

Implementing IBM Lotus Domino 7 for i5/0S

Guidelines for deploying and administering Domino 7 on i5/0S

Latest information about Domino for i5/OS performance tuning

Tips for moving Domino servers to the IBM System i platform

Luis Guirigay Philip McGibney Bryan Page Emilio Penedo John Weiser

Redbooks

ibm.com/redbooks



International Technical Support Organization

Implementing IBM Lotus Domino 7 for i5/OS

March 2007

Note: Before using this information and the product it supports, read the information in "Notices" on page ix.

First Edition (March 2007)

This edition applies to Domino 7 for i5/OS for use with i5/OS Version 5 Release 3 and later.

© Copyright International Business Machines Corporation 2007. All rights reserved. Note to U.S. Government Users Restricted Rights -- Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Notices	. ix x
Preface	. xi . xi
Become a published author	xiii xiii
Chapter 1. Introduction to Lotus Notes and Domino 7	. 1
1.1.1 Enhancements in Domino 7	. 3
1.2 Why choose i5/OS as your Domino server platform?	. 5
1.2.1 i5/OS architecture and Domino.	. 5
1.2.2 New features in Domino 7 for i5/OS	. 7
1.3 Domino extended products for i5/OS	. 8
1.3.1 Domino Fax for i5/OS	. 8
1.3.2 IBM Lotus Sametime	. 9
1.3.3 IBM Lotus QuickPlace	. 9
1.3.4 IBM Lotus Domino Document Manager	. 9
1.3.5 IBM Lotus Enterprise Integrator	. 9
Chapter 2. Prerequisites for running Domino 7 on 15/05	11
2.1 Deciding on the proper version of Domino 7 for 15/OS	12
2.1.1 Domino 7 for 15/OS product options	13
2.1.2 Oblaining the Domino 7 Software for 15/05	14
2.2.1 Disk space and moment: Required versus recommended minimums	14
2.3. Software requirements	15
2.3.1 Program temporary fixes	16
2.3.2 Additional i5/OS requirements for optional administration support	20
2.3.3 i5/OS administrative authority requirements	21
2.3.4 Domino 7 for i5/OS precautions for Lotus Enterprise Integrator installations	22
2.4 TCP/IP considerations for Domino	22
2.4.1 Naming your Domino servers	22
2.4.2 Domain Name System	25
2.4.3 HOSTS file configuration	26
2.4.4 Configuring TCP/IP on i5/OS	27
2.4.5 Creating a new TCP/IP interface.	28
2.4.6 Activating and verifying the new TCP/IP interface	30
2.5 Considerations when upgrading to Domino 7 for i5/OS	32
2.5.1 Verifying the release functionality before the upgrade	32
2.5.2 Additional concerns associated with standard upgrade implementation	35
2.5.3 Lotus Sametime and upgrades to Domino 7 on i5/OS	37
2.5.4 Upgrading the servers running Lotus Enterprise Integrator to Domino 7 on i5/OS	38
2.6 Overview of Domino for i5/OS multiversion capabilities	39
2.6.1 Multiversion terms and concepts.	39
2.6.2 Preparing for multiversion-capable releases.	40
Chapter 3. Installing Domino 7 on i5/OS	43

3.1 Before installing Domino	44
3.2 Installing Domino	 44
3.2.1 Actions that take place when Domino 7 is installed	46
3.2.2 Direct call to InstallShield using setup exe	. 40
3.2.3 Using the iSeries Navigator	. - 0 -53
3.2.4 Using LODBUN	. 55
3.2.4 Using LODION	. 55
3.2.5 Using RSTLICPGM	. 50
3.3 Veniying ii Domino is successfully installed	. 59
	. 59
	. 60
	. 61
3.4.1 Multiversioning when installing using the Domino Installation Wizard	. 62
3.4.2 Multiversioning when installing using the LODRUN command	. 64
3.5 Additional language support	. 66
3.5.1 Installing additional languages using the Language Pack Installer	. 66
3.5.2 Installing additional languages using the LODRUN command	. 74
3.6 Installing the iSeries Navigator Lotus Domino plug-in	. 85
3.6.1 Installing plug-in immediately after installing Domino 7 for i5/OS	. 87
3.6.2 Installing plug-in some time after installing Domino 7 for i5/OS	. 89
Chapter 4. Configuring a Domino 7 server on i5/OS	. 93
4.1 Configuring a first Domino server	. 94
4.1.1 Methods to configure a Domino server	. 94
4.1.2 What happens during the configuration of the first Domino server	. 95
4.1.3 Using domwzd.exe to configure a new Domino server	. 96
4.1.4 Using CFGDOMSVR to configure a new Domino server	113
4.1.5 Using the iSeries Navigator to configure a new Domino server	127
4.2 Configuring an additional Domino server	128
4.2.1 Registering an additional Domino server	129
4.2.2 Handling the ID file for an additional server	135
4.2.3 Verifying the connection to the Domino registration server	137
4.2.4 Using DOMWZD.EXE to configure an additional Domino server	137
4.2.5 Using CFGDOMSVR to configure an additional Domino server	151
Chapter 5. Administering Domino 7 on i5/OS.	159
5.1 Using the iSeries Navigator.	161
5.1.1 Starting the Domino services	161
5.1.2 Stopping the Domino services	163
5.1.3 Displaying the Domino jobs.	166
5.1.4 Domino server properties	167
5.1.5 Deleting a Domino server	178
5.1.6 Launching the Lotus Domino Administrator client.	178
5.2 Using the i5/OS commands	179
5.2.1 Working with Domino servers	180
5.2.2 Actions to be performed on a selected Domino server	182
5.2.3 Start Domino Server (STRDOMSVR)	185
5.2.4 End Domino Server (ENDDOMSVR)	185
5.2.5 Update Domino Server (UPDDOMSVR)	186
5.2.6 Set Domino Environment (SETDOMENV)	188
5.2.7 Run Domino Command (RUNDOMCMD)	189
5.2.8 Work with Subsystems (WRKSBS)	191
5.2.9 Work with Active Jobs (WRKACTJOB)	192
5.3 Using the Java Server Console.	192
-	

5.3.1 Starting the Java Server Console	193
5.4 Using the Web Administrator client	193
5.5 Using the Domino Administrator client	194
	105
Chapter 6. Domino / performance tuning on 15/05	195
6.1 Defining Domino 7 performance on the 15/OS	196
6.1.1 Prioritized strategies	197
6.1.2 Categorizing performance bottlenecks on the i5/OS.	198
6.2 Domino 7 performance management options for 15/OS	199
6.2.1 Performance and 15/OS commands	199
6.2.2 Performance Management for System 15	201
6.2.3 Management Central	201
6.2.4 Performance Tools for iSeries (5722-PT1)	202
6.2.5 Collection Services	203
6.2.6 Performance Explorer	204
6.2.7 iDoctor	204
6.2.8 Domino 7 cross-platform performance tools	205
6.3 Installing performance management tools for the i5/OS	206
6.3.1 i5/OS Performance Explorer preinstalled for i5/OS.	207
6.3.2 Setting up Management Central	207
6.3.3 Installing Performance Tools for the i5/OS	211
6.4 Measuring Domino 7 performance standards on the i5/OS	212
6.4.1 Work with System Status (WRKSYSSTS)	212
6.4.2 Work with Disk Status (WRKDSKSTS)	213
6.4.3 Work with System Activity (WRKSYSACT)	214
6.4.4 Performance analysis using Management Central	215
6.4.5 Memory resource performance analysis	222
6.5 Preserving performance on your Domino 7 server	223
6.5.1 Collecting Domino 7 performance data on the i5/OS	223
6.5.2 Managing resources on the i5/OS	230
6.5.3 Special performance considerations for Domino databases.	236
6.6 Domino 7 performance bottlenecking on the i5/OS	240
6.6.1 Analyzing the system for performance bottlenecks.	241
6.6.2 Bottleneck analysis for memory resources	247
6.6.3 Bottleneck analysis for Disk I/O	255
6.6.4 Bottleneck analysis for network resources	. 257
6.7 Improving Domino 7 performance expectations on i5/OS	260
6.7.1 CPU resource performance tuning: Choosing processor priority	260
6.7.2 Memory resource performance tuning: Choosing a memory pool to use	261
6.7.3 Disk I/O performance tuning	263
6.7.4 Network resource performance tuning	264
	204
Chapter 7. Moving your Domino server to the System i platform	269
7.1 Migration considerations	270
7.1.1 Transaction logging.	270
7.2 Moving the Domino server using a graphical interface	271
7.2.1 Copying ID files to the i5/OS integrated file system	271
7.2.2 Configuring a Domino for i5/OS server using domwzd.exe	275
7.2.3 Replacing the configuration databases	. 293
7.2.4 Moving the data	. 294
7.2.5 Starting the Domino server	298
7.3 Moving your Domino server using a 5250 emulation session	298
7.3.1 Copying ID files to the i5/OS integrated file system	. 298

7.3.2 Configuring a Domino for i5/OS server using CFGDOMSVR	302
7.3.3 Replacing the configuration databases	308
7.3.4 Starting the Domino server	309
Chapter 8. Problem determination.	311
8.1 Server crash	312
8.1.1 More about the Notes Server Diagnostic tool	313
8.1.2 Troubleshooting Domino server crashes	316
8.1.3 My Domino server keeps crashing or does not start.	318
8.1.4 Crash data to be collected before engaging Lotus support.	320
8.1.5 Consistency checks and FIXUP	320
8.1.6 Transaction logging.	322
8.1.7 Automatic Diagnostic Collection Tool	323
8.1.8 Cleaning up the orphaned shared memory or semaphores	326
8.2 Unresponsiveness and slowdown of a Domino server	332
8.2.1 Data to be provided to Lotus Support	333
8.2.2 Detailed evolution of the semanhore debug	335
8.3. Performance problems	337
9.2.1 Ligh converticed	220
8.3.1 Flight server workload	220
0.3.2 Finding the foot cause of high CPU upogo	000
8.3.3 Gathering data for high CPO usage	341
8.3.4 Using the iSeries Navigator to investigate a performance issue	343
8.4 Additional troubleshooting parameters	349
8.4.1 MEMCHECK	354
Chapter 9 Domino 7 backup and recovery using BBMS	357
9.1. How Backup, Becovery, and Media Services works with Domino	358
9.1.1 Backup, Recovery, and Media Services concents	358
9.1.2 How Domino onlino backups work	358
9.1.2 Configuring Backup Backups work and Media Sonvices to work with Domino	350
9.1.5 Configuring Dackup, necessary, and Media Services to work with Dominio	odio
Save and restore the scenarios of Donlino data using backup, necovery, and we	eula 260
0.0. Performing a full online backup of a Domine conver	261
9.2 Performing a full online backup of a Domino server	301
9.2.1 Using iSeries Navigator to perform the full backup	301
9.2.2 Using a 5250 emulation session to perform the full backup	365
	368
9.3.1 Changes required to provide for Domino incremental backups	368
9.3.2 Using the iSeries Navigator to perform an incremental backup	376
9.3.3 Using a 5250 emulation session to perform an incremental backup.	377
9.4 Recovering data from a Domino full online backup	377
9.4.1 Using iSeries Navigator to restore data from full online backup	380
9.4.2 Using a 5250 emulation session to restore data from a full online backup	383
9.5 Recovering data from a Domino incremental online backup	387
9.5.1 Using iSeries Navigator to restore from incremental online backup	387
9.5.2 Using a 5250 session to restore data from an incremental online backup	389
9.6 Integrated file system directories used by BRMS	394
9.6.1 Directories used when implementing full online backups	394
9.6.2 Directories used when implementing incremental online backups	394
9.7 Customization options available through the notes ini file	395
Appendix A. Configuring Domino for i5/OS to use System i Secure Sockets Layer	397
System requirements	398
Steps to set up Domino to use system SSL	398

Appendix B. Adding presence awareness to the Domino 7 environment 4 Installing Sametime 7 Limited Use on i5/OS 4 Adding Sametime 7 Limited Use to a Domino 7 server 4 Verifying if Sametime is working correctly 4 Adding presence awareness to Domino Web Access 4 Creating Connection documents 4 Setting up Domino single sign-on authentication 4 Specifying the Sametime server configuration for Domino Web Access 4 Sametime not working with Domino Web Access 4	423 424 426 428 432 432 433 436 439
Appendix C. Domino Access for Microsoft Outlook 4 Requirements 4 New features in Domino R7 4 Installation and configuration 4	441 442 442 443
Related publications 2 IBM Redbooks 2 Other publications 2 Online resources 2 How to get IBM Redbooks 2 Help from IBM 2	451 451 451 452 454 454
Index	455



Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing, IBM Corporation, North Castle Drive, Armonk, NY 10504-1785 U.S.A.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Trademarks

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

AS/400® Collation® DB2® DB2 Universal Database™ Domino® Domino Designer® eServer™ i5/OS® IBM® iNotes™ iSeries™ Lotus® Lotus Enterprise Integrator® Lotus Notes® Lotus Workflow™ Notes® OS/400® PartnerWorld® Passport Advantage® POWER5™ QuickPlace® Redbooks (logo) ™ Redbooks[™] Sametime® System i[™] System i5[™] System p[™] Tivoli® WebSphere® Workplace[™] Workplace Managed Client[™]

The following terms are trademarks of other companies:

SAP, and SAP logos are trademarks or registered trademarks of SAP AG in Germany and in several other countries.

Oracle, JD Edwards, PeopleSoft, Siebel, and TopLink are registered trademarks of Oracle Corporation and/or its affiliates.

Java, JVM, J2EE, and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Access, Internet Explorer, Microsoft, Outlook, Windows NT, Windows, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

Preface

With the introduction of IBM® Lotus® Notes® and Domino® 7, IBM Lotus continues to set the standard for innovation in the messaging and collaboration market that Lotus defined two decades ago. With Lotus Notes and Domino 7, IBM has enhanced the scalability, security features, administration, interoperability, productivity, and performance, enabling companies to achieve the most from their infrastructure.

Upgrading to the latest version of Lotus Notes and Domino can help your organization realize high return on investment, potentially lower the cost of ownership, and help improve user productivity and business responsiveness.

This IBM Redbook targets system administrators who plan to implement or upgrade to Domino 7 for IBM i5/OS® in their organization. It provides tips and techniques to help you successfully deploy and administer Domino 7 servers on i5/OS. The primary focus is to explain the installation, configuration, and performance tuning of Domino 7 in this environment. This IBM Redbook also provides information about moving Domino servers to the IBM System i[™] platform and information about backup, recovery, and troubleshooting regarding Domino 7 servers running on i5/OS.

The team that wrote this IBM Redbook

This IBM Redbook was produced by a team of specialists from around the world working at the International Technical Support Organization (ITSO), Poughkeepsie Center.



John Weiser is an Advisory Software Engineer with IBM Global Services in Rochester, Minnesota. He has been working with the AS/400®, now System i platform, since 1995. He has been involved with Domino since it first became available on the AS/400, now System i platform, in 1998. John currently holds Lotus System Administration Principal Certified Lotus Professional (PCLP) and Certified Lotus Professional (CLP) status for Domino R4, R5, R6, and R7.



Luis Guirigay is an IT Specialist with Ascendant Technology LLC (http://www.atech.com), an IBM Premier Business Partner based in Austin, Texas. Luis has more than seven years of IT experience in Lotus Domino and related products, such as IBM Lotus Sametime®, IBM Lotus QuickPlace®, and IBM Lotus Workflow[™], and two years of experience with the System i platform. Luis has coauthored the following IBM Redbooks[™]: Deploying IBM Workplace Collaboration Services on the IBM System i5 Platform, SG24-6640, and Preparing for and Tuning the SQL Query Engine on DB2 for i5/OS, SG24-6598. He is a Dual IBM Certified Advanced Professional in Application Development and System Administration for Notes and Domino 5, 6, and 7, and an IBM Certified Specialist for Collaborative Solutions. Lately, Luis has been focusing on projects involving IBM WebSphere® Portal. He holds a Bachelor of Science degree in Computer Engineering from Rafael Belloso Chacin University, Venezuela.



Philip McGibney is the technical team lead for Domino on IBM eServer[™] iSeries[™] in Lotus Customer Support EMEA. He began working for IBM in 2000 as an IBM AS/400 system administrator, and later as a Domino Software Engineer. Philip has experience in data processing, operations, communications, and technical support on mostly midrange systems, such as DECS, Digital VAX, Wang, and AS/400, mainly in the agricultural and financial services sectors. He has overseen many platform conversion issues, designed help desk and technical support infrastructures, and coordinated disaster recovery procedures for many companies. Philip attended the Vocational Educational College in Dublin, Ireland.



Bryan Page is a Lotus Domino Technical Services Advisor, facilitating the implementation and support of commercial strategic outsourcing engagements at IBM. He is currently a member of IBM Integrated Technology Delivery's E-mail and Collaboration Services organization in Server Systems Operations. Bryan has over seven years of Lotus Domino System Administration background, with five years focused primarily on support of Domino for System i platforms. He is a Dual IBM Certified Professional in System Administration and Application Development for Lotus Notes/Domino 5 and 6/6.5. Bryan holds a Bachelor of Science degree in Chemistry and Mathematics from Morehouse College in Atlanta, Georgia.



Emilio Penedo is a Senior Lotus Consultant with ABSystems, S.A. de C.V. (http://www.absystems.biz), an IBM Advanced Business Partner based in Mexico City. Emilio has more than 15 years of IT experience. Since 1998, he has been working on Domino-extended portfolio solutions such as IBM Lotus Domino Document Manager, QuickPlace, Sametime, and IBM Lotus Virtual Classroom (LVC). He is a Certified Domino Administrator 5, 6, and 7, and an IBM Certified Specialist for Domino on System i and System p[™] platforms. He has coauthored the IBM Redbook *Exchange Migration and iNotes Implementation on the IBM eServer iSeries Server*, SG24-6230. Emilio has recently been working on mobile and SAP® integration to Lotus Domino projects. He holds a Bachelor Degree in Mechanical Engineering from La Salle University in Mexico.



The production of this IBM Redbook was managed by **Debra** Landon. Debbie Landon is an IBM Certified Senior IT Specialist in the IBM ITSO, Rochester Center. Her current area of expertise is focused on the System i collaboration products, including IBM Workplace[™] products, Domino and related Lotus products such as Sametime and QuickPlace. Debbie has been with IBM for 23 years, working first with the S/36 and then the AS/400, which has since evolved to the iSeries server, and is now the IBM System i platform. Before joining the ITSO in November of 2000, Debbie was a member of the PartnerWorld® for Developers iSeries team, supporting IBM Business Partners in the area of Domino for iSeries. You can contact Debbie by sending e-mail to da1andon@us.ibm.com.

Thanks to the following people for their contributions to this project:

Barb Foss César G. Miramontes Catón Martha Miriam Godinez Cervantes Moises Gabriel Gonzalez Mejia Laurie Miller Joe Peterson Steve Sparrow IBM Domino for i5/OS development team

Thomas Gray Joanna Pohl-Misczyk Jenifer Servais

Become a published author

Join us for a two-week to six-week residency program! Help write an IBM Redbook dealing with specific products or solutions, while getting hands-on experience with leading-edge technologies. You will have the opportunity to team with IBM technical professionals, Business Partners, and Clients.

Your efforts will help increase product acceptance and customer satisfaction. As a bonus, you will develop a network of contacts in IBM development labs, and increase your productivity and marketability.

Find out more about the residency program, browse the residency index, and apply online at:

ibm.com/redbooks/residencies.html

Comments welcome

Your comments are important to us!

We want our IBM Redbooks to be as helpful as possible. Send us your comments about this or other IBM Redbooks in one of the following ways:

Use the online Contact us review IBM Redbook form found at:

ibm.com/redbooks

• Send your comments in an e-mail to:

redbooks@us.ibm.com

• Mail your comments to:

IBM Corporation, International Technical Support Organization Dept. HYTD Mail Station P099 2455 South Road Poughkeepsie, NY 12601-5400

1

Introduction to Lotus Notes and Domino 7

This chapter introduces Lotus Notes and Domino 7 and provides a brief overview of this newest release from Lotus. It also provides a high-level look at what is new in Domino 7, specifically, what is new in Domino 7 for i5/OS. Finally, it outlines some of the Domino extended products that are supported.

1.1 Understanding Domino

Domino is the world's most successful groupware product. Domino is a software, a framework. an infrastructure that connects people anywhere, anytime. Domino is hard to define because it adapts to so many different tasks. Domino is an environment that makes it easier for you to productively perform unstructured work by using a wealth of rapidly changing information and knowledge. Domino is middleware that lets you add the "human touch" to the Web and to your business-to-business interactions.

A robust, versatile architecture

Domino is built on several key foundations that make it perfect for the applications that today's knowledge workers require. It is also extendable for the applications of the future. The key foundations include the following:

- ► A unique, related database architecture that combines structured and unstructured data. This is the foundation for an application that is different from that built with IBM DB2® and online transaction processing (OLTP).
- A messaging infrastructure that lets users and applications send anything to anyone. Rich, full-function e-mail is just one example of this. With Domino, people can send messages to applications, and applications can send messages to people or to other applications, all of which are critical for workflow and business process automation.
- A rich application development environment that is visual, event-driven, fun, and easy to use.
- Unmatched replication capability that is perfect for today's distributed and mobile workforce. Information can exist in multiple places, including central servers, distributed servers, desktops, and disconnected notebook computers. Domino keeps all this in synchrony.

A flexible application environment

What kind of applications are appropriate for Domino? Many, as the thousands that are available from Lotus independent software vendors (ISVs) demonstrate. They fall into several broad groups:

- Collaborative applications that track information (ISO 9000 projects, legal cases, Food and Drug Administration (FDA) approval processes), disseminate information (corporate policy documents, human resource (HR) procedures, tips and techniques), and share ideas (discussion forums).
- Web applications that focus on information sharing, collaboration, and business process automation. A Domino database is a collection of documents (just like a Web site). It has built-in capabilities for sorting and viewing documents in different ways, for managing the documents, complete with built-in workflow for approval, and for e-mail integration, all of which is required in a good Web site.
- Knowledge management involving the next wave of applications to manage and leverage intellectual capital, the new currency of business.

Even as new features are made available with each Domino release, Domino 7 continues to protect your investment by providing backward compatibility. For example, release 2 applications from 10 years ago can still be used with today's Domino 7 server, as shown in Figure 1-1.

Investment Protection						
Rel 2	Rel 3	Rel 4	Rel 4.5	Rel 5	Rel 6	Rel 7
	 Forms/Views @Formulas Agents ODBC 	•Forms/Views •@Formulas •Agents •ODBC •LotusScript •SMTP	•Forms/Views •@Formulas •Agents •ODBC •LotusScript •SMTP •POP/IMAP •HTML Pages	•Forms/Views •@Formulas •Agents •ODBC •LotusScript •SMTP •POP/IMAP •HTML Pages •CORBA •Java/Javascript	•Forms/Views •@Formulas •Agents •ODBC •LotusScript •SMTP •POP/IMAP •HTML Pages •CORBA •Java/Javascript •Jsva/Javascript •JSPsJ •SOAP/XML	•Forms/Views •@Formulas •Agents •ODBC •LotusScript •SMTP •POP/IMAP •HTML Pages •CORBA •Java/Javascript •JsPsJ •SOAP/XML •DB2
	nvestment Pro	otection - Bac	kwards comp	atibility		•Web Services •Other Open Standards

Figure 1-1 Domino investment protection

1.1.1 Enhancements in Domino 7

The Domino 7 enhancements discussed in this section help reduce the time and costs associated with administration, systems management, software deployment, and configuration.

Domino domain monitoring

The Domino domain monitoring feature provides monitoring capabilities and fast recognition and reporting of critical server issues by delivering a single, feature-oriented view through which administrators can see the status of multiple Domino servers across one or more domains. This customizable tool enables administrators to assess the overall health of all the Domino servers in the enterprise, and locate problems that require attention. When a problem is reported, Domino domain monitoring suggests the probable causes and provides the possible solutions to fix the problem. It also displays any correlated events, enabling administrators to see if the same problem has been reported on other servers too.

Activity trends

Domino 7 incorporates the activity trends feature that was formerly delivered as a separate product called IBM Tivoli® Analyzer for Lotus Domino software. This integrated software technology provides powerful, predictive analysis tools to help administrators predict growth and sizing requirements within the Domino server environment, and to plan for potential hardware and software changes. Additional capabilities include workload balancing and change management tools to help keep your infrastructure running at an optimal level, and seamless integration with the Domino 7 administration client.

Mail policies and policy lockdown

Domino software has for long provided features that enable policy-based administration and management for Lotus Notes desktop settings. With Domino policy-based administration, you can easily set standards and enforce IT policies across the organization. With Domino 7, you have the option to lock down the settings, and extend the policies to cover the mail and calendar settings stored in user mail files.

Security and anti-spam enhancements

Domino 7 offers improvements to Lotus Notes ID management and enhanced security features. These include application programming interfaces for manipulating secure e-mail and the option to use 1024-bit RSA encryption keys and 128-bit symmetric keys for the Lotus Notes remote procedure call (RPC) protocol. Enhanced anti-spam features include the use of domain name system (DNS) whitelists containing public lists of acceptable sources.

Expanded interoperability and integration

Domino 7 software helps you extend the reach of your Domino data and applications through support for Web services and open standards and an option to use IBM DB2 Universal Database[™] as an alternative data store.

Domino 7 offers native support for Web services, including a Web services hosting environment based on Simple Object Access[™] Protocol (SOAP). IBM Lotus Domino Designer® 7 application development tool provides complementary enhancements, including a Web services design element and built-in support for Web Services Description Language (WSDL). The combination of these capabilities help you easily extend and integrate your applications with Java[™] 2 Enterprise Edition (J2EE[™]) and Microsoft®.NET environments, often with less time and effort, and by using existing skills. Support for open standards also makes it easy to integrate Domino solutions with other IBM software, including IBM Workplace Collaboration Services, IBM Workplace Services Express, and IBM WebSphere Portal software.

Rooms and Resources Manager

Domino 7 has centralized the processing of room and resource reservations into a new Rooms and Resources Manager (RnRMgr) task. The Rooms and Resources Manager is designed to prevent overbooking of rooms and resources, and is responsible for processing the workflow relating to reserving a room or a resource and accurately updating the busytime database.

Rooms and Resources Manager handles the functionality that was earlier handled in multiple places such as the router, the Rooms and Resources Template, and the Schedule Manager. Regardless of where the reservation request is created, that is, either in the Resource Reservations database, a user's calendar, or using the Internet, the reservation request will not have any conflicts with other reservations. The Rooms and Resources Manager task accepts the same server console commands that the Schedule Manager does because it performs the same functionality

Enhanced support for Linux

On July 10, 2006, IBM announced a new platform option for IBM Lotus Notes software, Lotus Notes for Linux[®]. From July 24, 2006, Lotus Notes licensees are able to run Lotus Notes 7.0.1 software on select Linux client operating systems.

With Lotus Notes for Linux, companies can use Lotus Notes on a Linux workstation in a supported fashion, without using virtualization software such as WINE or VMWare, without installing IBM Workplace Managed Client[™], and without waiting for a future release of the Lotus Notes client.

Lotus access for SAP solutions

Domino 7.0.1 introduced five capabilities that let you integrate SAP business applications and workflow with your Lotus Notes collaboration client at no additional charge:

- Time reporting
- Vacation or leave request
- Contact management
- Workflow integration
- Report generation

Domino 7.0.2 software adds two more capabilities to this list:

- Meeting scheduling
- ► Employee or manager self-service

Note: For SAP and Domino applications integration, IBM provides the LOTUS SAP CONNECTOR. Download the White Paper "*Lotus Integration Technologies for SAP*", from the following URL:

ftp://ftp.software.ibm.com/software/lotus/info/Domino/SAPandDomino042002.zip

Lotus Notes and Domino 7.0.2

Version 7.0.2 of Domino software is planned to be more than just a maintenance release. In addition to delivering software fixes, IBM plans to add bonus features such as a Lotus Notes Smart Upgrade "run as admin" utility, new platform options, and enhanced integration capabilities.

Lotus Notes and Domino 7.0.2 software will expand the support for open standards through:

- A new calendar option to import information from standards-based Internet calendars into the Lotus Notes calendar
- Lotus Domino eXtensible Markup Language (DXL) support for outlines, shared columns, shared files, and style sheets
- Hypertext Markup Language (HTML) application programming interface (API) to convert Lotus Notes forms, views, and documents to HTML.

1.2 Why choose i5/OS as your Domino server platform?

Domino runs on seven different server platforms. What makes the System i platform stand out from the crowd? Following are some of the phrases that are used about outstanding partnerships to describe Domino with i5/OS:

- "A marriage made in heaven"
- "Bringing the best together for business"
- "Uniting two hall-of-fame technologies"

1.2.1 i5/OS architecture and Domino

Putting the two architectures together is beneficial because they deliver values that are critical to your business success. The two architectures complement each other well, they are both versatile and integrated, and are independent of the underlying technology, which means that they can change with the times.

Reliability and availability

The System i family builds on the IBM eServer iSeries history of robust hardware and software reliability. The applications are always available when your users require them. The application subsystem architecture isolates Domino applications from each other and from other work, which means that applications stay up and run consistently. And if a problem occurs, i5/OS automatically stops and restarts the Domino server without affecting the other activity on the system.

Scalability

On the System i platform, you can increase your Domino workload with the same operating system and the same skills. With the combination of advanced scalable technology and architectural advances for Domino servers, the System i platform achieves excellent results. For the latest NotesBench results, refer to the following Web site:

http://www.ibm.com/servers/eserver/iseries/domino/scalerecord.html

Integration

Domino for i5/OS is designed to integrate with many built-in i5/OS services, including security, backup and recovery, directory, systems management, iSeries Navigator, Java virtual machine (JVM[™]), and IBM DB2 Universal Database for iSeries. Furthermore, the IBM System i5[™] platform is the only system that allows the deployment of Linux, Java, UNIX®, Microsoft Windows®, and Domino-based applications on a single system.

Domino for i5/OS applications takes advantage of direct real-time access to the DB2 Universal Database for i5/OS database, with or without programming. Users can embed the results of a DB2 Universal Database for iSeries query into a Notes document without programming. Domino for i5/OS allows access to DB2 Universal Database for i5/OS from Domino application development tools and APIs. This access is direct and does not require an Open Database Connectivity (ODBC) driver or a middleware communications layer when the application code runs on the server instead of the client.

Mixed workload

With Domino partitioning and i5/OS subsystems, customers can safely and reliably run multiple instances of Domino running different types of Domino applications on the same system footprint. On traditional System i machines, customers can combine Domino with other non-Domino task such as enterprise resource planning (ERP) of applications.

Speed of deployment

The System i platform's reputation for speedy deployment extends to Domino. Because so much is built-in and preintegrated into i5/OS, the administrator has less tasks to perform when the System i machine arrives, and can quickly move to the task of delivering services to users.

Ease of administration

System i machines have a "built-for-business" design. The capabilities that an administrator requires include "integrated" and "consistent", which means less money spent on people managing the servers and more time available to deliver real value to the business.

Lower total cost of ownership

The primary benefits of installing Domino for i5/OS include data integration, centralized management, and solution consolidation. Domino for i5/OS offers customers a single hardware platform to manage their line of business applications and their collaborative applications. Customers with a Domino implementation on i5/OS do not have to invest in an

additional hardware platform, operating system software, or the skills that are required to maintain this environment. Furthermore, the ability to run Domino applications and a Linux firewall or spam filter on the same system connected with a gigabit virtual Ethernet provides unmatched flexibility. Powerful functionality coupled with unique integration and simplified systems management make Domino for i5/OS one of the most cost-effective investments.

1.2.2 New features in Domino 7 for i5/OS

Domino 7 for i5/OS uses the licensed program ID of 5733-LD7 for the installed product identifier. Domino 7 for i5/OS is only available through the IBM Passport Advantage® ordering process. For more information, refer to the following Web site:

http://www.ibm.com/software/sw-lotus/services/cwepassport.nsf/wdocs/passporthome

Domino 7 for i5/OS is only supported on IBM i5/OS V5R3 or later. Domino 7 cannot be installed and is not supported on IBM OS/400® V5R2.

Attention: Support for i5/OS cluster-enabled Domino has been removed. Use Domino clustering instead.

Domino administration using iSeries Navigator tasks on the Web

Beginning i5/OS V5R4, the administration of Domino servers from iSeries Navigator tasks on the Web is now supported. This feature allows you to perform most of the same tasks that you can perform when using the Domino plug-in for iSeries Navigator Windows interface, but from a Web browser.

The iSeries Navigator Web interface for Domino differs from the iSeries Navigator Windows interface for Domino, in that, it is shipped with i5/OS, whereas the iSeries Navigator Windows interface for Domino is shipped as an iSeries Navigator plug-in as part of the Domino for i5/OS product. Therefore, there is no necessity for any update operation to run on the client in order to get a newer version of the iSeries Navigator Web interface for Domino. Whenever you update to a new i5/OS level, you get the latest version of the iSeries Navigator Web interface for Domino.

New Work with Domino Servers options

The following new options are available from the Work with Domino Servers (WRKDOMSVR) display:

- Option 14: Work with support files
- Option 15: Work with Notes Server Diagnostic (NSD)
- Option 16: Dump server call stacks

To see these new options in the WRKDOMSVR display, press the F23 key (Shift+F11).

The new functionality works well in Domino multiversion environments.

Prior to Domino 7 for i5/OS, the DMPSVRSTKS functionality was available in the form of a downloadable tool at the following URL:

http://www.ibm.com/servers/eserver/iseries/domino/devtools/dmp/

Domino 7 for i5/OS introduced the Dump Domino Server Call Stacks (DMPDOMSVRC) CL command that reads the pid.nbf file under the data directory of the specified Domino server to determine which jobs will have their call stacks dumped.

For additional information about Domino 7 for i5/OS problem determination, refer to Chapter 8, "Problem determination" on page 311.

Domino multiversioning

Domino 7 continues to provide support for Domino multiversioning on the same i5/OS partition. Multiversioning supports the following functionalities:

- Install new releases with no user interruption
- Update Domino servers on demand
- Test new releases
- Retain the earlier multiversion-capable Domino releases to run applications
- Consolidate multiple Domino servers in one i5/OS partition

For additional information about multiversioning, refer to the IBM Redbook *Lotus Domino 6 Multi-Versioning Support on the IBM eServer iSeries Server*, SG24-6940, which is available on the Web at:

http://www.redbooks.ibm.com/abstracts/sg246940.html?Open

1.3 Domino extended products for i5/OS

IBM Lotus software provides additional collaboration products that run on top of a Domino server. This includes the following products:

- Domino Fax for i5/OS
- Sametime
- QuickPlace
- Domino Document Manager
- Lotus Enterprise Integrator®

For detailed information go to the following Lotus Domino for i5/OS Extended product updates Web site:

http://www.ibm.com/servers/eserver/iseries/domino/support/extprod.html

1.3.1 Domino Fax for i5/OS

IBM Integrated Domino Fax for i5/OS (5733-FXD) enables Lotus Notes users to send and receive faxes directly from their Lotus Notes client using their current telephone system and Domino infrastructure. On specifying the intended recipients in the Fax To field, inbound faxes arrive in the recipient's inbox promptly and privately.

Domino Fax for i5/OS supports more than just simple text. You can also fax Notes memos containing rich text and graphics. You can format and fax files attached to your Notes memo. And with the Print-to-Fax driver, Notes users can send faxes directly from within a Microsoft Windows application, such as word processing or spreadsheet software.

1.3.2 IBM Lotus Sametime

IBM Lotus Sametime 7 is the IBM market-leading platform for real-time collaboration. It is based on three on demand capabilities:

- Presence awareness: Check in advance whether a person or an application is available to collaborate, share information and/or take action
- Instant messaging: Virtually converse through the exchange of text, audio, or video-based information in real time
- Web conferencing: Share information, applications, or an entire desktop, or engage in team Whiteboarding

Although basic in nature, this combination presents customers with virtually unlimited possibilities. In fact, over 15 million people worldwide use Lotus Sametime every day to gain instant access to people and information, bringing together geographically dispersed team members and helping improve individual and team productivity.

1.3.3 IBM Lotus QuickPlace

IBM Lotus QuickPlace 7 is an enterprise-ready, self-service workspace expressly designed for team collaboration. With Lotus QuickPlace, users can instantly create secure workspaces for their team, providing them with a virtual workspace to communicate, coordinate, and collaborate on any project or specialized initiative. Key Lotus QuickPlace capabilities include:

- Coordination between people, tasks, plans, and resources
- ► Collaboration of ideas and discussion, issues, shared documents, and files
- Communication of actions and decisions, key findings and lessons, and knowledge capture

Organizations of all sizes can take advantage of Lotus Quickplace, as it is available or after they are customized to meet the organization's unique business requirements.

1.3.4 IBM Lotus Domino Document Manager

Capture, organize, manage, and reuse business documents and content easily, using IBM Lotus Domino Document Manager's secure, distributed document library with built-in collaborative capabilities. Lotus Domino Document Manager is a collaborative document management system to organize documents for effective shared access by authorized teams or individuals. The software manages multiple versions and automates document processes such as review and approval.

With complementary offerings, it helps provide the foundation for Web content management and document lifecycle management solutions. Transparent integration with e-mail and desktop applications help users easily organize important e-mail attachments and content to share and reuse in a safe and managed library environment.

1.3.5 IBM Lotus Enterprise Integrator

IBM Lotus Enterprise Integrator for Domino is an enterprise application integration and server-based data access tool that provides industrial strength, real-time data access, bidirectional data movement, exchange, transformation, and synchronization among a wide range of applications and data sources supported by Lotus Connectors. These data sources include Lotus Domino, IBM DB2 Universal Database, Oracle®, Sybase, Microsoft SQL

Server, and Microsoft Access using Object Link Embedding database (OLE DB), file system, text, and ODBC data sources.

Lotus Enterprise Integrator can easily and seamlessly perform enterprise-scale interactions in real time, on a scheduled or event-driven basis, on a one-time basis, or simply on demand. The point-and-click user interface helps to ease an otherwise complex and daunting integration project.

2

Prerequisites for running Domino 7 on i5/OS

This chapter describes the hardware and software requirements for Domino 7 servers running on i5/OS. These conditions must be met and verified prior to attempting the installation and configuration of a Domino 7 server on i5/OS.

2.1 Deciding on the proper version of Domino 7 for i5/OS

When deciding on the version of Domino 7 for i5/OS you want to install on a System i machine, it is important to be aware of the specific versions of Domino 7 that are currently available from IBM. Over regular intervals, throughout each year, IBM provides updated levels of various product lines. For the latest information regarding the current versions of Domino 7 for i5/OS, refer to the following Lotus Domino for i5/OS Domino 7 updates Web site:

http://www.ibm.com/servers/eserver/iseries/domino/support/mr70.html

IBM provides for the Domino 7 product and subsequent updates to the product, three classes of code packages that are available for i5/OS. Following is an explanation of the three code packaging types and why it is important to be aware of these code packages when they become available or are identified as being required:

Lotus Domino Maintenance Releases

Maintenance Releases are regularly scheduled updates for Domino feature releases. They are denoted by the use of a third digit in the release number, for example, Domino 7.0.1 is a Maintenance Release for Domino 7.0. In a similar manner, the initial release of the Domino 7 product that was made available is now considered Domino 7.0.0. Maintenance Releases typically follow a four-month development cycle and are available for download from the Internet for IBM Passport Advantage members. Refer to 2.1.2, "Obtaining the Domino 7 software for i5/OS" on page 14 for details.

Lotus Domino Fix Packs

Fix Packs are issued as required, to fix specific problems that are identified between scheduled Maintenance Releases of Domino. These are prepackaged module enhancements that are created to provide a greater level of preventive service and stability when using a specific maintenance release of Domino. Normally, the installation of a Fix Pack eliminates the requirement for certain individual program temporary fixes (PTF) to be installed within an environment. When you download a Domino Fix Pack, you will find that the fix is packaged and installed on your system as an i5/OS PTF. Fix Packs are released as necessary, and are available to Passport Advantage members for download from the Internet.

In the earlier versions of Domino, Fix Packs were referred to as Critical Fix Packs, Maintenance Updates, and Quarterly Maintenance Updates. They must be thought of primarily as base code fixes developed for a specific Maintenance Release.

Lotus Domino Program Temporary Fixes

Also known as *hotfixes* or PTFs, these are module enhancements that are provided directly from Lotus Support to improve the functionality of the Domino Maintenance Release code, even enhancing the applied Fix Packs, if necessary. These are delivered on an as is required basis, depending on the customized configuration of a Domino 7 environment. There is no necessity to request PTFs for your environment unless you are advised to do so by Lotus Support.

Note: Understanding the difference between i5/OS cumulative (cume) and recommended group PTFs for Domino 7 is also necessary. For a better understanding of i5/OS cumulative and group PTFs, refer to the iSeries Information Center on the Web at:

http://publib.boulder.ibm.com/infocenter/iseries/v5r4/topic/rzam8/rzam8fixco
ncepts1.htm

Domino 7 release notes

Administrators planning to install Domino 7 for i5/OS must check the release notes for technical updates when considering any particular Maintenance Release or Fix Pack. This review is critical because release notes provide administrators with information such as:

- Updated listings of the latest System i hardware and i5/OS software requirements
- Updated guidance associated with server configuration
- Alerts regarding specific i5/OS PTFs that are required prior to Domino installation
- Enhancements and features that are not previously available in Domino

Release notes exist for every Maintenance Release and Fix Pack of Domino 7 that is available. It is recommended that you apply the latest Fix Pack available for the latest Maintenance Release in order to make use of the most advanced Domino 7 functionality available. Accordingly, a review of the release notes of the Fix Pack decided upon is recommended prior to any installation attempt of either a Maintenance Release or a Fix Pack. The release notes for every Domino 7 release can be found on the Lotus Documentation Web site:

http://www.lotus.com/ldd/notesua.nsf/RN

In addition to the basic Domino 7 information that is available in the release notes corresponding to the selected Domino 7 Maintenance Release and Fix Pack, it is recommended that you also read the release notes chapter on Domino for i5/OS to effectively maximize the success of any Domino 7 for i5/OS implementation.

2.1.1 Domino 7 for i5/OS product options

For every Maintenance Release of Domino 7, the following product options are available for installation:

*BASE option

This option defines the product options that can be installed for a specific product ID. *BASE must be installed before any other product options can be installed.

Product option

This option contains the programs, data, and template files required to run a specific release of Domino. You must select this option to install and configure a Domino server, for example, 5733LD7 option 11 is the product option for Domino Version 7.0.1.

► C API option

Listed as option 1, this option contains the header files and modules for creating Notes C applications that can run on a Domino 7 server on i5/OS.

If you have application developers who make use of advanced Domino Designer coding techniques within either Domino databases or by connecting compatible technologies with your Domino 7 for i5/OS environment, you might want to include them in the verification so that the latest C API option will suffice for their intended programming requirements.

Important: You can install the C API option 1 later if you are not sure that you require it. However, be aware that only one instance of this option can be installed on an i5/OS partition. For more information, refer to the topic "Installing multiple releases of Domino" in Chapter 12 of the i400hlp.nsf help database. To determine if a more recent version of the C API is available, check the Domino Developer Tools section of the Domino for i5/OS (Developer Resources) Web site:

http://www.ibm.com/servers/eserver/iseries/domino/devresources.html

Multiple language support

With Domino 7 for i5/OS, you can run more than one language on a Domino server or can have Domino servers running with different languages, using the Domino Language Pack and multilingual database support. If you plan to run more than one language on a Domino server, you must install the language pack in addition to the Domino software. During the Domino installation process, you have the opportunity to specify whether or not you will be using multiple languages. If so, the language pack installation process is automatically launched. For more information about using multiple languages, refer to "Using National Language Versions" in Chapter 20 of the i400hlp.nsf help database.

Refer to 3.5, "Additional language support" on page 66 for details about how to install a Domino Language Pack.

2.1.2 Obtaining the Domino 7 software for i5/OS

To obtain the Domino 7 software for i5/OS, your organization can either request the software from your IBM Business Partner or contact IBM directly. IBM makes the Lotus Domino 7 software for i5/OS available to both individual customers and IBM Business Partners through the use of the IBM Passport Advantage system.

Larger enterprises with multiple sites often leverage the complete IBM Passport Advantage offering and smaller enterprises with fewer sites rely upon the IBM Passport Advantage Express. These offerings provide the organizations running Domino 7 with the ability to perform tasks such as:

- Acquiring software licenses
- Renewing and reinstating licenses for software maintenance
- Purchasing and maintaining varying levels of technical support

For more information about Passport Advantage, refer to the following Web site:

http://www-306.ibm.com/software/howtobuy/passportadvantage/

Accessing Domino software through Passport Advantage

Passport Advantage can be used to request the Domino 7 media in both physical and electronic formats. A Passport Advantage account allows you to download the software through the Internet from a designated location created for you by IBM. Alternatively, you can ask for the software to be shipped to you at an additional cost.

If you have difficulty using Passport Advantage to make either of these requests, contact the Lotus Support Center for assistance. For contact numbers or further assistance, use the following Web site to contact Lotus:

http://www-306.ibm.com/software/lotus/support/

2.2 Hardware requirements

Before installing Domino 7 for i5/OS, the appropriate System i hardware is required to ensure that the installation and configuration of Domino 7 for i5/OS can be completed successfully.

The following hardware configurations are required for environments running Domino 7 servers on i5/OS:

- ▶ IBM System i5 model 270 or 8xx servers (excluding System i5 800-2463)
- IBM System i5 model 520 and later (excluding System i5 520-0900)

To verify that your System i model meets the requirements for Domino 7, use the following Display System Value (DSPSYSVAL) CL command to show you the model number of your System i machine:

DSPSYSVAL SYSVAL (QMODEL)

Use the following Work with Hardware Resources (WRKHDWRSC) CL command to obtain information about processor capacity and interactive card:

WRKHDWRSC TYPE(*PRC)

2.2.1 Disk space and memory: Required versus recommended minimums

Between .5 - 1.0 megabytes (MB) of memory and 75 MB of free disk space must be available for every user with a mail file on your Domino 7 for i5/OS server.

Table 2-1 provides the minimum values for memory and the disk space required to successfully install and configure Domino 7 on i5/OS. Although you can run Domino 7 for i5/OS using the required minimums shown, it is recommended that your System i hardware prior to Domino 7 installation include a minimum of 512 MB base memory and a minimum of 2.0 gigabytes (GB) of available disk space.

Prerequisite	Required minimum	Recommended minimum	
Base memory	288 MB	512 MB	
Free disk space	1.6 GB	2.0 GB	

Table 2-1 Minimum and recommended memory and disk space prerequisites

When staging the optimal amount of memory and available disk space in preparation for your Domino 7 server on the i5/OS, keep in mind that the recommendations in Table 2-1 are general guidelines. To obtain more specific recommendations regarding Domino for i5/OS and your assumed load of users on your system, take advantage of the IBM Systems Workload Estimator. The Estimator is available online at the following Web site:

http://www-912.ibm.com/estimator

2.3 Software requirements

Domino 7 for i5/OS can only be run on System i machines running i5/OS V5R3 and later. The only exception to this is the initial Release 7.0.0, which is only supported on V5R3. Domino 7.0.1, 7.0.2, and later releases are supported on systems running either V5R3 or V5R4. Use Table 2-2 as a guide to ensure that you are using a version of i5/OS that is compatible with the release of Domino 7 that you are planning to install.

i5/OS version	Can Domino 7 be installed?	Is Domino 7 supported?
V5R2 and earlier	No	No
V5R3 and later	Yes	Yes (Version 7.0.0 in V5R3 only)

Table 2-2 Domino 7 and i5/OS compatibility

Before you install Domino 7 for i5/OS, install the software that is necessary to support Domino 7 servers on your system. The following System i software is required:

- 5722SS1, option 12 Host Servers
- ► 5722SS1, option 30 Qshell
- 5722TC1 TCP/IP Connectivity Utilities for i5/OS
- ► 5722JV1 IBM Developer Kit for Java (*BASE)
- 5722JV1, option 6 Java Developer Kit 1.4

Tip: To determine which software is currently installed on your system, enter the Display Software Resources (DSPSFWRSC) CL command in an i5/OS command line and press Enter. In the Display Software Resources display, the Resource ID column shows the program number, for example, 5722TC1 for the TCP/IP Connectivity Utilities for i5/OS.

2.3.1 Program temporary fixes

In addition to the prerequisite software listed in the previous section, it is recommended that you ensure that you have the latest PTFs installed. Domino for i5/OS requires cumulative PTF packages and individual PTFs. Each cumulative PTF package or individual PTF includes installation instructions. For the required system fixes that are specific to i5/OS V5R4 and V5R3, refer to the Lotus Domino for i5/OS (Required System Fixes) Web site:

http://www.ibm.com/servers/eserver/iseries/domino/support/ptf.html

For Frequently Asked Questions about PTFs and Domino updates, refer to the following Web site:

http://www.ibm.com/servers/eserver/iseries/domino/domptfgi.html#domupdate

Group Program temporary fixes

A group PTF is a single PTF that you can order. It provides a logical set of PTFs that affect a specific function. You can find information about all the group PTFs by release, in the Preventive Service Planning Web page:

http://www-912.ibm.com/s dir/sline003.nsf/sline003home

Table 2-3 provides a list of generally recommended i5/OS Group PTFs that can affect Domino implementations on i5/OS.

Group PTF	Description
Java	All Domino installations must have the latest Java Group PTF installed
DB2 Universal Database	Install if moving data between Domino and DB2 Universal Database
IBM Hypertext Transfer Protocol (HTTP) Server	Install if using the IBM HTTP (powered by Apache) Server
Backup, Recovery, and Media Services (BRMS)	Install if using Backup, Recovery, and Media Services
TCP/IP	For network communications

Table 2-3 i5/OS group PTFs

Table 2-4 lists the specific group PTF numbers for i5/OS V5R3 and V5R4.

Group PTF	i5/OS V5R3	i5/OS V5R4	
Java	SF99269	SF99291	
DB2 Universal Database	SF99503	SF99504	
IBM HTTP Server	SF99099	SF99114	
BRMS	SF99185	SF99186	
TCP/IP	SF99314	SF99315	

Table 2-4 Group PTF numbers for i5/OS V5R3 and V5R4

Verifying the group program temporary fixes

To verify that the correct group PTF levels are installed on your system, perform the following tasks:

- 1. Sign in to a 5250 emulation session in your i5/OS instance.
- 2. Enter the Work with PTF Groups (WRKPTFGRP) CL command in a command line and press Enter.
- 3. In the Work with PTF Groups screen (Figure 2-1) that lists the group PTFs installed on your system, and the level, verify that each group PTF shows the Installed status.

		Worl	with PTF Group)S		
					System:	RCHAS12
Туре	options, press	Enter.				
4=	Delete 5=Displ	ay 6=Print	8=Display spe	ecial handli	ng PTFs	
9=	Display related	PTF groups				
0pt	PTF Group	Level	Status			
	SF99530	5102	Installed			
	SF99503	4	Installed			
	SF99287	7	Installed			
	SF99282	3	Installed			
	SF99269	5	Installed			
	SF99099	6	Installed			
						Bottom
F3=E	xit F6=Print	F11=Display	descriptions	F12=Cancel		
F22=	Display entire f	ield				

Figure 2-1 Work with PTF Groups (WRKPTFGRP) initial display

 The initial Work with PTF Groups display provides limited information. For a more descriptive display of the group PTF information, press F11 (Display descriptions). This shows the group PTF descriptions, as shown in Figure 2-2.

Type entions proce Enter	Work with PTF Groups System:	RCHAS12
4=Delete 5=Display	• 6=Print 8=Display special handling PTFs	
9=Display related PTF a	rouns	
y-bispidy iciated in g	Toups	
Opt PTF Group	Text	
SF99530	CUMULATIVE PTF PACKAGE C4272530	
SF99503	DB2 UDB FOR ISERIES	
SF99287	WEBSPHERE APP SERVER V5.0 (BASE EDITION)	
SF99282	WEBSPHERE PORTAL EXPRESS/EXPRESS PLUS SERV	ICE PACK
SF99269	JAVA	
SF99099	IBM HTTP SERVER FOR ISERIES	
		Bottom
F3=Exit F6=Print F11=	Display status F12=Cancel	
F22=Display entire field		

Figure 2-2 Work with PTF Groups (WRKPTFGRP) display, showing the descriptions

You can also use the iSeries Navigator to verify the installed group PTFs on your system. From the iSeries Navigator, select **My Connections** \rightarrow *system name* \rightarrow **Configuration** and **Service** \rightarrow **Fixes Inventory** \rightarrow **Fix Groups**, as shown in Figure 2-3.

🕗 iSeries Navigator				de la comp	lei fammani i samanan		
File Edit View Help					Last collected:	11/15/2004 5:26 PM	
Environment: My Connections		Rchas12: Fix Groups					
	×	Fix Group (a) 5f99099 (a) 5f99173 (a) 5f99269 (a) 5f99282 (a) 5f99287 (a) 5f99288 (a) 5f99288 (a) 5f99503 (a) 5f99530	Level 2 1 2 3 2 5 2 2 4272	Status Installed Installed Installed Installed Installed Installed Installed Installed Installed	Description IBM HTTP SERVER FOR ISERIES IBM BUSINESS SOLUTIONS JAVA WEBSPHERE APP SERVER - EXPRESS V5.0 WEBSPHERE PORTAL EXPRESS/EXPRESS PLU WEBSPHERE APP SERVER V5.0 (BASE EDITION) WEBSPHERE APP SERVER ND V5.0 DB2 UDB FOR ISERIES CUMULATIVE PTF PACKAGE C4272530		

Figure 2-3 Using iSeries Navigator to display the installed group PTFs

For more information, refer to the following Web sites:

Methods and instructions to order group PTFs

http://www.ibm.com/servers/eserver/support/iseries/fixes/orderfix.html

► Fix Central

http://www-912.ibm.com/eserver/support/fixes/fcgui.jsp

Verifying individual program temporary fixes

To determine if the required individual PTFs are installed on your i5/OS instance, perform the following tasks:

1. Sign in to a 5250 emulation session in your i5/OS instance.

2. Enter the following Display Program Temporary Fix (DSPPTF) CL command in the i5/OS 5250 command line and press Enter:

```
DSPPTF LICPGM(productID)
```

In this example, the product ID is 5722SS1.

3. In the Display PTF Status screen, the PTFs that have been applied for a particular product are displayed. Figure 2-4 shows the PTFs installed for i5/OS V5R3.

			Display PTF	Status			
						System: RCHAS12	2
Prod	uct ID .		:	5722551	L		
IPL	source .		:	##MACH#	B ##SERV	P	
Rele	ase of ba	se option	:	V5R3M0	L00		
-							
Туре	options,	press Enter.			0 Diaulau		
5=	Display P	IF details 6=Pi	rint cover i	etter	8=Display	cover letter	
	PTF					TPI	
Ont	חד	Status				Action	
ope	TC04272	Temporarily app	ied			None	
	TC04209	Permanently app	ied			None	
	TC04153	Superseded				None	
	TC04118	Superseded				None	
	TC04083	Superseded				None	
	TCP0039	Temporarily app	ied			None	
	TCP0038	Superseded				None	
	TCP0037	Superseded				None	
	TCP0036	Superseded				None	
						More.	•
F3=Exit F11=Displayalternateview F17=Positionto F12=Cancel							

Figure 2-4 Displaying the PTF status for i5/OS V5R3 (5722SS1)

You can also use the iSeries Navigator to verify the installed individual PTFs on your system. From the iSeries Navigator, select **My Connections** \rightarrow *system name* \rightarrow **Configuration and Service** \rightarrow **Fixes Inventory** \rightarrow *licensed program*, as shown in Figure 2-5.

🥢 iSeries Navigator							
File Edit View Help							
🔁 27 Pa 27 29 🗊 🛇	Last collected: 11/15/2004 5:2	26 PM					
Environment: My Connections	Rchas12	: 5722dq1					
🗉 🏽 Management Central (Rchas12)	^ Fix	Status	Release	Save File	Cover Letter	Last Changed	^
🖻 🛗 My Connections	→ Si1107	4 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
🖃 🖥 Rchas12		9 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
Basic Operations	🚯 Si1143	2 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
H 🛱 Work Management		3 Superseded	v5r3m0	No	No	9/16/2004 1:50:31 AM	
Configuration and Service	🔁 Si1151	8 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
System Values	🔂 Si1172	7 Installed	v5r3m0	No	No	9/16/2004 2:41:44 AM	
	🕂 🔂 Si1174	7 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
Unite Management	🔁 Si1183	9 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
Hardware		2 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
🗉 🌆 Software	📲 🙆 Si1190	1 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
🖻 🔂 Fixes Inventory	🔁 Si1205	1 Superseded	v5r3m0	No	No	9/16/2004 1:49:58 AM	
- 🚯 All Fixes	🔁 Si1213	0 Superseded	v5r3m0	No	No	9/16/2004 1:50:35 AM	
- 🕭 Fix Groups	🔁 Si1217	'0 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
1tmelcf		9 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
5639c34		18 Installed permanently	v5r3m0	No	No	11/3/2004 6:41:38 PM	
I = 5333000	🔁 Si1237	6 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
5722999		7 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
5/22ac3		4 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
- 🛃 5722bz1		3 Superseded	v5r3m0	No	No	9/16/2004 2:18:35 AM	
- 🛃 5722ce3		.8 Superseded	v5r3m0	No	No	9/16/2004 1:50:31 AM	
	Si1273	0 Superseded	v5r3m0	No	No	9/16/2004 1:49:58 AM	
5722iwe	Si127€	5 Superseded	v5r3m0	No	No	9/16/2004 1:50:31 AM	
5722ic1		8 Installed	v5r3m0	No	No	9/16/2004 2:41:45 AM	
5722jv1	€ Si1297	8 Installed	v5r3m0	No	No	9/16/2004 2:41:45 AM	

Figure 2-5 Using the iSeries Navigator to display the installed individual PTFs

2.3.2 Additional i5/OS requirements for optional administration support

Domino 7 for i5/OS allows administrators to manage Domino 7 servers in a variety of ways, including the following:

- Domino 7 Administrator client
- Domino 7 Web Admin client
- ► 5250 Emulation programs
- ► iSeries Access for Windows
- ► iSeries Access for the Web
- ► Java Server Console

The additional resources in Table 2-5 provide a list of what must be installed for these functionalities to be leveraged within your environment.

Table 2-5	O ptional	prerequisites	for use	with	Domino	7 foi	r i5/OS	servers
-----------	------------------	---------------	---------	------	--------	-------	---------	---------

If you want to use	Which allows	Then, you must install
IBM iSeries Access for Microsoft Windows	i5/OS administration from a Windows workstation	 5722XW1 - IBM iSeries Access Base 5722XE1 - IBM iSeries Access for Windows iSeries Access for Windows Service Packs
If you want to use	Which allows	Then, you must install
---	---	---
IBM iSeries Access for the Web	i5/OS administration from a Web browser	 5722DG1 - IBM HTTP Server for iSeries Also, either of the following: 5733W60 - IBM WebSphere Application Server V6 (BASE) 5722WE2- IBM WebSphere Application Server V6 Express In addition to the latest Group PTE for 5733W60
Java Server Console	Manage Domino servers from workstations that support Java	5722AC3 - Crypto Access Provider 128-bit (required for i5/OS V5R3 only)
IBM HTTP Server plug-in for Domino (available for V5R4 running Domino 7.0.1 and later)	Forward HTTP traffic to Domino 7 servers	 5722DG1 - IBM HTTP Server HTTP Server Group PTF PTF SI19429 - Domino plug-in for HTTP server

For the latest information about IBM eServer iSeries Access for Windows Service Packs, refer to the following Web site:

http://www.ibm.com/eserver/iseries/access/casp.html

2.3.3 i5/OS administrative authority requirements

You want to ensure that you have access to user IDs with the appropriate authority. The higher the privileges on the user ID being used, the better the chances of you not having difficulty in installing any of the prerequisite and extended software resources that allow the desired functionalities to be available before, during, and after the configuration of your first Domino 7 for i5/OS server.

An i5/OS user ID with *SECADM (Security Administration) and *ALLOBJ (All Object) special authority is required to install Domino 7, using the techniques discussed in Chapter 3, "Installing Domino 7 on i5/OS" on page 43. QSECOFR is an example of a user ID that has security officer privileges under i5/OS. In addition to having command-line capability, QSECOFR is the default administrator ID on your System i machine.

An i5/OS user ID with *SECADM, *ALLOBJ, *IOSYSCFG (System Configuration) and *JOBCTL (Job Control) authority must configure the Domino 7 servers using the techniques discussed in Chapter 4, "Configuring a Domino 7 server on i5/OS" on page 93.

Throughout this IBM Redbook, you will see the QSECOFR user ID being used in many of the examples provided. It will be noted when the usage of the QSECOFR user ID is mandatory. Otherwise, remember that any i5/OS user ID with the proper authority is suffice to perform the installation and configuration tasks.

For more information about user class authorities, refer to the IBM eServer iSeries Information Center at:

http://publib.boulder.ibm.com/iseries/

2.3.4 Domino 7 for i5/OS precautions for Lotus Enterprise Integrator installations

1.3, "Domino extended products for i5/OS" on page 8 mentions other collaboration products that are available for use in conjunction with Domino 7 for i5/OS. If you intend to make use of these products, it is important that you are aware of the versions of Domino that are compatible with them. Consult the Lotus Software for i5/OS Compatibility Guide, which is available in the following Web site, to verify the products that work best with the version of Domino 7 that you will be using:

http://www.ibm.com/servers/eserver/iseries/domino/domino6/pdf/releasesupport.pdf

When preparing for a Domino 7 installation that also involves installation of Lotus Enterprise Integrator (LEI), it is critical that you perform the following tasks prior to attempting the installation of LEI:

Consult the LEI Installation documentation for the LEI product level being installed. The LEI Installation Guide and the Release Notes for the LEI product level that is chosen is available in the Lotus product documentation repository on the Web at:

http://www-10.lotus.com/ldd/notesua.nsf

Ensure that product 5799-PTL, iSeries Tools for Developers, is installed. This product is used during your installation of LEI to allow the use of the Virtual Network Computing (VNC) server that is required to complete your LEI installation. You can verify if this product is installed by using the Display Software Resources (DSPSFWRSC) CL command. If you do not see the product 5799-PTL, iSeries Tools for Developers listed, download it from the following Web site:

http://www.ibm.com/servers/enable/site/porting/tools/

Add the parameter ElUseOSMemory=1 to the notes.ini file of Domino 7 for i5/OS server after the configuration steps described in Chapter 4, "Configuring a Domino 7 server on i5/OS" on page 93 are completed. This variable is required for LEI activities that return large result sets and use a sort order to function correctly. The variable grants LEI the access to additional memory resources.

2.4 TCP/IP considerations for Domino

Before you configure your first Domino server, plan the server and organizational naming and security. In addition, understand your existing network configuration and how Domino will fit into the network. If you are adding an additional server to an existing Domino infrastructure, you must register the Domino server, and its server ID and password must be available.

Domino 7 for i5/OS uses the TCP/IP for Lotus Notes client and Domino server connections. Before you install Domino on i5/OS, you must:

- Decide on a naming convention for your Domino servers
- Create, activate, and verify the necessary i5/OS TCP/IP interfaces

2.4.1 Naming your Domino servers

Hierarchical names provide unique identifiers to servers and users across your organization. When you register new servers and users, the hierarchical names drive their certification or their level of access to the system, and control whether users and servers in different organizations and organizational units can communicate with one another. Because hierarchical naming is the cornerstone of Domino security, planning it is a critical task. It is recommended that you perform this task seriously and familiarize yourself with the hierarchical naming conventions before you configure your first Domino server.

Before you configure Domino servers, create a diagram of your company's organization and then use the diagram to help you plan a meaningful Domino server naming scheme. After you create the name tree, create certifier IDs to implement the naming structure and ensure a secure system.

An hierarchical name scheme uses a tree structure that reflects the actual structure of your company. The organization name is at the top of the tree, which is usually the company name. The organizational units, which you create to suit the structure of the company, are beneath the organization name. You can organize the structure geographically, departmentally, or both.

An hierarchical name reflects a user's or server's place in the hierarchy and controls whether users and servers in different organizations and organizational units can communicate with each another. An hierarchical name might include the following components:

► Common name (CN)

This corresponds to a user's name or a server's name. All the names must include a common name component.

Organizational unit (OU)

This identifies the location of the user or the server in the organization. Domino allows for a maximum of four organizational units in an hierarchical name. Organizational units are optional.

Organization (O)

This identifies the organization to which a user or server belongs. Every name must include an organization component.

Country (C)

This identifies the country in which the organization exists. The country is optional.

The close relationship between the TCP/IP host names and the Domino server names makes it important to think about the Domino server name. A Domino server might have a long name, even with embedded spaces, for example, Acme Domino Server One is a valid name for a Domino server. This type of naming is possible in Domino environments. However, it is not a valid TCP/IP host name.

By default, when a Lotus Notes client or another Domino server tries to connect to a Domino server through the TCP/IP protocol, it uses the common name, the first part of the hierarchical name, as the TCP/IP host name. Such a naming convention can use connection documents to translate between the Lotus Notes client or Domino server name and the TCP/IP host name or IP address.

Important: The first Domino server on i5/OS *cannot* have a space in its name. In fact, it is recommended that you do *not* use any Domino server names with spaces or underscores (_). Additional configuration is required to allow client connection and you might have problems managing the Domino server. A simple solution is to use a short name with no spaces or underscores in it, such as DOMSVR1. The TCP/IP host name and the Domino server name can then be the same.

Giving the Domino server and the System i machine the same name

The easiest way to name a Domino 7 for i5/OS server is to use the existing host name of the System i machine. If you have an existing TCP/IP network, the System i TCP/IP host name is in all probability, already defined in the Domain Name System (DNS) server or the HOSTS files of the clients. This makes configuration much easier. Use the Configure TCP/IP (CFGTCP) menu's option 12 or the Change TCP/IP Domain (CHGTCPDMN) command to find out or define the host name of your System i machine.

Note: The TCP/IP host name of the System i machine might be identical to the System i machine name (this is recommended for a single-server system). However, these are two different parameters and are totally independent.

Naming the Domino server and the System i machine differently

Although it is the most obvious approach, it is not always possible to use the existing System i machine name as the Domino server name. If you plan to, for example, configure more than one logical Domino server (a partitioned server) on the same System i machine, each Domino server must have its own unique name.

Because all the Domino 7 servers for i5/OS use i5/OS TCP/IP interfaces, the System i machine can be known in the network by more than one host name. This allows Domino to use a different host name from other i5/OS applications. The two concepts that are supported by the i5/OS TCP/IP implementation for enabling this are *multihoming* and *multihosting*.

Multihoming allows more than one (up to 128 per line, but not more than 512 per System i machine) Internet addresses to be defined on a single network adapter (represented by a communication-line description). If you decide that each Domino server will use its own unique TCP/IP address, create a TCP/IP interface for each Internet address associated with each Domino server.

Note: Your System i machine's multihomed host capability allows for multiple IP addresses on the machine, which you can think of as logical interfaces. These logical interfaces can be associated with one or more physical interfaces. These physical interfaces might be connected to the same network or different networks. This allows you to specify either a single interface or multiple interfaces for a line description and use IP aliasing.

Multihosting (or name aliasing) allows you to assign up to four host names (aliases) to the same IP address within the i5/OS host table, and more on the DNS name servers. If you decide that more than one Domino 7 server for i5/OS will share a TCP/IP address, distinguished by name and port number, add aliases to the existing host table entries in the i5/OS host table, the DNS name server database, or the Notes client host tables.

Note: If you do not have a DNS name server, ensure that all the clients and the i5/OS host table contain entries to translate the server (nonqualified) host name to a numerical Internet address. The host name DOMSVR1 must, for example, be translated using a host table or DNS to an IP address such as 10.1.2.3.

Deciding on the Domino domain name

A Domino domain is a group of Domino servers that share the same Domino Directory (names.nsf). As is the case with the control and administration center for Domino servers in a domain, the Domino Directory contains, among other documents, a server document for each Domino server and a person document for each Notes user.

Planning for Domino domains

Four basic scenarios exist for setting up Domino domains:

- The first scenario, which many small and medium size companies use, involves creating only one Domino domain and registering all the servers and users in one Domino Directory. This scenario is the most common and the easiest to manage.
- The second scenario is common when a large company has multiple independent business units. For one organization that is spread across multiple domains, this might be the best scenario. All the servers and users are members of the same organization, and each business unit administers its own Domino Directory.
- A third scenario is common when multiple companies work closely together, but want to retain individual corporate identities. In such a situation, one domain and multiple organizations might work best.
- Finally, the fourth scenario involves maintaining multiple domains and multiple organizations. This scenario often occurs when one company acquires another company.

Sometimes, the decision to create multiple Domino domains is not based on organization structure at all, for example, you might want to create multiple Domino domains if you have slow or unreliable network connections that prohibit frequent replication of a single, large directory. Remember that working with multiple domains requires additional administrative work and for you to set up a system for managing them.

Domains can be used as a broad security measure. You can, for example, grant or deny a user access to servers and databases, based on the domain in which the user is registered. Using an extended access control list (ACL) is an alternative to creating multiple domains because you can use the extended ACL to specify different levels of access to a single Domino Directory, based on organization name hierarchy.

For more information about Domino domain names, refer to the Domino 7 Administrator Help database.

2.4.2 Domain Name System

The Domain Name System (DNS) is an application that enables a TCP/IP host (in our case, either a Domino server or a Notes client) to determine the IP address associated with a given host name.

Note: There is no relationship between the Domino domain name and the domain name mentioned with reference to TCP/IP throughout this section.

The DNS is similar to a telephone book. The user looks up the name of the person or the organization to be called, and cross-references the name to a telephone number. In the case of a DNS, it is the IP address or information about how to find the IP address, that is returned. It is an hierarchical client/server-based distributed database. Name servers are programs that contain information about some segment of the network in a database and make it available to the clients.

In many environments, you have to register the intended host name for your Domino servers with the network administration team that manages your company's DNS configuration. If you have a firewall positioned between your company's servers and the Internet, and you want to use Domino's Simple Mail Transfer Protocol (SMTP) functionality to send and receive

Internet mail, ensure that Domino server's fully qualified host name is permitted to communicate inbound and outbound on port 25. You must also ensure that the Mail Exchange (MX) records are in place in order to allow the proper routing of messages to your Domino servers.

2.4.3 HOSTS file configuration

It is recommended that you use a DNS address resolution in your network because hosts file changes are not flexible. If you do not have a DNS for your TCP/IP network (or you do not want to use it), use the TCP/IP host table entries on i5/OS and the client workstations (see Table 2-6) to associate the host names with the Internet addresses. On Windows clients, the host table is implemented with an American Standard Code for Information Interchange (ASCII) file called HOSTS.

Windows version	HOSTS file directory location
Windows 98	[X: ^a]\WINDOWS\
Windows NT® and Windows 2000	[X:]\WINNT\SYSTEM32\DRIVERS\ETC\
Windows XP	[X:]\WINDOWS\SYSTEM32\DRIVERS\ETC\

Table 2-6 Location of the HOSTS file on Windows workstations

a. [X:] represents the letter of the drive where Windows has been installed on your machine.

If you do not find a file called HOSTS on your PC, search for a file called HOSTS.SAM. Rename or copy it to HOSTS without an extension, and edit it to contain the names of your Domino servers along with the appropriate IP addresses. Figure 2-6 shows the HOSTS file being edited with the DOS edit command.

```
File Edit Search View Options Help
+----- C:\WINNT\system32\drivers\etc\hosts ------
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# 102.54.94.97 rhino.acme.com # source server
# 38.25.63.10 x.acme.com # x client host
127.0.0.1 localhost
10.1.2.3 domsvr1.rchland.ibm.com domsvr1
```

Figure 2-6 Example of a HOSTS file on a Windows 2000 system

To create or modify the host table on i5/OS, use the Configure TCP/IP (CFGTCP) menu's option 10 (Work with TCP/IP host table entries). The Work with TCP/IP Host Table Entries screen is shown in Figure 2-7.

	Work with TCP/IP Host Table Entries	System: RCHAS10
Type options, press	Enter.	
1=Add 2=Change	4=Remove 5=Display 7=Rename	
Internet	Host	
Opt Address	Name	
10.1.2.1	RCHAS10, RCHLAND, TBM, COM	
10111211	RCHAS10	
10.1.2.3	DOMSVR1.RCHLAND.IBM.COM	
	DOMSVR1	
127.0.0.1	LOOPBACK	
	LOCALHOST	
		Bottom
F3=Exit F5=Refresh	F6=Print list F12=Cancel F17=Pos	sition to

Figure 2-7 Example of i5/OS host table entries

2.4.4 Configuring TCP/IP on i5/OS

To allow Lotus Notes clients or Web browsers to connect to Domino 7 servers on i5/OS, configure and start the i5/OS TCP/IP support. This section provides the minimum steps that you must perform to activate TCP/IP on i5/OS.

Note: This section is not meant to replace the existing i5/OS TCP/IP documentation.

Before you make use of TCP/IP on i5/OS, a communication line description for a TCP/IP interface must exist.

TCP/IP interface is a logical interface used to configure the TCP/IP address of a logical network source or destination that will remain active.

Line description is an i5/OS object (*LIND) that allows a user to define the type of TCP/IP interface associated with a specific Internet address on a communications network. See Table 2-7 for a listing of the TCP/IP interface types.

User-defined interface type	Line description specified using
Ethernet	CRTLINETH, prior to adding a new TCP/IP interface
*LOOPBACK	ADDTCPIFC, only if the first octet of the Internet address being added is 127
*VIRTUALIP	ADDTCPIFC, when using circuitless interfaces
*OPC	ADDTCPIFC, when adding an OptiConnect interface

Table 2-7 Line description details for user-defined TCP/IP interface types

For additional assistance with the creation of line descriptions prior to adding a new TCP/IP interface, contact your System i Support Center or reference the System i Information Center:

http://publib.boulder.ibm.com/infocenter/iseries

2.4.5 Creating a new TCP/IP interface

The steps described in this section explain how to add a TCP/IP interface to i5/OS. The procedure associates an Internet address with an existing line description to allow that Internet address to communicate on your organization's TCP/IP network from the System i machine. Perform the following tasks:

- 1. Sign in to your System i machine with a user profile that has the following special authority. Refer to 2.3.3, "i5/OS administrative authority requirements" on page 21 for additional information about authority:
 - *ALLOBJ
 - *SECADM
 - *IOSYSCFG
- 2. In the i5/OS command line, type CFGTCP and press Enter to display the Configure TCP/IP menu.
- 3. In the Configure TCP/IP menu (Figure 2-8), type option 1 (Work with TCP/IP interfaces) and press Enter to Work with TCP/IP Interfaces on your System i machine.

CFGTCP		Conf	igure TCP/IP		
Select	one of the fol	lowing:		System:	RCHAS10
		· · · · · · · · · · · · · · · · · · ·			
1.	Work with TCP,	/IP interfaces	;		
2.	Work with TCP,	/IP routes			
3.	Change TCP/IP	attributes			
4.	Work with TCP,	/IP port restr	rictions		
5.	Work with TCP,	/IP remote sys	stem information		
10					
10.	WORK WITH ICP,	/IP NOST TADIE	entries		
11.	Merge ICP/IP I	nost table	ation		
12.	change TCP/IP	domain inform	Id L I ON		
20.	Configure TCP	/IP applicatio	ons		
21.	Configure rela	ated tables			
22.	Configure poir	nt-to-point T(CP/IP		
Selecti	on or command				
===> 1					
F0 F			F10 0 1		
F3=Exit	F4=Prompt	F9=Retrieve	F12=Cancel		

Figure 2-8 Configure TCP/IP (CFGTCP) menu

4. In the Work with TCP/IP Interfaces screen (Figure 2-9), type option 1 (Add) in the Opt column, enter the Internet address of the new interface in the blank line in the Internet Address column, and press Enter.

		Work with TC	P/IP Interfac	es					
	System: RCHAS10								
lype options,	, press Enter	`•							
1=Add 2=0	Change 4=Re	move 5=Disp	lay 9=Start	10=Er	nd				
		_							
Internet	t Sub	net	Line	Line					
Opt Address	Mas	k	Description	Туре					
1 10.1.2.3	3		·						
10.1.2.1	L 255	.255.255.0	ETHLINE	*ELAN					
127.0.0.	.1 255	.0.0.0	*LOOPBACK	*NONE					
192.168.	.9.106 255	.255.255.0	PRIVATE	*ELAN					
F3=Exit	F5=Refresh	F6=Print lis	t F11=Displ	ay inter	face statu	is			
F12=Cancel	F17=Top	F18=Bottom							

Figure 2-9 Work with TCP/IP Interfaces screen

- 5. In the Add TCP/IP Interface (ADDTCPIFC) screen (Figure 2-10), enter the following information and press Enter:
 - The name of the line description for the new interface
 - The subnet mask for the new interface

Add TCP/IP	Interface (AD	DTCPIFC)
Type choices, press Enter.		
Internet address > Line description <e Subnet mask</e 	<pre>> '10.1.2.3' nter Descriptic <enter *lind="" *none="" *normal="" *yes<="" m="" pre="" subnet=""></enter></pre>	DN> Name, *LOOPBACK Mask> *MINDELAY, *MAXTHRPUT 576-16388, *LIND *YES, *NO 001-FFF
 X.25 idle circuit timeout X.25 maximum virtual circuits . X.25 DDN interface TRLAN bit sequencing F3=Exit F4=Prompt F5=Refresh F24=More keys 	60 64 *NO *MSB F12=Cancel F	1-600 0-64 *YES, *NO *MSB, *LSB F13=How to use this display

Figure 2-10 Add TCP/IP Interface (ADDTCPIFC) screen

2.4.6 Activating and verifying the new TCP/IP interface

Perform the following steps to activate and verify the newly added TCP/IP interface:

- 1. If it is not already started, start the TCP/IP support by typing the Start TCP/IP (STRTCP) CL command in the i5/OS command line and press F4 to prompt the command.
- 2. In the Start TCP/IP (STRTCP) screen (Figure 2-11), confirm the desired settings and press Enter to start the TCP/IP.

Tip: If you do not see the F11=Display interface status at the bottom of the Work with TCP/IP interfaces screen, you know that the TCP/IP support has not been started.

Start TCP/IP (ST	RTCP)
Type choices, press Enter. Additional Paramete	rs
Start application servers *YES Start TCP/IP interfaces *YES Start point-to-point profiles . *YES Start IPv6 *YES	*YES, *NO *YES, *NO *YES, *NO *YES, *NO
F3=Exit F4=Prompt F5=Refresh F12=Cancel F24=More keys	F13=How to use this display

Figure 2-11 Start TCP/IP (STRTCP) CL screen

- 3. From the Configure TCP/IP menu, type option 1 (Work with TCP/IP interfaces) and press Enter to return to the Work with TCP/IP Interfaces screen shown Figure 2-9 on page 29.
- 4. To start the new TCP/IP interface, type option 9 (Start) next to the TCP/IP address and press Enter.
- 5. Press F11 (Display interface status) to see whether the new interface is active.

TCP/IP interface verification using the PING (VFYTCPCNN) command

Verify that your TCP/IP connection is active by using the Verify TCP/IP Connection (VFYTCPCNN) CL command, also known as PING. The easiest way to see the results of the PING command is to use the i5/OS Command Entry display. Perform the following steps:

1. In the i5/OS command line, type the following command and press Enter:

CALL QCMD

- 2. Press F10 to include the detailed messages.
- 3. Type PING and press F4 to prompt the command.

4. In the Verify TCP/IP Connection (PING) screen (Figure 2-12), enter the Internet address you defined when creating your TCP/IP interface, as described in 2.4.4, "Configuring TCP/IP on i5/OS" on page 27, and press Enter.



Figure 2-12 Verify TCP/IP Connection (PING) screen

5. The connection verification statistics is displayed, as shown in Figure 2-13.

Command Entry RCHAS10	
Request level: 4	
All previous commands and messages:	
End of requests.	
3 > STRTCP	
3 > PING RMTSYS('10.1.2.3')	
Verifying connection to host system 9.5.92.18.	
PING reply 1 from 10.1.2.3 took 2 ms. 256 bytes. TTL 64.	
PING reply 2 from X10.1.2.3 took 0 ms. 256 bytes. TTL 64.	
PING reply 3 from 10.1.2.3 took 0 ms. 256 bytes. TTL 64.	
PING reply 4 from 10.1.2.3 took 0 ms. 256 bytes. TTL 64.	
PING reply 5 from 10.1.2.3 took 0 ms. 256 bytes. TTL 64.	
Round-trip (in milliseconds) min/avg/max = 0/0/2.	
Connection verification statistics: 5 of 5 successful (100 %).	
Bottom	ł.
Type command, press Enter.	
===>	
F3=Exit F4=Prompt F9=Retrieve F10=Exclude detailed messages	
F11=Display fullF12=CancelF13=Information AssistantF24=More keys	

Figure 2-13 Results of using the PING command to verify the TCP/IP connection

Note: Verifying the connection by using the (numerical) IP address is not normally sufficient to ensure that the Lotus Notes clients or other Domino servers can connect to your Domino 7 server on i5/OS. The Lotus Notes clients also assume that the name of the Domino server to connect to is known as a TCP/IP host name. For more details, refer to 2.4.1, "Naming your Domino servers" on page 22.

2.5 Considerations when upgrading to Domino 7 for i5/OS

If you plan to install Domino 7 for i5/OS on a System i machine, with Domino 6 servers running Domino versions 6.0, 6.0.1, or 6.0.2, all your Domino servers will automatically be upgraded to Domino 7 during installation. If you have Domino servers configured for 6.0.3 or 6.5 or later, use the Update Domino Server (UPDDOMSVR) command to upgrade your servers to the desired versions of Domino 7. For more information about UPDDOMSVR, refer to 5.2.5, "Update Domino Server (UPDDOMSVR)" on page 186.

2.5.1 Verifying the release functionality before the upgrade

In this example, let us assume that you want to upgrade a Domino server called DOMSVR1 to a Domino 7 Maintenance Release. The process outlined in this section assists you in preparing for the upgrade that is being scheduled.

Identifying the initial Domino release of the server being upgraded

Perform the following tasks to identify the initial release of Domino for the Domino server to be upgraded:

- 1. From the i5/OS command line, type the Work with Domino Servers (WRKDOMSVR) CL command and press Enter to view all the Domino servers that are currently configured on the system.
- 2. In the Work with Domino Servers screen (Figure 2-14), press the F11 key (Display library) to display the libraries and releases of the existing Domino servers on the system.

	Work with	Domino Servers	Svstem: R	CHAS10
Type options press En	ter		- 0	
1-Stant convon		E-Dierlay coreal	a G-Frad again	
I=Start server 2	=change server	5=DISPIAY CONSOL	e o=End server	
7=Submit command 8	=Work console	9=Work server jo	bs	
11=Change current di	rectory 12=We	ork object links	13=Edit NOTES.IN	I
Domino		Domino		
Ont Service	Cubayatam	Status		
opt server	Subsystem	Status		
DOMSVR1	DOMSVR1	*STARTED		
DOMSVR2	DOMSVR2	*ENDED		
				Bottom
Parameters or command				
===>				
F3=Exit F5=Refresh	F9=Retrieve	F10=Sort by name	F11=Display lib	rarv
F12=Cancel F17=Top	F18=Bottom	F23=More Options	F24=More kevs	v
	110 200000		TET Hore Reys	

Figure 2-14 Work with Domino Servers (WRKDOMSVR) screen

3. In the case of our example, the Work with Domino Servers (WRKDOMSVR) screen confirms that DOMSVR1 is currently running Domino 6.5.4 (Figure 2-15).

Work with Domino Servers									
	System: RCHAS10								
Type optior	s, press Enter	r.							
1=Start s	erver 2=Cl	nange server	5=Display c	onsole	6=End serv	ver			
7=Submit	command 8=We	ork console	9=Work serv	er jobs					
11=Change	current dire	ctory 12=Wor	rk object lin	ks 13=	Edit NOTES.	INI			
Domina				Domino					
		C	1.21	Domino					
Opt Server		Subsystem	Library	Release					
DOMSVE	1	DOMSVR1	QDOMIN0654	6.5.4					
DOMSVF	.2	DOMSVR2	QDOMIN0652	6.5.2					
						Bottom			
Parameters	Parameters or command								
===>									
F3=Exit	F5=Refresh	F9=Retrieve	F10=Sort b	y name	F11=Displa	y path			
F12=Cancel	F17=Top	F18=Bottom	F23=More C)ptions	F24=More	keys			

Figure 2-15 Work with Domino Servers screen showing the libraries and releases of Domino

Check the Fix Packs and program temporary fixes in use for the initial Domino release

After you have verified the initial maintenance release of the Domino server that is to be upgraded, factor in the possibility that fixes might have been applied when this release has been running on your production environment in order to add to the overall stability of Domino in your system. The two release enhancement categories that you must be concerned with are:

Program temporary fixes

Also known as hotfixes or PTFs, these are module enhancements that are provided directly from Lotus Support to improve the functionality of the Domino Maintenance Release code. These are delivered on an "as required basis" associated with the customized configuration of a Domino environment.

Fix packs

These are prepackaged module enhancements created to provide a greater level of preventive service and stability when using a specific maintenance release of Domino. Normally, the installation of a fix pack eliminates the requirement for certain individual PTFs to be installed within an environment.

In order to verify the fix packs and the PTFs installed for the version of the Domino server that is being upgraded to Domino 7, use the Display Program Temporary Fix (DSPPTF) CL command. For purposes of simplicity, we continue with the same example scenario where it has been determined that DOMSVR1 is currently running Domino 6.5.4. Perform the following steps:

- From an i5/OS command line, type the Display Software Resources (DSPSFWRSC) CL command and press Enter to display the software resources currently installed on your system.
- 2. From the Display Software Resources display, use the PgUp and PgDn keys to scroll through the listing of licensed products until you locate the product number associated with the initial release of Domino that is running on the Domino server that is scheduled for

upgrade. In our example, which is shown in Figure 2-16, the licensed product number for Domino 6.5.4 is 5733L65, option 14. Press F3 to exit the list of licensed products.

			Display Software Resources				
			System: F	RCHAS10			
Resource							
ID	Option	Feature	Description				
5722XW1	*BASE	5050	iSeries Access Base				
5722XW1	*BASE	2924	iSeries Access Base				
5722XW1	1	5101	iSeries Access Option 1				
5733L65	14	5050	Lotus Domino 6.5: Release 6.5.4				
5733L65	14	2924					
5733L65	*BASE	5050	Lotus Domino 6.5 (5724E70)				
5733L65	*BASE	2924	Lotus Domino 6.5 (5724E70)				
5733L65	15	5050	Lotus Domino 6.5: Release 6.5.5				
5733L65	15	2924	Lotus Domino 6.5: Release 6.5.5				
AJDGP01	*BASE	5050	Licensed Internal Code - AJDGP01 9400DGP				
				More			
Press Ent	Press Enter to continue.						
F3=Exit F19=Displ	F3=Exit F11=Display libraries/releases F12=Cancel F19=Display trademarks						

Figure 2-16 Display Software Resources (DSPSFWRSC) command

 From the i5/OS command line, type the following Display PTF (DSPPTF) CL command and press Enter to display the installed PTFs and fix packs associated with Domino 6.5.4:

DSPPTF LICPGM(5733L65) RLS(V6R5M4)

In this command:

- 5733L65 is the licensed product number obtained from DSPSFWRSC
- V6R5M4 is the format to designate that in a multiversioned environment, where there can be groups of hot fixes and fix packs for each level of Domino on the system, only the hot fixes and fix packs associated with Domino 6.5.4 must be identified.

Note: You only require the RLS parameter if you are already on a multiversion-capable Domino Maintenance Release (6.0.3, 6.5, or later). In the earlier versions of Domino for i5/OS that were not multiversion capable, only one Domino Maintenance Release could be installed on an i5/OS partition at a given time. Thus, all that is necessary in environments fitting that description is the license product number of the single level of the Domino installed, for example, DSPPTF LICPGM (5733LD6). Refer to 2.6, "Overview of Domino for i5/OS multiversion capabilities" on page 39.

4. Figure 2-17 shows the Display PTF Status screen. Record the PTF IDs listed in this screen, where the Fix Packs and individual PTFs are displayed. In this instance, verifying this information with Lotus Support will confirm that Domino 6.5.4 Fix Pack 2 is installed on this system, superseding Fix Pack 1 PTF for 6.5.4, with two additional individual hot fixes applied as well.

Display PTF Status	System, RCHAS10
Product ID	
Type options, press Enter.	cover letter
5-Display Fil decails 0-Film cover letter 8-Display	
PTF	IPL
Opt ID Status	Action
SI20418 Temporarily applied	None
SI18786 Permanently applied	None
LD00262 Temporarily applied	None
LD00192 Temporarily applied	None
F3=Exit F11=Display alternate view F17=Position to F This is a subsetted list of PTFs.	12=Cancel

Figure 2-17 Display PTF Status (DSPPTF) screen

Now that you have the associated IDs and PTFs recorded, confirm with Lotus that the SPRs associated with the problems resolved by the fix packs and PTFs have also been fixed in the version of Domino 7 to which you are upgrading. In the event that some of them are not fixed, discuss the availability of existing fix packs and PTFs that might be available for your release of Domino 7 in order to help maintain stability and user availability within your Domino infrastructure.

2.5.2 Additional concerns associated with standard upgrade implementation

This section addresses some of the additional aspects that you must be aware of when upgrading to Domino 7.

Room and Resources Manager task considerations

Domino Room and Resource management technology has been enhanced for Domino 7. Instead of depending on the busytime.nsf database and the scheduler task as was the case in the earlier versions, the reservation of rooms and resources are now facilitated through a new server task called RnRMgr. In the situation that the Domino servers being upgraded house the Resource Reservations databases, it is critical that you know that these databases must be upgraded to the Domino 7 Resource Reservation Database template, resrc7.ntf. **Important:** Resource Reservation databases running on upgraded Domino 7 servers with Rooms and Resources Reservation database templates from earlier versions of Domino will have problems processing the requests beneath the new RnRMgr task. For more information, refer to Technote Number 1219243 titled *Notes/Domino Fix List*, which is available on the Web at:

http://www-10.lotus.com/ldd/r5fixlist.nsf/FixPrint/02BEFB21338B787B852570EC0011
0A59/?OpenDocument

It is recommended that you perform the tasks described here to ensure that your Rooms and Resources Reservation databases are processed appropriately before and after an upgrade to Domino 7 on the i5/OS. Before upgrading your Domino server with Rooms and Resources Reservation databases to Domino 7, open the Rooms and Resources Reservation databases through the Domino Designer 7 client and make a note of the agents that are enabled in the databases.

Immediately after upgrading a Domino server housing a Rooms and Resources Reservation database, perform the following steps:

- In an i5/OS command line, type the Work with Domino Servers (WRKD0MSVR) CL command and press Enter.
- 2. In the Work with Domino Servers screen, type option 13 (Edit NOTES.IN) next to the Domino server that was upgraded, and press Enter. In the Domino server's notes.in file, remove RnRMgr from the ServerTasks line. This prevents the Domino 7 server from disabling auto processing for your Domino 6 Rooms and Resources Reservation databases when the Domino 7 server starts. Press F3 to save and exit the changes.

In the Work with Domino Servers screen, type option 1 (Start) next to the Domino server that was upgraded, and press Enter to start the Domino server.

- From a Lotus Notes client, using an Administrator's ID, upgrade your Domino 6 Rooms and Resources Reservation databases to the Domino 7 Rooms and Resources Reservation databases template by selecting Database → Replace Design. Do *not* use Load Convert.
- 4. In each Rooms and Resources Reservation database that is upgraded to the Domino 7 template, select Actions → Upgrade to enable the Domino 7 router to send acceptances or declines from the newly upgraded Rooms and Resources Reservation database.
- Open the newly upgraded Rooms and Resources Reservation databases in Domino Designer and re-enable the agents that were identified prior to the Domino server upgrade.
- 6. Start the RnRMgr task manually on your Domino 7 server using the following command from the Domino server console:

load RnRMgr

7. Lastly, add the RnRMgr task back to the Server tasks line of the Domino server's notes.ini file, so that the task begins automatically at the next Domino server restart.

Domino Directory upgrade considerations

After you have upgraded your Domino servers to Domino 7 from an earlier Domino version, be aware that the process for upgrading the Domino Directory to the new design level might have changed. After starting each Domino 7 server for the first time, you *must* use the Work with Domino Console (WRKDOMCSL) CL command and answer the console prompt that

asks whether you want to upgrade the Domino Directory to the Domino 7 design. It is recommended that you plan your answer - either "Y" for yes or "N" for no - before a server upgrade because you must answer this question before service can be restored on the Domino server that is upgraded.

For more information about Domino Directory upgrades and preserving directory customizations, consult the Domino 7 Upgrade Guide available on the Web at:

http://doc.notes.net/uafiles.nsf/docs/domino7b2/\$File/v7_admin_upgrade.pdf

2.5.3 Lotus Sametime and upgrades to Domino 7 on i5/OS

The following precautions must be considered for any Domino server running Sametime and is being upgraded to Domino 7 for i5/OS, or any Domino server running Domino Web Access that communicates with a Sametime server or is also a Sametime server.

Important: The scenarios described in this section can occur when you are performing the following tasks:

- Upgrading the Sametime servers that are not yet multiversion capable (Domino 6.0, 6.0.1, and 6.0.2) by installing the Domino 7 server code. If you plan to install Domino 7 for i5/OS on a System i machine, with Domino 6 servers running Domino Version 6.0, 6.0.1, or 6.0.2, all your Domino servers will be upgraded to Domino 7 automatically during the installation.
- Upgrading multiversion-capable Sametime servers (Domino 6.0.3, 6.5, and later) using the Update Domino Server (UPDDOMSVR) CL command. For more information about UPDDOMSVR, refer to 5.2.5, "Update Domino Server (UPDDOMSVR)" on page 186.

STLINKS and STLINKS.SAV precautions

Before upgrading to Domino 7 on one of the server types described earlier, it is important to understand the distinction between the STLINKS and STLINKS.SAV directories.

STLINKS

A directory with this name can be found within the Domino server data directory in the <data>/domino/html/sametime directory. The STLINKS directory (Figure 2-18) holds files that enable Sametime integration with Domino Web Access.

Work with Object Links					
Directory : /Lotus/dor	nsvr1/data/domino/htm1/SAMETIME				
Type options, press Enter. 2=Edit 3=Copy 4=Remove 5= 11=Change current directory	=Display 7=Rename 8=Display attributes				
Opt Object link Type STLINKS DIR	e Attribute Text				
Parameters or command	Bottom				
===>					
F3=Exit F4=Prompt F5=Refresh F22=Display entire field	F9=Retrieve F12=Cancel F17=Position to F23=More options				

Figure 2-18 Initial Domino install: STLINKS exists, but STLINKS.SAV does not

► STLINKS.SAV

A directory with this name can be found within the Domino server data directory in the <data>/domino/html/sametime directory under specific circumstances. When the upgrade to Domino 7 occurs, the files that are currently in existence in the STLINKS directory are backed up to this directory *only* if the directory does not exist or is empty.

The first time that a Domino Maintenance Release upgrade occurs on a Domino server from Domino Release 6.5.5 to Release 7.0.1, for example, the following actions take place:

- The directory <data>/domino/html/sametime/STLINKS.SAV is created
- The contents of <data>/domino/html/sametime/STLINKS is backed up to the newly created STLINKS.SAV directory

To ensure that the Sametime customizations on your Domino server are preserved upon multiple upgrades to later releases, Lotus recommends that you perform either of the following tasks:

- Copy the latest files found within the STLINKS directory into the STLINKS.SAV directory
- Remove all the files from the STLINKS.SAV directory beforehand, so that a subsequent Domino 7 install or upgrade will copy the latest files to that directory as a backup for STLINKS.

2.5.4 Upgrading the servers running Lotus Enterprise Integrator to Domino 7 on i5/OS

When upgrading a Domino server running LEI to Domino 7 for i5/OS, it is important to keep in mind that you might have to upgrade the LEI product in your environment at the same time that the Domino product is upgraded. Check the LEI installation guide associated with the version of LEI that you currently have in use to ensure that you take the appropriate action to keep your instances of LEI functioning appropriately, for example, LEI 7.0.1 requires Domino 7.0.1, LEI 7.0 requires Domino 7.0, LEI 6.5.5 requires Domino 6.5.5.

Thus, if you are upgrading from Domino 6.5.5 or earlier to Domino 7.x, it is of utmost importance that you upgrade the LEI product to a version that is compatible with Domino 7.x. For more details about LEI compatibility and Domino, refer to the online Lotus Software for i5/OS Compatibility Guide on the Web at:

http://www.ibm.com/servers/eserver/iseries/domino/domino6/pdf/releasesupport.pdf

When preparing for a Domino 7 upgrade that involves the upgrade of an LEI product, it is critical that you perform the following tasks before attempting the upgrade of LEI:

► Install product 5799-PTL, iSeries Tools for Developers.

This product is used during your upgrade of LEI to allow the use of the VNC server, which you require to perform your LEI upgrade. Download this product from the following Web site:

http://www.ibm.com/servers/enable/site/porting/tools/

 Add the EIUseOSMemory=1 parameter to the notes.ini file of the Domino server that is being upgraded.

This variable is required for LEI activities that return large result sets and use a sort order to function correctly. The variable grants LEI the access to additional memory resources.

2.6 Overview of Domino for i5/OS multiversion capabilities

Staring with the 6.0.3 and 6.5.0 releases of Domino, IBM introduced multiversion capabilities for Domino on i5/OS. Earlier implementations of multiple Domino releases on one system required separate logical partitions (LPARs) of i5/OS, which is not always a viable solution. With the advent of multiversioning, Domino for i5/OS supports multiple releases of Domino on the same i5/OS LPAR or partition.

This added capability is designed to allow increased flexibility for Domino for i5/OS users. You can now run different applications on different release levels of Domino in one i5/OS partition. A significant advantage of this capability is that you do *not* have to end Domino servers of one release in order to install another release. Because the existing Domino servers that are configured to use one release are *not* automatically updated when installing a different release of Domino, these servers can remain active. This provides a useful environment for running production servers on one release and testing new servers and applications on another release without impacting each other. Operating in this mixed environment helps increase the stability of both the testing and the production environments.

Installing and using multiple versions of Domino on one partition is optional. You can still operate in a single-version environment, but you might have to take some action to ensure that your environment works with these multiversion-enabled releases. For details about multiversioning, which is not covered in this IBM Redbook, refer to the IBM Redbook *Lotus Domino 6 Multi-Versioning Support on the IBM eServer iSeries Server*, SG24-6940, which is available on the Web at:

http://www.redbooks.ibm.com/abstracts/sg246940.html?Open

2.6.1 Multiversion terms and concepts

This section describes some of the terms and concepts that are important in a multiversion-capable environment.

Release

A major release, also called *version*, of Domino, such as Domino 7, includes significant changes or enhancements to the product. Each version has Maintenance Releases, which are also called MRs, for example, MRs of Domino 7 are referred to as 7.0.x.

In a multiversion-capable environment, any number of multiversion-capable Domino versions and releases can be installed at the same time. You can, for example, install Domino 6.5.0, 6.5.1, and 7.0 on the same i5/OS partition. These releases and versions do not have to be installed or removed in any particular order.

Important: Installing a multiversion-capable release on the same i5/OS partition as a release that is not multiversion capable results in an automatic upgrade of each Domino server to the multiversion-capable release. You cannot install a release that is not multiversion-capable on the same i5/OS partition as the releases that are multiversion-capable. You cannot, for example, install Domino 6.0.2, which is not multiversion-capable, on the same i5/OS partition where 6.0.3, 6.5.0, or 7.0 are installed.

Primary release

For systems with multiple versions installed, the term *primary release* is a way of indicating which installed release provides the most function. The primary release is always the most recently shipped release installed on a partition, for example, on a server with Domino 6.0.3

and 6.5.0 installed, 6.5.0 is the primary release. If 6.0.4 is installed later, 6.0.4 becomes the primary release. If 7.0 is installed after 6.0.4, then 7.0 becomes the primary release.

There are some situations where Domino will default the settings to those of the primary release. In these situations, manual steps are required to manipulate the settings of a Domino server with a release other than the primary release.

Multiversion capable

This term refers to releases of Domino 6.0.3 and later, Domino 6.5.0 and later, and Domino 7 or later. All the releases of Domino prior to 6.0.3 and 6.5.0, including all the R5 releases, are *not* multiversion capable.

Logical partition

Logical partitions allow you to distribute resources within a single system to make it function as if it were two or more independent servers. LPAR technology allows for virtual and shared resources, dynamic load balancing, and much more. For more information about System i LPAR technology, refer to the following Web site:

http://www.ibm.com/eserver/iseries/lpar

Partition

This term is used synonymously with LPAR. If you are not using multiple LPARs on a system, the term partition means the system itself.

Updating a Domino server

The term *updating* is sometimes used synonymously with *upgrading*. However, these two terms are emerging to imply two different things. Updating refers to applying a newer release of software, and upgrading refers to hardware.

With multiversion-capable releases of Domino for i5/OS, the Domino servers are no longer updated automatically during product installation. The only exception to this is when installing a multiversion-capable release over a release that is not multiversion capable. After installing a multiversion-capable release of Domino, either by itself or by upgrading an existing multiversion-capable release, you must also use the Update Domino Server (UPDDOMSVR) CL command for each Domino server that you want to update to a later release. Refer to 5.2.5, "Update Domino Server (UPDDOMSVR)" on page 186 for details about this.

2.6.2 Preparing for multiversion-capable releases

For Domino releases that are not multiversion capable, the software is installed into the QNOTES library and the /QIBM/PRODDATA/LOTUS/NOTES directory. To enable multiple versions of Domino on a single partition, several significant changes will be seen by all the administrators and developers, whether they choose to install one or multiple releases of Domino:

Beginning Domino 6.0.3 and 6.5.0, every Domino release is now multiversion capable and is installed into its own unique library and directory. Domino 6.5.0 is, for example, installed into the QDOMINO650 library and the /QIBM/PRODDATA/LOTUS/DOMINO650 directory. Domino 6.0.3 is installed into the QDOMINO603 library and the /QIBM/PRODDATA/LOTUS/DOMINO603 directory. Domino 7.0 is installed into the QDOMINO700 library and the /QIBM/PRODDATA/LOTUS/DOMINO700 directory.

- Prior to multiversioning support, all the Domino releases were installed into the QNOTES library and the /QIBM/PRODDATA/LOTUS/NOTES directory. With multiversioning, the QNOTES library and the /QIBM/PRODDATA/LOTUS/NOTES directory still exist, but are shared among the multiversion-capable releases.
- ► Every new release of Domino is packaged as a Domino product option so that when it is installed, it uses its own product library and product directory, for example, release 6.0.3 for 5733LD6 is installed using option 13 of that product and release 6.5.0 for 5733L65 is installed using option 10 of that product. New releases of these products will be installed with their own options for that product.
- ► For major new versions of Domino, new licensed product IDs are used, for example, Domino 6.0.x uses 5733LD6, Domino 6.5.x uses 5733L65, and Domino 7.0 uses 5733LD7.



Installing Domino 7 on i5/OS

This chapter describes the different methods that are available to install Domino 7 on i5/OS. It also explains how to install the Domino plug-in for iSeries Navigator, and includes information about additional language support.

3.1 Before installing Domino

Before you install and configure your first Domino server, you must plan server and organizational naming and security. In addition, you must understand your existing network configuration and how Domino will fit into the network.

Some of the important questions that you must ask yourself are:

Is my server properly sized?

Properly sizing your system is crucial to the success of your Domino environment. IBM provides an online tool called the IBM Systems Workload Estimator to help you assess your environment and provide sizing recommendations. This tool is available on the Web at:

http://www-912.ibm.com/estimator

I already have Domino installed. What can I do?

If you already have Domino servers configured on the system, stop these servers and all the Domino subsystems before installing the Domino 7 for i5/OS software. However, if all the configured Domino servers are multiversion-capable servers, you can install the Domino software when they are still running. Multiversion-capable servers are discussed in detail in 3.4, "Multiversioning" on page 61.

Are other languages supported?

You can run more than one language on a Domino server or can have Domino servers running with different languages, using the Domino Language Pack and multilingual database support. These language packs are available some weeks after a particular release is available. Refer to 3.5, "Additional language support" on page 66 for more information.

Review the information provided in Chapter 2, "Prerequisites for running Domino 7 on i5/OS" on page 11 before installing Domino on your i5/OS.

3.2 Installing Domino

For every Maintenance Release of Domino 7, the following product options are available for installation:

*BASE option

This option defines the product options that can be installed for a specific product ID. *BASE must be installed before any other product options can be installed.

Product option

This option contains the programs, data, and template files that are required to run a specific release of Domino. You must select this option to install and configure a Domino server, for example, 5733LD7 option 11 is the product option for Domino version 7.0.1.

C API option

Listed as option 1, this option contains the header files and the modules for creating Notes C applications that can run on a Domino 7 server on i5/OS.

Important: You can install the C API option 1 later if you are not sure that you require it. However, be aware that only one instance of this option can be installed on an i5/OS partition. For more information, refer to "Installing multiple releases of Domino" in Chapter 12 of the i400hlp.nsf help database.

Table 3-1 summarizes the various methods that are available to launch the installation of Domino 7 on i5/OS.

Method	Invoked from	Media
Domino Server Installation Wizard (using InstallShield)	 Direct call to InstallShield (setup.exe) iSeries Navigator EZ-Setup 	 Local CD drive System i optical drive
LODRUN	i5/OS CL command	System i optical drive
RSTLICPGM	i5/OS CL command	i5/OS save file (SAVF)

Table 3-1 Installation methods available to install Domino 7 on i5/OS

Note: When you use the iSeries Navigator or EZ-setup installation method, they still use the InstallShield software provided by the Windows operating system. However, it is not called directly by you. Although there are several ways in which to initiate the installation, all use the same underlying code in the RSTLICPGM command to perform the installation.

Figure 3-1 shows the questions you must answer in order to select the best installation method according to your skills.



Figure 3-1 Flow chart of installation methods

Important: By using the compressed file obtained from Passport Advantage you will only be able to install through the Domino Server Installation Wizard by using the setup.exe file or by using the RSTLICPGM command.

3.2.1 Actions that take place when Domino 7 is installed

The following actions occur during the installation process:

- Licensed program objects, such as programs (*PGM) and service programs (*SRVPGM), are placed in the release-specific library, such as QDOMINO700, QDOMINO701, or QDOMINO702.
- The following miscellaneous objects are placed in the QUSRNOTES library:
 - All the Domino server subsystem descriptions
 - All the data queues and job queues for the Domino servers
 - The status of the Domino servers
- Basic Domino files, such as .nsf and .ntf types, and files that contain symbolic links to the programs, service programs, and other objects in the release-specific library, are created in the release-specific directory in the i5/OS integrated file system, for example, /QIBM/ProdData/Lotus/DOMINO702. These symbolic links provide access to the objects in the release-specific library from the integrated file system.
- The /QIBM/USERDATA/LOTUS/NOTES directory is created in the i5/OS integrated file system. Users who create the programs to be accessed by Domino must add symbolic links to their programs in this directory.
- The QNOTES user profile is created for use by Domino and Notes application programs that run on the Domino server. This user profile is intended for the use of system functions by Domino and for integration with the underlying i5/OS security mechanisms. Therefore, it does *not* have a password. Individual users cannot use the QNOTES user profile to sign in to the system. The QNOTES user profile must *not* be deleted.

3.2.2 Direct call to InstallShield using setup.exe

To make a direct call to the InstallShield interface, execute the setup.exe file. This file is included in either the Domino 7 for System CD or in the folder created when you uncompress the file from the Passport Advantage. Because most installations are carried out from the electronic image downloaded from Passport Advantage, the installation steps for that method are described here.

To install Domino 7 for i5/OS, perform the following steps:

 Double-click the self-extracting executable file you obtained from Passport Advantage and click OK to uncompress it, as shown in Figure 3-2



Figure 3-2 Uncompressing the file

2. Select the location of the files to be extracted and click **Unzip** to start the process, as shown in Figure 3-3.



Figure 3-3 Location of the files to be extracted

3. Click OK to continue, as shown in Figure 3-4.

WinZip Self-Extractor	×	
10 file(s) unzipped successf	ully	
ОК		

Figure 3-4 Files extracted successfully

4. One of the unzipped files will be the setup.exe file. Double-click this file to begin the installation (Figure 3-5).

InstallerDomino7	lotototototototoj					-0
File Edit View Favorit	es Tool	s Help				_
🕒 Back 🝷 🅥 🚽 💋	5 <i>S</i>	Search 🔀 Folders	•			
Address 🛅 C: \InstallerDomin	107					💌 🄁 Go
		Name 🔻		Size	Туре	Date Modified
File and Folder Tasks	۲	VERSION.TXT		1 KB	Text Document	1/23/2006 9:03 AM
		SETUP.EXE		39,784 KB	Application	1/23/2006 9:13 AM
Other Places	*	README.PDAS		7,609 KB	Adobe Acrobat Doc	1/23/2006 9:10 AM
		E READ 1ST.TXT		14 KB	Text Document	1/19/2006 11:50 AM
Details	*	D QNOTESRL		1, 167, 441 KB	File	1/23/2006 9:22 AM
becom		D QNOTESAP		3,019 KB	File	1/23/2006 9:19 AM
		0 QNOTES		876 KB	File	1/23/2006 9:19 AM
		LICENSE.TXT		70 KB	Text Document	1/23/2006 9:09 AM
		i400HELP.pdf		1,332 KB	Adobe Acrobat Doc	1/23/2006 9:09 AM
		BOMWZD.EXE		43,174 KB	Application	1/23/2006 9:07 AM

Figure 3-5 Executing setup.exe

5. Click **Next** in the Welcome to the InstallShield Wizard for Lotus Domino window (Figure 3-6).

🔊 Installer	and a second second second	
InstallShield	Welcome to the InstallShield Wizard for Lotus Domino The InstallShield Wizard will install Lotus Domino on your computer. To continue, click Next.	
motomotio	Next >	Cancel

Figure 3-6 InstallShield Welcome

6. Read the International Program License Agreement and select the I accept the terms of the license agreement option (Figure 3-7). Click Next.

🔊 Installer	
InstallShield	Please read the following license agreement carefully. International License Agreement for Early Release of Programs Part 1 - General Terms THIS INTERNATIONAL LICENSE AGREEMENT FOR EARLY RELEASE OF PROGRAMS ("AGREEMENT") IS A LEGAL AGREEMENT BETWEEN YOU AND IBM BY DOWNLOADING, INSTALLING, COPYING, ACCESSING, OR USING THE PROGRAM YOU AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU ARE ACCEPTING THESE TERMS ON BEHALF OF ANOTHER PERSON OR A COMPANY OR OTHER LEGAL ENTITY, YOU REPRESENT AND WARRANT THAT YOU HAVE FULL AUTHORITY TO BIND THAT PERSON, COMPANY, OR LEGAL ENTITY TO THESE TERMS. "Early Release" is a release of a Program that (1) may still be under development (and therefore, is potentially unreliable) or (2) may no longer be under development but has not been made commercially available to users. "IBM" is International Business Machines Corporation or one of its subsidiariaes. "License Information" ("II") is a document that provides information."
	< Back Next > Cancel

Figure 3-7 License agreement

 Sign in to the System i machine by entering the system name or IP address, your user ID, and password information, as shown in Figure 3-8. Click Next. You must have the required user authority to perform this installation. (Refer to 2.3.3, "i5/OS administrative authority requirements" on page 21 for more information.)

🔊 Installer		
Part Part 1	Specify the user ID and password for sign on to the system. System: RCHAS10 User ID: QSECOFR Password: ********	
mstanomeru —	< Back Next >	Cancel

Figure 3-8 Signing in to the System i machine

8. Select the type of Domino server to install (Figure 3-9) according to the type of license you purchased. Click **Next** to continue.

Following are the types of Domino servers:

- Domino Messaging Server

The Domino Messaging Server includes the following capabilities, designed for the company that requires only messaging:

- Mail, calendar, and scheduling
- Personal information management functions such as a personal directory
- Discussion databases, teamrooms, and reference databases with basic workflow
- Domino partitioning (the capability to run more than one instance of Domino on the same machine using one copy of the Domino code)
- Domino Utility Server

The Domino Utility Server includes the following capabilities that are designed for collaborative applications where the number of users is high or difficult to track, for example, a Web application for customer self-service:

- Access to nonmail collaborative applications and use of individual mail files is not allowed
- Client access licenses are not required for Web browser access to nonmail
 applications, even when user authentication is involved
- Access from a Lotus Notes client is allowed, but the Lotus Notes software and client access license must be acquired separately
- Domino partitioning (the capability to run more than one instance of Domino on the same machine using one copy of the Domino code)
- · Domino clustering for failover and load balancing
- · Limited use entitlement to IBM WebSphere Application Server
- Entitlement to Lotus Domino Document Manager and Lotus Workflow
- Domino Enterprise Server

The Domino Enterprise Server includes the following capabilities that are designed to extend return on investment by including the business benefit of Domino applications, and is designed for environments requiring high availability:

- Mail, calendar, scheduling, personal information management (directory) functions, discussion database, reference databases, teamrooms, and reference databases with basic workflow
- Access to collaborative applications developed inhouse using Domino Designer (a separate client product) or by an IBM Business Partner
- Authenticated access requires the user to have a client access license. For anonymous access, a CAL is not required.

Note: Authentication is involved whenever the application requires secure validation of a user's unique identity.

- Domino partitioning (the capability to run more than one instance of Domino on the same machine using one copy of the Domino code)
- Domino clustering for failover and load balancing
- Limited use entitlement to IBM WebSphere Application Server

For more details about Domino licensing, refer to the following Web site:

http://www-142.ibm.com/software/sw-lotus/products/product4.nsf/wdocs/dominofaq

Installer				
	Select the type of installation you want.			
	C Domino Messaging Server			
	C Domino Utility Server			
	C Domino Enterprise Server			
InstallShield				
		< Back	Next >	Cancel

Figure 3-9 Types of Domino server licenses

9. Select the Domino 7 for i5/OS options that you want to install (Figure 3-10). Click Next.

Note: If this is not the first multiversion-capable release to be installed on your system, refer to 3.4.1, "Multiversioning when installing using the Domino Installation Wizard" on page 62.

Installer		
InstallShield	Select the options of Domino to install: C Domino 7.0.2 Server C API	
	< Back Next > Ca	ncel

Figure 3-10 Domino 7 for i5/OS options

10. Verify the options you selected (Figure 3-11) and click **Next** to continue.



Figure 3-11 Verifying the options to be installed

11.A progress bar (Figure 3-12) is displayed. Wait until the installation process is completed.

Important: On some systems, this process takes more than an hour.



Figure 3-12 Installation progress bar

12.1 When the installation is complete, you must receive a confirmation message, as shown in Figure 3-13. Click **Finish** to exit InstallShield.

Note: By selecting the **Launch the Domino setup wizard to configure a new server** option (new in 7.0.2), you start this process after this window closes.



Figure 3-13 Domino 7 for i5/OS successfully installed

3.2.3 Using the iSeries Navigator

This section shows you how to start the InstallShield process using the iSeries Navigator. Because the steps to install Domino using the Domino Server Installation wizard are the same as the setup.exe method (refer to 3.2.2, "Direct call to InstallShield using setup.exe" on page 46), this section explains the steps involved in invoking Installshield from the iSeries Navigator. To start the Domino Server Installation wizard from iSeries Navigator, perform the following steps:

- 1. Start iSeries Navigator and log in to the system where you want to install Domino.
- 2. Select the System i machine you want to work with and click **Network**. Right-click **Servers** and select **Install and Configure Domino**, as shown in Figure 3-14.



Figure 3-14 Installing Domino using iSeries Navigator

 The Welcome to the Lotus Domino Server Installation wizard window opens. Click Next to continue (Figure 3-15).

Convince	 Welcome to the Lotus Domino Server Installation wizard ! This wizard takes you through the steps of setting up Lotus Domino. Your Domino server will be running at the end of this wizard. This wizard: Installs Domino server software on your iSeries server if Domino has not been previously installed. Configures a Domino server based on your choices. Have the following ready: If the Domino software has not been installed on your iSeries server or if your PC does not have the required Domino EZ Stup files, you will need a Lotus Domino installation CD-ROM. One blank PC diskette to back up your Domino ID files. For additional information that you need to set up your Domino server, click Help. You can cancel at any time by clicking Cancel.
	Next X Cancel ? Help ?

Figure 3-15 Welcome window

4. Select the location of the installation media (Figure 3-16), and click Next.

To begin installing Domino for iSeries, you need to insert the Domino for iSeries CD-ROM into the CD-ROM device on the iSeries server or, if supported, into the CD-ROM device of your PC. See help for information on how to determine if your version of Domino can be installed from the CD-ROM device of your PC. Insert the CD-ROM now and click Next.	
Remote iSeries server CD-ROM drive Local PC CD-ROM drive	
k}	
Help ?	

Figure 3-16 Selecting the location of the installation media

 After this point, you will be prompted with steps similar to the ones described earlier in 3.2.2, "Direct call to InstallShield using setup.exe" on page 46, starting with step 5 on page 48.

3.2.4 Using LODRUN

Installing Domino 7 using the Load and Run (LODRUN) CL command requires the original medias provided by IBM. To complete the installation using the LODRUN command, perform the following tasks:

- Sign in to a System i 5250 emulation session with a user profile that has at least *ALLOBJ and *SECADM special authorities.
- 2. Insert the Lotus Domino for iSeries CD 1 into the System i optical drive. From an i5/OS command line, enter the following LODRUN command and press Enter:

```
LODRUN DEV(*OPT) DIR('/OS400')
```

3. Read the International Program License Agreement and press Enter to continue (Figure 3-17).

International Program License Agreement Part 1 - General Terms BY DOWNLOADING, INSTALLING, COPYING, ACCESSING, OR USING THE PROGRAM YOU AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU ARE ACCEPTING THESE TERMS ON BEHALF OF ANOTHER PERSON OR A COMPANY OR OTHER LEGAL ENTITY, YOU REPRESENT AND WARRANT THAT YOU HAVE FULL AUTHORITY TO BIND THAT PERSON, COMPANY, OR LEGAL ENTITY TO THESE TERMS. IF YOU DO NOT AGREE TO THESE TERMS, - DO NOT DOWNLOAD, INSTALL, COPY, ACCESS, OR USE THE PROGRAM; AND - PROMPTLY RETURN THE PROGRAM AND PROOF OF ENTITLEMENT TO THE PARTY FROM WHOM YOU ACQUIRED IT TO OBTAIN A REFUND OF THE AMOUNT YOU PAID. IF YOU DOWNLOADED THE PROGRAM, CONTACT THE PARTY FROM WHOM YOU ACQUIRED IT. "IBM" is International Business Machines Corporation or one of its subsidiaries. "License Information" ("LI") is a document that provides information More... F12=Cancel F3=Exit ENTER=Accept (C) COPYRIGHT IBM CORP.

Figure 3-17 International Program License Agreement
4. Select the products you want to install and press Enter to continue, as shown in Figure 3-18.

Note: If this is not the first multiversion-capable release to be installed on your system, refer to 3.4.2, "Multiversioning when installing using the LODRUN command" on page 64.

```
Install Lotus Domino Licensed Program (5733LD7)
 Type options, press Enter.
   1=Install
           Product
                     Installed
 Option
          Option
                     Status
                                    Description
                     *NO
                                    Lotus Domino 7: Release 7.0.2
   1
          12
   1
          1
                     *NO
                                    C API Release 7
F3=Exit
            ENTER To Continue
 (C) COPYRIGHT IBM CORP. 1989, 2006. ALL RIGHTS RESERVED.
```

Figure 3-18 Selecting the product options to install

 After a few minutes (the time depends on the System i model you are working with) the installation process asks you to insert the Lotus Domino for iSeries CD 2 into the System i optical drive. Press Enter to continue (Figure 3-19).

Lotus Domino for iSeries Please insert the Lotus Domino for iSeries CD 2 and then press ENTER. Otherwise, you may cancel the installation by pressing F3=Exit and reattempt the installation. Note that you will have to start from the beginning using the CD 1 again. F3=Exit ENTER=Continue

Figure 3-19 Prompt to insert the Lotus Domino for iSeries CD 2

After a few minutes, the installation process ends and the following message is displayed:
 "Command LODRUN ended successfully".

 Go to the additional message information screen (Figure 3-20) by pressing F1 for more information.

```
Additional Message Information
                          LNT0997
                                                                  00
Message ID . . . . . :
                                        Severity . . . . . . :
Message type . . . . :
                          Completion
                          07/25/06
Date sent . . . . . :
                                        Time sent . . . . . :
                                                                  15:15:55
Message . . . : Command LODRUN ended successfully.
Cause . . . . : The command indicated ended without errors.
Recovery . . . :
                   None required.
                                                                      Bottom
Press Enter to continue.
F3=Exit
         F6=Print
                  F9=Display message details
F10=Display messages in job log
                                 F12=Cancel
                                            F21=Select assistance level
```

Figure 3-20 Additional message information

3.2.5 Using RSTLICPGM

Using the Restore License Program (RSTLICPGM) CL command requires you to have the save files of QNOTES and QNOTESRL on the i5/OS. The save file of QNOTESAP is required only if you want to install the C API option.

Perform the following steps to complete the installation using RSTLICPGM:

1. Use file transfer protocol (FTP) to transfer the save files to the i5/OS integrated file system. See Example 3-1.

Example 3-1 Transferring save files to the i5/OS integrated file system

```
C:\>cd InstallerDomino7
C:\InstallerDomino7>ftp 192.168.9.104
Connected to 192.168.9.104.
220-QTCP at DOM7SVR1.ITSO.COM.
220 Connection will close if idle more than 5 minutes.
User (192.168.9.104: (none)): itsouser
331 Enter password.
Password:
230 ITSOUSER logged on.
ftp> bin
200 Representation type is binary IMAGE.
ftp> put gnotes mylib/gnotes
200 PORT subcommand request successful.
150 Sending file to member QNOTES in file QNOTES in library MYLIB.
226 File transfer completed successfully.
ftp: 896016 bytes sent in 0.13 Seconds 6892.43Kbytes/sec.
ftp> put qnotesrl mylib/qnotesrl
200 PORT subcommand request successful.
150 Sending file to member QNOTESRL in file QNOTESRL in library MYLIB.
226 File transfer completed successfully.
ftp: 1195459584 bytes sent in 138.26 Seconds 8646.52Kbytes/sec.
```

```
ftp> put qnotesap mylib/qnotesap
200 PORT subcommand request successful.
150 Sending file to member QNOTESAP in file QNOTESAP in library MYLIB.
226 File transfer completed successfully.
ftp: 3076096 bytes sent in 0.06 Seconds 7322.66Kbytes/sec.
ftp> quit
221 QUIT subcommand received.
C:\InstallerDomino7>
```

2. Now that you have the save files copied into the System i machine, use the RSTLICPGM commands shown in Example 3-2 to install Domino 7 from the save files.

Example 3-2 Installing Domino 7 from the save files

```
rstlicpgm licpgm(5733LD7) dev(*savf) option(*base) savf(mylib/qnotes)
rstlicpgm licpgm(5733LD7) dev(*savf) option(12) savf(mylib/qnotesrl)
rstlicpgm licpgm(5733LD7) dev(*savf) option(1) savf(mylib/qnotesap)
```

3.3 Verifying if Domino is successfully installed

There are two options to verify if the Domino 7 software is successfully installed on the System i machine. You can use either the iSeries Navigator or a 5250 emulation session.

3.3.1 Using iSeries Navigator

Perform the following tasks using the iSeries Navigator to verify that Domino is successfully installed:

- 1. Start iSeries Navigator and select the System i machine on which you installed Domino 7.
- 2. Select Configuration and Services → Software → Installed Products.
- 3. In the right panel, look for the product ID of 5733LD7, as shown in Figure 3-21.

iSeries Navigator					
8 • • • × • • • • • • •					
Environment: My Connections		RCnasiu: Ins	stalled Prod	lucts	
🕀 🏽 Management Central (Rchas10)	^	Product	Option	Release	Description
My Connections		5722xp1	0000	V5R3M0	iSeries Access for Wireless
Rchas10 Rchas10 Basic Operations Work Management Generation and Service		5722xw1	0000	V5R4M0	iSeries Access Base
		5722xw1	0001	V5R4M0	iSeries Access Option 1
		5733ld7	0000	V7R0M2	Lotus Domino 7 (5724E62)
Configuration and Service		5733ld7	0001	V7R0M2	Lotus Domino 7: C API
System values		5733ld7	0012	V7R0M2	Lotus Domino 7: Release 7.0.2
Time Management		5733sc1	0000	V5R4M0	IBM Portable Utilities for i5/OS
Hardware		5733sc1	0001	V5R4M0	OpenSSH, OpenSSL, zlib
		5733w60	0000	V6R0M0	WebSphere Application Server for OS/400
All Products		5733w60	0002	V6R0M0	WebSphere Application Server V6 ("Base")
Installed Products		5733w60	0003	V6R0M0	WebSphere Application Server V6 Network
Supported Products	~	5733xt1	0000	V1R1M0	XML Toolkit for iSeries

Figure 3-21 Using iSeries Navigator to verify if Domino 7 is installed

3.3.2 Using the i5/OS command line

You can verify if Domino7 is properly installed by using the Display Software Resources (DSPSFWRSC) CL command. The result is shown in Figure 3-22.

			Display Software Resources
			System: RCHAS10
Resource			
ID	Option	Feature	Description
5722XW1	*BASE	2924	iSeries Access Base
5722XW1	1	5101	iSeries Access Option 1
5733LD7	*BASE	5050	Lotus Domino 7 (5724E62)
5733LD7	*BASE	2924	Lotus Domino 7 (5724E62)
5733LD7	1	5050	Lotus Domino 7: C API
5733LD7	12	5050	Lotus Domino 7: Release 7.0.2
5733LD7	12	2924	Lotus Domino 7: Release 7.0.2
5733SC1	*BASE	5050	IBM Portable Utilities for i5/0S
5733SC1	*BASE	2924	IBM Portable Utilities for i5/0S
5733SC1	1	5050	OpenSSH, OpenSSL, zlib
5733W60	*BASE	5050	WebSphere Application Server for OS/400 V6
5733W60	2	5102	WebSphere Application Server V6 ("Base")
5733W60	3	5103	WebSphere Application Server V6 Network Deployment
5733XT1	*BASE	5050	XML Toolkit for iSeries
			More
Press Ent	er to co	ntinue.	
F3=Exit	F11=Dis	play libr	aries/releases F12=Cancel
F19=Display trademarks			

Figure 3-22 Display Software Resources screen

Installed status values

This section describes the installed status values that you might see on the LICPGM displays. Use these values to determine whether you can use a product or whether you have to upgrade a licensed program. If you do not see a value of *COMPATIBLE, check the other installed status values to proceed further. Following are the installed status values:

*COMPATIBLE

The product is installed. Its version, release, and modification are compatible with the installed level of the operating system. Use this program with the installed level of the operating system.

*ERROR

Either the product has not installed successfully or the product is only partially installed, for example, a language or a language object for the product is not installed. Use the Check Product Option (CHKPRDOPT) CL command to determine the cause of the failure. To determine the cause of a missing object, enter 60 LICPGM and select options **10** and **50**.

Note: The product lists now show many products, such as Programming Request for Price Quotations (PRPQ), licensed program offerings (LPO), and non-IBM products. This *ERROR status might have existed before the upgrade to the current operating system release, but not detected. Use the CHKPRDOPT command to find out why the product shows an *ERROR, and contact your software provider if you require help in correcting the problem.

*BACKLEVEL

The product is installed. Its version, release, and modification is not compatible with the currently installed level of the operating system. To correct this problem, install a current release of this product. And if you have secondary languages, install a new release of these languages too, by using the LICPGM menu option 21.

Note: If you use a licensed program that is listed as *BACKLEVEL, you run the risk of having an information mix up between release levels, or some portions of the licensed program might not work properly. An installed status value of *COMPATIBLE is necessary.

*BKLVLOPT

The product is installed. Its version, release, and modification is not compatible with the currently installed level of the base product that is associated with the option. To correct this problem, install a current release of this option.

*BKLVLBASE

The product is installed, but its associated base product is not compatible with this option. To correct this problem, install a current release of the base product.

*NOPRIMARY

The product is installed, but the language for the product is not the same as the primary language of the operating system. To correct this problem, install the primary language for the product.

Note: If this product is an LPO, PRPQ, or non-IBM product, it is possible that the licensed program (from the manufacturer) is not available in the primary language of the operating system.

*INSTALLED

The product is installed, but might or might not be compatible with the installed level of the operating system.

Note: Licensed programs that are a part of the single set are listed on the display panel as *INSTALLED. Verify that the release level of the licensed program is compatible with the release level of the operating system.

3.4 Multiversioning

For an overview of multiversioning, refer to 2.6, "Overview of Domino for i5/OS multiversion capabilities" on page 39. When you install Domino 7, and you have already installed a multiversion-capable release of Domino, you will be asked if you want to keep the other releases installed. This section shows you these windows when you use the Domino Installation Wizard or the LODRUN command.

3.4.1 Multiversioning when installing using the Domino Installation Wizard

The Domino Installation Wizard has a few additional steps if you already have a multiversion-capable release of Domino installed on the system. Perform the following steps to install an additional release of Domino to your System i machine:

1. Select the Domino options to install and click Next to continue (Figure 3-23).

Attention: The C API option is not multiversion capable. Only one instance of this option can be installed on one i5/OS partition at a time.

	Select the options of Domino to install:
	 Domino 7.0.2 Server (Domino version 7.0.1 already installed) C API (Domino version 7.0.1 already installed)
	k}
InstallShield ———	< Back Next > Cancel

Figure 3-23 Selecting the options of Domino to install

2. If you choose to install the C API, the window shown in Figure 3-24 is displayed. Click **Yes** to continue.

C API option, 7.0.1, is alr installation of this option overwritten.	eady installe the existinूि	ed. If you proceed Linstalled option w	with the ill be
	Yes	No	

Figure 3-24 Prompt to overwrite the previous C API option

3. Select the **Attempt to delete the previous release** option (Figure 3-25) if you want to delete any other installed releases of Domino. This requires you to end any Domino server that is currently running those releases. Leave it unchecked to retain the earlier Domino releases that are installed. Click **Next** to continue.



Figure 3-25 Option to delete the existing versions of Domino that are installed

 After this point, the installation process is the same. After successful installation, from iSeries Navigator go to Services → Software → Installed Products to check the installed releases, as shown in Figure 3-26.

🖉 iSeries Navigator						
File Edit View Help						
X 🖻 🖻 🗙 🖆 🔮 🚺 🛇	※					
Environment: My Connections		Rchas10: Ins	stalled Prod	ucts		
🕀 📳 Management Central (Rchas10)		Product	Option	Release	Description	
Hy Connections		5722xh2	0000	V5R4M0	iSeries Access for Web	
		5722xp1	0000	V5R3M0	iSeries Access for Wireless	
	≡	5722xw1	0000	V5R4M0	iSeries Access Base	
		5722xw1	0001	V5R4M0	iSeries Access Option 1	
		🔊 5733ld7	0011	V7R0M1	Lotus Domino 7: Release 7.0.1	
History Log		💽 5733ld7	0000	V7R0M2	Lotus Domino 7 (5724E62)	
		🔊 5733ld7	0001	V7R0M2	Lotus Domino 7: C API	
Handware		5733ld7	0012	V7R0M2	Lotus Domino 7: Release 7.0.2	
Software		5733sc1	0000	V5R4M0	IBM Portable Utilities for i5/OS	
All Products		5733sc1	0001	V5R4M0	OpenSSH, OpenSSL, zlib	
Installed Products		5733w60	0000	V6R0M0	WebSphere Application Server for OS/400	

Figure 3-26 Multiple Domino releases installed

3.4.2 Multiversioning when installing using the LODRUN command

The installation process has some additional steps if you already have a multiversion-capable release of Domino installed on the system earlier. Perform the following steps to install an additional release of Domino to your System i machine when using the LODRUN command:

1. Select the Domino options to install and press Enter (Figure 3-27).

Attention: The C API option is not multiversion capable. Only one instance of this option can be installed on one i5/OS partition at a time.

	Instal	l Lotus Domino	Licensed Program (5733LD7)
Type opt 1=Inst	cions, press call	Enter.	
	Product	Installed	
Ontion	Ontion	Status	Description
000100	operon	Status	Description
1	12	*NO	Latus Domino 7: Dologso 7 0 2
1	12		C ADI Deleger 7
1	1	^INSTALLED	C API Release /
F3=Exit	ENTER	To Continue	
(C) COPYRIGHT IBM CORP. 1989, 2006. ALL RIGHTS RESERVED.			

Figure 3-27 Installing Domino options

2. If you want to keep the other releases of Domino installed, select option **0** and press Enter to continue (Figure 3-28).

Attention: When installing using the Domino Installation wizard, the option to delete the earlier installed version is *not* selected by default. However, when installing using LODRUN, the option to delete the earlier installed releases is selected by default.

Option Inst	all Actions	Suctor: DCHAS10
Type choices, press Enter:		System. RUNASIO
Install action	Choice	Possible choices
Delete currently installed release	0	O=Do not Delete,1=Delete
F3=Exit F12=Cancel		

Figure 3-28 Option Install actions

3. After this point, the installation process is the same. After successful installation, use the DSPSFWRSC CL command as shown in Figure 3-29 to check the installed releases.

		D	isplay Software Resources	
_			System:	RCHAS10
Resource				
ID	Option	Feature	Description	
5722XW1	*BASE	2924	iSeries Access Base	
5722XW1	1	5101	iSeries Access Option 1	
5733LD7	11	5050	Lotus Domino 7: Release 7.0.1	
5733LD7	11	2924	Lotus Domino 7: Release 7.0.1	
5733LD7	*BASE	5050	Lotus Domino 7 (5724E62)	
5733LD7	*BASE	2924	Lotus Domino 7 (5724E62)	
5733LD7	1	5050	Lotus Domino 7: C API	
5733LD7	12	5050	Lotus Domino 7: Release 7.0.2	
5733LD7	12	2924	Lotus Domino 7: Release 7.0.2	
5733SC1	*BASE	5050	IBM Portable Utilities for i5/OS	
5733SC1	*BASE	2924	IBM Portable Utilities for i5/OS	
5733SC1	1	5050	OpenSSH, OpenSSL, zlib	
5733W60	*BASE	5050	WebSphere Application Server for OS/400 V6	
5733W60	2	5102	WebSphere Application Server V6 ("Base")	
				More
Press Ent	er to co	ntinue.		
F3=Exit	F11=Dis	play libra	aries/releases F12=Cancel	
F19=Display trademarks				
5733W60 5733W60 Press Ent F3=Exit F19=Displ	2 er to co F11=Dis ay trade	5050 5102 ntinue. play libra marks	WebSphere Application Server V6 ("Base") WebSphere Application Server V6 ("Base") aries/releases F12=Cancel	More

Figure 3-29 Display Software Resources

3.5 Additional language support

Starting with Domino 6, you can deploy more than one language on a Domino server or have Domino servers with different languages by using a language pack and multilingual database support. This section explains how to install these language packs, using different methods.

The IBM Lotus Domino Server Language Pack Installer adds, replaces, and removes language packs from your Domino server. Language packs include translated versions of standard Domino system templates such as the Discussion and Mail templates and certain binary files required by the server.

The options that are available to install additional languages to your Domino servers are:

Using the Language Pack Installer that is provided in the Language Pack CD

For details, refer to 3.5.1, "Installing additional languages using the Language Pack Installer" on page 66.

Using the i5/OS Load and Run (LODRUN) CL command

For details, refer to 3.5.2, "Installing additional languages using the LODRUN command" on page 74.

3.5.1 Installing additional languages using the Language Pack Installer

This section describes the steps involved in installing additional languages to your Domino servers using the Language Pack Installer. In this example, the language pack for Spanish is installed. Perform the following steps:

Note: At the time of writing this book, the language pack for 7.0.2 was not yet available. Because the process is the same, the steps involved in installing the Spanish language pack for Domino 7.0.1 is described here.

- 1. Execute the file called DomLP701_iSeries.EXE in the language pack CD.
- 2. Sign in to the System i machine where you want to install the language pack (Figure 3-30) and click **OK**.

Signon to the Server		
System:	RCHAS10	
User ID:	QSECOFR	
Password:	*****	
ок	Cancel	

Figure 3-30 Signing in to the System i machine

3. Select the language to be used for this wizard (Figure 3-31) and click OK.

🞯 IBM Lotus Domino Se 🖃 🗆	X
Select a language to be used for this wizard.	
English	
ОК Cancel	

Figure 3-31 Selecting the language for the wizard

4. In the Welcome to the IBM Lotus Domino Server Language Pack Installer window, click **Next** to continue (Figure 3-32).



Figure 3-32 Welcome window

5. Read the software license agreement shown in Figure 3-33 and select the **I accept the terms in the license agreement** option. Click **Next**.

🞯 IBM Lotus Domino Server Language Pack Installer 🛛 🔲 🔲 🔀			
	Software License Agreement Please read the following license agreement carefully. International Program License Agreement		
R	Part 1 - General Terms BY DOWNLOADING, INSTALLING, COPYING, ACCESSING, OR USING THE PROGRAM YOU AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU ARE ACCEPTING THESE TERMS ON BEHALF OF ANOTHER PERSON OR A COMPANY OR OTHER LEGAL ENTITY, YOU REPRESENT AND WARRANT THAT YOU HAVE FULL AUTHORITY TO BIND THAT PERSON, COMPANY, OR LEGAL ENTITY TO THESE TERMS. IF YOU DO NOT AGREE TO THESE TERMS,		
	 DO NOT DOWNLOAD, INSTALL, COPY, ACCESS, OR USE THE PROGRAM; accept the terms in the license agreement I do not accept the terms in the license agreement 		
InstallShield	< Back Next > Help Cancel		

Figure 3-33 Software License Agreement

6. The installer lists the Domino server program directory where the language pack will be installed. You can also select any of the existing Domino servers where you want to install the language pack. If you want to apply the language pack to all the Domino servers, select the Select all partitions check box and click Next (Figure 3-34).

IBM Lotus Domino Ser	ver Language Pack Installer
	The following Domino data directories have been detected. Choose the directories into which you want to install language packs.
	Domino server program directory
	/QIBM/PRODDATA/LOTUS/DOMIN0701
	Domino server data directories Data directory /Domino/DOMSVR1/Data/ /Domino/DOMSVR2/Data/
	Select all partitions
InstallShield	
	< Back Next > Help Cancel

Figure 3-34 Selecting the Domino servers to install the language pack

- Select the language pack installation method. In this example, the Add Language Pack to Domino server option is selected. Click Next to continue (Figure 3-35). Following is an explanation of all the available options (you can also click Help for help on these options):
 - Add Language Pack to Domino server

Installs language packs by merging the translated forms, views, and other design elements with your existing language templates. The Language Pack Installer also installs additional files for Web enablement. You can add more than one language pack to a Domino server and select which templates to add to the server. By default, the Language Pack Installer adds all the translated templates to the Domino server.

- Replace Language Pack

Overwrites the current language of the Domino server with the selected language pack. You can only replace one language pack at a time.

- Remove Language Pack from Domino server

Uninstalls specified language packs from the Domino server by removing the translated forms, views, and other design elements from your templates. You can only remove languages added by earlier installations of the Language Pack Installer.



Figure 3-35 Specifying how to install the language pack

 The installer checks for available disk space and validates the Domino version. The language pack must be at the same version level as the Domino code. Click Next (Figure 3-36).

🞯 IBM Lotus Domino Ser	ver Language Pack I	nstaller			
	Finished checking th Confirmed versi Release 7.0 Click Next button to c	e Domino ser on of the Dom 1.1 January 17, ontinue the ins	ver. ino server: , 2006 (Release 7 stallation.	0.1)	
	Temporary Area: Space Needed: Available Space:	/tmp/install 184.01 MB 528.94 GB	IShield ytes ytes		
InstallShield		< Back	Next >	Help	Cancel

Figure 3-36 Confirming the language pack to be installed

9. Select the language to install, as shown in Figure 3-37. Click **Select Files** to verify all the templates that will use the new language.

Note: Multiple languages might be available, depending on your installer. You can also customize the language pack installation by deciding on which language packs and templates to add, which ones to replace, and which ones to remove from the Domino server.

🗐 IBM Lotus Domino Ser	ver Language Pack Installer	
	The following Language Packs are avai want to add.	lable. Select the Language Packs you
	Domino server	Language Pack selection
12	Default Language : English	Language Pack Spanish Select Files
InstallShield	< Back	Next > Help Cancel

Figure 3-37 Available languages

10. Select the templates that will use this language pack, as shown in Figure 3-38. During the language pack installation process, the translated database templates are added to the current ones in the Domino server data directory. You can either select all the templates or decide to install only some of them. By default, all the templates are selected. Click **OK**.

👙 Sele	ect files	
Unchec	ස් the templates and files that you do not want install	ed.
	Bookmark (7) Discussion - Notes & Web (7) Doc Library - Notes & Web (7) Domino Web Access (7) Domino Web Access (6) Personal Journal (7) Extended Mail (R7) Mail (R7) Personal Address Book	
App	oly all Language Packs	

Figure 3-38 The templates list

🞯 IBM Lotus Domino Ser	ver Language Pack Installer
	Confirm the following settings. Click the "Next" button, to begin the installation, using the selected Language Pack(s).
	Install type of Language Pack: Add Language Pack Program directory: /QIBM/PRODDATA/LOTUS/DOMINO701 Data directory which Language Pack installed to: /Domino/DOMSVR1/Data/ /Domino/DOMSVR2/Data/ Install language: Spanish
InstallShield	< Back Next > Help Cancel

11.Confirm the information displayed in the window, as shown in Figure 3-39, and click Next.

Figure 3-39 Confirmation window

12. Status bars display the progress of the language pack installation, as shown in Figure 3-40.

BM Lotus Domino Serv	Yer Language Pack Installer Type of installation: Add Language Pack Status: Copying updated templates to Domino data directory File: mail7.ntf	
InstallShield	86% 34% < Back Next > Help	Cancel

Figure 3-40 installation progress bars

13.A message informs you about the successful installation of the language pack. Click **Finish** to exit the installation wizard (Figure 3-41).

🞯 IBM Lotus Domino Ser	ver Language Pack Installer	
	Selected Language Packs are successfully installed. Click "Finish" button to end this installation.	
- N	5	
InstallShield		
matamonisti	< Back Finish He	lp

Figure 3-41 Language pack installation successful

The additional language packs are now successfully installed. To use the translated version for the Domino databases, refresh the design of the databases. Refer to "Creating Multilingual Applications" section of the Lotus Domino Designer 7 Help database (help7_designer.nsf) for more information. Figure 3-42 shows a translated mail database.

S Correo -	Nu	evo mensaje	Responder •	Responder a tode	os 🔹 Remitir 🖲	Eliminar	Seguimiento 🔻	Carpeta
para Domino Administrator		A [^]	lombre ^	^ Fecha ∨	Hora	Tamaño 🗸	Asunto ^	
👌 Bandeja de entrada (*	1	Domino	07/27/2006	02:13 PM	1,070	Test	
🕅 Borradores			Administrator					
🛐 Enviados								
Seguimiento								
🚇 Correo no deseado								
📆 Papelera								
🕀 🔲 Vistas								
🕀 🧰 Carpetas								
 ☐								

Figure 3-42 Spanish mail database

3.5.2 Installing additional languages using the LODRUN command

This section describes the steps involved in installing additional languages to your Domino servers using the LODRUN CL command. In this example, the language pack for Spanish is installed. Perform the following steps:

Note: At the time of writing this book, the language pack for 7.0.2 was not yet available. Because the process is the same, the installation of the Spanish language pack for Domino 7.0.1 is described here.

- 1. Place the Domino Language Pack CD into the System i optical drive.
- 2. From an i5/OS command line, type the following LODRUN command:

LODRUN DEV(*OPT) DIR('/OS400')

3. The language code installation process starts. After a few seconds, an installation console is displayed. Type the option that corresponds to the language to be used by the wizard and press Enter (Figure 3-43).

Tip: If you do not see all the text in the Language Pack Installer console displayed, use the PgUp and PgDn keys to see all the text.

```
Java Shell Display
 Attaching Java program to /QOPT/C89A6ES/DomLP701 Suite.jar.
   _____
 Select a language to be used for this wizard.
 [] 1 - Portuguese (Brazil)
 [] 2 - Czech
   ] 3 - Danish
 [] 4 - Dutch
 [X] 5 - English
  ] 6 - Finnish
   ] 7 - French
 [] 8 - German
===> 5
F3=Exit
        F6=Print F9=Retrieve F12=Exit
F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-43 Selecting the language of the wizard

4. Type 0 and press Enter to continue (Figure 3-44).

```
Java Shell Display
  [] 14 - Korean
  [] 15 - Norwegian
  [ ] 16 - Polish
  [] 17 - Russian
  [] 18 - Simplified Chinese
  [] 19 - Slovenian
  [] 20 - Spanish
  [] 21 - Swedish
 [] 22 - Traditional Chinese
 [] 23 - Turkish
 To select an item enter its number, or 0 when you are finished: [0]
===> 0
F3=Exit
         F6=Print F9=Retrieve F12=Exit
F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-44 Language Pack installation wizard

5. Type 1 and press Enter to continue (Figure 3-45).

```
Java Shell Display

Welcome to the IBM Lotus Domino Server Language Pack Installer

The IBM Lotus Domino Server Language Pack installer adds, replaces, and

removes Language Packs from the Domino server. Language Packs include

translated resource files and templates.

If you have English-language or customized templates that you want to

maintain, copy those files to a directory outside of the Domino data

directory.

Software License Agreement will be displayed at next screen.

Press 1 for Next, 3 to Cancel or 4 to Redisplay [1]

===> 1

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-45 Welcome to the IBM Lotus Domino Server Language Pack Installer

6. Press Enter to display the Software Licensing Agreement (Figure 3-46).

```
Java Shell Display

Software Licensing Agreement

Press Enter to display the license agreement on your screen. Please

read the agreement carefully before installing the Program. After

reading the agreement, you will be given the opportunity to accept it

or decline it. If you choose to decline the agreement, installation

will not be completed and you will not be able to use the Program.

===>

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-46 Software Licensing Agreement

7. Read through the Software Licensing Agreement by pressing Enter (Figure 3-47).

```
Java Shell Display

"License Information" ("LI") is a document that provides

information specific to a Program. The Program's LI is

available at http://www.ibm.com/software/sla/ . The LI may

also be found in a file in the Program's directory, by the

use of a system command, or as a booklet which accompanies

the Program.

Press Enter to continue viewing the license agreement, or, Enter 1 to

accept the agreement, 2 to decline it or 99 to go back to the previous

screen.

===>

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-47 Reading through the Software Licensing Agreement

8. Type 1 to accept the agreement and press Enter. Type 1 again and press Enter to continue (Figure 3-48).

```
Java Shell Display
>
You have completed viewing the license agreement. Enter 1 to accept
the agreement or 2 to decline it. If you choose to decline the
agreement, installation will not be completed and you will not be
able to use the Program.
> 1
Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
===> 1
F3=Exit F6=Print F9=Retrieve F12=Exit
F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-48 Accepting the agreement's terms

9. The Language Pack installer detects the existing Domino server data directories. Select the Domino servers where you want to install the language pack (Figure 3-49). In this example, Y is typed to install the language pack on all the existing Domino servers. Press Enter.

```
Java Shell Display

Language Pack installer has detected multiple data directories.

You can install Language Packs to one or all of these data directories.

Domino server data directory:

[] /Domino/DOM7SVR1/Data/

[] /Domino/DOM7SVR2/Data/

Do you want to install Language Packs to all data directories? [Y]es or

[N]o : [Y]

===> Y

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-49 Selecting the Domino server data directories to install the language pack

10. Type 1 and press Enter to continue (Figure 3-50).

```
Java Shell Display

The following Domino data directories have been detected. Language Pack

will only be installed into the selected data directories.

Domino server program directory

: /QIBM/PRODDATA/LOTUS/DOMIN0701

Domino server data directory

[X] /Domino/DOM7SVR1/Data/

[X] /Domino/DOM7SVR2/Data/

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]

===> 1

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-50 Continuing with the language pack installer wizard

- 11.Select the language pack installation method. For this example, the Add Language Pack to Domino server option is selected by typing option 1 and pressing Enter (Figure 3-51). Following is an explanation of all the available options:
 - Add Language Pack to Domino server

Installs language packs by merging the translated forms, views, and other design elements with the existing language templates. The Language Pack Installer also installs additional files for Web enablement. You can add more than one language pack to a Domino server, and select which templates to add to the server. By default, the Language Pack Installer adds all the translated templates to the Domino server.

- Replace Language Pack

Overwrites the current language of the Domino server with the selected language pack. You can only replace one language pack at a time.

- Remove Language Pack from Domino server

Uninstalls specified language packs from the Domino server by removing the translated forms, views, and other design elements from your templates. You can only remove languages added by the earlier installations of the Language Pack Installer.

```
Java Shell Display

Replace Language Pack

Overwrites files and/or designs of the Domino server, with translated

files of the selected language.

Remove Language Pack from Domino server

Remove files and/or designs, of selected languages, from the files of

the Domino server.

[] 1 - Add Language Pack to Domino server

[] 2 - Replace Language Pack

[] 3 - Remove Language Pack from Domino server

To select an item enter its number, or 0 when you are finished [0]:

===> 1

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-51 Language Pack Installer options

12. Type 0 and press Enter to continue (Figure 3-52).

```
Java Shell Display
             Add Language Pack to Domino server
   []
       1 -
   [] 2 -
             Replace Language Pack
             Remove Language Pack from Domino server
   [] 3 -
    To select an item enter its number, or 0 when you are finished [0]:
> 1
   [X] 1 - Add Language Pack to Domino server
   [] 2 - Replace Language Pack
   [] 3 -
             Remove Language Pack from Domino server
    To select an item enter its number, or 0 when you are finished [0]:
      0
===>
F3=Exit
         F6=Print F9=Retrieve F12=Exit
F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-52 Continuing with the language pack installer wizard

13. The Language Pack Installer checks the templates and copies the new language resources to the Domino server data directory (Figure 3-53).

```
Java Shell Display
   Obtaining language information from templates...
 Copied from: /Domino/DOM7SVR1/Data/
          bookmark.ntf
          discsw7.ntf
          doclbw7.ntf
          dwa7.ntf
          forms6.nsf
          forms7.nsf
          inotes6.ntf
          journal6.ntf
          mail7ex.ntf
         mail7.ntf
===>
F3=Exit
          F6=Print F9=Retrieve F12=Exit
F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-53 Obtaining language information from the templates

14. The installer checks for available disk space and validates the Domino version. The language pack must be at the same version level as the Domino code. Type 1 and press Enter to confirm the installation (Figure 3-54).

```
Java Shell Display

Finished checking the Domino server.

Confirmed version of the Domino server:

Release 7.0.1|January 17, 2006 (Release 7.0.1)

Please select Next and continue the installation.

Temporary Area: /tmp/

Space Needed: 184.01 MBytes

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]

===> 1

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-54 Confirmation screen

15.Select the languages you want to add to the Domino servers (Figure 3-55) and press Enter.

```
Java Shell Display

Default language : English

Current languages : .

The following Language Packs are available. Select the Language Packs you

want to add.

[] 1 - Spanish

To select an item enter its number, or 0 when you are finished [0]:

===> 1

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-55 Selecting the language to install

16. Type 0 and press Enter to continue (Figure 3-56).

```
Java Shell Display

The following Language Packs are available. Select the Language Packs you

want to add.

[] 1 - Spanish

To select an item enter its number, or 0 when you are finished [0]:

> 1

[X] 1 - Spanish

To select an item enter its number, or 0 when you are finished [0]:

===> 0

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-56 Continuing with the language pack installer wizard

17. Confirm the installation by typing 1 and pressing Enter (Figure 3-57).

```
Java Shell Display

Confirm the selected language(s) for installation.

Default language: English

Current languages: .

Language Pack selection:

[X] Spanish

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]

===> 1

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-57 Confirm the selected languages for installation

18. Select the templates to use the new language pack, type 0, and press Enter to continue (Figure 3-58). You can either select all the templates or decide to install only some of them. By default, all the templates are selected.

Java Shell Display
<pre>[X] 1 - bookmark.ntf [X] 2 - discsw7.ntf [X] 3 - doclbw7.ntf [X] 4 - dwa7.ntf [X] 5 - inotes6.ntf [X] 6 - journal6.ntf</pre>
<pre>[X] 7 - mail7ex.ntf [X] 8 - mail7.ntf [X] 9 - pernames.ntf [X] 10 - resrc7.ntf [X] 11 - teamrm7.ntf [X] 12 - Core Files</pre>
To select an item enter its number, or 0 when you are finished [0]: ===> 0 F3=Exit F6=Print F9=Retrieve F12=Exit F13=Clear F17=Ton F18=Bottom F21=CL command entry

Figure 3-58 Selecting the templates that will use the new language

19. Type 1 and press Enter to continue (Figure 3-59).

		_
	Java Shell Display	
bookmark.ntf	x	
discsw7.ntf	X	
doclbw7.ntf	x	
dwa7.ntf	X	
inotes6.ntf	x	
journal6.ntf	x	
mail7ex.ntf	X	
mail7.ntf	Х	
pernames.ntf	Х	
resrc7.ntf	Х	
<pre>teamrm7.ntf</pre>	Х	
Core Files	X	
Press 1 for Next, 2 for	or Previous, 3 to Cancel or 4 to Redisplay [1]	
===> 1		
F3=Exit F6=Print F9=R	etrieve F12=Exit	
F13=Clear F17=Top F18=	Bottom F21=CL command entry	

Figure 3-59 Confirmation screen

20. Confirm the settings, type 1, and press Enter (Figure 3-60).

```
Java Shell Display
    Confirm the following settings. Select the "Next", to begin the
    installation, using the selected Language Pack(s).
    Install type of Language Pack:
      Add Language Pack
    Program directory:
      /QIBM/PRODDATA/LOTUS/DOMIN0701
    Data directory which Language Pack installed to:
      /Domino/DOM7SVR1/Data/
      /Domino/DOM7SVR2/Data/
    Install language:
      Spanish
  Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
===> 1
F3=Exit
          F6=Print F9=Retrieve F12=Exit
F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-60 Confirming the settings

21. Wait until all the components are added to the selected Domino servers (Figure 3-61).

```
Java Shell Display
  Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
> 1
Adding selected language components...
       es - bookmark.ntf
       es - discsw7.ntf
       es - doclbw7.ntf
       es - dwa7.ntf
       es - iNotes6.ntf
       es - journal6.ntf
       es - mail7ex.ntf
       es - mail7.ntf
===>
           F6=Print F9=Retrieve F12=Exit
F3=Exit
F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-61 Adding the selected language components

22. When the process is completed, a message informs you about the successful installation of the language pack. Type 3 and press Enter to exit the installer (Figure 3-62).

```
Java Shell Display

Selected Language Packs are successfully installed.

Please select "Finish" to end this installation.

Press 3 to Finish or 4 to Redisplay [3]

===> 3

F3=Exit F6=Print F9=Retrieve F12=Exit

F13=Clear F17=Top F18=Bottom F21=CL command entry
```

Figure 3-62 Language pack successfully installed

Figure 3-63 shows the Spanish language installed on the System i machine. The new language is installed as feature 2931.

		D	isplay Software Resources
			System: RCHAS10
Resource			
ID	Option	Feature	Description
5722XW1	*BASE	2924	iSeries Access Base
5722XW1	1	5101	iSeries Access Option 1
5733LD7	*BASE	5050	Lotus Domino 7 (5724E62)
5733LD7	*BASE	2924	Lotus Domino 7 (5724E62)
5733LD7	1	5050	Lotus Domino 7: C API
5733LD7	11	5050	Lotus Domino 7: Release 7.0.1
5733LD7	11	2924	Lotus Domino 7: Release 7.0.1
5733LD7	11	2931	Lotus Domino 7: Release 7.0.1
5733SC1	*BASE	5050	IBM Portable Utilities for i5/0S
5733SC1	*BASE	2924	IBM Portable Utilities for i5/0S
5733SC1	1	5050	OpenSSH, OpenSSL, zlib
5733W60	*BASE	5050	WebSphere Application Server for OS/400 V6
5733W60	2	5102	WebSphere Application Server V6 ("Base")
5733W60	3	5103	WebSphere Application Server V6 Network Deployment
			More
Press Ent	er to co	ntinue.	
F3=Exit	F11=Dis	play libr	aries/releases F12=Cancel
F19=Displ	ay trade	marks	

Figure 3-63 Verifying the installed language packs

3.6 Installing the iSeries Navigator Lotus Domino plug-in

iSeries Navigator offers a powerful graphical interface for Windows clients so that you can manage and administer System i machines. It is fully integrated with the client desktop in the Windows environment. You can use iSeries Navigator to set up, manage, and administer one or multiple Domino servers. This requires you to install the Domino plug-in for iSeries Navigator.

The Domino plug-in for iSeries Navigator is a separately installed subcomponent of iSeries Navigator that allows you to perform the following tasks:

- Configure Domino for i5/OS servers
- Access Domino for i5/OS server properties
- Start and stop Domino for i5/OS servers
- ► Launch the Domino Administrator client
- Register the Domino users
- View or modify a Domino server's NOTES.INI file

Although the Domino plug-in is installed as a subcomponent of iSeries Navigator, it is delivered through Domino for i5/OS. Because the plug-in ships with Domino for i5/OS rather than with iSeries Access for Windows, install the Domino plug-in from a System i machine on which Domino is installed.

Important: Every time you install a new release of Domino on your system, update the Domino plug-in to the new version that is shipped with the new release of Domino.

If you are familiar with a graphical user interface such as Windows, you might prefer to use iSeries Navigator to manage your Domino servers. Figure 3-64 shows iSeries Navigator with the Domino plug-in installed.

Series Navigator				
File Edit View Help				
🙈 🦦 🕨 💿 🚋 🗙 🖆 🏈 🔢 🍳				
Environment: My Connections	Rchas10: Domino			
🖭 🏽 Management Central (Rchas10)	Server Name	Status	Version	
My Connections Rchas 10 Basic Operations Work Management Network Network Remote Access Services Servers Servers User-Defined DNS Defined DNS DNS DNS Defined DNS Defined DNS Defined DDF DDF DDF DDF DDF DDF DDF DD	G DOM7SVR1 G DOM7SVR2	Started Started	7.0.2 7.0.2	

Figure 3-64 Using iSeries Navigator to administer Domino servers on a System i machine

3.6.1 Installing plug-in immediately after installing Domino 7 for i5/OS

Perform the following tasks to install the Domino plug-in for iSeries Navigator immediately after installing Domino 7 for i5/OS:

1. When Domino is installed on the System i machine, the next time you start iSeries Navigator, it automatically detects a new plug-in to download, as shown in Figure 3-65. Click **Yes** to install it.

Plug-ins Detected
iSeries Navigator has detected the following plug-ins on 'Rchas10' that are available for installation on your PC:
Lotus Domino
Installing plug-ins will cause all active (Senes Navigator sessions to be ended. Would you like to end (Senes Navigator and install them now?
Yes No Help
Show this dialog again if new plug-ins are found the next time a server is accessed.

Figure 3-65 iSeries Navigator plug-in detected

2. Sign in to your system, as shown in Figure 3-66, and click OK.

Signon to iSeries Netserver				
	System:	DOM570		
	User ID:	QSECOFR		
	Password:			
		OK Cancel		

Figure 3-66 Signing in to the System i machine

3. Select the Lotus Domino plug-in and click Next, as shown in Figure 3-67.

Dive in Selection		
Plug-in Selection		_
Select the plug-ins you want to add.		
Components	Size	License Required 🔥
🖃 👿 🧭 iSeries Navigator	6855 K	
- 🗖 🕵 Advanced Job Scheduler	0 K	
🚽 🔚 🖳 OnDemand for iSeries Administrative Fur	0 K	
🗕 🗖 🖳 Backup, Recovery and Media Services	0 K	
	0 K	
🛛 🚽 🖳 Lotus Domino	6855 K	
🔄 🗖 🕵 Communications Trace Analyzer	0 K	
		>
Drive: C: Space Required: 7 M Space Available: 265	20 M	
Help < Back	Next >	Cancel

Figure 3-67 Selecting the Lotus Domino plug-in

4. Click Next to start the installation of the Domino plug-in (Figure 3-68).



Figure 3-68 Start copying files

5. Click Finish to exit the installation process (Figure 3-69).

Setup Completed		
	iSeries Access for Windows Setup is now complete.	
	< Back Finish	

Figure 3-69 Setup completed

3.6.2 Installing plug-in some time after installing Domino 7 for i5/OS

In the event that you did *not* select the check box against "Show this dialog again if new plug-ins are found the next time the server is accessed", and clicked **No** in the Plug-ins Detected window shown in Figure 3-65 on page 87, the Lotus Domino plug-in will *not* be installed for use with iSeries Navigator. Perform the following tasks if you now want to enable the Domino plug-in for iSeries Navigator:

1. In the top menu bar of iSeries Navigator, click **View**. In the drop-down window, make sure that Taskpad is selected, as shown in Figure 3-70.



Figure 3-70 iSeries Navigator Taskpad enablement

- 2. In the bottom right-hand corner of your iSeries Navigator window, the Taskpad is displayed. Select the **Install Plug-ins** option.
- 3. In Install Plug-ins dialog box (Figure 3-71), select the System i machine that has that particular latest release of Domino installed, and click **OK**.

Install Plug	ins 🔹 🕄 🔀
Select the so Navigator plu	rce system from which you want to install iSeries -ins:
Server:	•
	Dom570 Rchassq2
	OK Cancel Help

Figure 3-71 iSeries Navigator Install Plug-ins

4. You will be prompted to sign in to the System i machine that you have selected, as shown in Figure 3-72. Click **OK**.

Signon to iSeries			
	Server:	DOM570	
	User ID:	QSECOFR	
	Password:	*****	
		OK Cancel	

Figure 3-72 Signing in to the System i machine

5. At this point, the iSeries Access for Windows install procedure is called, as shown in Figure 3-73.



Figure 3-73 iSeries Access for Windows setup wizard splash screen

 You are prompted to sign in to the iSeries Netserver (Figure 3-74). Enter your i5/OS user ID and password again, and click OK.

Signon to iSeries Netserver					
	System:	DOM570			
Jii	User ID:	QSECOFR			
	Password:				
		OK Cancel			

Figure 3-74 Signing in to iSeries Netserver

7. From this point, perform the steps described in 3.6.1, "Installing plug-in immediately after installing Domino 7 for i5/OS" on page 87, beginning from step 3 on page 88.


4

Configuring a Domino 7 server on i5/OS

After successfully installing the Domino 7 for i5/OS software, the next logical step is to configure a Domino server. This chapter describes the different methods that are available to configure your first Domino 7 for i5/OS server. This chapter also discusses the various considerations you must keep in mind when adding additional Domino servers into an existing Domino domain.

4.1 Configuring a first Domino server

The first section of this chapter shows you how to configure the first Domino server in a new Domino domain. If you are configuring an additional Domino server into an existing Domino domain, refer to 4.2, "Configuring an additional Domino server" on page 128.

4.1.1 Methods to configure a Domino server

Use any of the following methods to configure a Domino 7 for i5/OS server:

Domino Server Setup wizard (domwzd.exe)

The Domino Server Setup wizard was first introduced in Release 6.0 and replaced the R5 Web-based Domino setup wizard. The wizard is written in Java and no longer requires the special version of Hypertext Transfer Protocol (HTTP) to be installed on the system. This wizard is a common Java source part implementation for all 6.0 and 7.0 platforms, although the common part does include some minor platform-unique code and panels.

InstallShield support is a Java-based installer, which is consistent to all Domino platforms. Following are the changes in the product installation options:

- Removed functions, such as C++ API and Toolkit, which are now available as Web-downloadable features
- Moved functions, such as the Operations Navigator features and the single sign-in option
- Changed functions, such as the C API are now a part of the base option installation

For details about how to configure a Domino server using the Domino Server Setup wizard (domwzd.exe), refer to 4.1.3, "Using domwzd.exe to configure a new Domino server" on page 96.

Configure Domino Server (CFGDOMSVR) CL command

The Configure Domino Server (CFGDOMSVR) CL command configures a Domino server or removes a Domino server configured earlier. Use this command to configure either a first Domino server or an additional Domino server.

For details about how to configure a Domino server using the Configure Domino Server (CFGDOMSVR) CL command, refer to 4.1.4, "Using CFGDOMSVR to configure a new Domino server" on page 113.

Using iSeries Navigator

Using the iSeries Navigator to configure a Domino server invokes the Domino Server Setup wizard (domwzd.exe). Before you use the iSeries Navigator to configure a Domino server, ensure that you have the current Domino plug-in installed. Refer to 3.6, "Installing the iSeries Navigator Lotus Domino plug-in" on page 85.

For details about how to configure a Domino server using the iSeries Navigator, refer to 4.1.5, "Using the iSeries Navigator to configure a new Domino server" on page 127.

As shown in Figure 4-1, the domwzd.exe, the EZ-Setup, and the iSeries Navigator configuration methods access the Domino Server Setup wizard, and follow the same Java graphical user interface for configuration, with some minor variations in the menus displayed.

Note: Two additional configuration methods that are not discussed in this chapter, but are shown in Figure 4-1, include using EZ Setup and setup.exe, because they too lead up to the Domino Server Setup wizard.



Figure 4-1 The options available to configure a Domino server on i5/OS

4.1.2 What happens during the configuration of the first Domino server

The following actions take place during the configuration of the first Domino server in a new Domino domain on i5/OS:

- Creates a new domain for the Domino servers
- Enables the appropriate network and serial ports
- Creates the Domino Directory (names.nsf) for the Domino domain
- Creates a certifier ID for your organization. The certifier ID file is saved in the same directory you choose for the Domino data files, and gives it the default name of CERT.ID.
- Creates a Certifier document in the Domino Directory. This document describes the certifier ID.
- Creates a server ID for the new server. The server ID file is saved in the same directory you choose for Domino data files, and gives it the default name of SERVER.ID.
- Certifies the server ID with the organization certifier ID or the organizational unit certifier ID
- Creates a Server Document in the Domino Directory. This document describes the first server, based on the information that you specify during configuration.
- Creates a Person Document in the Domino Directory for the Domino administrator specified during configuration
- Creates a user ID and a password for the Domino administrator, and attaches it as a file called USER.ID to the administrator's Person Document in the Domino Directory
- Certifies the administrator's user ID with the organization certifier ID or the organizational unit certifier ID
- Adds the administrator's name and the server's name as managers in the access control list of the Domino Directory
- ► Adds the server name to the LocalDomainServers group in the Domino Directory

- Creates the log file for the Domino server in the same directory you choose for the Domino data files and gives it the default name LOG.NSF
- Creates a mail directory in the Domino data directory and a mail file in that directory for the Domino administrator

4.1.3 Using domwzd.exe to configure a new Domino server

The Domino Server Setup wizard (domwzd.exe) is available after expanding the downloaded self-extracting executable file from Passport Advantage and the physical media. To configure a Domino server on i5/OS using the Domino Server Setup wizard (domwzd.exe) configuration method, perform the following steps:

- 1. Locate domwzd.exe file in your PC workstation and double-click it to launch.
- 2. In the Signon to the Server window (Figure 4-2), enter your System i name or IP address and your i5/OS user ID and password to authenticate.

Note: An i5/OS user ID with the special authority of *SECADM (Security Administration), *ALLOBJ (All Object), *IOSYSCFG (System Configuration), and *JOBCTL (Job Control) must configure a Domino 7 server.

👙 Signon to the Server 🛛 🔀		
System:	DOMINO570	
oystem.	D O MINITO OTO	
User ID:	ITSOUSER	
Password:	*****	
ОК	Cancel	

Figure 4-2 Signing in to the System i machine

3. In the Welcome to Domino Server Setup window (Figure 4-3), click Next.

Remote	Server Setup for DOMIN0570
	Welcome to Domino Server Setup! Lotus software
	You are about to set up a new Lotus Domino Server. Setup will ask you a few questions and suggest default options whenever possible to quickly and easily setup your Domino server.
	Setting up Domino on server DOMINO570
	To change the font for your language settings, click "Fonts"
	To continue with Setup click Next.
Н	elp < Back Next > Cancel

Figure 4-3 Welcome to Domino Server Setup wizard

4. If you have multiple versions of Domino installed on your System i machine, you are prompted to choose the version that you want to configure the new Domino server to use. After selecting the version, click **Next** (Figure 4-4).

Server	Setup 🔀
Ē	Pick release of Domino server to create
	Multiple Domino releases are installed on this system. Choose the release of the server you would like to create.
	Available releases:
	7.0.2 7.0.1 7.0.0 6.5.5 6.5.4 6.5.3
н	lelp < Back Next > Cancel

Figure 4-4 Selecting the release of Domino to configure

5. You must now decide whether this configuration is for a first Domino server or an additional Domino server (Figure 4-5). In this example, the option to set up the first server, which is the default, is selected. Click **Next**.

Note: If you are configuring an additional Domino server into an existing Domino domain, refer to 4.2, "Configuring an additional Domino server" on page 128.

Remote Server Setup for DOMIN0570			
	First or additional server?		
	Is this E domain within a	Domino server the first server or a stand-alone server, or should it join an existing Domino as an additional server? (A Domino domain is a collection of Domino servers and users in organization).	
		Set up the first server or a stand-alone server This will setup a new Domino Server and a new Domino domain.	
	<u>1</u>	Set up an additional server This will setup an additional Domino server into an existing Domino domain. This requires that the server is already registered in the Domino Directory (You may need to obtain additional information from your Domino administrator).	
н	elp	< Back Next > Cancel	

Figure 4-5 Selecting to configure a first or additional Domino server

6. Enter the Domino server name and title (Figure 4-6) and click **Next**. Remember, the Domino server name must be unique within the Domino domain.

Tip: Use the Help button for additional information.

Remote Server Setup for DOMIN0570			
	Provide	a server name and title	Lotus software
	You must provide a unique name for your new Domino server. Carefully choose the server name; you cannot easily change it later. By default, Setup recommends that you use the computer's host name as the server name.		
	R	Server name:	DOM7SVR1
	-		For example: Sales1
	Optiona always	I: Provide a short title w change this information	hich describes the purpose or function of this server. (You can h later in the Domino Directory)
	5	Server lille.	
		I want to use an e	xisting server ID file: Browse
н	lelp		< Back Next > Cancel

Figure 4-6 Entering the Domino server name and title

7. Enter the folder name and the path or click **Browse** to specify the i5/OS integrated file system path to be used for the Domino server data directory (Figure 4-7). Click **Next**.

Note: It is a good idea to provide the Domino server data directory the same name as the Domino server, particularly if you plan to have multiple Domino servers on the same system. This makes it easy to identify which data directory belongs to which Domino server. Grouping these Domino server data directories as subdirectories under one directory (in this example, /Domino/), makes it easy to locate the Domino server data directories and collectively back up or restore these directories.

The default naming convention for the data directory in the Domino Server Setup wizard is /Domino/servername/Data. To shorten the directory path, specify the path as /Domino/servername. The /data directory is really not necessary. In this example, the full default path is kept consistent with the configuration defaults of the Domino Server Setup wizard.

Remote	e Server Setup for DOMIN0570
	Provide the data folder for this Domino server
	Type the name and path of the folder where all of the Domino servers data files will reside.
	Folder name and path: /Domino/DOM7SVR1/Data Browse
	If you are setting up more than one Domino server on this system (partitioned servers), specify the data folder for the desired partition you are configuring.
н	lelp Cancel

Figure 4-7 Specifying the Domino server data directory

- 8. Specify any advanced settings that are required by clicking the **Customize** button shown in Figure 4-8. (In this example, the defaults are accepted.) Click **Next** to continue.
 - Start server after setup

This starts the Domino server after the Domino Server Setup wizard is completed.

Start server with TCP/IP

This starts the Domino server when the STRTCP command, the STRTCPSVR SERVER(*AUTOSTART) command, or the STRTCPSVR SERVER(*DOMINO) CL command is run. It also means that this Domino server will shut down when the ENDTCP command or the ENDTCPSVR SERVER(*DOMINO) command is run.

- Start Java server controller with TCP/IP

This starts the Java server controller when starting Domino servers when TCP/IP is started.

Note: Start server with TCP/IP and Start Java server controller with TCP/IP are ignored if your current level of system does not support these fuctions for Domino.

- Enable server partitioning

This sets this Domino server up as a partitioned server. You can run up to 99 Domino servers on the same i5/OS partition. The actual number of Domino servers that you can run on a system depends on system size and system load.

Enable BRMS incremental save

This includes the Backup Recovery and Media Services (BRMS) incremental save task (QINNINBRM) for incremental back up of Domino databases. This task is not required if you are planning to only implement BRMS full online backups.

- Copy Administrator ID File

This specifies where the Administrator ID file for this Domino server will be saved.

Remote	Server Setup for DOMIN0570			
	Specify advanced server settings	Lotus software		
	There are a number of additional advanced server settings that can be customized. The setup wizard will automatically configure these settings to values that a typical server would use.			
	Advanced server settings:			
	Parameter	Value		
	Start server after setup Start server with TCP/IP Start Java server controller with TCP/IP Enable server partitioning Enable BRMS incremental save Copy Administrator ID File	No No Yes No *ALL		
	, To change advanced server settings, click Cus	stomize. Customize		
He	ql	< Back Next > Cancel		

Figure 4-8 Specifying the advanced Domino server settings

9. Enter the Organization name and the Organization Certifier password that are to be associated with the certifier ID (Figure 4-9). Make a note of the information you enter here because it is critical to your Domino configuration.

Attention: Passwords are case-sensitive.

To add additional organizational details, for example, creating an organizational unit name, click **Customize**. Otherwise, click **Next** to continue.

Remote Server Setup for DOMIN0570			\mathbf{X}	
F	Choose your organization name			otus software
The organization name is usually your company name. It becomes part of each server and user name. Do not choose a long organization name. For example, instead of Acme Corporation, use Acme.			d user on, use	
		Organization name	ITSO Minimum of 3 characters	
		This server's final name will be:	DOM7SVR1/ITSO	
		A typical user name will be:	ITSOUSER/ITSO	
	-	Organization Certifier password:	Confirm password:	
	~~~~	****	*****	
		Minimum of 5 characters		
		□ I want to use an existing certifier ID file: /Domino/DOM78VR1/Data/cert.id	Brows	se
	To spe	cify additional organization settings click Cus	tomize. Custon	nize
н	lelp		< Back Next > Ca	ncel

Figure 4-9 Specifying the organization name and organization certifier password

Remote	Server	Setup for DOMIN0570	
F	Choos	e the Domino domain name	Lotus software
	As part collecti The Do name.	of setting up the first Domino se on of Domino servers and users mino domain name can be the	erver, Setup creates a new Domino domain, which is a s that share the same Domino Directory. same as the organization name. Choose a short domain
	8	Domino domain name	ITSO For example: Acme
н	elp		< Back Next > Cancel

Figure 4-10 Specifying the Domino domain name

11. Specify the Administrator name and password (Figure 4-11) and click **Next**. Make a note of the information you enter here because it is critical to your Domino server configuration.

Attention: Passwords are case-sensitive.

Remote Server Setup for DOMIN0570				
	Specify	Specify an Administrator name and password		
	To create the Administrator's ID, you must provide the administrator's name and password. You can use the name of a specific person, or a last name only to create a generic Administrator ID that can be used by several people.			
	Q	First name:	Middle:	Last name (or generic account name):
	¶©	Domino		Admin
		Administrator password:		Confirm password:
	~	*****		*****
		Minimum of 5 characters		
	_	☐ I want to use an existing /Domino/DOM78VR1/Da	g Administrato Ita/user.id	or ID file: Browse
н	lelp			< Back Next > Cancel

Figure 4-11 Specifying the administrator name and password

12. In the "What Internet services should this Domino Server provide?" window (Figure 4-12), select the Internet services that this Domino server will provide. Click **Customize** to select other Domino services. (You can change these options later if your company's requirements change, by either using the iSeries Navigator or the Change Domino Server (CHGDOMSVR) CL command.)

Click **Next** to continue.

**Note:** By default, the Domino HTTP server listens on port 80 and the LDAP server on port 389. If you are running multiple i5/OS or Domino HTTP or Lightweight Directory Access Protocol (LDAP) servers, consider the IP addresses and ports you are using so that there are no port conflicts.

Remote	Remote Server Setup for DOMIN0570		
	What Internet services should this Domino Server provide?		
	Select the Internet services this Domino server will provide. Basic Notes and Domino services are set up by default. (You can always change these options later in the Domino Directory).		
	<ul> <li>Setup Internet services for:</li> <li>Web Browsers (HTTP services)</li> <li>Internet Mail Clients (SMTP, POP3 and IMAP services)</li> <li>Directory services (LDAP services)</li> </ul>		
	To customize all other Domino services, click Customize.		
F	lelp < Back Next > Cancel		

Figure 4-12 Selecting the Internet services this Domino server will provide

13. Specify the TCP/IP address and define the fully qualified host name for this Domino server by clicking the **Customize** button in the Domino network settings window (Figure 4-13). When finished, click **Next** to continue.

Remote Server Setup for DOMIN0570			
	Domino network settings Lotus software		
	Setup has reliably detected the following network ports on this computer. To add additional ports, click Customize (You can change all settings later in the Domino Directory).		
	Enabled port drivers: TCPIP		
	Setup suggests the host name to use in the Domino Directory for this Domino server based on this computer's network name.		
	I Host name: DOM7SVR1.RCHLAND.IBM.COM		
	o customize the network settings, click Customize.		
н	a < Back Next > Cancel		

Figure 4-13 Specifying the Domino server network settings

14. Specify the time zone for this Domino server and whether the daylight saving time is going to be observed (Figure 4-14). Click **Next**.

Remote Server Setup for DOMIN0570		
	Specify the	e time zone Lotus software
	lf you do n will be use	ot provide time zone information, the time zone used by the server's operating system ed.
		Time zone:
		Central Standard Time (CST)
	-	✓ Observe daylight-saving time
H	elp	< Back Next > Cancel

Figure 4-14 Specify the time zone

15. In the Secure your Domino Server window (Figure 4-15), confirm that you want to secure your Domino server and prevent unauthenticated access to the Domino databases. It is recommended that you retain the default settings. Click **Next**.

Server Setup		
	Secure your Domino Server	
	To increase security and prevent unauthenticated access of databases from the Internet, Setup recommends to configure Access Control Lists of all databases and templates to prohibit Anonymous access.	
	Prohibit Anonymous access to all databases and templates	
For better managability and administration, Setup will add the system group "LocalDomainAdmins" with "Manager" access to all databases and templates.		
Add LocalDomainAdmins group to all databases and templates		
(If you are not sure, leave both options selected)		
ŀ	telp < Back Next > Cancel	

Figure 4-15 Securing your Domino server

16. In the Make optional copies of ID files window (Figure 4-16), you can optionally specify whether you want to create additional copies of your soon-to-be-created ID files. Click **Next** to continue.

During the configuration of the Domino server, the ID files are all stored in the data directory of the Domino server. By selecting the "I want to make additional copies of the ID files" option, you can store a copy of the ID files locally in your PC workstation.

It is recommended that you make the additional ID file copies. Move these backup copies to a safe place or at least protect the ID directory against unauthorized access. A lost "root" certifier file might require a global recertification of your entire Domino environment. Back up at least all your organization unit (OU) certifier files.

Select the I want to make additional copies of the ID files check box and click Browse to specify the ID file copy path.

Remote Server Setup for DOMIN0570		
Ē	Make optional copies of ID files	
	Server Setup will create these new ID files: [/Domino/DOM7SVR1/Data/server.id] [/Domino/DOM7SVR1/Data/cert.id]	
	[/Domino/DOM7SVR1/Data/user.id]	
	These ID files will be stored on the server. To make additional copies of these ID files, click the checkbox below and specify where to store them. Otherwise, click Next.	
	I want to make additional copies of the ID files: Browse	
	C:\DownloadDirector\Domino 7.0.2 for iSeries	
	To continue with Setup click Next.	
н	elp <a>Back Next &gt; Cancel</a>	

Figure 4-16 Option to make additional copies of ID files

17. You are now prompted to confirm your configuration settings for the new Domino server (Figure 4-17). You also have the option of clicking the **View command** button (see Figure 4-18) to see what the Configure Domino Server (CFGDOMSVR) CL command looks like. If all the settings are correct, click **Setup** to configure the Domino server.

Remote	Remote Server Setup for DOMIN0570			
	Please review and confirm your chosen server setup options			
	Please review the following options you have chosen for your Domino server setup:			
	Setting	Current selection		
	Remote server name Release Server type Data directory or partiti Organization name Domino domain name ACL System Group	name DOM7SVR1/ITSO 7.0.2 Set up the first server or a stand-alone server in partiti /Domino/DOM7SVR1/Data arne ITSO n name ITSO Prohibit anonymous access to all databases and templates. LocalDomainAdmins created with "Manager" access to all template		
To make any changes, click "Back".				
To setup your server with the above options, click "Setup".				
Help Cancel				

Figure 4-17 Reviewing the Domino server setup options

Figure 4-18 shows the pop-up that is displayed on selecting the View Command button. After reading the contents, click **OK**.

Server setup	
The following configuration command will be invoked: QDOMINO702/CFGDOMSVR OPTION(*FIRST) ORG('ITSO') CERTID(*GEN ('dom1no')) DOMAIN('ITSO') ADM('Admin' 'Domino' *N ('dom1no') 5) TEXT('International Technical Support Organization Server 1') SERVER('DOM7SVR1') DTADR ('Demine CONTROL (AIL OWNER) ADM SERVER('DOM7SVR1') DTADR	
*SCHED #RNRMGR ) CNNSRV(*NONE) WEB(*HTTP) DIRSRV(*LDAP) DOLS(*YES) NETWORK(*NETWORK1') TCPOPT(*NOENCRYPT '9.5.30.47" *YES *NO) TIMEZONE(CST) MAIL(*IMAP *POP3 *SMTP ) SVRHSTNAME(*DOM7SVR1.RCHLAND.IBM.COM*) LOGREPEVT (*YES) LOGSSNEVT(*YES) AUTOSTART(*NO) ADVSRV(*PARTITION) CPYADMID(*ALL) DFTACL(*ADMGRP)	
OK	

Figure 4-18 Example of the CFGDOMSVR CL command used by the wizard

18. Monitor the status of your Domino server configuration by looking at the progress bar. Eventually, you see the Setup summary completion window (Figure 4-19). Click **Finish** to complete the configuration process.

Remote Server Setup for DOMIN0570		
	Setup summary	
	Congratulations, Domino Server Setup is now complete! For help with the first tasks in configuring your domain click the Help button.	
	Click "Finish" to close Setup.	
F	Help Finish	

Figure 4-19 Domino server configuration setup complete message

Your new Domino server starts automatically if you specified "Start server after setup = Yes" in the advanced server settings (Figure 4-8 on page 103). This example does *not* have this automatic start value set. To learn more about starting a Domino server, refer to Chapter 5, "Administering Domino 7 on i5/OS" on page 159.

## 4.1.4 Using CFGDOMSVR to configure a new Domino server

Configure Domino Server (CFGDOMSVR) is an i5/OS CL command that is used to configure a new Domino server. If multiple versions of Domino are installed on the system, by default, the command corresponds to the latest version of the Domino installed. Thus, if both Domino 7.0.1 and 7.0.2 are installed and the command is issued from an i5/OS command line, it configures a new 7.0.2 server. To configure a Domino server for a release that is earlier than the current release, qualify the CFGDOMSVR CL command by specifying the corresponding library first. Thus, if the goal is to configure a new 7.0.1 server, the command is as follows:

#### QDOMIN0701/CFGDOMSVR

To configure a Domino server on i5/OS using the CFGDOMSVR command, perform the following steps:

1. Start a 5250 emulation session to the System i machine and sign in with the appropriate authority.

**Note:** An i5/OS user ID with the special authority of *SECADM (Security Administration), *ALLOBJ (All Object), *IOSYSCFG (System Configuration), and *JOBCTL (Job Control) must configure a Domino 7 server.

- 2. From an i5/OS command line, enter the CFGDOMSVR command and press F4 to prompt the command.
- 3. In the Configure Domino Server (CFGDOMSVR) screen (Figure 4-20), enter the Domino Server name and *FIRST for the Option parameter. Press Enter.

Configure Dom	ino Server (CFGDOMSVR)
Type choices, press Enter.	
Server name	DOM7SVR1
Option	*FIRST *FIRST, *ADD, *REMOVE
Bottom F3=Exit F4=Prompt F5=Refresh	F10=Additional parameters F12=Cancel
F13=How to use this display	F24=More keys

Figure 4-20 CFGDOMSVR command for a first Domino server (Display 1 of 7)

Table 4-1 provides a description of the parameters in this screen.

Table 4-1 CFGDOMSVR parameters (Display 1 of 7)

Parameter	Description
Server name	This specifies the name of the Domino server. The first 15 characters of this name must be unique across the organization. The Domino server name can be a text string having 1 - 246 characters.
	The maximum server name length decreases by one for every character after the third character in the Organization name, for example, if the Organization name is four characters long, the server name length cannot exceed 245 characters.
	Server names can contain a maximum of 246 characters and consist of any characters except parentheses, at (@), slash and backslash (/ and \), underscore (_), equal (=), plus (+), and space ().
	If you are setting up an additional Domino server (you specify *ADD against the Option parameter in Figure 4-20), provide the full hierarchical name of the server, for example, if the name of the additional server is Server1, the organization name is Acme, and the country or region code is US, specify Server1/Acme/US as the Server name.
Option	<ul> <li>This specifies whether you are setting up the first Domino server, adding an additional Domino server, or removing a Domino server. The possible values are: <ul> <li>*FIRST: Specify this option only when you are setting up Domino for the first time in your company or when you are creating a new Domino domain.</li> <li>*ADD: Specify this option to add a preregistered Domino server to an existing Domino domain.</li> <li>*ADD: Specify this option to add a preregistered Domino server to an existing Domino domain. Before you add an additional Domino server to an existing domain you must: <ul> <li>Use the Domino Administrator or Web Administrator to register the new server with an administration server in the Domino domain. Registering a server adds the server to the Domino domain. The server registration process creates a Server document for the server in the Domino Directory and creates a server ID.</li> <li>Have access to the server ID file that was created during server registration</li> <li>Have access: This value is <i>not</i> currently supported.</li> </ul> </li> <li>*REMOVE: Specify this option to remove a Domino server.</li> </ul></li></ul>

4. You now see the parameters for Data directory and Organization (Figure 4-21). (In this example, /Domino/DOM7SVR1/Data is specified for the data directory and ITSO for the organization.) Enter the information for these values and press PgDn.

**Note:** It is a good idea to give the Domino server data directory the same name as the Domino server, particularly if you plan to have multiple Domino servers on the same system. This makes it easy to identify which data directory belongs to which Domino server. Grouping these Domino server data directories as subdirectories under one directory (/Domino/, in this example) makes it easy to locate the Domino server data directories and collectively back up or restore these directories.

Configure Domino Server (CFGDOMSVR)			
Type choices, press Enter.			
Server name > DOM7SVR1			
Option > *FIRST *FIRST, *ADD, *REMOVE Data directory /Domino/DOM7SVR1/Data			
Organization ITSO			
More			
F3=Exit F4=Prompt F5=Refresh F10=Additional parameters F12=Cancel F13=How to use this display F24=More keys			

Figure 4-21 CFGDOMSVR command for a first Domino server (Display 2 of 7)

Table 4-2 provides a description of the parameters in this screen.

Table 4-2 CFGDOMSVR parameters (Display 2 of 7)

Parameter	Description
Data directory	This specifies the path of the i5/OS integrated file system directory where you want the Domino server data files to reside. If the specified directory does not exist, it is automatically created with the public authority of *EXCLUDE. If the specified directory already exists, it is recommended that you specify a public authority of *EXCLUDE for this directory. If you are setting up more than one Domino server on the same system (partitioned Domino servers), specify a different data directory for each Domino server.
Organization	This specifies the organization name for the Domino server. The organization name can be the name of your company or a group within your company. You must have a good understanding of your organization's hierarchical name scheme before you select the name for your Domino organization.
	The organization name is appended to all user and server names and is the name of the organization certifier. The organization name is usually the same as the Domino domain name, can have a maximum of 63 characters, and might include alpha characters (A - Z), numbers (0 - 9), and the ampersand (&), dash (-), period (.), space (), and underscore (_).
	You must specify an organization name when you specify an option of *FIRST.

5. In the next display (shown in Figure 4-22), specify the Administrator's name and password along with other customized settings, many of which can be changed later using the Change Domino Server (CHGDOMSVR) CL command. After you have entered the values, press the PgDn key.

Configure Dom	nino Server (CFGDOMSVR)
Type choices, press Enter.	
Administrator: Last name	Admin
First name	Domino password 8 0-31 password CST GMT,EST,CST,MST,PST,CET *YES *YES, *N0 *HTTP *NONE, *ALL, *HTTP, *IIOP
Internet mail packages + for more values Directory services	<pre>*SMTP *NONE,*ALL,*IMAP,*POP3 *NONE Character value, *NONE</pre>
F3=Exit F4=Prompt F5=Refresh F13=How to use this display	More F10=Additional parameters F12=Cancel F24=More keys

Figure 4-22 CFGDOMSVR command for a first Domino server (Display 3 of 7)

Table 4-3 provides a description of the parameters in this screen.

 Table 4-3
 CFGDOMSVR parameters (Display 3 of 7)

Parameter	Description
Administrator	This specifies the name and password of the person who is the administrator for this Domino server. This name appears in the Server document and in the access control list (ACL) of the Domino Directory (Public Address Book).
	Specify at least a last name when you specify an Option of *FIRST. The first name and middle name are optional, but recommended, in order to prevent duplicate names. A password is required, unless the minimum password length is specified as zero.
	By default, Domino saves the administrator ID file in the Domino data directory.
	<ul> <li>If you plan to administer the Domino server from a Web browser, use the Internet password value to specify a password for accessing the Domino server from the Internet. The possible values are:</li> <li>*ADMIN: The Internet password is the same as the administrator's password.</li> <li>*NONE: There is no Internet password.</li> <li>Internet-password: Specify a password. The maximum length of the password is 32 characters.</li> </ul>

Parameter	Description			
Time zone	This specifies the time zone to be used by the Domino server. Press the F4 key to display a list of the valid values for the time zone. Specify a time zone if you specify an option of either *FIRST or *ADD.			
	Be sure that the time zone and the daylight saving time are set correctly for the server's operating system.			
	Do not change the operating system time zone or daylight saving time settings between the time you configure the Domino server and the first time you start the Domino server.			
	If you change the time zone or daylight saving time for the operating system when the Domino server is running, the new settings do not take effect until you restart the Domino server.			
	The Domino server time zone and the daylight saving time settings must match those of the servers with which a server replicates. If the settings do not match, you might experience unexpected behavior from agents that run at a scheduled time.			
	You can change the Domino server's time zone and daylight saving time settings later in the Server Location section of the Server document in the Domino Directory.			
Daylight saving time	<ul> <li>This specifies whether the Domino server time stamp must be adjusted for daylight saving time.</li> <li>This value does not affect the actual system time. The possible values are:</li> <li>*YES: Adjust the time stamp for daylight saving time.</li> <li>*NO: Do not adjust the time stamp for daylight saving time.</li> </ul>			
Web browsers	<ul> <li>This specifies which, if any, Web features must be included in the Domino server configuration.</li> <li>These features enable Web browsers to access your Domino server. The possible values are:</li> <li>*NONE: Do not include any Web features.</li> <li>*ALL: Include all the Web features. This option does not include any operating system HTTP Web Servers.</li> <li>*HTTP: Include the Domino HTTP Web server if you want Web browsers to access data on the Domino server or if you plan to use iNotes™ or DOLS (Domino Off-Line Services).</li> <li>*IIOP: Include the Internet Inter-ORB Protocol (IIOP) feature. IIOP lets Web browsers and servers exchange complex objects, unlike HTTP, which only supports the transmission of text. The IIOP supports both Notes objects and Object Request Broker (ORB) objects.</li> <li>Note: Operating system HTTP Web server names are not allowed for this parameter.</li> </ul>			
Internet mail packages	Specifies which, if any, Internet mail packages must be included in the Domino server configuration. These packages enable the Domino server to send mail to and receive mail from the Internet.			
	<ul> <li>You can enter multiple values. If you require additional entry fields to enter these multiple values, type a plus sign (+) in the entry field opposite the phrase "+ for more values" and press Enter. The possible values are: <ul> <li>*NONE: Do not include any Internet mail packages.</li> <li>*ALL: Include all Internet mail packages.</li> <li>*IMAP: Include the Internet Mail Access Protocol (IMAP) package.</li> <li>*POP3: Include the Post Office Protocol Version 3 (POP3) mail package.</li> <li>*SMTP: Include the Simple Message Transfer Protocol (SMTP) mail package.</li> </ul> </li> </ul>			
Directory services	<ul> <li>Specifies which, if any, directory services must be included in the configuration.</li> <li>The possible values are:</li> <li>*NONE: Do not include any directory services in the configuration.</li> <li>*ALL: Include all the directory services in the configuration.</li> <li>*LDAP: Include the Lightweight Directory Access Protocol (LDAP) in the configuration.</li> </ul>			

6. In the screen shown in Figure 4-23, press the F10 key to view the additional parameters. Choose the settings that are relevant for your new Domino server and press PgDn.

```
Configure Domino Server (CFGDOMSVR)
Type choices, press Enter.
Connection services . . . . . > *NONE
                                                *DECS, *NONE
                                                *NONE, *ALL, *PARTITION...
Advanced services . . . . . .
                                  *PARTITION
              + for more values
Default ACL settings . . . . .
                                  *ADMGRP
                                                *NONE, *ANONYMOUS, *ADMGRP
Text 'description' . . . . . > 'Domino R7 server for ITSO'
                          Additional Parameters
                                  *DOMINO
SMTP services (obsolete) . . .
                                                Character value
News readers (obsolete) . . . .
                                  *NONE
                                                Character value
Replace configuration . . . .
                                  *YES
                                                *YES, *NO
Domain name . . . . . . . . . .
                                  *ORG
Network name . . . . . . . . . . . .
                                  NETWORK1
Country or region code . . . .
                                  *BLANK
                                                                     More...
F3=Exit
         F4=Prompt
                     F5=Refresh
                                  F12=Cancel
                                               F13=How to use this display
F24=More keys
```

Figure 4-23 CFGDOMSVR command for a first Domino server (Display 4 of 7)

Table 4-4 provides a description of the parameters in this screen.

Table 4-4 CFGDOMSVR parameters (Display 4 of 7)

Parameter	Description
Connection services	This specifies whether the Domino Enterprise Connection Services (DECS) feature must be included in the Domino server configuration. DECS provides the capability to build live links from Domino pages and forms to the data from relational databases.
Advanced services	<ul> <li>This specifies which, if any, features of the Domino Advanced Services must be included in the Domino server configuration. You can enter multiple values. If you require additional entry fields to enter these multiple values, type a plus sign (+) in the entry field opposite the phrase '+ for more values' and press the Enter key. The possible values are:</li> <li>*NONE: Do not set up any Advanced Services features on this server.</li> <li>*ALL: Set up all the Advanced Services features on this server.</li> <li>*PARTITION: Set up this Domino server as a partitioned server. The partitioned servers feature enables you to run up to 99 Domino servers on the same i5/OS partition. The actual number of Domino servers that you can run depends on the system size and load.</li> <li>*BILLING: Set up this Domino server as a cluster server. The billing feature allows a Domino server to track and record specific Domino activities for billing purposes.</li> <li>*CLUSTER: Set up this Domino server as a cluster server. The server clusters feature enables you to group Domino servers in the same domain connected by a local area network. Clusters provide failover protection for high availability of data and services.</li> </ul>

Parameter	Description			
Default ACL settings	<ul> <li>This specifies the configuration of the Access Control List (ACL) to be applied for all the databases and the templates. The possible values are:</li> <li>*ADMGRP: This option adds the group called LocalDomainAdmins in the Domino Directory and gives this group Manager access to all the Domino databases and templates on the Domino server. To give individual administrators Manager access to all the databases and templates, you only have to add their names to this group in the Domino Directory. Manager access in an ACL allows an administrator to modify the database ACL, encrypt the database, modify replication settings, delete the database, and perform all the tasks allowed by lower access levels.</li> <li>*ANONYMOUS: Allow anonymous access. This decreases security and does not prevent unauthenticated access of databases from the Internet. Any user or server that accesses a Domino server without first authenticating is known by the name of Anonymous on that server. Anonymous database that reside on Domino servers that are available to the general public. You can control the level of database access granted to an anonymous user or server by entering the name Anonymous in the ACL and assigning an appropriate level of access. Typically, you assign Anonymous users Reader access to a database.</li> <li>*NONE: Prohibit anonymous access and do not add the system group of LocalDomainAdmins.</li> </ul>			
Text "description"	<ul> <li>This specifies the text that briefly describes the purpose or function of the Domino server. The possible values are:</li> <li>▶ *BLANK: Text is not specified.</li> <li>▶ 'description': Specify no more than 60 characters of text, enclosed in apostrophe.</li> </ul>			
SMTP services (obsolete)	SMTP services is an obsolete parameter and is only allowed syntactically for upwards compatibility of command language (CL) programs that use the CFGDOMSVR command and specify the parameter. Any value specified for this parameter is ignored.			
News readers (obsolete)	News readers is an obsolete parameter and is only allowed syntactically for upwards compatibility of CL programs that use the CFGDOMSVR command and specify the parameter. Any value specified for this parameter is ignored.			
Replace configuration	<ul> <li>This specifies whether the existing Domino server configuration files in the data directory that is specified in the Data directory (DTADIR) parameter must be erased and replaced with the new ones. The possible values are:</li> <li>*YES: Replace the existing configuration files in the directory that is specified in the DTADIR parameter.</li> <li>*NO: Do not replace the existing configuration files in the directory that is specified in the DTADIR parameter.</li> </ul>			
Domain name	<ul> <li>This specifies the domain name for the Domino server. Each Domino domain has a common Domino Directory that is shared by all the Domino servers in the domain. If you are using TCP/IP, you must consider using your TCP/IP domain name. Otherwise, you must choose a name that identifies your organization. The possible values are:</li> <li>*ORG: Specifies that the domain name of the Domino server is the same as the organization name.</li> <li>domain-name: Specify the domain name to be used. The first 15 characters of the name must be unique across the organization. You can use letters, numbers, and the special characters ampersand (&amp;), hyphen (-), and underscore (_) in the name. The name can be in mixed case. The maximum length of the domain name is 31 characters.</li> </ul>			

Parameter	Description
Network name	<ul> <li>This specifies the name of the Notes-named network to which this Domino server belongs. A Notes-named network identifies a group of servers that share a common protocol so that they can communicate directly. The possible values are:</li> <li>NETWORK1: The network name is NETWORK1. Use this default name unless you are sure that another name is used for other Domino servers in the Notes network.</li> <li>network-name: Specify the name of the network. You can simplify administration by naming your networks with easily identifiable names, for example, use a name that reflects a location (such as Chicago), a network type or protocol (such as TCP), or a combination of location and network type or protocol.</li> </ul>
Country or region code	This specifies a two-character country or region code that is added to the certifier ID for the Domino server. If you are planning to use your Domino server to communicate with other companies, you can use a country or region code to minimize the chance of another company having the same Domino server ID.
	The country or region code must be entered only if you have registered your organization name with a national or an international standards body.
	<ul> <li>The possible values are:</li> <li>*BLANK: A country or region code is not used.</li> <li>country or region-code: Specify the two-character country or region code for the server, for example, the country or region code for the United States is US and the country or region code for Canada is CA. When the cursor is on this field, pressing F4 displays a list of valid country or region codes.</li> </ul>

7. The display shown in Figure 4-24 lists the options for the IDs to be used. Because this is a first Domino server configuration, accept the defaults and press the PgDn key.

Configure Domino Server (CFGDOMSVR)
Type choices, press Enter. Organizational unit: Name *BLANK ID file *GEN ID file's password *ADM
Certifier ID: ID file *GEN ID file's password *ADM Administrator ID: ID file *GEN ID file's password *ADM
More F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display F24=More keys

Figure 4-24 CFGDOMSVR command for a first Domino server (Display 5 of 7)

Table 4-5 provides a description of the parameters in this screen.

Table 4-5 CFGDOMSVR parameters (Display 5 of 7)

Parameter	Description
Organizational unit	<ul> <li>This specifies an organizational unit for the first Domino server being configured. Use the Name parameter to specify an organizational unit name. The possible values are:</li> <li>*BLANK: An organizational unit name is not used.</li> <li>OU-name: Specify an organizational unit name. It can be the name of a department within your company or the name of a specific location, for example, North. The name must not be more than 32 characters, it can be in mixed case, and letters, numbers, spaces, and the special characters &amp;, -, and _ can be used as part of the name.</li> </ul>
	<ul> <li>Use the ID file parameter to specify an organizational unit certifier ID. This option is ignored if an organizational unit name is not specified. The possible values are:</li> <li>*GEN: Specifies that a new organizational unit certifier ID file must be created.</li> <li>OU-certifier-ID-file-path-name: Specify the path to an existing Domino organizational unit certifier ID file that must be copied. The path is ignored if an organizational unit name is not specified.</li> </ul>
	For the ID file's password, specify the password that is associated with the new or existing organizational unit certifier ID file. The administrator's password is used if *ADM is specified. The password is ignored if an organizational unit name is not specified.
Certifier ID	<ul> <li>This specifies the certifier ID file to be used for the first Domino server being configured. Each grouping of Domino servers, which is known as a domain, has an organization certifier ID that is stored in a file called CERT.ID. During the configuration of the first Domino server, Domino automatically creates the organization certifier ID and saves it in the directory that is specified in the Data directory (DTADIR) parameter. This certifier ID automatically certifies the first server's ID and the administrator's user ID.</li> <li>When you register new users or servers, you use the certifier ID to give access to the domain. You also use the organization certifier ID when you create organizational unit certifiers for organizational units (lower level units) within an organization. The possible values are:</li> <li>* "GEN: Specifies that a new organization certifier ID file must be created. If the file CERT.ID already exists in the Domino data directory and the Replace configuration (RPLCFG) parameter is set to *NO, a new certifier ID file is not created.</li> <li>certifier-ID-file-path-name: Specify the path to an existing Domino certifier ID file that must be copied. If the certifier ID file does not exist in the Domino data directory and the RPLCFG parameter is set to *YES, the certifier ID file is replaced by the specified ID file. If the certifier ID file already exists in the Domino data directory and the RPLCFG parameter is set to *NO, no action is taken.</li> </ul>

Parameter	Description
Administrator ID	<ul> <li>Specifies the user ID file to be used for the Domino administrator. During the configuration of the first Domino server, Domino automatically creates a user ID for the Domino administrator and attaches it as a file named USER.ID to the administrator's Person document in the Domino Directory. The possible values are:</li> <li>*GEN: Specifies that a new administrator ID file must be created. If a USER.ID file already exists in the Domino data directory and the Replace configuration (RPLCFG) parameter is set to *NO, an administrator ID file is not created.</li> <li>administrator-ID-file-path-name: Specify the path to an existing Domino administrator ID file that must be copied. If the administrator ID file does not exist in the Domino data directory, it is copied from the specified file. If the administrator ID file already exists in the Domino data directory and the RPLCFG parameter is set to *YES, the existing administrator ID file is replaced by the specified ID file. If the administrator ID file already exists in the Domino data directory and the RPLCFG parameter is set to *NO, no action is taken.</li> </ul>
	For the ID file's password, specify the password that is associated with the new or the existing administrator ID file. The administrator's password is used if *ADM is specified.

8. The display shown in Figure 4-25 lists the additional configuration options to choose from. Often, the default settings are just fine. In this example, the defaults values are accepted, with the exception of entering the fully qualified host name of the Domino server in the Internet address field. Using an IP address is also acceptable. After you have entered the parameters, press PgDn to go to the last configuration screen.

Configure Domino Server (CFGDOMSVR)			
Type choices, press Enter.			
Server ID: ID file	*GEN		
ID file's password	*NOPWD		
Start server	*N0	*YES, *NO	
Start when TCP/IP started	*N0	*YES, *NO, *JSC, *ALL	
Log replication events	*YES	*YES, *NO	
Log client session events TCP/IP port options:	*YES	*YES, *NO	
Encrypt network data	*NOENCRYPT	*ENCRYPT, *NOENCRYPT	
Internet address	DOM7SVR1.RCH	LAND.IBM.COM	
Bind HTTP	*YES	*YES, *NO	
Compress network data	*N0	*YES, *NO	
		More	
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	F13=How to use this display	

Figure 4-25 CFGDOMSVR command for a first Domino server (Display 6 of 7)

Table 4-6 provides a description of the parameters in this screen.

Table 4-6 CFGDOMSVR parameters (Display 6 of 7)

Parameter	Description
Server ID	<ul> <li>This specifies the server ID file to be used for the first Domino server being configured. During the set up of the first Domino server, Domino automatically creates a server ID for the new server. The new server ID file is saved in the directory that is specified in the Data directory (DTADIR) parameter and has the default name of SERVER.ID. The possible values are:</li> <li>*GEN: Specifies that a new server ID file must be created. If a SERVER.ID file already exists in the Domino data directory and the Replace configuration (RPLCFG) parameter is set to *NO, a server ID file is not created.</li> <li>server-ID-file-path-name: Specify the path to an existing Domino server ID file that must be copied. If the server ID file does not exist in the Domino data directory and the RPLCFG parameter is set to *YES, the existing server ID file is replaced by the specified ID file. If the server ID file already exists in the Domino data directory and the RPLCFG parameter is set to *YES, the existing server ID file is replaced by the specified ID file. If the server ID file already exists in the Domino data directory and the RPLCFG parameter is set to *YO, no action is taken.</li> </ul>
Start server	<ul> <li>This specifies whether the Domino server must be started when the CFGDOMSVR CL command completes the setup. The possible values are:</li> <li>*NO: Do not start the server when the setup is complete.</li> <li>*YES: Start the server when the setup is complete.</li> </ul>
Start when TCP/IP is started	<ul> <li>This specifies whether this Domino server must be started when the STRTCP command, the STRTCPSVR SERVER(*AUTOSTART) command, or the STRTCPSVR SERVER(*DOMINO) command is run. It also means that this Domino server will be ended when the ENDTCP command or the ENDTCPSVR SERVER(*DOMINO) command is run. The possible values are:</li> <li>*NO: Do not start this server when the STRTCP command or the STRTCPSVR command is run, and do not end this server when the ENDTCP command or the ENDTCPSVR command is run.</li> <li>*YES: Start this server when the STRTCP command or the STRTCPSVR command is run.</li> <li>*YES: Start this server when the STRTCP command or the ENDTCPSVR command is run.</li> <li>*JSC: Start only the Java server controller (JSC) of this Domino server when the STRTCP command or the STRTCPSVR command or the ENDTCP command or the ENDTCP command or the STRTCPSVR command or the STRTCPSVR command is run.</li> <li>*ALL: Start this server and its Java server controller (JSC) when the ENDTCP command or the ENDTCP command or the ENDTCP command or the STRTCPSVR command or the STRTCPSVR command is run.</li> </ul>
Log replication events	Specifies whether the replication events must be logged in the Notes log (LOG.NSF) for this Domino server. The possible values are: *YES: Log all the replication events. *NO: Do not log the replication events.
Log client session events	Specifies whether the client session events must be logged in the Notes log (LOG.NSF) for this Domino server. The possible values are:     *YES: Log all the client session events.     *NO: Do not log the client session events.

Parameter	Description
TCP/IP port	Specifies options for the TCP/IP port.
	Use the Encrypt network data option to specify whether the system must encrypt the data that is sent through the port. Encrypting the data can make the transmission more secure, but the transmission speed might decrease slightly. The possible values are: <ul> <li>*NOENCRYPT: Do not encrypt the data.</li> <li>*ENCRYPT: Encrypt the data.</li> </ul>
	<ul> <li>Use the Internet address option to specify a separate Internet (IP) address for the Domino server's port. You can use this option to, for example, specify a separate port address for each partitioned server. The possible values are:</li> <li>*SYSTEM: This port must listen to all the IP interfaces configured on the system.</li> <li>IP address: Specify the IP address or host name of the port. If an IPv4 address is specified, it must be in the form nnn.nnn.nnn, where nnn is a decimal number between 0 - 255, for example, 199.4.191.76. An IPv4 address is not valid if it has a value of all the binary ones or all the binary zeros for the network identifier (ID) portion or the host ID portion of the address. A port number can be specified, it must be no more than 255 characters of text. The host name can be either the short form or the full domain version of the name and consist of one or more labels separated by periods. Each label can contain up to 63 characters. The specified host name must be listed either in the system's TCP/IP host table or in the Domain Name Server (DNS) of your network.</li> </ul>
	<ul> <li>Use the Bind HTTP option to bind the HTTP port of the Domino server to the specified Internet address^a. This option is ignored if the value of the Internet Address option is *SYSTEM. The possible values are:</li> <li> *YES: Bind the HTTP port to the specified Internet address. The Internet address must be associated to an existing host name through an entry either in the system's TCP/IP host table or in the Domain Name Server (DNS) of your network.</li> <li> *NO: Do not bind the HTTP port.</li> </ul>
	Use the Compress network data option to reduce the amount of data transmitted between a Notes workstation and a Domino server, or between two Domino servers. You can turn on network compression for each enabled network port.
	Whether you should enable network compression on Domino ports depends on the type of network connection and the type of data being transmitted. You must enable compression on both sides of a network connection for it to work. To enable compression on a port or ports on all the Notes clients (or a subset of them), use the Desktop or the Setup policy settings. For information about policy settings, refer to the Lotus Domino Administrator Help. You benefit from using network compression only if the data being transmitted is not already compressed. The same is true for tasks involving data that was compressed using the Lempel-Ziv algorithm (LZ1 compression), such as replicating a mail file with a large number of compressed attachments.
	For local area network (LAN) or private wide area network (WAN) connections, compression decreases the bandwidth utilization on the network. However, this gain must be weighed against increased memory and processor utilization because network compression works by buffering data before compressing it. The cost of compression might be worth the effort only for a heavily loaded network or network pathway. The possible values are: <ul> <li>*NO: Do not compress the data.</li> <li>*YES: Compress the data.</li> </ul>

a. Important: In a production environment do not use IP addresses in Network Address fields. Doing so results in serious administrative complications if an IP address changes or if network address translation (NAT) connections are used, because the values returned by the Notes Name Service will not be correct.

9. In the final configuration screen (Figure 4-26), you are again presented with a number of configuration choices. In this example, the fully qualified host name for the Server host name parameter and the Domino server name for the Subsystem name and object names parameter are entered.

On pressing Enter, you are informed that the command is in progress. You are also periodically provided with the percentages of the configuration status until eventually, the command comes back with a message that it has ended successfully.

Configure Dom	nino Server ((	CFGDOMSVR)
Type choices, press Enter.		
Server host name	DOM7SVR1.RCH	ILAND.IBM.COM
Subsystem and object names Collation	DOM7SVR1 *STD *ALL *NONE *NO *NO	Name, *GEN *STD,CS,DA-DK-AA,DE,E2-ES *DOMDIR, *DTADIR, *ALL *NONE,*ALL,*MINIMUM *YES, *NO *YES, *NO
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	Bottom F13=How to use this display

Figure 4-26 CFGDOMSVR command for a first Domino server (Display 7 of 7)

Table 4-7 provides a description of the parameters in this screen.

Table 4-7 CFGDOMSVR parameters (Display 7 of 7)

Parameter	Description	
Server host name	<ul> <li>Specifies the host name related to the Domino server being configured. The host name is used by some services and applications running within the Domino server such as SMTP. The possible values are:</li> <li>*NONE - A server host name is not specified. If SMTP is configured in the Domino server then the system's host name is used.</li> <li>'host-name' - Specify no more than 255 characters of text. The host name can be either the short form or the full domain version of the name and consist of one or more labels separated by periods. Each label can contain up to 63 characters. The specified host name must be listed either in the system's TCP/IP host table or in the Domain Name Server (DNS) of your network.</li> </ul>	
Subsystem and object names	<ul> <li>Specifies the name to be used for the subsystem in which the Domino server runs. This name is also used for other system objects that are used for the Domino server. These objects include a job description (*JOBD), a job queue (*JOBQ), a class (*CLS), and possibly BRMS lists. The possible values are:</li> <li>*GEN - The system should generate the name. The name will be 'DOMINO' followed by a two-character sequence number. For example, DOMINO01 or DOMINO02.</li> <li>Name - Specify the name to be used for the subsystem and associated objects. The name can be 10 characters or less.</li> </ul>	

Parameter	Description	
Collation®	<ul> <li>Specifies the way in which the Domino server must sort the characters. The possible values are:</li> <li>*STD: The standard collation sequence must be used. Using this collation sequence, Domino sorts numbers and accented characters before letters.</li> <li>collation-code: Specify a collation code that defines the way in which the Domino server must sort the characters. When the cursor is on this field, pressing the F4 key displays a list of valid collation codes.</li> </ul>	
Copy Administrator ID file	<ul> <li>Specifies where the system must copy the Administrator ID file for the Domino server. This parameter is intended for instances where a new USER.ID file is created (*GEN specified in the parameter ADMID). If an existing ID is being used, this parameter does not take effect. The possible values are: <ul> <li>*ALL: Copy the ID file to both the Domino Directory and the data directory for the server.</li> <li>*DOMDIR: Copy the ID file only to the Domino Directory.</li> <li>*DTADIR: Copy the ID file only to the Domino server's data directory.</li> </ul> </li> </ul>	
Additional services	<ul> <li>Specifies which additional services, if any, must be included in the Domino server configuration. The possible values are:</li> <li>*NONE: Include the default additional services (Update, AMgr, AdminP, CalConn, Replica, RnRMgr, Router, Sched, and Stats).</li> <li>*ALL: Include all the additional services.</li> <li>*MINIMUM: Include the minimum possible number of additional services.</li> <li>*AMGR: Runs agents on one or more databases (Agent Manager task).</li> <li>*ADMINP: Automates a variety of administrative tasks (Administration Process task).</li> <li>*BRMS: Include the BRMS incremental save task for backup of Domino databases.</li> <li>*CALCONN: Processes requests for free-time information from another server (Calendar Connector task).</li> <li>*CERTAUTH: Include the Certificate Authority task.</li> <li>*CHGMGR: Automates large-scale changes to enterprise systems. It provides reliable and simple "fire-and-forget" operation with workflow approval and tracking facilities. When combined with the Tivoli Analyzer for Domino, it leverages the Administration Process to provide a robust, distributed, high-performance solution for balancing resources across Domino servers (Change Manager task).</li> <li>*DMNIDX: Include the Internet Cluster Manager.</li> <li>*ISPY: Sends server and mail probes, and stores the statistics (ISpy task).</li> <li>*RHTDBG: Remote debug server (Remote Debug task).</li> <li>*RNTBGR: Renote debug server (Remote Debug task).</li> <li>*RNTBGR: Renote debug server (Router task).</li> <li>*SCHED: Returns meeting times and dates and the available invitees (Schedule Manager task).</li> <li>*STATCOL: Collects statistics for multiple servers (Statistics task).</li> <li>*STATLOG: Records database activity in the log file (Statistics task).</li> </ul>	
Allow Domino Off Line Services	Specifies whether this Domino server will support Domino Off Line Services (DOLS). DOLS technology enables Web browser users to access and interact with Web applications when disconnected from the network. The possible values are: <ul> <li>*NO: The server does not support DOLS.</li> <li>*YES: The server will support DOLS.</li> </ul>	
Service provider configuration	This value is no longer supported and is ignored if specified.	

Your new Domino server starts automatically if you specified "Start server after setup = Yes" in the advanced server settings (see Figure 4-25 on page 122). This example does not have this automatic start value set. To learn more about starting a Domino server, refer to Chapter 5, "Administering Domino 7 on i5/OS" on page 159.

## 4.1.5 Using the iSeries Navigator to configure a new Domino server

In order to use the iSeries Navigator to configure a new Domino server, you must first install the Domino plug-in. This plug-in becomes available as soon as the Domino licensed program is installed on your System i machine. Refer to 3.6, "Installing the iSeries Navigator Lotus Domino plug-in" on page 85 for details.

After the iSeries Navigator Domino plug-in is installed, numerous options are available to you for administering Domino on i5/OS, including the function of configuring a new Domino server.

Perform the following steps to configure a new Domino server with iSeries Navigator:

- 1. Start the iSeries Navigator
- Under My Connections, click the plus (+) sign next to the System i machine to configure Domino on. Select Network → Servers. Right-click Domino and select New → New Domino Server, as shown in Figure 4-27.



Figure 4-27 Configuring a Domino server with iSeries Navigator

3. In the Signon to the Server pop-up window (Figure 4-28), enter your System i machine's host name or IP address and a valid user ID and password. Click **O**K.

**Note:** An i5/OS user ID with the special authority of *SECADM (Security Administration), *ALLOBJ (All Object), *IOSYSCFG (System Configuration), and *JOBCTL (Job Control) is required to configure a Domino 7 server.

🖢 Signon to the Server 🛛 🛛 🔀				
System:	DOMINO570			
User ID:	ITSOUSER			
Password:	*****			
OK Cancel				

Figure 4-28 Signing in to the System i machine

4. To configure a Domino server, follow the steps described in 4.1.3, "Using domwzd.exe to configure a new Domino server" on page 96, starting with step 3 on page 97.

## 4.2 Configuring an additional Domino server

As mentioned in 4.1.1, "Methods to configure a Domino server" on page 94, several methods are available to configure a Domino server. When the new Domino server is not the first server in an existing Domino Domain, the configuration steps change slightly.

Use the procedure outlined in this section to add a new Domino server to an existing Domino domain. When you add a Domino server to a Domino domain, the additional server uses the same Domino Directory as the other servers in the Domain.

**Note:** Although the steps to configure the additional Domino server vary slightly between using the domwzd.exe, the CFGDOMSVR command, or the iSeries Navigator, the fundamental concept remains the same, as does the terminology.

In this example, a second Domino server is added to the ITSO domain and configured on the same System i machine as the Domino server (DOM7SVR1) configured earlier in this chapter.

To configure an additional Domino server, perform the following tasks:

1. Prepare the i5/OS environment for the Domino server. If you configured your first Domino server on the same i5/OS earlier, you have already set up the i5/OS environment.

If the additional Domino server is configured on the same i5/OS, you might have to create an additional TCP/IP interface (an IP address) for the new Domino server. Refer to 2.4, "TCP/IP considerations for Domino" on page 22, for information about creating a new TCP/IP interface.
2. Use a Domino Administrator client workstation and an existing Domino server in the Domino domain to register the additional Domino server. When an additional server is configured, the server ID file is created when you register the new server to the existing Domino Directory before you actually configure the new server.

Refer to 4.2.1, "Registering an additional Domino server" on page 129, for details about how to perform this task.

3. Copy the server ID file for the additional server to your i5/OS if you saved the new server ID in a file when you registered the server.

Refer to 4.2.2, "Handling the ID file for an additional server" on page 135 for details about how to perform this task.

4. If the registration Domino server is on a separate system, verify the TCP/IP connection from the System i machine on which the new additional Domino server will be configured to the registration Domino server.

Refer to 4.2.3, "Verifying the connection to the Domino registration server" on page 137, for details about how to perform this task.

5. Configure the additional Domino server on your System i machine.

Refer to 4.2.4, "Using DOMWZD.EXE to configure an additional Domino server" on page 137 or 4.2.5, "Using CFGDOMSVR to configure an additional Domino server" on page 151 for details about how to perform this task.

# 4.2.1 Registering an additional Domino server

The procedure to register a new Domino server is similar to the procedure used when registering a new Lotus Notes user. Before adding a Domino server to an existing Domino domain, register the server in the Domino Directory on a registration server. The registration server (the Domino server on which you register other servers) must be up and running on your network. To register a new server from your workstation, you must have access to the registration server. You must also have at least Author access to the Domino Directory, with the appropriate role in the ACL of the Domino Directory.

**Note:** This procedure for registering an additional server is *not* specific to i5/OS. This procedure applies across all the platforms when registering an additional server.

From the Domino Administrator workstation, perform the following steps:

- 1. From the Domino Administrator client, connect to the Domino server (in this example, this is DOM7SVR1) that you are going to register the additional server on.
- 2. Click the **Configuration** tab. In the right-hand side of the display, expand **Tools**  $\rightarrow$  **Registration**  $\rightarrow$  **Server** (Figure 4-29).

Optionally, you can select the pull-down menu options for Configuration  $\rightarrow$  Registration  $\rightarrow$  Server to get to the same place.



Figure 4-29 Domino Administrator client

 You are prompted to choose a certifier (Figure 4-30). Click the Server button to select the existing Domino server and then click the Certifier ID button to navigate to the correct cert.id file. Click OK.

Choose a Certifier
Server DOM7SVR1/ITSO
<ul> <li>Supply certifier ID and password</li> </ul>
Certifier ID] C:\ITSO\DOM7SVR1\cert.id
C Use the CA Process
CA configured certifiers:
(None Available)
The 'Use the CA Process' option allows you to specify a certifier without access to the certifier ID file or certifier password.
OK Cancel

Figure 4-30 Choosing a certifier ID

4. You are prompted to enter the certifier password (Figure 4-31). Click OK.

Lotus Notes			×
	Certifier password	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	ОК
<ul> <li>A</li> </ul>		For user: /ITSO	Cancel

Figure 4-31 Entering the certifier password

5. Click **OK** in the Certifier Recovery Information Warning window (Figure 4-32). This is the usual process, and therefore, there is no cause for concern.



Figure 4-32 Certifier Recovery Information Warning

6. In the Register Servers window (Figure 4-33), confirm the Registration Server and Certifier settings. Click **Continue**.

Register Servers			
Please specify the followi servers registered during t	ng information to be applied to all this registration session.	Continue	
Registration Server	DOM7SVR1/ITSO		
Notes certificate informa	tion		
Certifier	/ITSO		
Public key specification:	Compatible with all releases (630 Bits)	•	
License type:	North American	•	
Expiration date:	11/10/2106 04:13:35 PM		
Internet certificate inform	nation		
Certificate authority:	(None Available)		

Figure 4-33 Register Servers

- 7. In the Register New Servers window (Figure 4-34), enter the required information:
  - Server name: The name of the new Domino server
  - Server title: This long title is visible in the Domino Directory to identify the server.
  - Domino domain name: The name of the existing Domino domain
  - Server administrator name: The name of the Domino Administrator or an existing Administration group
  - ID file password: You can enter a password to protect the new Domino server's ID file. The password is mandatory if you want the ID file to be attached to the Server document in the Domino Directory. Attaching the file to the Server document seems to make the Domino server configuration easier. However, after you successfully configure the Domino server, you must either enter the password manually every time you start the server in the future, or clear the password.

The entire process is shorter if you do not specify a password (and consequently cannot attach the ID file to the Server document). To do so, you must also specify a minimum password quality of zero in the password quality scale by clicking the **Password Options** button.

- Password Options: Clicking this button displays the window shown in Figure 4-35. Use the scroll bar to select the required minimum password quality. Specify 0 (zero) or weak so that you can clear the password later. This also allows you to leave the password field empty. However, this occurs only if the ID file is not attached to the Server document in the Domino Directory.
- Location for storing server ID: You have the option of storing the new server ID as an attachment in the Server document in the Domino Directory, in a file on the disk drive of your PC workstation, or both.

If the ID file is stored in the Domino Directory, the setup process (when you configure the Domino server later) accesses the Domino Directory database to detach the ID file from the Server document. In this case, it is mandatory to specify a password even if you selected a minimum password length of 0 or weak.

If you choose to store the ID in a file, it is saved to the selected drive on your PC workstation. It must be copied to the i5/OS integrated file system before you configure the additional Domino server. The advantage of this method is that you do not have to clear the password after you set up the additional Domino server. If you do not want to specify a password, deselect the **In Domino Directory** option.

Refer to 4.2.2, "Handling the ID file for an additional server" on page 135 for more details about storing the server ID file.

In this example, the new server ID file is *not* saved to the Domino Directory because this requires a password be set. Instead, the **Password Options** button is selected and the password level reduced to weak (Figure 4-35). In this example, a decision is also taken to save the server ID file to a local directory on the PC by clicking the **Set ID File** button to specify where to save the ID file.

After confirming all the settings, click the green check mark to add the new server to the Registration queue.

Register New Server(s)		
🛃 Basics	Registration Server: DOM7SVR1/ITSO	Certifier: /ITSO
Advanced	Server name:	Server title:
	DOM/SVR2	ITSO Backup Server
	Domino domain name:	Server administrator name:
	ITSO	Domino Admin/ITSO
	ID file password:	
		Password Options
	Location for storing server ID:	
	In Domino Directory	
	In file: Set ID File	C:\ITSO\DOM7SVR2\dom7svr2.id
		New Server
^ Server Na	me ^ Registration Status ^	Date ^
Register All	Register Remove	Done
- rogiocor / ar	riegicion	Conc

Figure 4-34 Registering a new Domino server, Basics tab

#### Figure 4-35 shows the Password Options pop-up window.

P	assword Options X
	Choose password options for the new server. Password quality reflects the number and variety of characters in the password.
	Password Quality Scale
	Weak Strong
	Password is optional (0)
	Encryption Strength
	Base strength on RSA key size 💌
	OK Cancel

Figure 4-35 Password options

8. The Domino server is now added to the registration queue. The final step to complete the registration process is to either select the server entry in the queue and then click the **Register** button or to just click the **Register All** button (Figure 4-36).

Register New Server(s)			
🛃 Basics	Registration Server: DOM7SVR1/ITSO	Certifier: /ITSO	
Advanced	Server name: DOM7SVR2	Server title: ITSO Backup Server	
	Domino domain name:	Server administrator name: Domino Admin/ITSO	
	ID file password:	Password Options	
	Location for storing server ID: In Domino Directory In file: Set ID File	C:\ITSO\DOM7SVR2\dom7sv	r2.id
			New Server
Server Na     DOM7SVF	me ^ Registration Status ^ R2 Ready for registration	I	Date ^ 12/05/2006
Register All	Register Remove		Done

Figure 4-36 Registering a new Domino server, ready for registration

9. You should see a message stating that the Domino server is successfully registered. The new Domino server is now known to the existing Domino domain and the organization. However, you must still configure the Domino server. Before configuring the Domino server, two different methods of handling the new server ID file is explained in the next section (4.2.2, "Handling the ID file for an additional server").

10. After the registration process is complete, click **Done** to close the registration window.

# 4.2.2 Handling the ID file for an additional server

As mentioned earlier, you can place the new Domino server ID file in the following places when you register it:

- Store the ID file on disk
- Attach the ID file to the Server document in the Domino Directory

Each method has ITS advantages and disadvantages. The characteristics of each method is described here.

## Storing the server ID file on disk

If you do not attach the ID file to the Server document in the Domino Directory, you have the advantage that no password is required to be specified when configuring the additional server. However, this does not mean that the ID has to be created without a password. The ID file can still have a password. Set the minimum password length to zero because you might want to remove it later.

The disadvantage with this method is that you must copy the ID file from your PC workstation to a directory in the i5/OS integrated file system before configuring the additional Domino server. Perform the steps described here to copy the server ID file to the i5/OS integrated file system by using a graphical user interface or a 5250 emulation session. In the example described here, a 5250 emulation session is used. Perform the following tasks:

 Determine the i5/OS integrated file system directory in which you want to place the server ID. If the directory does not exist, create it using the Create Directory (MKDIR) CL command. In this example, the following MKDIR command is used to create a directory called ITSO in the i5/OS integrated file system:

MKDIR DIR('/ITSO')

- From the PC workstation, perform the following tasks to open a DOS prompt window and switch to the directory with server ID file. During the registration of the additional server, for example, the ID file is placed in C:\ITSO\DOM7SVR2.
  - a. Click Start and then Run. Type cmd and click OK to open a DOS prompt window.
  - b. In the DOS prompt window, switch to the root of the C drive using the cd \ command.
  - c. Change to the directory, for example, cd ITSO\DOM7SVR2, containing the server ID file.
  - d. Verify if the server ID file exists by using the dir *.id command.
- 3. Perform the following tasks to FTP the server ID file to the i5/OS integrated file system:
  - a. In the DOS prompt window, type the **ftp** *hostname* command, where *hostname* is the name of your System i machine.
  - b. When prompted, enter your i5/OS user ID and password to authenticate with the System i machine.
  - c. Switch to the i5/OS integrated file system format using the cd / command.

- d. Switch to the i5/OS integrated file system directory created in step 1by using the cd diretoryname command. In this example, this is cd ITSO.
- e. Switch to the binary format by using the **bin** command.
- f. Place the server ID file on the i5/OS integrated file system directory by using the **put serverid** command. In this example, this is put DOM7SVR2.ID.
- 4. From an i5/OS command line, change the ownership of the server ID file to QNOTES by using the following Change Owner (CHGOWN) CL command. In this example, the command is:

CHGOWN OBJ('/ITSO/DOM7SVR2.ID') NEWOWN(QNOTES)

**Attention:** If you do not change the ownership of the ID file and attempt to start the Domino server, the following message is displayed on the Domino server console, which then ends:

```
"Server exiting the ID file is write protected."
```

The server ID file is now available for configuring the additional server on the System i machine. Refer to 4.2.4, "Using DOMWZD.EXE to configure an additional Domino server" on page 137 or 4.2.5, "Using CFGDOMSVR to configure an additional Domino server" on page 151 for details about how to perform this task.

## Attaching the ID file to the Server document in the Domino Directory

The advantage of this method is that during the configuration process on i5/OS, the ID file is automatically retrieved from the registration Domino server. The disadvantage is that a password must be specified for the ID file everytime you start the Domino server.

This is not a problem during the configuration process because you can specify the ID file password with the additional Domino server ID (ADDSVRID) parameter of the CFGDOMSVR command. However, when you start the Domino server after you configure it, it does not completely start unless you access the Domino server console on i5/OS with the Work with Domino Console (WRKDOMCSL) CL command and enter the correct password. This must be done *everytime* you start the Domino server. If you had specified a minimum password length of zero, you can clear the password.

Perform the following steps to clear a Domino server ID's password:

- 1. Start the Domino Administrator client.
- 2. Click the **Configuration** tab. From the right-hand side of the display, expand **Tools**  $\rightarrow$  **Certification**  $\rightarrow$  **ID Properties** (Figure 4-29 on page 130).
- 3. Open the server ID file.
- 4. Click the Change Password button.
- 5. Click the No Password button, and then the Yes button to confirm the choice.
- 6. Click OK or Close.

**Note:** If this fails, it is likely that when the server ID was created, the minimum password strength was not set to allow for zero or no password. If this is indeed the case, recertify the server ID and change the password strength to "require no password" for the steps described here to work.

# 4.2.3 Verifying the connection to the Domino registration server

During the configuration process for an additional Domino server, an existing Domino server (usually, the registration Domino server) is contacted to request a replica of the Domino Directory. Therefore, the Domino registration server must be reachable by the System i machine using TCP/IP.

It is a good idea to verify the connection by performing a ping from an i5/OS command line before configuring the Domino server. A successful ping from your PC workstation to the Domino registration server does *not* guarantee that the System i machine can also access the registration server. Use the Verify TCP/IP Connection (PING) CL command from an i5/OS command line (rather than from a DOS command line). To verify the connection to the Domino server called DOM7SVR1, for example, type the following command from any i5/OS command line, and press Enter:

ping dom7svr1

You must be able to ping by the Domino server name. If you cannot reach the registration server by specifying its name, but receive a positive response by using the numerical IP address, add the name, along with the correct IP address, to a DNS, if it exists, or to the i5/OS host table by using the Configure TCP/IP (CFGTCP) menu, option 10, or the Add TCP/IP Host Table Entry (ADDTCPHTE) command.

# 4.2.4 Using DOMWZD.EXE to configure an additional Domino server

In this example, during the registration of the additional server, a decision was taken to save the newly created server ID to disk, and then FTP the server ID file to the i5/OS integrated file system.

The steps used to configure an additional server using the Domino Server Setup wizard (domwzd.exe) are similar to the steps described in 4.1.3, "Using domwzd.exe to configure a new Domino server" on page 96. Because all the parameters are discussed in detail in that section, they are not described again in this section.

Perform the following steps to configure the additional server using the domwzd.exe method:

- 1. Perform steps 1 4, as described in 4.1.3, "Using domwzd.exe to configure a new Domino server" on page 96.
- 2. In window shown in Figure 4-37, select Set up an additional server and click Next.

Remote Server Setup for DOMIN0570				
	First or additional server?			
	Is this E domain within a	Domino server the first server or a stand-alone server, or should it join an existing Domino as an additional server? (A Domino domain is a collection of Domino servers and users n organization).		
		<ul> <li>Set up the first server or a stand-alone server</li> <li>This will setup a new Domino Server and a new Domino domain.</li> </ul>		
	Ĩ	Set up an additional server This will setup an additional Domino server into an existing Domino domain. This requires that the server is already registered in the Domino Directory (You may need to obtain additional information from your Domino administrator).		
н	lelp	< Back Next > Cancel		

Figure 4-37 Selecting to configure an additional Domino server

3. In the "Where is the ID file for this additional Domino server" window (Figure 4-38), select **The server ID file is stored on server in a directory** if your Domino server ID file is stored in the i5/OS integrated file system. You can click the **Browse** button to find the server ID file. Click **Next** to continue.

Remote Server Setup for DOMIN0570				
	Where is the ID file for this additional Domino server?			
	Prior to Domino directly	setup, this additional Domino server needed to be registered in the domain-wide Directory first. During this registation, a server ID file gets created and is either stored in the Domino Directory or in a file.		
	_	<ul> <li>The server ID file is stored on your server in a directory.</li> <li>Browse</li> <li>/ITSO/dom7svr2.id</li> </ul>		
		O The server ID file is stored in the Domino Directory.		
	<del></del> 0	Optional Server ID password:		
н	lelp	< Back Next > Cancel		

Figure 4-38 Specifying the location of the additional server ID

4. The Domino Server Setup wizard reads the Domino server name from the server ID file. Confirm the Server name (Figure 4-39) and click **Next**.

Remote	e Server Setup for DOMIN0570
	Provide the registered name of this additional Domino server
	Type the name of this additional Domino server as it has been registered in the Domino Directory (Your company's Domino administrator can tell you what name to use).
	Server name: DOM7SVR2/ITSO For example: Sales1/Acme
	To set up an additional server, you must first have registered it using the Domino Administrator or Domino Web Administrator client. If you are creating a new Domino domain and this is the first server in that domain, click the Back button and choose to setup a first server instead.
н	lelp <a>Back Next &gt; Cancel</a>

Figure 4-39 Additional Domino server name

5. In the Provide the data folder for this Domino server window (Figure 4-40), enter the folder name and path of the Domino server data directory. You can also use the **Browse** button to select an existing i5/OS integrated file system directory. Each partitioned Domino server must have its own data directory. Click **Next**.

Remote	Remote Server Setup for DOMIN0570				
	Provide the data folder for this Domino server				
	Type the name and path of the folder where all of the Domino servers data files will reside.				
	Folder name and path: /Domino/DOM7SVR2/Data Browse				
	If you are setting up more than one Domino server on this system (partitioned servers), specify the data folder for the desired partition you are configuring.				
F	Help <a>Back Next &gt; Cancel</a>				

Figure 4-40 Additional Domino server data directory

6. Confirm the advanced server settings (Figure 4-41) or click on the **Customize** button to change the settings. When finished, click **Next**.

Remote Server Setup for DOMIN0570				
	Specify advanced server settings	Lotus software		
	There are a number of additional advanced s wizard will automatically configure these setti	erver settings that can be customized. The setup ings to values that a typical server would use.		
	Advanced server settings:			
	Parameter	Value		
	Start server after setup Start server with TCP/IP Start Java server controller with TCP/IP Enable server partitioning Enable BRMS incremental save Copy Administrator ID File	No No Yes No *ALL		
	ν Το change advanced server settings, click Cu	ustomize. Customize		
Help < Back Next > Cancel				

Figure 4-41 Additional Domino server advanced settings

 Confirm the desired Internet services (Figure 4-42) for this Domino server or click the Customize button to customize other Domino Internet services settings. When finished, click Next.

Remote	Remote Server Setup for DOMIN0570				
	What Internet services should this Domino Server provide?				
	Select ti are set i	ne Internet services this Domino server will provide. Basic Notes and Domino services up by default. (You can always change these options later in the Domino Directory).			
	<b>\$</b>	Setup Internet services for: Veb Browsers (HTTP services) Internet Mail Clients (SMTP, POP3 and IMAP services) Directory services (LDAP services)			
	To custo	mize all other Domino services, click Customize.			
Н	lelp	< Back Next > Cancel			

Figure 4-42 Additional Domino server Internet services

8. Confirm the network settings (Figure 4-43) or click **Customize** to customize the network settings. When finished, click **Next**.

Remote Server Setup for DOMIN0570				
	Domino	network settings Lotus software		
	Setup h: click Cu	s reliably detected the following network ports on this computer. To add additional ports, tomize (You can change all settings later in the Domino Directory).		
	<b>HH</b>	Enabled port drivers: TCPIP		
	Setup suggests the host name to use in the Domino Directory for this Domino server based on this computer's network name.			
	<b>Q</b>	Host name: DOM7SVR2.RCHLAND.IBM.COM		
	To custo	nize the network settings, click Customize.		
He	alp	< Back Next > Cancel		

Figure 4-43 Additional Domino server network settings

9. Specify the time zone and whether daylight saving time is observed (Figure 4-44) and click **Next**.

Remote	Remote Server Setup for DOMIN0570		
Ē	Specify the	time zone Lotus software	
	lf you do n will be use	ot provide time zone information, the time zone used by the server's operating system d.	
		Time zone:	
		Central Standard Time (CST)	
		✓ Observe daylight-saving time	
-	felp	< Back Next > Cancel	

Figure 4-44 Additional Domino server time zone

10. In the "Provide the system databases for this Domino server" window (Figure 4-45), specify an existing Domino server in the Domino domain, and optionally (if your DNS does not resolve the server name), a network address, and click **Next**.

Remote Server Setup for DOMIN0570				
	Provide the system databases for this Domino server			
The Domino server needs several system databases (Domino Directory) to operate properly. By default it will replicate them over the network from another Domino server. Alternatively, you can provide them from a CD or other media (faster).				
		Other Domino server name:	Optional network address:	
		DOM7SVR1/ITSO	9.5.30.17	
For example: Sales2/Acme For Example: sales2.acme.com			For Example: sales2.acme.com	
	Use a proxy server to connect to the other Domino server			
		Address: Por	t: 0 HTTP Tunnel 💌	
		Use a dialup connection	Dialup	
	<b>S</b> *	Get system databases from CD or other media /Domino/DOM78VR2/Data	Browse	
Н	lelp	< Back	K Next > Cancel	

Figure 4-45 Specifying an existing Domino server in the domain to copy databases from

11.Decide if the additional Domino server will be set up as a primary Domino directory or as a Configuration Directory (Figure 4-46), and click **Next**.

Remote	Server Setup	for DOMIN0570
	Specify the typ	e of Domino Directory for this server
	The Domino D Configuration connectivity to	Directory for this server can be configured as a primary Domino Directory or a Directory. Use of the Configuration Directory is recommended where good a centrally located primary Domino Directory exists.
		Set up as a primary Domino Directory (Recommended) This sets up a Directory including all users, groups, and enterprise custom entries as well as information about the configuration of the Domino environment. This server can then provide user and group information to other servers that have only a Configuration Directory.
	<u>[</u> ][]]	Set up as a Configuration Directory This sets up a local Configuration Directory. This server will use a primary Domino Directory on a remote server to look-up information about users and groups.
	(If you are not s	sure which option to select, choose the "primary Domino Directory")
He	alp	< Back Next > Cancel

Figure 4-46 Additional Domino server Domino Directory type

12. In the Secure your Domino Server window (Figure 4-47), confirm the Domino server security settings and click **Next**.

Server Setup		
	Secure your Domino Server	
	To increase security and prevent unauthenticated access of databases from the Internet, Setup recommends to configure Access Control Lists of all databases and templates to prohibit Anonymous access.	
	✓ Prohibit Anonymous access to all databases and templates	
	For better managability and administration, Setup will add the system group "LocalDomainAdmins" with "Manager" access to all databases and templates.	
	Add LocalDomainAdmins group to all databases and templates	
	(If you are not sure, leave both options selected)	
He	elp < Back Next > Cancel	

Figure 4-47 Additional Domino server security settings

13. You are now presented with an option (Figure 4-48) to make optional copies of the ID files in the new Domino server's data directory. Click **Next**.

Remote	Remote Server Setup for DOMIN0570			
	Make optional copies of ID files			
	Server Setup will create these new ID files:			
	[/Domino/DOM7SVR2/Data/dom7svr2.id]			
	These ID files will be stored on the server. To make additional copies of these ID files, click the checkbox below and specify where to store them. Otherwise, click Next.			
	I want to make additional copies of the ID files: Browse Browse			
	C:\DownloadDirector\Domino 7.0.2 for iSeries			
	To continue with Setup click Next.			
H	elp <a href="https://www.automaticality.com">Back</a> Next > Cancel			

Figure 4-48 Additional Domino server option to copy the ID files

#### 14. Confirm the additional Domino server settings (Figure 4-49) and click Setup.

**Note:** The View command button shows you what the Configure Domino Server (CFGDOMSVR) CL command looks like that the wizard is running in the background to configure the additional server.

Remote Server Setup for DOMIN0570				
	Please review and confirm your chosen server setup options			
Please review the following options you have chosen for your Domino server setup:				
	Setting		Current selection	
Remote server name         DOM7SVR2/ITSO           Release         7.0.2           Server type         Set up an additional server           Data directory or partiti /Domino/DOM7SVR2/Data           Directory type         Full directory           ACL         Prohibit anonymous access to all databases and templates.           System Group         LocalDomainAdmins created with "Manager" access to all template		d templates. sess to all template		
To make any changes, click "Back".				
To setup your server with the above options, click "Setup". View command				
Help Cancel				

Figure 4-49 Additional Domino server settings confirmation

15.A congratulations window must be displayed, as shown in Figure 4-50, stating that the Domino Server Setup is complete. Click **Finish**.

Remote Server Setup for DOMIN0570		
	Setup summary Lotus software	
	Congratulations, Domino Server Setup is now complete! For help with the first tasks in configuring your domain click the Help button.	
	Click "Finish" to close Setup.	
Н	Elp Finish	

Figure 4-50 Additional Domino server setup complete

Your new Domino server starts automatically if you specified "Start server after setup = Yes" in the advanced server settings (see Figure 4-41 on page 142). This example does not have this automatic start value set. To learn more about starting a Domino server, refer to Chapter 5, "Administering Domino 7 on i5/OS" on page 159.

# 4.2.5 Using CFGDOMSVR to configure an additional Domino server

In this example, during the registration of the additional server, a decision was taken to save the newly created server ID to disk and then FTP the server ID file to the i5/OS integrated file system. Perform the steps described here to configure the additional server using the CFGDOMSVR command.

The steps used to configure an additional server using the CFGDOMSVR CL command are similar to the steps described in 4.1.4, "Using CFGDOMSVR to configure a new Domino server" on page 113. Because all the parameters are discussed in detail in that section, this section does on elaborate on them.

Perform the following tasks:

1. From an i5/OS command line, enter the following command and press F4 to prompt the command:

CFGDOMSVR

2. In the Configure Domino Server (CFGDOMSVR) screen (Figure 4-51), provide the full hierarchical name of the Domino server. In this example, the Domino server name is DOMSVR2/ITSO.

Also, because you are configuring an additional Domino server, specify *ADD for the Option parameter. Press Enter.

	Configure Dom	ino Server ((	CFGDOMSVR)	
Type choices, press Enter.				
Server name	>	DOM7SVR2/ITS	60	
Option	>	*ADD	*FIRST, *ADD,	*REMOVE
F3=Exit F4=Prompt F24=More keys	F5=Refresh	F12=Cancel	F13=How to use	Bottom this display

Figure 4-51 CFGDOMSVR command for additional Domino server (Display 1 of 9)

3. The display expands as shown in Figure 4-52. Type the Domino server's data directory and time zone. Press PgDn.

Configure Domino Server (CFGDOMSVR)				
Type choices, press Enter.				
Server name				
Option > *ADD *FIRST, *ADD, *REMOVE Data directory > '/Domino/DOM7SVR2/Data'				
Time zone > CST GMT,EST,CST,MST,PST,CET Daylight savings time *YES *YES *YES, *NO				
More F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display F24=More keys				

Figure 4-52 CFGDOMSVR command for additional Domino server (Display 2 of 9)

- 4. In the screen shown in Figure 4-53, the Get Domino Directory From parameter specifies the source from which to get the Domino Directory to be used for this additional server.
  - Use the Domino server name option to specify the name of an existing Domino server that has the Domino Directory. The Domino Directory is copied from the specified Domino server to this new server. Because the Domino Directory has a large amount of information, the copy time might be extensive.

Specify a Domino server name when you specify the *ADD option.

- Use the Optional network address option to specify the Internet address of the Domino server that has the Domino Directory. This is an optional parameter. The possible values are:
  - *NONE: Do not specify an Internet address.
  - IP-address: Specifies the IP address or host name of the Domino server that has the Domino Directory. If an IP address is specified, it must be in the form nnn.nnn.nnn, where nnn is a decimal number between 0 255.

If a host name is specified, it must be no more than 255 characters of text. The host name can either be the short form or the full domain version of the name, and consist of one or more labels that are separated by periods. Each label can contain up to 63 characters. The specified host name must be listed either in the i5/OS TCP/IP host table or in the Domain Name Server of your network.

If the Domino server that has the Domino Directory requires a proxy server, specify the following proxy settings:

- Use the Proxy server address option to specify the Internet address of the proxy server. The possible values are:
  - *NONE: Internet address is not specified. It means that a proxy server is not necessary to reach the Domino server. All the proxy settings are ignored.
  - IP-address: Specifies the IP address of the proxy server. A valid proxy port must also be specified.
- Use the Proxy server port option to specify a port number between 1- 65535. Here, the proxy server is listening to requests.

Press PgDn to continue.

```
Configure Domino Server (CFGDOMSVR)
Type choices, press Enter.
Get Domino Directory from:
 Domino server name . . . . . > 'DOM7SVR1/ITSO'
 Optional network address . . . > '9.5.30.17'
  Proxy server address . . . .
                                  *NONE
 Proxy server port . . . . .
                                                1 - 65535
                                                                      More...
                     F5=Refresh
                                  F10=Additional parameters
F3=Exit F4=Prompt
                                                              F12=Cancel
F13=How to use this display
                                  F24=More keys
```

Figure 4-53 CFGDOMSVR command for additional Domino server (Display 3 of 9)

- 5. In the screen shown in Figure 4-54, after entering the parameters for the Get Domino Directory From parameter, type the Additional Server ID location and the other parameter settings:
  - Use the Proxy server type option to specify the type of the proxy server being used. The possible values are:
    - *HTTPTUN: An HTTP tunnel proxy server is used.
    - *SOCKS: A Sockets Secure (SOCKS) proxy server is used.
  - Use the Local file option to access the Domino Directory from a file in an i5/OS integrated file system directory. The possible values are:
    - *NONE: Do not use a local file. Use the Domino Directory from the specified Domino server.
    - file-path-name: Specifies the local directory path from which to access the Domino Directory, for example, /domino/server1/data.
  - The Domino directory type option specifies the type of Domino Directory to be used for the additional server. The possible values are:
    - *CENTRAL: The Domino Directory contains user and group entries in addition to all the documents required by the server for proper operation.
    - *CONFIG: The Domino Directory does not contain any user or group entries, but only the server-related or configuration-related documents required by the additional Domino server for proper operation. Users and groups are looked up on the domain's central directory using directory services assistance (DIRSRV parameter value).
  - The Additional server ID option specifies the name and the associated password for the server ID file of the additional Domino server. This server ID file was created for the new Domino server when it was registered by an existing Domino server. The possible values for the ID file are:
    - *NAB: The server ID file is retrieved from the Domino Directory for the Domino domain in which the new server was registered.
    - server-ID-file-name: Specify the path name that identifies the server ID file to be used for the new server.

For the ID file's password, specify the password that is associated with the new server when it is created. A password is required only if the new server ID file is

password-protected, that is, only if a password was specified when the new server was registered.

Enter the other parameters you want to change and press PgDn to continue.

```
Configure Domino Server (CFGDOMSVR)
Type choices, press Enter.
                                 *HTTPTUN
                                              *HTTPTUN, *SOCKS
 Proxy server type . . . . .
 Local file . . . . . . . . .
                                 *NONE
Domino directory type . . . . *CENTRAL
                                              *CENTRAL, *CONFIG
Additional server ID:
 ID file . . . . . . . . . > '/ITSO/dom7svr2.id'
 ID file's password . . . . .
                                              *NONE, *ALL, *HTTP, *IIOP
Web browsers . . . . . . . . > *HTTP
                                              *NONE, *ALL, *IMAP, *POP3 ...
Internet mail packages . . . . > *SMTP
              + for more values
Directory services . . . . . *NONE
                                              Character value, *NONE...
                                                                   More...
F3=Exit
         F4=Prompt F5=Refresh F10=Additional parameters
                                                            F12=Cancel
F13=How to use this display
                               F24=More keys
```

Figure 4-54 CFGDOMSVR command for additional Domino server (Display 4 of 9)

7. In the screen shown in Figure 4-55, press F10 to display the additional server parameters.

Configure Domino Serv	er (CFGDOMSVR)
Type choices, press Enter.	
Connection services > *NONE Advanced services *PARTIT + for more values	*DECS, *NONE ION *NONE, *ALL, *PARTITION
Default ACL settings *ADMGRP	*NONE, *ANONYMOUS, *ADMGRP
Text 'description' *BLANK	
F3=Exit F4=Prompt F5=Refresh F12=Can F24=More keys	Bottom cel F13=How to use this display

Figure 4-55 CFGDOMSVR command for additional Domino server (Display 5 of 9)

6. In the screen shown in Figure 4-56, type the parameters you want to change and press PgDn.

```
Configure Domino Server (CFGDOMSVR)
Type choices, press Enter.
Connection services . . . . . > *NONE
                                                *DECS, *NONE
                                                *NONE, *ALL, *PARTITION...
Advanced services . . . . . .
                                  *PARTITION
              + for more values
Default ACL settings . . . . .
                                  *ADMGRP
                                                *NONE, *ANONYMOUS, *ADMGRP
Text 'description' . . . . . .
                                  *BLANK
                          Additional Parameters
SMTP services (obsolete) . . .
                                  *DOMINO
                                                Character value
News readers (obsolete) . . . .
                                  *NONE
                                                Character value
Replace configuration . . . .
                                  *YES
                                                *YES, *NO
                                  *ORG
Domain name . . . . . . . . . . .
                                  NETWORK1
Network name . . . . . . . . . .
Country or region code . . . . .
                                  *BLANK
                                                                     More...
F3=Exit F4=Prompt
                     F5=Refresh F12=Cancel
                                               F13=How to use this display
F24=More keys
```

Figure 4-56 CFGDOMSVR command for additional Domino server (Display 6 of 9)

7. In the screen shown in Figure 4-57, type the parameters you want to change, and press PgDn.

Configure Dom	nino Server (CFGDOMSVR)
Type choices, press Enter.	
Organizational unit: Name	*BLANK *GEN *ADM
ID file	*GEN *ADM
ID file	*GEN *ADM
F3=Exit F4=Prompt F5=Refresh F24=More keys	More F12=Cancel F13=How to use this display

Figure 4-57 CFGDOMSVR command for additional Domino server (Display 7 of 9)

8. In the screen shown in Figure 4-58, type the parameters you want to change, and press PgDn.

Configure Domino Server (CFGDOMSVR)								
Type choices, press Enter.								
Server ID: ID file	*GEN							
ID file's password	*NOPWD *NO *NO *YES *YES *NOENCRYPT '9.5.30.18'	*YES, *NO *YES, *NO, *JSC, *ALL *YES, *NO *YES, *NO *ENCRYPT, *NOENCRYPT						
Bind HTTP	*YES *NO	*YES, *NO *YES, *NO						
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	F13=How to use this display						

Figure 4-58 CFGDOMSVR command for additional Domino server (Display 8 of 9)

9. In the screen shown in Figure 4-59, type the parameters you want to change and press Enter to configure the Domino server.

Configure Domino Server (CFGDOMSVR)								
Type choices, press Enter.								
Server host name >	DOM7SVR2.RCHI	LAND.IBM.COM						
Subsystem and object names > Collation	DOM7SVR2 *STD *ALL *NONE	Name, *GEN *STD,CS,DA-DK-AA,DE,E2-ES *DOMDIR, *DTADIR, *ALL *NONE,*ALL,*MINIMUM						
Allow Domino Off Line Services Service provider configuration	*N0 *N0	*YES, *NO *YES, *NO						
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	Bottom F13=How to use this display						

Figure 4-59 CFGDOMSVR command for additional Domino server (Display 9 of 9)

Your new Domino server starts automatically if you specified "Start server after setup = Yes" in the advanced server settings (see Figure 4-58 on page 157). This example does not have this automatic start value set. To learn more about starting a Domino server, refer to Chapter 5, "Administering Domino 7 on i5/OS" on page 159.

# Administering Domino 7 on i5/OS

To help you manage Domino servers on the System i platform, Domino for i5/OS allows you to use the following methods to perform common administration tasks:

iSeries Navigator

This graphical interface is part of the workstation support provided by IBM eServer iSeries Access. For details about administering Domino for i5/OS servers using iSeries Navigator, refer to 5.1, "Using the iSeries Navigator" on page 161.

i5/OS commands

These commands allow you to interact directly with the i5/OS operating system through the i5/OS command language (CL) interface. i5/OS commands allow you to initiate system functions by using a terminal directly connected with your system, or a workstation communicating with your system by using a session such as a 5250 emulator window. For details about administering Domino for i5/OS servers using i5OS commands, refer to 5.2, "Using the i5/OS commands" on page 179.

Java Server Console

This Java-based application allows you to manage your Domino servers from a workstation even when your Domino servers are not currently running. For details about administering Domino for i5/OS servers using the Java server console, refer to 5.3, "Using the Java Server Console" on page 192.

Web Administrator client

You can use the Web Administrator to perform most of the tasks that are available through the Domino Administrator client. For details about administering Domino for i5/OS servers using a Web Administrator client, refer to 5.4, "Using the Web Administrator client" on page 193.

Lotus Domino Administrator Client

The Domino Administrator is the administration client for Notes and Domino. You can use the Domino Administrator to perform most administration tasks. For details about administering Domino for i5/OS servers using the Domino Administrator client, refer to 5.5, "Using the Domino Administrator client" on page 194.

**Important:** You must use the iSeries Navigator, the i5/OS commands, or the Java Server Console to perform some of the Domino server tasks such as starting or stopping a Domino server.

Whether you use the iSeries Navigator, the i5/OS commands, or the Java Server Console to manage a Domino server, you must have an i5/OS user profile that has the necessary authority to perform each administrative operation.

# 5.1 Using the iSeries Navigator

The iSeries Navigator enables you to use your Domino administrator workstation to manage both your system and the Domino servers on the system. Through the Domino for i5/OS support in iSeries Navigator, you can perform the following tasks:

- Determine the status of all the Domino servers on a system
- Perform administrative tasks on the Domino servers, such as starting and stopping
- View and change Domino server properties, including Domino server's notes.inin files

The iSeries Navigator works through the iSeries Access support. Therefore, you must install iSeries Access on the system and the administrator's workstation. You must also install the Domino plug-in for iSeries Navigator on the administrator's workstation. The Domino plug-in for iSeries Navigator must be installed if you want to manage your Domino environment using the iSeries Navigator. It adds the necessary code to administer Domino from the iSeries Navigator. For details about installing the Domino plug-in for iSeries Navigator, refer to 3.6, "Installing the iSeries Navigator Lotus Domino plug-in" on page 85.

If you are familiar with a graphical user interface such as Microsoft Windows, you might prefer to use the iSeries Navigator (Figure 5-1).



Figure 5-1 Using the iSeries Navigator to administer Domino for i5/OS servers

# 5.1.1 Starting the Domino services

Use the iSeries Navigator to start the Domino servers, controllers, or the Domino Console. Perform the following steps to start all the Domino services on your system:

- Start the iSeries Navigator, open the system where you installed Domino, and select Network → Servers.
- 2. Right-click **Domino** and select **Start**. You have the option of starting the following Domino services, as shown in Figure 5-2:
  - All Servers: All the stopped Domino servers start.
  - All Controllers: All the stopped Controllers start.

- All Servers and Controllers: Both the Domino servers and the Controllers start.
- Domino Console: This starts the Domino Console.

Note: You must have the *JOBCTL special authority to start the Domino Console.



Figure 5-2 Starting all the Domino services on the system

Perform the following steps to work with a particular Domino server:

- 1. Start the iSeries Navigator, open the system where you installed Domino, and select Network  $\rightarrow$  Servers  $\rightarrow$  Domino.
- 2. Right-click the Domino server you want to work with and select **Start**. You have the option of starting the following Domino services, as shown in Figure 5-3:
  - Server: The selected Domino server starts.
  - Controller: The Domino server's Controller starts.
  - Server and Controller: Both the Domino server and the Controller start.

🥝 iSeries Navigator								
File Edit View Help								
Environment: My Connections	Rchas10: Domino	)						
🕀 🏽 Management Central (Rchas10)	Server Name	Status	Version					
My Connections	COM7SVR1	Started	7.0.2					
Er Rchas10	Composed Dom 7 SVR 2	Stopped	7.0.2					
± Sasic Operations				Start	> ⊧	Server		
Work Management	1			Stop 😽	•	Controller		
E Network				Server Administratio	n	Server and Controller		
🕀 🦻 TCP/IP Configuration								
Remote Access Services				Add Application				
⊡	1			Delete				
	1			Properties				
DNS	1			Properues				
	1							
Domino								
IP Policies								
🗉 🐻 Enterprise Identity Mapping								

Figure 5-3 Starting the services for a Domino server

# 5.1.2 Stopping the Domino services

Use the iSeries Navigator to stop the Domino servers, controllers, or the Domino Console. Perform the following steps to stop all the Domino services on your system:

- Start the iSeries Navigator, open the system where you installed Domino, and select Network → Servers.
- 2. Right-click **Domino** and select **Stop**. You have the option of stopping the following Domino services, as shown in Figure 5-4:
  - All Servers: All the Domino servers are stopped.
  - All Servers and Controllers: All the Domino servers and Controllers are stopped.

- All Servers Immediately: All the Domino servers are stopped immediately.
- All Servers and Controllers Immediately: All the Domino servers and Controllers are stopped immediately.

**Note:** You must have the *JOBCTL special authority to stop all the servers or all the servers and controllers immediately.



Figure 5-4 Stopping all the Domino services

Perform the following steps to work with a particular Domino server:

- 1. Start the iSeries Navigator, open the system where you installed Domino, and select Network → Servers → Domino.
- 2. Right-click the Domino server you want to work with and select **Stop**. You have the option of stopping the following Domino services, as shown in Figure 5-5:
  - Server: The selected Domino server is stopped.
  - Server and Controller: The Domino server's Controller is stopped.
- Server Immediately: The selected Domino server is stopped immediately.
- Server and Controller Immediately: Both the Domino server and the Controller are stopped immediately.

**Note:** You must have the *JOBCTL special authority to stop a server or a server and a controller immediately.

🥝 iSeries Navigator				the second second	_ 🗆 🔀		
File Edit View Help							
8 % ▶ ● 🚼 × 🗳 🗇 🗊 ♥							
Environment: My Connections	Rchas10: Domino						
🕀 🕕 Management Central (Rchas10)	Server Name	Status	Version				
My Connections	C DOM7SVR1	Started	7.0.2				
E Rchas10	Composed Dom 7 SVR 2	Started	7.0.2		1		
Basic Operations				Start •			
Work Management				Stop N	Server		
Configuration and Service				Server Administration	Server and Controller		
				Server Hammisd adon	Server Immediately		
Remote Access Services				Add Application	Server and Controller Immediately		
Servers				Delete			
TCP/IP				Deservices.			
iSeries Access				Properties			
- 🙀 DNS							
🛛 🔏 User-Defined							
Cata Domino							
E IP Policies							

Figure 5-5 Stopping the services for a Domino server

# 5.1.3 Displaying the Domino jobs

To view the active jobs related to the Domino servers on a system, perform the following steps:

- 1. Start the iSeries Navigator, open the system where you installed Domino, and select Network  $\rightarrow$  Servers.
- 2. Right-click Domino and select Domino Jobs, as shown in Figure 5-6.



Figure 5-6 Displaying the Domino jobs

3. The Domino jobs are displayed in a new window, as shown in Figure 5-7, sorted according to the subsystem.

ne core view	Help	N		
	Reference and the second secon	ý 🚺 o 🔨		0 minutes old
Job Name	User	Status	Туре	Entered System
Adminp	Qnotes	Running	Batch immediate - Server	8/8/06 10:20:56 AM
Adminp	Qnotes	Running	Batch immediate - Server	8/8/06 10:21:03 AM
Amgr	Qnotes	Running	Batch immediate - Server	8/8/06 10:20:56 AM
Amgr	Qnotes	Running	Batch immediate - Server	8/8/06 10:20:58 AM
Amgr	Qnotes	Running	Batch immediate - Server	8/8/06 10:21:02 AM
Amgr	Qnotes	Running	Batch immediate - Server	8/8/06 10:21:05 AM
Calconn	Qnotes	Running	Batch immediate - Server	8/8/06 10:20:56 AM
Calconn	Qnotes	Running	Batch immediate - Server	8/8/06 10:21:03 AM
Colsrv400	Qnotes	Running	Batch immediate - Server	8/8/06 10:20:56 AM
Colsrv400	Qnotes	Running	Batch immediate - Server	8/8/06 10:21:02 AM
Controller	Qnotes	Completed - Printer output available	Batch immediate	7/26/06 4:00:26 PM
Controller	Qnotes	Ended	Batch immediate	7/26/06 4:05:11 PM
Controller	Qnotes	Completed - Printer output available	Batch immediate	7/27/06 9:48:36 AM
Controller	Qnotes	Ended	Batch immediate	7/27/06 10:35:33 AM
Controller	Qnotes	Ended	Batch immediate	7/27/06 10:35:33 AM
Controller	Qnotes	Completed - Printer output available	Batch immediate	7/27/06 11:29:15 AM
Controller	Qnotes	Completed - Printer output available	Batch immediate	7/27/06 11:29:15 AM
Controller	Qnotes	Ended	Batch immediate	7/28/06 7:07:40 PM
Controller	Qnotes	Completed - Printer output available	Batch immediate	7/31/06 4:52:28 PM
Controller	Qnotes	Ended	Batch immediate	7/31/06 4:58:31 PM
Controller	Qnotes	Ended	Batch immediate	7/31/06 5:00:10 PM
Controller	Qnotes	Ended	Batch immediate	8/7/06 11:59:53 AM

Figure 5-7 Domino jobs

#### 5.1.4 Domino server properties

To change the Domino server's properties using the iSeries Navigator, perform the tasks described here.

**Note:** If the Domino server is active, some of the options displayed are grayed out and you cannot change them. Also, if the Domino server is not active, some of the information might be displayed as "Not available".

Perform the following tasks:

1. Start the iSeries Navigator, open the system where you installed Domino, and select Network → Servers → Domino.

2. Right-click the Domino server you want to work with and select **Properties**, as shown in Figure 5-8.

**Note:** If you are unable to see all the Domino server properties when using the iSeries Navigator, the problem is most likely related to your i5/OS user ID authority. When using the iSeries Navigator to manage your Domino server, the i5/OS user profile is authenticated. Make sure that you are using a user profile with the correct authority.

🖉 iSeries Navigator					
File Edit View Help					
🗞 %   🕨 💌 🗱   🗙 🖆   🏈 👿	0				
Environment: My Connections	Rchas10: Domin	D			
🕀 🏨 Management Central (Rchas10)	Server Name	Status	Version		
My Connections	Composed Boom Port 2013	Started	7.0.2		
E Rchas 10	Common Co	Stopped	7.0.2		
<ul> <li>Basic Operations</li> </ul>				Start	
Work Management				Stop	•
Configuration and Service     Ser				Server Administration	
					<u> </u>
				Add Application	
Remote Access Services				D. L.L.	— (
				Delete	
				Properties	N
DNS				11 spel bes	-2
User Defined					
Domine					-

Figure 5-8 Displaying the Domino server properties

#### The Basics tab

In the Domino server's Properties window, the Basics tab provides basic information about the Domino server (Figure 5-9). Also, when the Domino server is stopped, you can change some of the settings in this tab.

Ø DO	M7SVR2 Properti	ies - Rchas10
Basio	s Internet Mail	Services Locale Network Configuration Initialization File
	Start when TCP/IP	is started: Server
1	– Basic informatior	
	Server name:	DOM7SVR2/ITSO
	Subsystem:	DOM7SVR2
	Server title:	
	Domain name:	пто
	Server type:	Domino
	Data directory:	/Domino/DOM7SVR2/Data
	Server status:	Stopped
	Administrator:	Luis Guirigay
		OK Cancel Holn 2

Figure 5-9 Domino server properties, Basics tab

#### The Internet tab

As shown in Figure 5-10, the Internet tab provides the option of activating the Domino Hypertext Transfer Protocol (HTTP) task, the Internet Inter-ORB Protocol (IIOP) task, or the Internet Cluster Manager.

🖉 DOM7SVR2 Properties - Rchas10	<
Basics Internet Mail Services Locale Network Configuration Initialization File	
Enable Web Browser Access	
I Hypertext Transfer Protocol (HTTP)	
☐ Internet Inter-ORB Protocol (IIOP)	
🗖 Internet Cluster Manager (ICM)	
OK Cancel Help ?	1

Figure 5-10 Domino server properties, Internet tab

## The Mail tab

The Mail tab shown in Figure 5-11 allows to you enable or disable the POP3, the Internet Message Access Protocol (IMAP), or the Simple Mail Transfer Protocol (SMTP) tasks for messaging purposes, and the Lightweight Directory Access Protocol (LDAP) task for directory purposes. It also provides information about the type of Domino directory used by this server.

DOM7SVR2 Properties - Rchas10	X
Basics   Internet Mail   Services   Locale   Network Configuration   Initialization File	
Enchla Internet Meil Assess	
Enable Internet Mail Access	
Internet Office protocol (ROR) uproion 2.0	
Post Olice protocol (POP) version 3.0	
) Simple Message Transfer Protocol (SMTP)	
- Enable Directory services	
Lightweight Directory Access Protocol (LDAP)	
Domino directory type: Central	
OK Cancel Help	?

Figure 5-11 Domino server properties, Mail tab

#### The Services tab

The Services tab shown in Figure 5-12 shows the Domino server's tasks. You can disable or enable them from this window. You can also use this page to log replication and client session events.

ODM7SVR2 Properties - Rchas1	0	
Basics Internet Mail Services L	ocale   Network C	configuration Initialization File
Log replication events Log client session events		
- Services		Enabled
Backup and Recovery Media S Billing Certificate Authority Change Manager Cluster Domino Off Line Services ISpy Remote Debug Statistic Collector Statistics	Enable -> <- Disable	Administration Process Agent Manager Calendar Connector Domino Enterprise Connection Partitioning Replicator Rooms & Resources Manager Router Schedule Manager Stats
		OK Cancel Help ?

Figure 5-12 Domino server properties, Services tab

#### The Locale tab

Use the Locale tab shown in Figure 5-13 to specify the local time zone, whether to observe daylight saving time, and how the Domino server must sort the characters.

ODM7SVR2 Properti	es - Rchas10 🛛 🔀
Basics Internet Mail	Services Locale Network Configuration Initialization File
Local time zone:	(CSD Central Standard Time
Davlight savir	
, Dayingin oani	
Collation:	Standard
	OK Cancel Help ?

Figure 5-13 Domino server properties, Locale tab

#### The Network Configuration tab

The Network Configuration tab shown in Figure 5-14 shows network information for the Domino server. The values that appear on this page are set in the Domino Directory.

Important: You must stop the Domino server to change the network configuration.

You can perform the following actions on this tab:

- Click Add to add new network configuration information to the list.
- ► Click **Delete** to delete a specific network configuration from the list.
- ► Click Modify to change the network configuration information for a specific port.

~							
DOM7SVR2 Properties - Rchas10							
Reside Internet Mail Services Locale Network Configuration Initialization File							
Sawar bast nama: dam7cvr2 itea com							
	0017	ci nostina	nie. juonin swz.ite	0.00111			
	#	Port	Network node	Encrypted	Compressed	Enabled	IP address
	1	TCPIP	TCPIP Network	No	No .	Yes	192.168.9.99
	•						
			Add		Telete	Modify	
					Venete	wouny	
_							
					OI	< 0	ancel Help ?

Figure 5-14 Domino server properties, Network Configuration tab

When adding (	or modifying an	IP address	the window sh	own in Figure ⁴	5-15 is displayed
when adding	or mounying an	n auuress,		iowii iii i iyule .	J-15 is displayed.

CP/IP port options		
Communications port:	ТСРІР	
Network name:	TCPIP Network	
☐ Encrypt network data ☐ Compress network	a data	
🔽 Enabled port		
⊂ IP address ⊂ Use system IP addre	SS	
Specify an IP address	192.168.9.99	
C Specify a server host	name	
	OK Cancel Hel	p ?

Figure 5-15 IP address settings

#### The Initialization tab

The Initialization tab shown in Figure 5-16 shows a copy of the Domino server's NOTES.INI file.

**Important:** Making changes to the NOTES.INI file is only recommended for experienced Domino administrators. Even minor changes to the NOTES.INI file can introduce errors into the file and impair the operation of a Domino server.

To edit the NOTES.INI file, perform the following tasks:

1. Click Edit.

ODM7SVR2 Properties - Rchas10	$\mathbf{X}$
Basics Internet Mail Services Locale Network Configuration Initialization File	
DB2_DBS_PER_SCHEMA=10 FormulaTimeout=120	
NSF_QUOTA_METHOD=2	
TRANSLOG_AutoFixup=1 TRANSLOG_UseAll=0	
TRANSLOG_Style=0 TRANSLOG_Performance=2	
TRANSLOG_Status=0	
ServerController=1 ServerNameNative=03B20ABCC4D6D4F7E2E5D9F261C9E3E2D6	
CleanupTimeout=600	
SCHEDULE_VERSION=4	
MTEnabled=0	
WebAdminSetup=710 DominoConfigLevel=1	
EventSetup=700200	
DominoControllerCurrentLog=dcntrlr200608081020.log	
Edit Refresh	
OK Cancel	Help ?

Figure 5-16 Domino server properties, Initialization File tab

2. Click **OK** in the warning prompt shown in Figure 5-17.



Figure 5-17 Editing Notes.ini file warning

3. After editing, click Save (Figure 5-18).

ODM7SVR2 Properties - Rchas10	
Basics   Internet   Mail   Services   Locale   Network Configu	uration Initialization File
[Notes] Directory=/Domino/DOM7SVR2/Data KitType=2 NPN=1 UNICODE_DISPLAY=1 FaultRecovery_Build=Build V702_07092006 SHARED_MAIL=0 DisableLDAPOnAdmin=1 Passthru_LogLevel=0 Console_LogLevel=2 DefaultMailTemplate=mail7.ntf Preferences=32 ServerTasks=COLSRV400,Update,HTTP,DECS,AMgr,Adr d,Stats,RnRMgr ServerTasksAt1=Catalog,Design ServerTasksAt1=Catalog,Design ServerTasksAt2=UpdAll ServerTasksAt3=Object Info -Full ServerTasksAt3=Object Info -Full ServerTasksAt5=Statlog KillProcess=1 TCPIP=TCP,0,15,0,12288 Serial1=XPC,1,15,0,	minP,CalConn,Replica,Router,Sche
Şave Car	ncel
	OK Cancel Help ?

Figure 5-18 Editing the Notes.ini file

### 5.1.5 Deleting a Domino server

To delete a Domino server from a system using the iSeries Navigator, perform the steps described here.

**Note:** You must have *ALLOBJ, *JOBCTL, *SECADM, and *IOSYSCFG special authority to perform this task.

Perform the following tasks:

- 1. Start the iSeries Navigator, open the system where you installed Domino, and select Network → Servers → Domino.
- 2. Right-click the Domino server you want to work with and select **Delete**, as shown in Figure 5-19.



Figure 5-19 Deleting a Domino server

#### 5.1.6 Launching the Lotus Domino Administrator client

To manage your Domino server using the Lotus Domino Administrator client, open the client interface either from the Lotus Notes client or from the iSeries Navigator.

To launch the Domino Administrator client using the iSeries Navigator, perform the following steps:

1. Start the iSeries Navigator, open the system where you installed Domino, and select Network → Servers → Domino. 2. Right-click the Domino server you want to work with and select **Server Administration**, as shown in Figure 5-20. The Lotus Domino Administrator client is launched and connects to the Domino server that is specified in your administration preferences.



Figure 5-20 Launching the Lotus Domino Administrator client

# 5.2 Using the i5/OS commands

If you are familiar with i5/OS, the Domino i5/OS CL commands provide a direct and convenient way of managing both i5/OS and the Domino servers running on i5/OS. You can run the commands from any display or workstation that is communicating with the i5/OS operating system. No additional setup is required.

## 5.2.1 Working with Domino servers

The primary i5/OS CL command used to manage Domino servers is the Work with Domino Servers (WRKDOMSVR) command. This command is the starting point to reach all the i5/OS commands that are necessary to manage your Domino for i5/OS servers, without typing the commands on a command line. Figure 5-21 shows the Work with Domino Servers screen.

Work with Domino Servers					
				System:	RCHAS10
Type options,	press Enter.				
1=Start ser	ver 2=Char	ige server	5=Display conso	le 6=End serv	ver
7=Submit co	mmand 8=Work	console	9=Work server j	obs	
11=Change c	urrent directo	ory 12=Woi	rk object links	13=Edit NOTES.	INI
Domino			Domino		
Opt Server		Subsystem	Status		
DOM7SVR1		DOM7SVR1	*STARTED		
DOM7SVR2		DOM7SVR2	*ENDED		
					Bottom
Parameters or ===>	command				
F3=Exit F5=	Refresh F9=F	Retrieve H	-10=Sort by name	F11=Display l	ibrary
F12=Cancel	F17=Top F18=	Bottom	F23=More Options	F24=More keys	5

Figure 5-21 Work with Domino Servers display

The display shows you the following important information at a glance:

Domino servers and the related subsystems

The name of the subsystem is the one used by the Domino server. The Domino server jobs run in these subsystems.

- Current status of each Domino server. The possible values are:
  - *STARTING: The Domino server is being started or only the Server Controller is active. The Domino server is not yet available for use by Lotus Notes clients or Web browsers. If only the Server Controller is active, start your Domino server before the Notes clients or Web browsers can contact the Domino server.
  - *STARTED: The Domino server is active. Generally, the server is available for use by the Notes clients or the Web browsers.

**Note:** In the rare instance of a failure that requires restarting the system, the *STARTED status might still appear when the system is restarted, even though the Domino server is not active. In such a situation, update the status by issuing the Start Domino Server (STRDOMSVR) CL command to start the server or the End Domino Server (ENDDOMSVR) CL command to end the Domino server.

- *ENDING: The Domino server is in the process of ending.
- *ENDED: The Domino server is not active.

- *STANDBY: The Domino server is configured as part of a Domino application Cluster Resource Group (CRG) supported with i5/OS Cluster Management functions. When a server is in a *STANDBY state, its application CRG is not started, or even if it is started, the Domino server is active on another system in the cluster, as defined by the server's application CRG.
- *UNKNOWN: The system cannot determine the status of the Domino server or the user is not authorized to view the status.

Press F11 to view the information about the library and the release of each Domino server, as shown in Figure 5-22.

Important: This information is useful when working with multiversion-capable releases.

	Work with De	omino Servers		
			System: RCHAS10	
Type options, press Ente	r.			
1=Start server 2=C	nange server	5=Display conso	le 6=End server	
7=Submit command 8=W	ork console	9=Work server j	obs	
11=Change current dire	ctory 12=Wow	rk object links	13=Edit NOTES.INI	
Domino		Dom	Ino	
Opt Server	Subsystem	Library Rel	ease	
DOM/SVRI	DOM/SVR1	QDUMIN0702 7.0	.2	
DOM/SVR2	DOM/SVR2	QDOMINO/02 /.0	•2	
			Bottom	
Parameters or command			Doctom	
F3=Exit F5=Refresh	F9=Retrieve	F10=Sort by name	ne F11=Display path	
F12=Cancel F17=Top	F18=Bottom	F23=More Optio	ns F24=More kevs	
· · ·····				

Figure 5-22 Work with Domino Servers display: Library and release information

Press F11 again to show the path to the data directory for the Domino server, as shown in Figure 5-23. The data directory contains the files that are used by the Domino server.

**Note:** If the path is too long to fit in the space provided, a greater than (>) symbol appears at the end of the truncated path.

Work with Domino Servers						
Туре	options, press Enter	·.		System:	RCHAS10	
1=Start server 2=Change server 5=Display console 6=End server 7=Submit command 8=Work console 9=Work server jobs						
11	=Change current direc	tory 12=Wor	k object links 13=	Edit NOTES.	111	
•	Domino					
Opt	Server	Subsystem	Path /Domino /DOM7SVD1 /Do	+-		
	DOM7SVR1	DOM7SVR1	/Domino/DOM7SVR1/Da	ata		
					Bottom	
Para ===>	meters or command					
F3=E F12=	xit F5=Refresh Cancel F17=Top	F9=Retrieve F18=Bottom	F10=Sort by name F23=More Options	F11=Displa F24=More	iy status keys	

Figure 5-23 Work with Domino Servers display: Domino server data directory path

#### 5.2.2 Actions to be performed on a selected Domino server

The WRKDOMSVR command is not only valuable to display information about Domino servers, but can also be used to perform certain actions on a specific Domino server. These actions include:

Option 1 (Start server)

Use this option to start a Domino server. This option runs the Start Domino Server (STRDOMSVR) CL command. To use this option, you must have the *JOBCTL special authority. This option is not displayed if your user profile does not have the required authority. Refer to 5.2.3, "Start Domino Server (STRDOMSVR)" on page 185 for details.

Option 2 (Change server)

Use this option to change the configuration of a Domino server. This option runs the Change Domino Server (CHGDOMSVR) CL command. To use this option, you must have the *ALLOBJ, *JOBCTL, *IOSYSCFG, and *SECADM special authority. The option is not displayed if your user profile does not have the required authority.

Option 5 (Display console)

Use this option to start a Domino server console session to view the Domino server messages. This option runs the Display Domino Console (DSPDOMCSL) CL command. You cannot enter the Domino server commands in the Display Domino Console display. To use this option, you must have the *ALLOBJ special authority or have the Execute (*X) authority to the Domino server data directory and each directory in the path.

Option 6 (End server)

Use this option to end a Domino server. This option runs the End Domino Server (ENDDOMSVR) CL command. To use this option, you must have *JOBCTL special authority. The option is not displayed if your user profile does not have the required authority. Refer to 5.2.4, "End Domino Server (ENDDOMSVR)" on page 185 for details.

Option 7 (Submit command)

Use this option to submit a Domino server command. This option runs the Submit Domino Command (SBMDOMCMD) CL command. To use this option, you must have the *USE authority to the SBMDOMCMD command in the QSYS library and the *USE authority to the QNNINSDC program in the QNOTES library.

Option 8 (Work console)

Use this option to start a Domino server console session that shows Domino server activities and allows you to interact with the Domino server by entering server commands. This option runs the Work with Domino Console (WRKDOMCSL) CL command. To use this option, you must have the *ALLOBJ special authority or the *USE authority to the WRKDOMCSL command in the QSYS library and the *USE authority to the QNNINCSS program in the QNOTES library.

Option 9 (Work server jobs)

Use this option to work with the i5/OS jobs that support Domino server operations. This option runs the Work with Active Jobs (WRKACTJOB) CL command for the subsystem under which the Domino server runs.

Option 11 (Change current directory)

Use this option to change the working directory of your current i5/OS job to the data directory that is used by the Domino server. This option runs the Change Current Directory (CHGCURDIR) CL command. To use this option, you must have Execute (*X) authority to the Domino server data directory and each directory in the path.

Option 12 (Work object links)

Use this option to work with the objects in the data directory that is used by the Domino server. This option runs the Work with Object Links (WRKLNK) CL command. To perform operations using the WRKLNK command, you must have the following authority:

- The *USE authority to the command used by the operation and the appropriate authority to the objects on which the operation is to be performed.
- The Read (*R) authority to the directory containing the object links and the Execute (*X) authority to the other directories in the path. Object authority is not required when displaying only the object name.
- Option 13 (Edit Notes.ini)

Use this option to edit the NOTES.INI file that controls the operation of the Domino server. This option runs the Edit File (EDTF) CL command. To use this option, you must have the authority to change the NOTES.INI file. The option is not displayed if the EDTF command does not exist on your system. For some operating system versions, the EDTF command is provided by a PTF.

Option 14 (Work with support files)

Use this option to work with the support files in the <Domino server data directory>/IBM_TECHNICAL_SUPPORT/ i5/OS integrated file system directory that is used by the Domino server This option runs the Work with Object Links (WRKLNK) CL command. To perform operations using the WRKLNK command, you must have the following authority:

- The *USE authority to the command used by the operation and the appropriate authority to the objects on which the operation is to be performed.
- The Read (*R) authority to the directory containing the object links and the Execute (*X) authority to the other directories in the path. Object authority is not required when displaying the object name only.
- Option 15 (Work with Notes Server Diagnostics (NSD))

Use this option to work with the NSD files in the <Domino server data directory>/IBM_TECHNICAL_SUPPORT/nsd* i5/OS integrated file system directory that is used by the Domino server.

This option runs the Work with Object Links (WRKLNK) CL command. To perform operations using the WRKLNK command, you must have the following authorities:

- The *USE authority to the command used by the operation and the appropriate authority to the objects on which the operation is to be performed.
- The Read (*R) authority to the directory containing the object links and the Execute (*X) authority to the other directories in the path. Object authority is not required when displaying the object name only.
- Option 16 (Dump server call stacks)

Use this option to dump the call stacks of all the threads of jobs from the selected Domino server. This option runs the Dump Domino Server Call Stacks (DMPDOMSVRC) CL command.

**Note:** Options 14, 15, and 16 are only available if Release 7.0.2 or later is installed in your System i machine. Press F23 (Shift+F11) to display options 14, 15, and 16 (Figure 5-24).

				-
	Work with D	Oomino Servers		
			System: RCHAS10	
Type options, press En	ter.			
14=Work with support	files 15=Wor	k with NSDs 16=D	)ump server call stacks	
Domino		Domino		
Ont Server	Subsystem	Status		
	505535201			
DOM/SVR1	DOM/SVR1	*STARTED		
DOM7SVR2	DOM7SVR2	*ENDED		
			Bottom	
Parameters or command				
===>				
F3=Exit F5=Refresh	F9=Retrieve	F10=Sort by date	F11=Display library	
F12-Concol F17-Ton	F10-Dottom	F22-Mana Ontiona	$\Gamma_{24}$ Mara kaya	
FIZ=Cancer FIZ=Top	LIQ=ROLLOW	FZ3=MORE Uptions	FZ4=MORE KEYS	

Figure 5-24 Work with Domino Servers display: Displaying more options

# 5.2.3 Start Domino Server (STRDOMSVR)

The Start Domino Server (STRDOMSVR) CL command starts a Domino server that runs on the local system. The Start Domino Server (STRDOMSVR) CL command prompt is shown in Figure 5-25. The parameters to run this command are:

Server name (SERVER): Specifies the name of the Domino server that you want to start.

**Tip:** When the cursor is on this field, pressing the F4 key displays a list of the Domino servers on this system.

The possible values are:

- server-name: Specifies the name of the Domino server that you want to start.
- *ALL: Specifies that you want to start all the Domino servers on the system.
- Java Server Controller (JSC): Specifies whether the Java server controller related to the Domino server must be started. The possible values are:
  - *NO: Do not start the Java server controller when the Domino server starts.
  - *YES: Start the Java server controller when the Domino server starts.
  - *ONLY: Start only the Java server controller.

Important: You must have the *JOBCTL special authority to run this command.

Start Domino	Server (STRD	OMSVR)
Type choices, press Enter.		
Server name	DOM7SVR2	
Java Server Controller	*YES	*YES, *NO, *ONLY
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	Bottom F13=How to use this display

Figure 5-25 Start Domino Server (STRDOMSVR) command

# 5.2.4 End Domino Server (ENDDOMSVR)

The End Domino Server (ENDDOMSVR) CL command stops a Domino server that runs on the local system. The End Domino Server (ENDDOMSVR) CL command prompt is shown in Figure 5-26. The parameters to run this command are:

Server name (SERVER): Specifies the name of the Domino server that you want to stop.

**Tip:** When the cursor is on this field, pressing the F4 key displays a list of the Domino servers on this system.

The possible values are:

- server-name: Specifies the name of the Domino server that you want to stop.
- *ALL: Specifies that you want to stop all the Domino servers.

- How to end: Specifies whether the Domino server is ended in a controlled manner or immediately. The possible values are:
  - *CNTRLD: The Domino server command QUIT is sent to the Domino server to shut down the server. All the operating system jobs used by the Domino server are ended, but the subsystem used by the Domino server remains active. This option is the equivalent of entering the QUIT command from the Domino server console.
  - *IMMED: The subsystem that this Domino server is running under is ended by issuing the End Subsystem (ENDSBS) CL command with an option of *IMMED. As a result, all the processing by the Domino server is stopped immediately.

Attention: Use this option only if the Domino server fails to shut down when you enter this command with the *CNTRLD option or enter the QUIT command in the Domino server console. Data might be lost if the Domino server processing is stopped abruptly.

- Java Server Controller (JSC): Specifies whether the Java server controller related to the Domino server must be stopped. The possible values are:
  - *NO: Do not stop the Java server controller when the Domino server ends.
  - *YES: Stop the Java server controller when the Domino server ends.

Important: You must have the *JOBCTL special authority to run this command.

End Domino	Server (ENDDC	DMSVR)					
Type choices, press Enter.							
Server name DO	M7SVR2						
How to end	*CNTRLD *NO	*CNTRLD, *IMMED *YES, *NO					
F3=Exit F4=Prompt F5=Refresh I F24=More keys	F12=Cancel	Bottom F13=How to use this display					

Figure 5-26 End Domino Server (ENDDOMSVR) command

#### 5.2.5 Update Domino Server (UPDDOMSVR)

The Update Domino Server (UPDDOMSVR) CL command updates a configured Domino server to any installed Domino release specified. If a list of servers or *ALL is specified, UPDDOMSVR attempts to update every Domino server that is specified, and sends a summary message on completion. This summary lists the number of Domino servers that were updated and the number of servers that failed to update for some reason.

Attention: Each Domino server that is to be updated must be stopped.

The Update Domino Server (UPDDOMSVR) CL command prompt is shown in Figure 5-27. The parameters to run this command are:

- Server name (SERVER): Specifies the name of the Domino server to be updated. The name must be that of an existing Domino server configured on the system. The parameter prompts with a list of the configured Domino servers, and allows any or all of the configured Domino servers to be specified. The possible values are:
  - *ALL: Processes all the configured Domino servers on the system, attempting to upgrade all the servers to the specified release.
  - server-name: The name of a configured Domino server on the system.
- To release level (TORLS): Specifies the specific release to which the Domino server or the specified servers will be updated. The parameter prompts with a list of the installed Domino releases. The possible values are:
  - *LATEST: This is the default value for this parameter and will always represent the latest installed release.
  - target-release-number: The target release number specifies the release level that the Domino servers will be updated to. The target release number is specified in an n.n.n format, for example, 7.0.2. Only the release number of a currently installed Domino release can be specified. When the cursor is located on this field, pressing F4 displays all the available releases.

Update Domino Server (UPDDOMSVR)
Type choices, press Enter.
Server name DOM7SVR2 + for more values
To release level *LATEST F4 for list
Bottom F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display F24=More keys

Figure 5-27 Update Domino Server (UPDDOMSVR) command

If you select a release that is earlier than the release the Domino server is currently running, you receive an error message, as shown in Figure 5-28.

```
Additional Message Information
                          LNT8888
                                                                  30
Message ID . . . . . :
                                       Severity . . . . . . :
Message type . . . . :
                          Diagnostic
                          08/17/06
Date sent . . . . . :
                                       Time sent . . . . . :
                                                                  15:32:29
Message . . . . : Server DOMSVR was not updated to release 6.5.5. Error
 code 4.
                  An error occurred attempting to update a Domino server to
Cause . . . . . :
 the specified release. The error code is 4:
   -- 2 = Update of server failure.
   -- 3 = Server DOMSVR not found. Or could not retrieve server
           information.
      4 = Server DOMSVR is already at a higher Domino release than release
           6.5.5.
   -- 5 = Server is in a *STANDBY state.
Recovery . . . :
   -- 2 See previous messages in the job log to determine server update
                                                                    More...
Press Enter to continue.
F3=Exit F6=Print F9=Display message details
F10=Display messages in job log
                               F12=Cancel F21=Select assistance level
```

Figure 5-28 Error message

# 5.2.6 Set Domino Environment (SETDOMENV)

The Set Domino Environment (SETDOMENV) CL command sets the operating system job environment to the context of a particular Domino server. This includes setting the PATH environment variable, the active directory to the data directory of the Domino server, and optionally switching to the user profile associated with the Domino server. The server's product library is added to this job's library list.

To use this command, you must have either of the following:

- *ALLOBJ special authority
- *USE authority to the SETDOMENV object (object type *CMD) in the QSYS library and *USE authority to the QNNINRUN object (object type *PGM) in the Domino product library

The Set Domino Environment (SETDOMENV) CL command prompt is shown in Figure 5-29. The parameters to run this command are:

Server name (SERVER): Specifies the name of the Domino server to use for the context to set the environment for this current job.

Tip: When the cursor is on this field, pressing F4 displays a list of the Domino servers.

- Set user (USER): Specifies whether the command must switch this job to run under the user profile associated with the specified Domino server. This is normally the QNOTES user profile. The QNOTES user profile has limited capabilities. When switching to QNOTES in an interactive job, the command line can no longer be used. The possible values are:
  - *CURRENT: The user profile will remain as it is for this job. Using this default when the Domino server specified by the SERVER parameter is not started, could mean that the system objects that are created as a result of using a Domino API are owned by this current user profile. As a result, the Domino server specified by the SERVER parameter might not be able to start.
  - *SERVER: This job will be switched to run under the user profile associated with the specified Domino server.
- Set path (PATH): Specifies how the PATH environment variable will be set for this job. The possible values are:
  - *REPLACE: The current setting of the PATH environment variable will be reset with a
    path that specifies the Domino server's configured execution, data, and user
    directories.
  - *APPEND: The current setting of the PATH environment variable will be reset to a path setting that has the Domino server's configured execution, data, and user directories appended to it.
  - *PREPEND: The current setting of the PATH environment variable will be reset and appended to a path setting that first specifies the Domino server's configured execution, data, and user directories.

Set Domino Environment (SETDOMENV)
Type choices, press Enter.
Server name DOM7SVR2
Set user*CURRENT*CURRENT, *SERVERSet path*REPLACE*REPLACE, *APPEND, *PREPEND
Bottom F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display F24=More keys

Figure 5-29 Set Domino Environment (SETDOMENV) command

# 5.2.7 Run Domino Command (RUNDOMCMD)

The Run Domino Command (RUNDOMCMD) CL command runs an operating system CL command in the context of a particular Domino server. It sets up the environment that allows the command to be run, whether the Domino server is active or not. The setup includes setting the PATH environment variable for the Domino server, setting the directory for the job to the data directory of the Domino server and running the resulting job under the QNOTES user profile.

To use this command, you must have either of the following:

- The *ALLOBJ special authority
- The *USE authority to the RUNDOMCMD object (object type *CMD) in the Domino product library and the *USE authority to the QNNINRUN object (object type *PGM) in the Domino product library

The Run Domino Command (RUNDOMCMD) CL command prompt is shown in Figure 5-30. The parameters to run this command are:

- Server name (SERVER): Specifies the name of the Domino server in the context of which you want to run the CL command. When the cursor is on this field, pressing F4 displays a list of the Domino servers.
- Command (CMD): Specifies the CL command string to be run in the context of the specified Domino server.
- Run in batch (BATCH): Specifies whether the command will be submitted in a batch or not. The possible values are:
  - *YES: The command will be submitted in a batch job.
  - *NO: The command will be run interactively.
- Allow multiple threads (ALWMLTTHD): Specifies whether or not the batch job is allowed to run with multiple user threads. This attribute does not prevent the operating system from creating system threads in the job. This parameter is ignored if the Run in batch (BATCH) parameter is set to *NO. The possible values are:
  - *JOBD: The value specified in the job description of the QNOTES user profile determines whether or not the job is allowed to run with multiple user threads.
  - *YES: The job is allowed to run with multiple user threads.
  - *NO: The job is not allowed to run with multiple user threads.

**Note:** If the CL command string is to be run in batch (BATCH (*YES) is specified). The RUNDOMCMD command setup does not set the current working directory for the job to the Domino server data directory. Instead, the home directory of the QNOTES user profile is used. A batch job does not inherit the current working directory of the job that submits it. It uses the home directory of the user profile it runs under.

For more details about using the RUNDOMCMD, including an example, refer to "Run Domino Command (RUNDOMCMD)" on page 321.

Run Domino Command (RUNDOMCMD) Type choices, press Enter. Command *YES, *NO Run in batch . . . . . . . . . *YES Allow multiple threads . . . . *JOBD, *YES, *NO *JOBD Bottom F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display F24=More keys

Figure 5-30 Run Domino Command (RUNDOMCMD) command

#### 5.2.8 Work with Subsystems (WRKSBS)

The Work with Subsystems (WRKSBS) screen shows the status of, and information about, each subsystem in the system (Figure 5-31). Use this list to determine whether a specific amount of main storage has been assigned to a subsystem, and if so, which pool IDs within the subsystem were assigned that main storage. You can also see how many jobs are active in each subsystem.

```
Work with Subsystems
                                                         System:
                                                                   RCHAS10
Type options, press Enter.
 4=End subsystem 5=Display subsystem description
 8=Work with subsystem jobs
                     Total
                               -----Subsystem Pools--
                                   2 3 4 5
Opt Subsystem
                  Storage (M)
                               1
                                                   6
                                                     7
                                                          8
                                                              9 10
    DOM7SVR1
                          .00
                               2
    DOM7SVR2
                          .00
                               2
    QBATCH
                          .00
                               2
                          .00
                               2
    QCMN
    QCTL
                          .00
                               2
    QHTTPSVR
                          .00
                               2
    OINTER
                          .00
                               2
                                   3
                          .00
                               2
    QSERVER
    QSPL
                          .00
                               2
                                   4
    QSYSWRK
                          .00
                               2
                                                                    More...
Parameters or command
===>
F3=Exit F5=Refresh
                     F11=Display system data
                                               F12=Cancel
F14=Work with system status
```

Figure 5-31 Work with Subsystems display

# 5.2.9 Work with Active Jobs (WRKACTJOB)

The Work with Active Jobs (WRKACTJOB) display shows the performance and the status information for jobs that are currently active on the system (Figure 5-32). All the information is gathered on a job basis. The jobs are ordered on the basis of the subsystem in which they are running. Jobs that run in a subsystem (autostart jobs, interactive jobs, batch jobs, readers, and writers) are alphabetized by job name and indented under the subsystem monitor job field they are associated with.

		h	lork with	Active	Jobs		RCHAS10
						08/15/06	16:30:24
CPU	%: .0	Elapsed ti	me: 00	:00:00	Active jo	bs: 319	
Туре	options, press	Enter.					
2=	Change 3=Hold	d 4=End	5=Work	with	6=Release 7	=Display mes	sage
8=	Work with spool	ed files	13=Disc	onnect			J
		Current					
Opt	Subsystem/Job	User	Type	CPU %	Function	Status	
	DOM7SVR1	OSYS	SBS	.0		DEOW	
	ADMINP	ONOTES	BCI	.0	PGM-ADMINP	SELW	
	AMGR	ONOTES	BCI	.0	PGM-AMGR	SELW	
	AMGR	ONOTES	BCI	.0	PGM-AMGR	CNDW	
	CALCONN	ONOTES	BCI	.0	PGM-CALCONN	CNDW	
	COLSRV400	ONOTES	BCT	.0	PGM-COLSRV40	0 SELW	
	FVENT	ONOTES	BCI	.0	PGM-EVENT	SELW	
	HTTP	ONOTES	BCI	.0	PGM-HTTP	SELW	
	ONNINSTS	ONOTES	BCH	.0	PGM-ONNINSTS	FVTW	
	quittino i o	Q110 1 20	5011			20.00	More
Para	meters or comma	and					101 0
===>							
F3=F	xit F5=Refree	h F7	=Find	F10=	Restart stati	stics	
F11=	Display elanser	data F1	2=Cancol	F23=	More ontions	F24=More 4	AVS
1 1 1 1 -	bispiay erapsed			123-	noie operolis		Cy S

Figure 5-32 Work with Active Jobs display

# 5.3 Using the Java Server Console

The Java Server Console allows you to manage your Domino servers through any workstation that supports Java applications. To use the Java Server Console, you must first start the Java Server Controller (JSC) on the system. You can start the JSC when starting a Domino server from the iSeries Navigator or by using the STRDOMSVR CL command.

The JSC can also be started when running the STRTCP, the STRTCPSVR SERVER(*AUTOSTART), or the STRTCPSVR SERVER(*DOMINO) commands if *JSC or *ALL is selected in the AUTOSTART parameter during server configuration.

The Java Server Controller is a stand-alone Java program that listens for requests from the remote Java Server Console.

**Important:** When starting a Domino server and the JSC, you see a QJVAEXEC job instead of a SERVER job in the i5/OS job log.

# 5.3.1 Starting the Java Server Console

This section shows you the two methods you can use to start the JSC or the Domino Console on your Windows PC workstation.

Starting the Domino Console with the iSeries Navigator

You can start the Domino Console by using the iSeries Navigator. For details, refer to 5.1.1, "Starting the Domino services" on page 161.

Starting the Domino Console directly

You can start the Domino Console on a Windows workstation by starting the jconsole.exe file. This executable file is installed on your workstation when you install the Domino Administrator or Lotus Notes client. The file is located in the Notes program directory.

Note: JSC uses the HTTP user and password information.

# 5.4 Using the Web Administrator client

The Web Administrator (Figure 5-33) is almost identical to the Domino Administrator client, with a few exceptions. The user interface looks the same and most menu options, dialog boxes, and information boxes are identical. The administrator is authenticated by the user ID and password used to log in to the Domino server. The interface changes depending on the roles assigned to the user ID. The Web Administrator includes most of the Domino Administrator functionality.

To start the Domino Web Administrator, point your Web browser to the following URL: http://Dominoserver.yourdomain.com/webadmin.nsf

DON	A7SVR1/ITSO@ITSO Adu	ministration - Microsoft Internet Explorer	
File	Edit View Favorites 1	Tools Help	
<b>()</b> B	lack 🔹 🕥 🕤 🚺 🕻	💈 🏠 🔎 Search 🐈 Favorites 🜒 Media 🤣 🔗 - چ 🚍 📒 🦓	
ddress	http://dom7svr1.itso.c	om/webadmin.nsf	💌 🄁 Go
inks 🧧	Search the Web with Lyco	s 👌 IBM Business Transformation Homepage 🛛 👌 IBM Internal Help Homepage 🛛 👌 IBM Standard Softwar	e Installer 👘 🕈
	People & Groups Files	Server Messaging Replication Configuration	🔲 Logout 🔲 Preferences 🔲 Help
	You (Luis Guirigay/ITSO) a	are connected to:	
2	Server name:	DOM/SVR1/ITSD	
1	Host name:	dom7svr1.itso.com80	
	Version and build:	Build V702_07092006 (265)	
	Operating system:	IBM 05/400 ((5/05)	
	Directory & partition:	/Domino/D0M7SVR1/Data (D0M7SVR1)	
J	Server date & time:	08/08/2006 05:08:48 PM	
	Elapsed up-time:	06:47:53	
	Transactions/minute:	Last minute: 0; Last hour: 0; Peak: 46	
	Peak # of sessions:	3 at 08/08/2006 10:49:38 AM	
	Transactions:	115, Max. concurrent: 20	
	Waiting tasks:	0	
	Availability Index:	100 (state: AVAILABLE)	
	Mail domain:	ITSO	
	Mail tracking:	Not Enabled	
	Mail journalling:	Not Enabled	
	Shared mail:	Not Enabled	
	Mailboxes:		
	Pending mail:	0, Dead mail: 0 🔧	
	Transactional logging:	Not enabled	
	Activity logging:	Not Enabled	
	Fault recovery:	Enabled	
	Server controller:	Enabled	
	DB2 enabled:	Not Enabled	
	Lotus Domino Web Admini	istrator 7.01 (10/27/2005)	

Figure 5-33 Web Administrator

# 5.5 Using the Domino Administrator client

Typically, you manage a Domino server from the Lotus Domino Administrator client. This client interface provides the full set of Domino administration functions. The Lotus Domino Administrator is used on a remote workstation because a Domino server on i5/OS does not have a local Notes client.

For more information about the Domino Administrator client, refer to the Domino 7 Administrator, which is available on the Web at:

http://doc.notes.net/domino_notes/7.0/help7_admin.nsf

6

# Domino 7 performance tuning on i5/OS

Domino server on i5/OS is an application that runs within its own subsystem, but also competes for overall i5/OS system resources. Domino 7 allows application developers to create complex workflow or other graphical user interface-based (GUI-based) client/server applications. They can route information automatically and exchange information with enterprise software such as relational databases and transaction processing systems. Under varying circumstances, these factors can, alone and in concert, result in slow user response time and resource bottleneck if your environment is not taking advantage of the tools available to track performance, for the environment to be adjusted properly as the requirement arises. Performance analysis can be a long and tedious process. For any performance-oriented work environment, always consider general performance management guidelines.

To benefit from these guidelines, you must perform the following tasks:

- Develop objectives such as user expectations
- Establish performance baselines to ensure that expectations are realistic
- Implement a good strategy for the deployment of your objectives
- Set evaluation benchmarks for your level of progress

A well-defined strategy can make a difference in the degree of overall performance preservation and improvement. Performance management generally consists of performance measurements and trend analysis.

# 6.1 Defining Domino 7 performance on the i5/OS

Designing a performance management solution for Domino 7 on i5/OS is slightly more complex than traditional i5/OS performance tuning. First and foremost, you must understand Lotus Domino to best leverage the relationships between the processes that are taking place in Domino, and have an understanding of how these processes affect the performance of your System i machine.

**Performance:** Often associated with response time, it is the measure of time spent on an individual operation or job. From a capacity planning (throughput) standpoint, it can be measured in terms of data transfer rates or resource utilizations that occur within a given system.

Because various combinations of tools are available to provide the analysis of Domino 7 performance on i5/OS, you might be required to utilize these tools to gather the necessary information to make your performance determinations. This chapter is structured to assist you with that process.

The best practice for understanding Domino 7 performance on the i5/OS is to have a good understanding of the information found in the following references:

- Domino 6 for iSeries Best Practices Guide, SG24-6937
- Domino 7 Performance Tuning Best Practices to Get the Most Out of Your Domino Infrastructure, REDP-4182
- Domino 7 Administration Help (help7_admin.nsf) database
- Domino for i5/OS Help (i400hlp.nsf), included with Domino 7 for the i5/OS

If you require a better understanding of the components of performance management for i5/OS, it is recommend that you read the following:

- ► AS/400 Performance Management V3R6/V3R7, SG24-4735
- Performance Tools for iSeries Version 5, SC41-5340

Seasoned Domino administrators also have the provision to stay abreast of the latest performance management strategies available for Domino 7 across all the platforms by regularly consulting the performance articles, which are stored and updated in the following IBM DeveloperWorks Web site:

http://www-128.ibm.com/developerworks/lotus/performance/

For those who are new to Domino administration, many basic performance tuning practices for Domino are found in detail in IBM Redbooks and Lotus product documentation books, and are also taught in the following Domino 7 System Administration classes:

- N7D750: IBM Lotus Domino 7 System Administration Operating Fundamentals
- N7D760: Building the IBM Lotus Domino 7 Infrastructure
- N7D770: Managing IBM Lotus Domino 7 Servers and Users

Classes such as the ones listed here provide hands-on exposure to concepts such as Domino server clustering, setting up server monitoring, and analyzing Domino server activity data. More information on these and other Lotus-related course offerings can be found in the IBM Training and Certification Web site:

http://www-306.ibm.com/software/sw-training/

When gathering performance information about Domino 7 for i5/OS, i5/OS techniques in conjunction with Domino administration strategies provide a good foundation for making performance management decisions that are truly effective.

## 6.1.1 Prioritized strategies

It is important that administrators clearly understand their performance objectives before developing the performance management strategy.

Following are the three levels of strategic focus that can be applied to performance management. These levels can be used independently or sequentially in phases by an administrator:

Preservation

When the system is running at acceptable levels of response and throughput efficiency, this focus involves taking action to provide the system with resistance against negative factors that can degrade the current efficiency standards over short-term and long-term duration

Prediction

Assuming an understanding of the level of efficiency within a given system, this focus involves searching the parameters and conditions on the system to identify scenarios where the full potential of response time or throughput might have not yet been realized

Possibility

After identifying the potential for greater efficiency within a system, this focus involves taking actions intended to improve response time and throughput efficiency, in an effort to develop new and lasting standards of performance on the system

#### Prioritizing Domino 7 performance on i5/OS

Often, administrators wait until there is a problem on a system, and only then concern themselves with performance. They find themselves wishing that they had taken the time to gauge the efficiency of their systems *before* the performance bottlenecks occurred. When steps are taken to measure the initial performance baselines for a system before poor performance, it becomes easier to take action when circumstances force administrators to search for adjustments to be made on their systems. Make measuring performance a priority in your Domino 7 environment, and you will find it easier to identify issues and make the necessary efficiency improvements.

Following is a definition of baseline and bottleneck:

Baseline

This is a benchmark measurement of system response and data throughput within your Domino 7 and i5/OS environments. It is collected as a basis for comparison and reference over time as changes are introduced to those environments, and updated measurements are made available.

Bottleneck

This is a degradation of system response and data throughput within your Domino 7 and i5/OS environments. This often highlights the opportunities to improve the management of the CPU, memory, disk, and network resource configurations that are currently in place within those environments.

Table 6-1 illustrates how focus on performance and the associated priorities can change for administrators when comparing proactive performance measurement in a stable environment with reactive administrative intervention after poor performance has already impacted a system's user population. Given the vast suite of performance tools available for Domino 7 on i5/OS, the opportunity to be prepared for performance bottlenecks and requested optimization directives when either of them arise, is already at your command.

Driving force	Strategic focus	Proactive strategy	Reactive strategy
Performance (Baseline versus Bottleneck)	Defining the parameters of performance quality	Capture Baseline: Understand the initial or current caliber of Domino and i5/OS system performance	Pinpoint Bottleneck: Identifying decreases in quality of Domino and i5/OS performance
Preservation	Protecting the caliber of performance quality	Maintain the initial or current caliber of Domino and i5/OS system performance	Stabilize the current caliber of Domino and i5/OS system performance
Prediction	Questioning the caliber of performance quality	Identify abnormalities in contrast with the prospect of a higher caliber of Domino and i5/OS system performance	Troubleshoot abnormalities in contrast to a previously attained caliber of Domino and i5/OS system performance
Possibility	Enhancing the caliber of performance quality	Raise the current caliber of Domino and i5/OS system performance	Remove identified abnormalities to restore previously attained caliber of Domino and i5/OS system performance

Table 6-1 Driving forces influencing Domino 7 performance strategies on the i5/OS

# 6.1.2 Categorizing performance bottlenecks on the i5/OS

Table 6-2 lists the factors that are most often associated with i5/OS performance. Also listed are the available tools that can be used to assist in handling bottlenecks for specific performance categories.

Performance category	Factors affecting performance	Available tools for monitoring and intervention
Processor load	Job CPU usage	<ul> <li>Work with Active Jobs (WRKACTJOB)</li> <li>Work with System Activity (WRKSYSACT)¹</li> </ul>
Main storage	<ul><li>Faulting statistics</li><li>Wait-to-ineligible</li></ul>	Work with System Status (WRKSYSSTS)
Disk	<ul><li>Low arm number</li><li>Low arm speed</li></ul>	Work with Disk Status (WRKDSKSTS)
Communications	<ul> <li>Slow lines</li> <li>Line errors</li> <li>Line user excess</li> </ul>	<ul> <li>Work with TCP/IP Connection Status (NETSTAT)</li> <li>Performance Tools Advisor for the i5/OS ¹</li> <li>Performance Tools Component Report for i5/OS ¹</li> <li>Communications Trace</li> </ul>

 Table 6-2
 Typical performance categories and degradation influences on i5/OS

Performance category	Factors affecting performance	Available tools for monitoring and intervention
IOPs	<ul> <li>Processor imbalance IOP deficiency</li> </ul>	<ul> <li>Performance Tools Advisor for the i5/OS¹</li> <li>Performance Tools Component Report for i5/OS¹</li> </ul>
Applications	Object locks	<ul> <li>Performance Tools for iSeries (5722-PT1)</li> <li>Work with Object Locks (WRKOBJLCK)</li> </ul>

¹ Requires Performance Tools for iSeries (5722-PT1)

# 6.2 Domino 7 performance management options for i5/OS

Upgrading to Domino 7 on i5/OS can provide your system with improvement in CPU conservation in comparison with typical CPU usage as measured under Domino 6. However, this is dependent on any deployment of advanced or process-intensive Domino 7 functionalities because they might affect the ultimate extent of this conservation improvement. In any event, there are many resources available to help you maintain a standard of expected service quality when managing Domino 7 on i5/OS.

This section briefly introduces you to the tools available to measure, preserve, troubleshoot, and improve performance when using Domino 7 for i5/OS. More specific information about using these tools for a variety of performance-related purposes are discussed later in this chapter.

### 6.2.1 Performance and i5/OS commands

Performance involves many levels of system awareness and can be managed in many different ways. Use Table 6-3 as a general reference for the commands available using a 5250 emulation session to view performance related data.

CL command	Command request	Performance benefits		
Collecting hardware information				
DSPSYSVAL	Display System Values	DSPSYSVAL SYSVAL(QMODEL) Provides model number for your i5/OS machine.		
WRKHDWRSC	Work with Hardware Resources	WRKHDWRSC TYPE(*PRC) Processor capacity card information and interactive card information.		
Collecting and tuning performance dynamics				
WRKACTJOB	Work with Active Jobs	Provides information on CPU usage of the system and individual Domino jobs. Also provides the run priority of Domino jobs.		
WRKSYSACT	Work with System Activity	Shows recent jobs using the CPU. Requires Performance Tools for the i5/OS (5722-PT1).		

Table 6-3 i5/OS CL commands for performance management

CL command	Command request	Performance benefits		
WRKSYSSTS	Work with System Status	<ul> <li>Review faulting and the Wait-to-Ineligible transitions.</li> <li>Displays nondatabase fault rates for the machine pool and all the other pools.</li> <li>Displays page rates for all pools.</li> <li>Displays transition rates for all pools.</li> <li>View or increase pool sizes.</li> <li>Increase maximum number of active jobs in a pool.</li> </ul>		
WRKSYSVAL	Work with System Values	Display and change i5/OS system values.		
WRKDSKSTS	Work with Disk Status	<ul> <li>Can help find i5/OS disk constraints.</li> <li>Shows disk units in the ASP where Domino is running.</li> <li>Shows % busy data for each unit (arm).</li> <li>Shows disk actuator changes.</li> <li>Shows how full each disk unit is.</li> </ul>		
WRKOBJLCK	Work with Object Locks	Investigate object usage on the system.		
NETSTAT *CNN	Work with TCP/IP Connection Status	Retransmission checking on port 1352.		
CFGTCP	Configure TCP/IP	<ul> <li>Configure IP interfaces and routes.</li> <li>Set i5/OS host table and domain information.</li> </ul>		
WRKLIND	Work with Line Description	Used to check the MTU on the line description.		
CHGTCPA	Change TCP/IP Attributes	CHGTCPA UDPCKS(*NO) Resolves Checksum issues when retransmissions have been identified. Disables UDP checksum for Windows clients to avoid network retransmissions.		
STRPFRCOL	Start Performance Collection	Starts i5/OS Performance Collection Services. Equivalent to option 2 on GO PERFORM menu.		
STRPFRTRC	Start Performance Trace	Collects performance trace data.		
CHGJOBTYP	Change Job Type	Change to batch or interactive type.		
ADDPEXDFN	Add PEX Definition	Performance Explorer (PEX) command		
STRPEX	Start Performance Explorer	Starts the Performance Explorer Tool.		
ENDPEX	End Performance Explorer	Ends the Performance Explorer Tool.		
Reviewing and reporting performance dynamics				
DSPLOG	Display System Log	Shows QHST system history log and recent changes in system values.		
PRTSYSRPT	Print System Report	Performance Tools Command Creates and prints Collection Services system operation overview report.		
PRTCPTRPT	Print Component Report	Performance Tools Command Creates and prints Collection Services system operation overview report by component.		
PRTTNSRPT	Print Transaction Report	Performance Tools Command (Requires that STRPFRTRC be run) Generates reports on transactions taking place when performance data was being collected.		
CL command	Command request	Performance benefits		
------------	------------------------------------	---------------------------------------------------------------------------------------------------------------------------		
PRTACTRPT	Print Activity Report	Performance Tools Command Creates WRKSYSACT data reports.		
CVTPFRTHD	Convert Performance Thread Data	Performance Tools Command Converts Collection Services performance data.		
PRTPEXRPT	Print PEX report	Performance Explorer Command Prints formatted listing of PEX data saved across a physical fileset within a library.		

# 6.2.2 Performance Management for System i5

Performance Management for System i5 allows for automatic collection of performance data. The data collected can then be sent to IBM for analysis, saving you the trouble of worrying about having to store an excess of performance information on your system.

Performance Management for System i5, which is included on the system when your machine is shipped, must to be activated and customized to allow your environment to benefit from its functionality.

Performance Management for System i5 works in collaboration with a variety of the other available performance resources on i5/OS, including Management Central (see 6.2.3, "Management Central" on page 201) and Collection Services (see 6.2.5, "Collection Services" on page 203) to save you the time of having to manually collect and tediously process your system's performance data.

For more information, refer to the Performance Management for System i5 Web page:

http://www.ibm.com/systems/i/pmsystemi5/

# 6.2.3 Management Central

Management Central (Figure 6-1) is a suite of systems management functions that allows you to manage multiple systems through a single central system. Simply select a System i machine to use as your central system, and then add endpoint systems to your Management Central network. You can create groups of similar or related endpoint systems to make managing and monitoring your systems even easier. Your central system handles the communications for you. You no longer have to worry about configuring communications connections or juggling multiple login sessions. Management Central is scalable, flexible, and easily manipulated to fit the requirements of your environment.

Management Central provides the ability to monitor system-wide metrics, and can focus on specific jobs running on the system. System monitors track various performance statistics, provide real-time tracking, and have the ability to view historical data on such areas as disk arm utilization and interactive feature utilization. The job monitors can monitor the activity of a single job or numerous jobs by job name, user, subsystem, or server type.



Figure 6-1 Management Central

# 6.2.4 Performance Tools for iSeries (5722-PT1)

Performance Tools for iSeries manages and analyzes performance data, providing real-time and long-term views, and detailed analyses. You can order this product with one of two features, the Manager feature or the Agent feature. The Agent feature contains a subset of the functions in the Manager feature. The performance capabilities in both the Manager and Agent features allow you to:

- Manage performance data
- Monitor performance in real-time interactively
- Display performance data
- Analyze performance data

Performance Tools for iSeries has the capability to report, analyze, and model system performance. The Advisor function (option 10 on the Perform menu shown in Figure 6-2) can analyze the system and give recommendations to improve performance.

PERFORM IBM Performance Tools for iSeries RCHAS10 System: Select one of the following: 1. Select type of status 2. Collect performance data 3. Print performance report 5. Performance utilities 6. Configure and manage tools 7. Display performance data 8. System activity 9. Performance graphics 10. Advisor 70. Related commands Selection or command ===> F3=Exit F4=Prompt F12=Cancel F13=Information Assistant F9=Retrieve F16=System main menu (C) COPYRIGHT IBM CORP. 1981, 2005.

Figure 6-2 IBM Performance Tools for iSeries menu

# 6.2.5 Collection Services

Collection Services (Figure 6-3), formerly known as Performance Monitor, is a data collection tool that is native to i5/OS. It can provide significant help in troubleshooting performance problems. Data analysis can be performed against this data collection online or offline. To

analyze the data acquired by Collection Services, utilize Management Central or the Performance Tools for iSeries (5722-PT1).

**Note:** If you are upgrading to Domino 7 from a release prior to Domino 6 for i5/OS, you will notice a new ServerTask called COLSRV400 added to the ServerTasks line of the NOTES.INI file of each Domino server that is upgraded. This is the add-in task used to gather Domino server statistics required by Collection Services for data collection and analysis. Whether you use Collection Services or not, Lotus recommends that the add-in task be left in the ServerTasks line for each server. COLSRV400 has been available since Domino 6 for i5/OS running V5R2 and earlier.



Figure 6-3 Collection Services access from iSeries Navigator

#### 6.2.6 Performance Explorer

Performance Explorer (PEX) is a set of performance collection functions and reporting commands. Part of the total i5/OS performance management methodology, the PEX commands should be one of the last lines of defense engaged when analyzing a performance problem. The Performance Explorer and Collection Services are separate from one another and produce two completely different sets of database files that contain grouped sets of collected data, but both collections of data can run at the same time. This practice should be kept to a minimum, however, because the impact to the system is significant with both the collections active.

As with Collection Services, the capability to collect Performance Explorer data is shipped with i5/OS. Your ability to analyze this data after it has been obtained is significantly enhanced by the purchase of Performance Tools for iSeries (5722-PT1).

# 6.2.7 iDoctor

iDoctor for i5/OS is a plug-in that provides your system with a suite of tools that aid with the management of i5/OS performance. The suite of tools includes:

- Performance Trace Data Visualizer, a free tool to analyze PEX trace data
- PEX Analyzer, to analyze 5722PT1 data tied to analyzing CPU utilization, physical disk operations, logical disk input/output, data areas, and data queues

- Consulting Services, which allows expert consultants to view your performance data
- ► Job Watcher, a job activity viewing and reporting tool

The iDoctor functionalities provide a number of strategies to measure the overall health of your system. The analysis of a vast amount of data is evaluated quickly and in ways that can be easily understood. For more information regarding iDoctor usage, refer to the iDoctor for iSeries Web site at:

https://www-912.ibm.com/i_dir/iDoctor.nsf

# 6.2.8 Domino 7 cross-platform performance tools

In Domino 7, performing traditional performance troubleshooting involves:

- Using information from the Domino server log (log.nsf), the Monitoring Results database (statrep.nsf), and the Administration Requests database (admin4.nsf) to perform historical data-analysis
- Using Monitoring Configuration (events4.nsf) event generators and notifications with standard Domino server monitoring to perform real time data analysis
- Using Domino Directory documents and notes.ini settings to customize the Domino server configuration

The following sections discuss the advanced tools native to the Domino 7 server, which can be used to manage performance when using Domino 7 on i5/OS.

## **Domino Domain Monitoring**

Domino Domain Monitoring (DDM) is Domino's next generation system event management suite. Packaged with the Domino 7 product for use on all platforms, DDM works in conjunction with the Domino Monitoring Configuration database (events4.nsf) to gather and report activity data for multiple Domino 7 servers through the use of configurable probes that collect data and report predetermined threshold flags and resource usage ranking to the Domino Domain Monitor database (ddm.nsf).

From a performance perspective, a major benefit of DDM is its state-of-the-art offering of Domino 7 database application performance monitoring functionalities. These functionalities allow for memory, CPU, and slow response time to be flagged and reported to the Domino Domino Monitor database associated with the processing of agents running within databases on your Domino 7 server. Additionally, Domino processes such as the building of temporary full-text indexes by agents can be tracked and identified so that administrative intervention can occur to limit performance cost. For more information about limiting the performance impact of building temporary full-text indexes, see ""Preventing agents from creating temporary full text indexes" on page 240".

Application probes allow monitoring of agents running both through the Agent Manager task and the HTTP Web Services task. Application probe classifications include:

- Agents behind schedule
- Agents ranked by CPU usage
- Agents ranked by memory usage
- Agents with unusually extended runtimes

If you require a better understanding of the components of Domino Domain Monitoring or ddm.nsf database creation, refer to *Lotus Domino Domain Monitoring*, REDP-4089.

For information about configuring DDM application probes to monitor agents being processed by the AMGR or HTTP jobs on your Domino 7 server, refer to the article *Troubleshooting application performance: New tools for data collection*, which is available on the Web at:

http://www-128.ibm.com/developerworks/lotus/library/app-troubleshooting2/

# Activity Trends and the Domino Change Manager

Activity Trends allows you to collect and explore the stored activity statistics as current observations and historical trends. The collected activity statistics relate to:

- The Domino server
- Domino databases
- User load
- Connections of users to databases

Activity Trends recommends a resource-balancing plan using this data. Then, in collaboration with the Domino server's Domino Change Manager, Activity Trends provides workflow that facilitates implementing the recommended changes. For more information about Activity Trends and the Domino Change Manager, refer to the Lotus Domino 7 Administration Help database.

## Server.Load

With Domino Server.Load, you can evaluate the capacity of your Domino servers and evaluate the requirements for additional CPU, memory, or disk storage upgrades. The tool can also be used to determine the effect of changes to the machine, such as upgrading a device drive, an OS service pack, or a Domino maintenance release. Domino Server.Load is included as part of the Domino 7 Administrator client, and is best for small and midsized evaluations.

If you configure multiple clients, you can set up and run the test from each client system. Each client workstation running Server.Load generates a simulated user load of Notes transactions, which reports server statistics back to the client. You can also monitor real-time server metrics. When the script is running, the Metrics window displays an immediate characterization of server performance by updating metrics on a per-minute basis.

New to Domino 7 is the Enterprise Mail workload. The Enterprise Mail workload attempts to simulate variations of user activity on Domino servers. These activities include:

- Messaging
- Calendaring
- Database searches
- Database replication between servers
- ► Local database replication on the client, and cluster replication

For additional explanation of the Enterprise Mail workload, refer to the following Web site:

http://www-128.ibm.com/developerworks/lotus/library/domino7-enterprise-performance/

For more information about Server.Load, refer to the Lotus Domino 7 Administration Help.

# 6.3 Installing performance management tools for the i5/OS

You have many options regarding your choice of performance management tools on i5/OS. Adding Domino 7 to an i5/OS partition provides for a more complex, collaborative environment which requires performance specialists to consider processes that span comprehensions beyond standard performance techniques. Domino acts as its own entity on i5/OS, running Domino transactions to meet both the Domino server requirements and the requirements of the users. Transactions are also run for any external system requirements such as requests from the i5/OS operating system. Because Domino is so diverse, Domino 7 on i5/OS can be optimized, with proper planning, to take advantage of i5/OS assets such as scalability.

# 6.3.1 i5/OS Performance Explorer preinstalled for i5/OS

The collection functions and related commands of the i5/OS Performance Explorer are part of the i5/OS licensed program. The reporting function and various associated commands are part of the base option in the Performance Tools for iSeries licensed program (5722-PT1) and are available with either the Manager feature or the Agent feature described in 6.3.3, "Installing Performance Tools for the i5/OS" on page 211.

# 6.3.2 Setting up Management Central

Management Central is an optionally installable component of iSeries Navigator. To be able to start the Management Central server on i5/OS, users must have *USE authority to the Start TCP/IP Server (STRTCPSVR) command. Perform the following steps to set up Management Central:

1. From a Windows workstation, Management Central is installed as long as the installer selects the Typical option when installing iSeries Access for Windows (Figure 6-4).

The Typical option ensures that the following components are installed to provide users with the basic Management Central functionality:

- Tasks (inventory only)
- Endpoint systems
- System groups

To utilize additional Management Central functionality, you can use the pull down menu options of File  $\rightarrow$  Install Options  $\rightarrow$  Selective Setup function in iSeries Navigator to install additional functionality at a later time. The additional install components required for full Management Central functionality are:

- Configuration and Service
- Users and Groups
- Commands
- Packages and Products
- Monitors



Figure 6-4 Installation options for iSeries Access for Windows

2. From iSeries Navigator, choose your central system when you first start Management Central. By default, the first System i machine to which you create a connection to in iSeries Navigator is designated as your central system. You can also change your central system at any time, by right-clicking **Management Central** and selecting **Change Central System** as is shown in Figure 6-5.



Figure 6-5 Changing the Central System for Management Central

 From iSeries Navigator, add the endpoint systems by expanding Management Central, right-clicking Endpoint Systems and selecting New Endpoint System, as is shown in Figure 6-6.

**Note:** Endpoint systems are the *other* systems in your network that you manage with your single central system. Your central system is automatically added to the list of endpoint systems. If you have more than one System i machine, you can add your other systems manually or use the Discover Systems function.



Figure 6-6 Adding endpoint systems within Management Central

4. From iSeries Navigator, create system groups by expanding **Management Central**, right-clicking **System Groups**, and selecting **New System Group** as shown in Figure 6-7.



Figure 6-7 Creating a new system group in Management Central

5. In the New System Group window (Figure 6-8), name your system group and select the systems that will be members of the system group. Click **OK**.

**Tip:** Make the most of Management Central's ability to manage groups of systems. Create groups of systems, for example, based on system functions (all Domino servers, all WebSphere servers, and so on) or geography, to make managing them easier and more efficient.

1	My Now	Sustem Croup				
Name:	MYNEW	System Group				
escription:	List of systems I like to check					
ype:	Managem	ent Central sys	tem group			
Available systems:			Selected systems:	2		
Rchas07	^		Rchas11			
Rchas09		Add	1			
Rchas 10		Add>				
Rchas 10.rchland.ibm.com		Demove <				
Rchas11.rchland.ibm.com		Kenove <				
Rchas55						
Rchascip.rchland.ibm.com						
Rehastica en anti-torra						
Rchasm05						
Rehasral	والسيا					
Rchasslh.rchland.ibm.con						

Figure 6-8 New System Group window

After you have finished this preliminary work with Management Central, you are ready to begin managing your systems. For more details about installing and configuring Management Central, refer to the Getting Started with Management Central Web page at:

http://publib.boulder.ibm.com/infocenter/iseries/v5r4/topic/rzaih/rzaksinstlmc.htm

# 6.3.3 Installing Performance Tools for the i5/OS

Performance Tools for the i5/OS runs out of a library called QPFR. Rename any pre-existing libraries called QPFR on your system using the Rename Object (RNMOBJ) CL command before installing the Performance Tools. Use the following Restore License Program (RSTLICPGM) CL command to install the Performance Tools into the QPFR library:

RSTLICPGM LICPGM(5722PT1) DEV(NAME) OPTION(*BASE)

Attention: To install the Performance Tools, use an i5/OS user ID with *SAVSYS special authority.

Install one or both of the following options to complete the installation:

- The Manager feature RSTLICPGM LICPGM(5722PT1) DEV(device-name) OPTION(1)
- The Agent feature

RSTLICPGM LICPGM(5722PT1) DEV(device-name) OPTION(2)

**Note:** If you have several CD-ROMs to install, you might receive a message saying that the 5722PT1 licensed program is restored, but no language objects are restored after you installed the first CD. If this occurs, insert the next CD-ROM and enter the following RSTLICPGM command:

```
RSTLICPGM LICPGM(5722PT1) DEV(NAME) RSTOBJ(*LNG) OPTION(*BASE)
```

# 6.4 Measuring Domino 7 performance standards on the i5/OS

You can check your system's performance at any time. This section provides a brief synopsis of some of the tools and metrics available to assist with collecting performance data related to both Domino and i5/OS.

# 6.4.1 Work with System Status (WRKSYSSTS)

The Work with System Status (WRKSYSSTS) display shown in Figure 6-9, allows you to view and alter several aspects of i5/OS. This tool is referenced throughout this chapter during

discussions on main memory (6.5.2, "Managing resources on the i5/OS" on page 230) and disk space (6.7.3, "Disk I/O performance tuning" on page 263).

**Tip:** The best way to view the information discussed in this section is to use the Intermediate assistance level. When you are on the Work with System Status display, press F21 to access the different assistance levels. Select option **2** for Intermediate and press Enter.

RCHAS10 Work with System Status 08/16/06 10:37:45 % CPU used . . . . . . . 1.4 Auxiliary storage: % DB capability . . . . : .0 System ASP . . . . . : 632.9 G Elapsed time . . . . . : 00:00:01 % system ASP used . . : 13.2079 4434 Jobs in system . . . . : Total . . . . . . . . : 632.9 G .007 Current unprotect used : **99**53 M % perm addresses . . . . : % temp addresses . . . : .016 Maximum unprotect . . : 11045 M Type changes (if allowed), press Enter. Svstem Pool ----DB---- ---Non-DB---Reserved Max Pool Size (M) Size (M) Active Fault Pages Fault Pages 865.21 476.57 +++++ 1 .0 .0 .0 .0 .0 2 17565.03 5.57 6585 .0 1.8 1.8 5000.00 .02 .0 .0 .9 3 67 .9 .0 .25 .0 .00 5 .0 4 .0 Bottom Command ===> F4=Prompt F5=Refresh F12=Cancel F3=Exit F9=Retrieve F10=Restart F19=Extended system status F24=More keys

Figure 6-9 Work with System Status (WRKSYSSTS) display

## 6.4.2 Work with Disk Status (WRKDSKSTS)

The Work with Disk Status (WRKDSKSTS) display shown in Figure 6-10, allows you to view a few aspects of your i5/OS direct access storage devices (DASD). Some of the things you can see on this display are:

- How many disk units you have configured in an ASP
- How busy the disk arms are
- How full each disk unit is

The two aspects that affect Domino performance the most are how busy the disk arms are and if any disk arms are significantly busier than the other disk arms in the ASP.

				Work	with Disk	Status		00/1	R	CHAS10
Elaps	ed time:	00:0	0:05					00/1	0/00 1	0:40:41
		Size	%	I/0	Request	Read	Write	Read	Write	%
Unit	Туре	(M)	Used	Rqs	Size (K)	Rqs	Rqs	(K)	(K)	Busy
1	4326	30769	12.5	.0	.0	.0	.0	.0	.0	0
2	4326	30769	12.5	.1	4.0	.0	.1	.0	4.0	0
3	4326	30769	12.5	.0	.0	.0	.0	.0	.0	0
4	4326	30769	12.5	.0	.0	.0	.0	.0	.0	0
5	4326	30769	12.5	.1	4.0	.0	.1	.0	4.0	0
6	4326	30769	12.5	.3	6.0	.0	.3	.0	6.0	0
7	4326	30769	12.5	.0	.0	.0	.0	.0	.0	0
8	4326	30769	12.5	.3	22.0	.0	.3	.0	22.0	0
9	4326	30769	12.5	.1	4.0	.1	.0	4.0	.0	0
10	4326	30769	12.5	.1	4.0	.1	.0	4.0	.0	0
11	4326	35165	12.5	.3	4.0	.1	.1	4.0	4.0	0
12	4326	30769	12.5	.3	4.0	.1	.1	4.0	4.0	0
13	4326	35165	12.5	.1	4.0	.1	.0	4.0	.0	0
-										More
Comma	nd									
===>										
F3=Ex	it F5=	Refresh	F12:	=Cancel	F24=Mor	e keys				

Figure 6-10 Work with Disk Status (WRKDSKSTS) display

# 6.4.3 Work with System Activity (WRKSYSACT)

The Work with System Activity (WRKSYSACT) display (Figure 6-11), allows you to interactively work with the jobs and tasks currently running in the system. At first glance, the information shown by this command looks similar to the Work with Active Jobs (WRKACTJOB) screen. However, WRKSYSACT has several advantages over WRKACTJOB:

- It uses less system resources.
- Besides user jobs, it also shows system tasks.
- The resource utilization shown is not cumulative and shows as a snapshot of each measurement interval. When used with the Automatic Refresh (F19) function, it shows live information for the very second, you are watching it.

**Note:** The WRKSYSACT command is only available when the Performance Tools for the i5/OS (5722-PT1) product is installed on your system.

Besides having the ability to view this data on the screen, you can also direct the data to be stored in a database file for future use. To direct the data to a database file, specify either *FILE or *BOTH for the OUTPUT parameter of the WRKSYSACT command. This allows you to produce a report using the Print Activity Report (PRTACTRPT) CL command.

Work with System Activity RCHAS10 08/16/06 10:46:31 Automatic refresh in seconds . . . . . · · · · 5 Elapsed time . . . . . : 00:00:02 Average CPU util . . . : 2.5 Number of CPUs . . . . . : 2 Maximum CPU util . . . . : 3.5 Overall DB CPU util . . . : .0 Minimum CPU util . . . . : 1.5 Current processing capacity: 2.00 Authorization Type . : Type options, press Enter. 1=Monitor job 5=Work with job DB Total Total CPU Job or CPU Sync Async Opt Task User Number Thread Pty Util I/0 I/0 Util SERVER QNOTES 040258 00000244 20 1.3 1 3 .0 040258 0000020D SERVER QNOTES 20 .3 0 0 .0 CHRONOS QNOTES 040937 00000015 20 .3 0 .0 6 QPADEV0007 BBPAGE 040912 000000D 1 .1 7 0 .0 040263 000000F0 0 20 .0 2 .0 HTTP QNOTES Bottom F11=View 2 F12=Cancel F19=Automatic refresh F3=Exit F10=Update list F24=More keys (C) COPYRIGHT IBM CORP. 1981, 2005.

Figure 6-11 Work with System Activity (WRKSYSACT) display

# 6.4.4 Performance analysis using Management Central

By using Management Central, you can manage and monitor your Domino server performance in an easy and understandable way. System and job monitors gather and present real-time performance data for your Domino servers. You can use monitors to see your server's performance as it happens on a single system or across multiple systems and groups of systems.

In contrast, you can use Collection Services to collect performance data for later analysis. Collection Services allows you to analyze multiple sets of true performance data for a longer period of your system performance history. Using the Graph History window, you can see a graphical view of the metrics that you collected for an extended period of time.

For information about Collection Services, see 6.6, "Domino 7 performance bottlenecking on the i5/OS" on page 240.

This section does not cover all the functions on Management Central performance monitors. For more detailed and complete information, refer to *Managing OS/400 with Operations Navigator V5R1 Volume 1: Overview and More*, SG24-6226.

The system monitor graphs present real-time system performance data in a graphical interface that you can directly manipulate to gather different or more detailed data. Monitors

allow you to collect performance data simultaneously for a wide variety of system metrics, for any system or system group, and for any length of time.

To monitor real-time system performance, start with creating a system monitor.

#### Creating a new system monitor

Define a new system monitor by using one of the following methods:

From iSeries Navigator, select Management Central → Monitors, right-click System and select New Monitor (Figure 6-12).



Figure 6-12 Creating a new system monitor with Management Central

 ▶ Right-click a System i machine under My Connections in iSeries Navigator and select Monitors → System. See Figure 6-13.

<b>O</b> iSeries Navigator			_ 🗆 🔀
File Edit View Help			
% 🗗 🕷 🕾 🗳 🚺 C 🛇			121 minutes old
Environment: My Connections	<u> </u>	Rchas10: Active P	ools Elapsed time: 00:00:01
Hanagement Central (Rchas10)		Pool	Description
Rcha Copen Customize this View Connection to Server Run Command Send Message Display Emulator	• •	Machine Base Interactive Spool	Used by internal machine functions Default system pool Used for interactive work Used for printing
Users and Groups Inventory Monitors	;    •	System	
Fixes Creates a System	* * *	File Job Message	
System Status Application Administration		Event Log Fraph History	

Figure 6-13 Using the My Connections method to create a new system monitor

- ► Expand Endpoint Systems under Management Central, right-click a system and select Monitors → System.

Each of these methods activates the New Monitor window shown in Figure 6-14.

ew Monitor		?
ieneral   Metrics   Actions	Systems and Groups   Sharing	
Name:	SYSMONXX	
Description:	Management Central System Monitor	

Figure 6-14 Creating a new system monitor, General tab

#### General tab

In the General tab of the New Monitor window, enter the name of the monitor and a brief description of the monitor.

#### Metrics tab

The Metrics tab (Figure 6-15) allows you to select the metrics that you want to monitor. You can view and change information about the collection interval, the maximum graphing value, and the display time for each metric. You can define one or two thresholds for each metric.

The thresholds are independent of each other and provide a way to monitor for different conditions in one monitor, for example, you might monitor for a less severe condition and send a command to page the system operator. Alternatively, you might monitor for a more severe condition and send a command page to start ending certain jobs. A threshold consists of a trigger value and, optionally, a reset value. You can specify an i5/OS command to be run when the threshold is triggered.

New Monitor			? 🗙
General Metrics Actions Systems and Gr	roups Sharing		
Available metrics:		Metrics to monitor:	
CPU Utilization (Interactive Jobs) CPU Utilization (Interactive Feature) CPU Utilization (Database Capability) CPU Utilization (Secondary Workloads) CPU Utilization Basic (Average) Interactive Response Time (Average) Interactive Response Time (Maximum) Transaction Rate (Average) Transaction Rate (Interactive) Batch Logical Database I/O	Add> Remove <	CPU Utilization (Average)	
CPU Utilization (Average)			
General Threshold 1 Threshold 2			
Collection interval:	1 minute		
Maximum graphing value:	100	percent	
Display time:	5	minutes	

Figure 6-15 Metrics tab for Management Central system monitor

Following is a description of the available metrics shown in Figure 6-15:

CPU Utilization (Average)

This metric shows you the percentage of available processing unit time that is being consumed by all the jobs on your system. This metric includes all the work being done, including interactive and noninteractive.

CPU Utilization (Interactive Jobs)

Earlier known as CPU Utilization (Interactive), this metric shows you the percentage of available processing unit time that is being consumed on the system for all the jobs of type I (interactive). It also helps you manage your interactive users' work compared to the total CPU utilization capacity. The resulting data is relative to achieving good interactive response time and the amount of CPU left for noninteractive jobs. Type I jobs include:

- Twinaxial data link control (TDLC)
- 5250 remote workstation
- 3270 remote workstation
- SNA pass-through
- 5250 telnet

CPU Utilization (Interactive Feature)

This metric is designed to help you monitor and manage your system's interactive use. It determines whether a particular job is doing interactive work and measures the system's overall interactive workload. This metric complements the existing Management Central metrics such as CPU Utilization (Interactive Jobs) and CPU Utilization (Average). This metric shows you when your system is approaching its interactive limits:

- Signed-on 5250 workstation jobs
- Autostart jobs, prestart jobs, or jobs submitted to a batch job queue that run I/O operations on a 5250 workstation
- CPU Utilization (Database Capability)

This metric is intended to help you monitor your system's database use. With this metric, you can see how much of your system CPU is consumed by database activities and which jobs contribute the most to this use. In addition, you can find detailed data for each job, including the number of milliseconds of CPU used by that job in database processing during the particular sample interval being graphed.

CPU Utilization (Secondary Workloads)

This metric is designed for use on System i-dedicated systems. It measures how much CPU is being used on the system for work other than the primary workload for which the system is designed, which can include database activity. This metric can, for example, be used on the Dedicated Server for Domino to see how much non-Domino work is being done on the system. The amount of CPU used by secondary workloads is currently reported only on Dedicated Servers for Domino systems running V4R5 or later and is a portion of the total CPU utilization capacity. On other systems and servers, the value is ignored and appears as 0%. This metric does not track detailed data.reset.

CPU Utilization Basic (Average)

This metric shows the percentage of available processing unit time that is being consumed by all the jobs on the system. Unlike the CPU Utilization (Average) metric mentioned earlier, this metric does not track detailed data.

Interactive Response Time (Average)

This includes the average response time for interactive (5250) jobs on the system. Second-level information shows the jobs having the highest average response time.

Interactive Response Time (Maximum):

This includes the highest response time for interactive (5250) jobs on the system when the monitor is active. Second-level information shows the jobs having the highest response time.

Transaction Rate (Average)

This includes the average number of transactions per second completed by all the jobs active on the system. Second-level information shows the jobs having the highest rate.

Transaction Rate (Interactive)

This includes the average number of transactions per second completed by 5250 jobs active on the system. Second-level information shows the jobs having the highest rate.

Batch Logical Database I/O

The average number of logical database I/O operations currently performed by all non-5250 (batch) jobs on the system. Second-level information shows the jobs performing the highest I/Os.

Disk Arm Utilization (Average)

The average percentage of disk arm busy performing I/O operations for all the disks on the system. Second-level information shows information for each disk arm.

Disk Arm Utilization (Maximum)

The maximum percentage of disk arm busy performing I/O operations for all the disks on the system. Second-level information shows information for each disk arm.

Disk Storage (Average)

The average percentage of disk arm storage that is full on your system during the time you collect the data. Second-level information shows information for each disk arm.

Disk Storage (Maximum)

The highest percentage of disk arm storage that is full on your system during the time you collect the data. Second-level information shows information for each disk arm.

Disk IOP Utilization (Average)

The average per cent the disk input/output processors (IOPs) are busy on your system during the time you collect the data. Second-level information shows information for each IOP.

Disk IOP Utilization (Maximum)

The maximum per cent the disk IOPs are busy on your system during the time you collect the data. Second-level information shows information for each IOP.

Communication IOP Utilization (Average)

The average per cent the communication (LAN, WAN, and so on) IOPs are busy on your system during the time you collect the data. Second-level information shows information for each IOP.

Communication IOP Utilization (Maximum)

The maximum per cent the communication (LAN, WAN, and so on) IOPs are busy on your system during the time you collect the data. Second-level information shows information for each IOP.

Machine Pool Faults (Average)

The average number of faults per second occurring in the machine pool of the system during the time you collect the data. Only Licensed Internal Code runs in the Machine pool.

User Pool Faults (Average)

The average number of faults per second occurring in all the user pools on the system during the time you collect the data. Second-level information shows information for each pool.

User Pool Faults (Maximum)

The maximum number of faults per second occurring in all the user pools on the system during the time you collect the data. Second-level information shows information for each pool.

Communication Line Utilization (Average)

The average percentage of line utilization for all non-LAN lines active during the time you collect the data. Line utilization is an approximation of the actual amount of data transmitted compared to the theoretical maximum line speed configured on the line description object. Second-level information shows information for each non-LAN line. A non-LAN line supports binary synchronous, asynchronous, IDLC, X.25, LAPD, or SDLC protocols.

Communication Line Utilization (Maximum)

The maximum percentage of line utilization for all non-LAN lines active during the time you collect the data. Second-level information shows information for each non-LAN line.

LAN Utilization (Average)

The average percentage of line utilization for all LAN (Token-Ring and Ethernet) lines active during the time you collect the data. Line utilization is an approximation of the actual amount of data transmitted compared to the theoretical maximum line speed configured on the line description object. Second-level information shows information for each LAN line.

LAN Utilization (Maximum)

The maximum percentage of line utilization for all LAN lines active during the time you collect the data. Second-level information shows information for each LAN line.

#### Actions tab

The Actions tab (Figure 6-16) allows you to specify the actions to occur when a threshold is triggered and when a threshold is reset.

Log event

Adds an entry to the event log on the central system when the threshold is triggered or reset. The entry includes the date and time the event occurred, the endpoint system being monitored, the metric being collected, and the monitor that logged the event.

Open event log

Displays the event log when a trigger or reset event occurs. This automatically brings up the Event Log window if it is not currently displayed on your PC.

Open monitor

Displays a list of systems that are being monitored for the specified metrics and a list of values for the specified metrics as they are collected for each system when a trigger or reset event occurs. This automatically brings up the Monitor window if it is not currently displayed on the PC.

Sound alarm

Sounds an alarm on the PC when the threshold for the monitor is triggered.

New Monitor			? 🔀
General Metrics Actions Systems a	and Groups   Sharing		
Actions for all metrics			
	Trigger:	Reset:	
Log event:		<b>v</b>	
Open event log:	Г	Г	
Open monitor:	Г		
Sound alarm:			

Figure 6-16 Actions tab for Management Central system monitor

#### Systems and Groups tab

The Systems and Groups tab shows you a list of endpoint systems or system groups. The list can include systems from which the monitor is currently collecting data. The list can also include systems on which the monitor is not currently running. You can also add or remove endpoint systems or system groups from this page.

## 6.4.5 Memory resource performance analysis

Periodically checking the amount of memory your memory pools use is important. By monitoring these levels, you can tune your memory pools to run at maximum efficiency.

In iSeries Navigator, you can easily monitor the amount of memory your pools are using by performing the following steps:

- 1. Open iSeries Navigator, expand **My Connections** and then expand the connection for your System i machine.
- Expand Work Management → Memory Pools and click on either Active Pools or Shared Pools.
- 3. Right-click the specific pool of your choice and select Properties. See Figure 6-17.



Figure 6-17 Choosing a memory pool to check in iSeries Navigator

4. In the Properties window (Figure 6-18), click on the **Configuration** tab. View the memory usage amount in the Current field under the Size section.

Defined:	0.25	MB	
Current:	0.25	MB	
Reserved	: 0.00	MB	
Current ir	eligible threa	ds: 0	
	and the second		

Figure 6-18 Configuration tab of spool memory pool properties

# 6.5 Preserving performance on your Domino 7 server

This section shows you how to preserve the performance of your Domino 7 server.

## 6.5.1 Collecting Domino 7 performance data on the i5/OS

This section shows you how to collect Domino 7 for i5/OS performance data.

#### **Collection Services**

Collection Services analysis requires that the Performance Tools for the i5/OS has been installed on your system. See 6.3.3, "Installing Performance Tools for the i5/OS" on page 211 for details.

### Starting performance collections from a 5250 emulation session

To start a Collection Services analysis from a 5250 emulation session, perform the following steps:

1. In the i5/OS command line, type G0 PERFORM and press Enter.

2. In the IBM Performance Tools for iSeries menu, type option 2 (Collect Performance Data) and press Enter. See Figure 6-19.

PERFORM	IBM Performa	nce Tools	for	iSeries	System.	RCHAS10
Select one of the fol	lowing:				Jystem.	NellA310
1. Select type o 2. Collect perfo 3. Print perform	f status rmance data ance report					
5. Performance u 6. Configure and 7. Display perfo 8. System activi 9. Performance g 10. Advisor	tilities manage tools rmance data ty raphics					
70. Related comma	nds					
Selection or command ===> 2						
F3=Exit F4=Prompt F16=System main menu (C) COPYRIGHT IBM COR	F9=Retrieve P. 1981, 2005	F12=Can	cel	F13=Info	ormation Ass	istant

Figure 6-19 IBM Performance Tools for iSeries menu

3. In the Collect Performance Data display (Figure 6-20), you will see the status of Collection Services running on your system.

Collect Performance Data	07/31/06	RCHAS10
Collection Services status: Status Started Collection object	07/31/00	19.47.29
Select one of the following: 1. Start Performance Collection 2. Configure Performance Collection 3. End Performance Collection Selection or command ===>		
F3=Exit F4=Prompt F5=Refresh F9=Retrieve F12=Cancel		

Figure 6-20 Status shown when Collection Services has been started

4. If the status shown is Started, it means that Collection Services is already running. If the status shown is Stopped, type an option 1 (Start Performance Collection) and press Enter twice to start Collection Services on your system. Press F5 to refresh the display and confirm that the status of Collection Services has changed to Started.

#### Starting performance collections from the iSeries Navigator

Collection Services can also be started from iSeries Navigator. Perform the following steps:

1. Open iSeries Navigator, expand **My Connections** and then expand the connection for your i5/OS machine.

2. Expand **Configuration and Service**, right click Collection Services and select **Start Performance Collection**. See Figure 6-21.



Figure 6-21 Starting a Collection Services Performance Collection from iSeries Navigator

## Performance Explorer

PEX commands can be run by i5/OS users with *SERVICE special authority.

The following list shows the process (or the cycle) for using the PEX tool:

- 1. Enable PEX trace point debugging on your Domino 7 server.
- 2. Add the PEX Definition (ADDPEXDFN).
- 3. Add the PEX Filter (ADDPEXFTR).
- 4. Start Performance Explorer (STRPEX).
- 5. End Performance Explorer (ENDPEX).
- 6. Print the PEX Report (PRTPEXRPT).
- 7. Analyze the PEX data.

#### Enabling PEX trace point debugging

Four levels of trace point debugging exist to allow a more Domino-specific collection of data by PEX. The desired level of trace point analysis that you would like performed can be specified by the addition of the parameter DEBUG_OS400_PEX to notes.ini of each Domino 7 server for which data will be collected.

## Adding the PEX Definition (ADDPEXDFN)

A PEX definition identifies the performance data that is collected during a Performance Explorer session. You can add PEX Definitions using the Add PEX Definition (ADDPEXDFN) command. See Figure 6-22. The ADDPEXDFN commands add a new Performance Explorer definition to the system and stores the definition as a member of QAPEXDFN in library QUSRSYS.

Add PEX De	efinition (AD	DPEXDFN)
Type choices, press Enter.		
Definition > Type > Jobs:	• TESTDEF • *TRACE	Name *STATS, *TRACE, *PROFILE
Job name	*	Name, generic*, *, *NONE, *ALL Name, generic*, *ALL 000001-999999, *ALL 00000001-FFFFFFF, *ALL
Task name	*NONE	
Maximum storage to use Trace full	10000 *STOPTRC *ALL *NO	1024-4000000 K *STOPTRC, *WRAP *ALL, *NEW, *CURRENT *NO, *YES
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	F13=How to use this display

Figure 6-22 Add PEX Definition (ADDPEXDFN) command

## Adding the PEX Filter (ADDPEXFTR)

Add a PEX filter to limit the amount of data collected by specifying a compare value for specific events. See Figure 6-23.

Add PEX	Filter (ADDPEXFTR)
Type choices, press Enter.	
Filter > Program trigger:	> TESTFILTER Name
Program	Name Name Name, *ALL *PEP *PGM *PGM, *SRVPGM
F3=Exit F4=Prompt F5=Refresh F24=More keys	*ENTRYEXIT More F12=Cancel F13=How to use this display

Figure 6-23 Add PEX Filter (ADDPEXFTR) command, Filter field

## Starting PEX (STRPEX)

You are now ready to start the PEX with the Start Performance Explorer (STRPEX) command. See Figure 6-24. Use the definition created in "Adding the PEX Definition (ADDPEXDFN)" on page 227 and the filter created in "Adding the PEX Filter (ADDPEXFTR)" on page 228.

**Note:** When troubleshooting a performance issue using PEX, steps 1 - 4 must occur before you expect a problem to resurface. After it looks as if the performance issue has returned, the PEX data collection can be stopped (step 5) so that you can analyze (step 6) the performance snapshot for the system that corresponds to the time of your performance issue.

	Start Perform	nance Explorer	· (STRPEX)
Type choices, press E	nter.		
Session ID Option Definition Filter	· · · · · · · · · · · · · · · · · · ·	• ITSO *NEW TESTDEF TESTFILTER	Name *NEW, *INZONLY, *RESUME Name, *SELECT Name, *NONE, *SELECT
F3=Exit F4=Prompt F24=More keys	F5=Refresh	F12=Cancel	Bottom F13=How to use this display

Figure 6-24 Start Performance Explorer (STRPEX) command

### Ending PEX (ENDPEX)

While experiencing the performance issue, end the PEX trace using the End Performance Explorer (ENDPEX) command. See Figure 6-25.

```
End Performance Explorer (ENDPEX)
Type choices, press Enter.
                                             Name, *SELECT
Session ID . . . . . . . . . > ITSO
*END
                                             *END, *SUSPEND, *STOP
Data option . . . . . . . . .
                                *LIB
                                             *LIB, *MGTCOL, *DLT
                                QPEXDATA
Data library . . . . . . . . . .
                                             Name
Data member . . . . . . . . .
                                *SSNID
                                             Name, *SSNID
                                             *NO, *YES
Replace data . . . . . . . . .
                                *NO
Number of threads . . . . . .
                                *CALC
                                            1-256, *CALC
Text 'description' . . . . . .
                                Pex data for performance issue
                                                                 Bottom
F3=Exit
         F4=Prompt F5=Refresh
                                F12=Cancel
                                            F13=How to use this display
F24=More keys
```

Figure 6-25 End Performance Explorer (ENDPEX) command

#### Printing the PEX Report (PRTPEXRPT)

After the trace has ended, print out the results for review using the Print PEX Report (PRTPEXRPT) command. See Figure 6-26.

```
Print PEX Report (PRTPEXRPT)
Type choices, press Enter.
Member . . . . . . . . . . . . > ITSO
                                            Name
Library . . . . . . . . . . . .
                                QPEXDATA
                                            Name
                                            *STATS, *TRACE, *PROFILE...
Type . . . . . . . . . . . . > *PROFILE
Profile options:
                                            *SAMPLECOUNT, *ADDRESS
 Sort by . . . . . . . . > *SAMPLECOUNT
 Summarize by . . . . . . . > *PROCEDURE
                                            *BLANK, *STATEMENT...
 Filter percentage . . . . .
                                            0-99
                               0
                               *DESCENDING
                                            *ASCENDING, *DESCENDING
Bottom
         F4=Prompt
                              F12=Cancel
F3=Exit
                    F5=Refresh
                                           F13=How to use this display
F24=More keys
```

Figure 6-26 Print PEX Report (PRTPEXRPT) command

#### Analyzing the PEX data

You are now ready to review the results that are contained in a spool file and are accessible using the Work with Job (WRKJOB) command and typing option 4 (Work with spooled files).

# 6.5.2 Managing resources on the i5/OS

This section shows you how to manage i5/OS resources.

#### Main memory

A storage pool is a logical division of main memory that is reserved for processing a group of jobs. In the i5/OS, all the main storage is divided into logical allocations called storage pools. If you enable the performance adjuster, the system manages most aspects of the storage pools.

**Note:** When the performance adjuster is enabled (QPFRADJ system value is set to 2 or 3), it monitors the jobs running in the different storage pools. If a storage pool requires more memory for the jobs running in it, the performance adjuster can increase the size of that storage pool. When the performance adjuster increases the size of a storage pool, it takes the required memory from the *BASE pool. So, if the performance adjuster wants to increase the size of the *INTERACT storage pool by 10 MB, it decreases the *BASE storage pool by 10 MB. However, if decreasing the *BASE storage pool by 10 MB will make it smaller than the QBASPOOL, the performance adjuster cannot increase the size of the *INTERACT storage pool.

By default, all the Domino servers run in the base (*BASE) storage pool. This is pool number 2 on the Work with System Status (WRKSYSSTS) display. You can manually change a Domino server to run in a different storage pool. The purpose of separate storage pools is to guarantee a certain amount of memory to a group of jobs that will not be paged out by other jobs that require memory.

There are two storage pools that you must focus on when managing Domino 7 for the i5/OS:

- The machine (*MACHINE) storage pool (viewed as pool number 1 in WRKSYSSTS)
  - Processes Licensed Internal Code work
  - Processes communications data work (TCP/IP and so on)
  - Does not process work from user jobs
  - Size is specified by QMCHPOOL
- The storage pool the Domino server is running in (*BASE by default)
  - Contains all the memory not allocated by other (private or shared) storage pools
  - Contains storage that can be shared by many subsystems
  - Size can be altered by the system value of QBASPOOL
  - Activity level can be altered by the system value of QBASACTLVL

**Note:** You can configure a Domino server to run in another shared pool or private pool. For suggestions about deciding which storage pool to run a Domino partition on and how to change the Domino configuration so that it runs in another storage pool, refer to *Domino for iSeries Sizing and Performance Tuning*, SG24-5162.

Domino performance is negatively impacted if the paging and faulting for the storage pool Domino is running on or the *MACHINE storage pool gets *too high*. Domino is concerned with the values in the Non-DB Paging and Faulting columns.

# Adjusting i5/OS system values

Table 6-4 contains a list of i5/OS system values that can be changed to help improve performance for a Domino 7 server running on i5/OS. These changes can be made using the Work with System Values (WRKSYSVAL) command.

Table 6-4 System values influencing performance on i5/OS

System value	Definition	Default value	Recommended value	Need IPL to update?
QTOTJOB	Total number of jobs for which the auxiliary storage is allocated during IPL ^a	30	Varies	Yes
QADLTOTJ	Additional number of jobs that need storage allocated when QTOTJOB is reached	10	Varies	No
QACTJOB	Initial number of active jobs for which auxiliary storage is allocated during an IPL.	20	Varies	Yes
QADLACTJ	Additional number of active jobs that need storage allocated when QACTJOB is reached.	10	Varies	No
QMAXACTLVL	Maximum activity level of the system	*NOMAX	Varies	No
QMCHPOOL	Size of the *MACHINE storage pool (Pool 1 in WRKSYSSTS)	20	Varies	No
QBASPOOL	Minimum size of the *BASE storage pool (Pool 2 in WRKSYSSTS)	5% of the main storage with a minimum value of 2000KB	Varies	No
QBASACTLVL	Activity level for the *BASE storage pool	6	120 times the number of Domino servers (if i5/OS Performance Adjuster is not active)	No
QPFRADJ	Performance adjustment values that specify whether the system should adjust values during IPL, at regular intervals for system pool sizes and activity levels, or not make any automatic adjustments. This functionality is commonly referred to as the i5/OS performance adjuster.	3 (Automatic adjustment)	2 (Adjustment at IPL and automatic adjustment) or 3 (Automatic adjustment), to allow for auto adjust of memory pool activity levels.	Yes
QDYNPTYADJ	Priority of interactive jobs is dynamically adjusted to maintain high performance of batch job processing.	1 (On)	Varies	Yes
QDYNPTYSCD	The dynamic priority scheduler	1 (On)	Varies	Yes
QPRCMLTTSK	Processor multitasking capability	2 (System-controlled)	1 (On)	Yes

a. Note: If set too high, it can significantly lengthen the total time to IPL.

## PercentAvailSysResources

On Domino 7 for i5/OS, you can control the amount of memory allocated to each Domino server (subsystem) by percentage, using the PercentAvailSysResources variable. Before the introduction of this variable, in the earlier releases of Domino, each Domino server assumed it had 100 per cent of system physical memory available to it. Unless you set an actual value in NSF_Buffer_Pool_Size_MB, Domino will take three-eighths (3/8) of total physical memory. Other Domino memory allocation sizing parameters will take a percentage of the remaining five-eighths (5/8) of all memory.

With the PercentAvailSysResources variable, you can assign a portion of total system physical memory to each Domino server by specifying a value from 2% to 100%, which represents an absolute percentage of the system's total physical memory. On the i5/OS, memory calculations are based on the main storage size multiplied by PercentAvailSysResources if the Domino subsystem is running in *BASE pool, or on the actual pool if running in a shared or private pool. The NSFBuffer pool then defaults to approximately three-eighths (3/8) of that calculated base for each Domino server. Note also that if QPFRADJ is not set to 0 (zero), and you are using shared pools, your shared pool sizes will be adjusted on the fly. That might affect how PercentAvailSysResources works in cases where the Domino server is started or restarted when the subsystem is already active for a longer time and the pool size has been adjusted meanwhile. In that case, using NSF_Buffer_Pool_Size_MB will be more predictable.

If the NSF_Buffer_Pool_Size_MB is omitted, the allocated three-eighths (3/8) of the total amount of memory allocated to Domino by PercentAvailSysResources. If you require more memory in the NSF_Buffer_Pool_Size_MB, you must adjust any one (or more) of the following areas:

- Physical memory (so that the amount from the same percentage increases)
- Proportion of memory that this Domino server acquires by increasing PercentAvailSysResources
- Deliberately set NSF_Buffer_Pool_Size_MB to a higher value than three-eighths (3/8) of the available memory

In the first two cases, the remaining memory buffer allocation parameters (the 3/8 versus 5/8) will keep their correct relative values and balance. With the third case, you should carefully ensure that the NSF_Buffer_Pool_Size_MB fits in with your actual requirements for this particular configuration by calculation if you set it to greater than 3/8 deliberately.

If, for example, you want to dedicate 25 per cent of the total system memory to a Domino server, add the following line to the Domino server's notes.ini file:

#### PercentAvailSysResources=25

This effectively leaves 75 per cent of the memory for other Domino servers, for example, a Domino server on a system with 10 Gb of memory and a Domino server with its notes.ini setting of PercentAvailSysResources=25 will reserve 2.5 Gb for itself.

The PercentAvailSysResources parameter has significant advantages over the old method of "hard coding" the memory using NSF_Buffer_Pool_Size_MB parameters:

- If you add additional memory, it is immediately proportionally shared between the Domino servers without any necessity to change or edit the notes.ini parameters.
- In high-availability clustering and failover scenarios, when a Domino server's workload is failed over to another partition, the per cent of physical memory that is required by the receiving partition to cope with the increased workload is quite simply the sum of the two separate PercentAvailSysResources parameters from the failed and the newly joined partition.

## Domino database indexing: Controlling the UPDATE task

One of the most common, preventable causes of poor response time and performance of Domino servers is excessive and unnecessary activity of the Domino UPDATE task. This task is responsible for updating and rebuilding the indexes of Domino database views. It is designed to run in the background and is intended to improve the response time and performance by ensuring that when a user opens a database view, the user does not have to wait for it to be indexed. Ironically, it often turns out to have the opposite effect. This section explains how the UPDATE task is supposed to work. It looks at how Domino administrators and designers can monitor and control it to improve Domino server performance. It also explains the potential impact to performance when the UPDATE task is running excessively. It provides a hint of the kind of improvements you might see by correcting the problem.

#### Components of the Domino database indexer

Lotus Technote #167013 provides a great deal of information regarding the Domino Indexer and the UPDATE task. This section includes a few excerpts that are relevant to the topics in this book. However, it is recommended that you read the entire Technote. You can find the Technote by searching for 167013 on the Lotus Support Web site at:

#### http://www.support.lotus.com

The Indexer comprises three components:

- ► The UPDATE task
- ► The UPDALL task
- ► The Notes Indexing Facility (NIF) Subsystem

The Indexer as a whole is responsible for keeping the active views and the full text indexes current within the databases. It processes any requests for changes to documents within a database, so that the active view collections and the full text indexes display the most recent modifications and current information.

#### The UPDATE task

UPDATE is a Domino server task that must run at all times under normal conditions, which is explained later. You can load the UPDATE task in one of two ways:

Automatically, by specifying it in the "ServerTasks=" line in the Domino server's notes.ini file. This is the default when you configure a Domino server. Following is an example of the "ServerTasks=" line:

ServerTasks=Replica,Router,Update,Stats,AMgr,AdminP,Sched,....

Manually, from the Domino server console, using the load update command.

The UPDATE task works continuously from a queue called \$UpdateQueue. When a change occurs in a database (such as deletions, additions, or edits), a corresponding request is entered into the UPDATE queue. UPDATE checks the queue every five seconds for any new

requests that have been deposited and takes the requests from the queue on a first-come, first-served basis.

\$UpdateQueue is a hard-coded queue that has a maximum capacity of 500 requests. These requests include updates to view indexes and full text indexes. When a request is placed into the queue, the actual names of the databases and paths to the databases are stored in the queue, not the view names themselves. No published method is available to display the actual contents of the \$Update queue.

To see if UPDATE is running and what it is doing, use the **show tasks** Domino server console command.

#### The UPDALL task

The UPDALL task is a single instance of the UPDATE task. It does not operate off a queue like UPDATE, but accomplishes the same purpose in a different way. When the UPDALL task runs, it processes every Domino database, refreshing the views or updating the full text indexes for each database. The UPDALL task starts in one of the following ways:

Automatically, at a scheduled time each day. By default, the UPDALL task is run at 2:00 a.m. It is defined in the ServerTasksAt2 line in the Domino server's notes.ini file as follows:

ServerTasksAt2=Updal1

Manually, from the Domino server console. When you run the UPDALL task from the console command line, you can use various switches to control it, for example, you can invoke UPDALL to rebuild only the full text index on a single database.

The UPDALL task performs additional functions beyond what the UPDATE task does. In the design of a view, you can specify, in View Properties, the frequency with which a view index is discarded:

- Never
- After each use
- If inactive for a specified number of days

It is the responsibility of the UPDALL task to remove the view index if a discard option is specified. In other words, if the Discard Index option is selected for a view, the index is not actually discarded immediately. Rather, the index is removed the next time the UPDALL tasks runs, for example, a view has a Discard View option of 'After each use'. If you exit from a view at 1:00 p.m., the view will not be removed until UPDALL is run (usually done at 2:00 a.m.).

#### Notes Indexing Facility

The Notes Indexing Facility (NIF) is made up of a multitude of functions within Domino that allow a server to keep the data ordered and current within a view. Specifically, the NIF performs the following tasks:

- Updates indexes
- Opens and closes view collections/view indexes
- Locates index entries

The majority of these requests are made by the Domino server when users open and close databases, for example, the NIF subsystem, and not the UPDATE task, forces the update of a view collection when a user switches between views. If a user makes a modification to a document within a view, and then switches quickly to another view and then back again to the original view, the new changes should be seen almost immediately by the user.

#### The UPDATE task and CPU utilization in a normal environment

On a typical Domino server (one that is not experiencing performance problems due to the UPDATE task), UPDATE might run quite often, but usually for very short periods of time.

Unless a database has just had several hundred or thousand documents added or changed, UPDATE does its work quickly, updates each view in the database that it is indexing, and finishes in a few seconds.

With small databases, even on older and slower hardware, performing an incremental update of a view in which only a few or no documents have changed, takes less than a second. If you observe CPU utilization when this is taking place, you might see the utilization rise to 90% or more (on a single CPU), but only for a few seconds when UPDATE traverses all the views in a database.

With very large databases (as long as the number of new or changed documents is small), the time to perform an incremental update of a view still remains short, usually only a second or maybe a few seconds.

In any case, with small or large databases, or fast or slow servers, the time it takes to do an incremental update of the views in a given database will be similar for all the views in that database as long as the number of new or changed documents is small.

This activity (incremental updates of view indexes) does not usually cause much of a performance problem for servers. Although the utilization is high, it is brief. Its effect is hardly noticeable. Also, although views are also "locked" and, therefore, inaccessible when they are being updated, no one usually notices because it normally takes, at the most, a few seconds.

You must also be aware that the time to do an incremental update of a view in which few or no documents have changed, depends more on the number of documents in the database than the number of documents in the view. This might sound contrary to what you have read, but it is not. When the number of documents to be indexed is low or zero, the time to update is really mostly just overhead, and depends on the database size. However, if you consider the time it takes to completely build a view, then it is the number of documents in the view that matters more than the actual number in the database.

#### The UPDATE task and CPU utilization in a problem environment

Now, if you consider a Domino server in which the UPDATE task is observed to be running almost all the time and in which the CPU utilization is consistently at or near 100%, usually it means that something else is going on. This does not necessarily mean the UPDATE task permanently consumes over 90% of all processor resources. There can also be cases where the overall utilization approaches 100% and the UPDATE task accounts for the major part of it.

A high total CPU utilization does not necessarily cause problems on i5/OS. However, if high priority jobs such as Domino tasks or interactive (5250) jobs consume a major part of resources (including disk utilization), you can see the following results:

- All jobs with the same priority might see longer response times.
- Jobs with lower priority, for example, traditional batch jobs with lower priority (that is, the priority value is higher than 20), drastically slow down or even stop working.

The total number of views in databases with many documents to be maintained by the UPDATE task is extremely high. Several reasons might cause the UPDATE task to use up too many processing cycles or even monopolize the CPU.

- ► Full text indexes are created frequently.
- Many views (for big databases) have to be completely rebuilt from scratch.
- Many views contain time-dependent selection formulas.

Because the views and the capability of full text search represent the full power of many Domino applications, in most cases, it is not an option to reduce any of them. If these two reasons turn out to be the cause of excessive resource consumption, probably the only choice is to invest in more and faster hardware.

When the UPDATE task is called upon to completely rebuild a view from scratch, it is also very CPU-intensive. So far, this is the bad news. The good news is that this should normally not happen. UPDATE should almost never have to completely rebuild a view. Most of the time, this is redundant and a waste of CPU resources.

The only circumstances in which UPDATE should rebuild views from scratch are:

- All the documents in the view or database have changed or are new. This might occur because:
  - An agent or an external program has updated them.
  - A Lotus Enterprise Integrator (LEI) Direct Transfer Activity deletes and refreshes all the documents in a database. This should be avoided whenever possible. Sometimes, other techniques or tools can be used, such as using LEI Replication Activities, which have a smaller impact.
- The database is new. If a new replica is created on a Domino server, and some of the views have the proper settings, UPDATE builds the indexes for those views.
- The design of the view has changed. If the view has the proper settings and existed previously, changing the design causes the whole view index to be rebuilt.

As you might surmise, the circumstances in the second and third bullets should not be common occurrences.

**Note:** If the examples provided here are not the cause of views having to be rebuilt, then the likely cause is the existence of one or more views with time-dependent selection formulas in which the View Refresh Index options specify that the views should be automatically updated. The UPDATE task must not rebuild these types of views because they are always out of date.

## 6.5.3 Special performance considerations for Domino databases

The main function of the Domino server is to provide various services to its users such as database access, mail routing, and often data processing through the use of Domino database agents. Frequently, these tasks require interaction with the i5/OS operating system, such as when Domino users access DB2 Universal Database for i5/OS databases directly through Domino. Although these and other interfaces to the i5/OS operating system use system resources, the Domino server tasks themselves must be the primary focus of performance considerations. If you understand some of the components of Domino, you must understand the advantages that Domino can provide under i5/OS, and the performance implications.
When you consider the effects of application responsiveness in a Domino environment, there are several factors that can impact performance:

- ► The number and frequency of users accessing the application
- Access to a back-end relational database by the application
- Client type (simple Web browser, Lotus Notes client)
- Client and server operations
- Domino server architecture
- Server deployment topology

When designing an application, always start at the high level, where you can make performance considerations from the architectural perspective. Although all the factors mentioned earlier are important, the factor that has the most impact is the actual design of the applications. By building a complex application, you increase the processing and calculations required by the Domino server, which can compromise performance.

Developers must balance the necessity for clean and simple functionality with performance. There is no single means of maximizing the performance of a Domino application. The desire for application performance does not always leave room for design elegance or maintainability. The following list contains some application design factors that affect performance. You must carefully consider the following when developing an application with performance in mind:

- Requirements for agent execution
- Actions within forms
- Field validation
- Using formulas in views
- Dynamic data versus static data
- Indexing requirements (Frequency of indexing, Full text indexing)

Further information about application development performance for Domino can be found in the following references:

Domino 7 for i5/OS Application Development Guide

http://www-12.lotus.com/ldd/doc/uafiles.nsf/docs/i5osdom7/\$File/apdev400.pdf

Performance Considerations for Domino Applications, SG24-5602

http://www.redbooks.ibm.com/redbooks/SG245602.html

#### **Enabling teraspace**

*Teraspace* is the term used for process-local storage on the i5/OS model. Teraspace support, required for Single-Level Store (SLS) data, allows larger storage spaces to be allocated on your i5/OS machine. In addition to allowing the use of 8-byte pointers instead of 16-byte pointers, Domino 7 for the i5/OS model makes use of teraspace in certain areas where it requires more than 16 MB of contiguous storage.

Domino 7 for the i5/OS is fully enabled for teraspace. You can pass teraspace memory to Domino and it can access the larger memory allocations. For maximum performance, be sure to enable all the Domino applications, modules, and service program extensions for teraspace.

To ensure that your Domino C or C++ application is properly enabled for use with future versions of Domino, there are two important considerations:

Bind to QNOTES/LIBNOTES

Some applications incorrectly specify a library of *LIBL when binding to the LIBNOTES service program. This can result in incorrect operation in a multiversioned Domino environment. Applications must specify library QNOTES when binding to the LIBNOTES service program in order to function correctly in a multiversioned environment.

► Enable for teraspace

When 64-bit support for Domino becomes available, Domino for i5/OS will also change to use the i5/OS 64-bit pointer and teraspace support. To ensure proper operation, applications using the Domino C or C++ API must be enabled for teraspace. This can be accomplished by recompiling the application with the teraspace compiler options specified. No source changes are required. This is expected to provide significant improvement in Domino i5/OS performance when 64-bit support is introduced.

Use the *INHERIT storage model

For service programs that implement extensions to Domino, use the *INHERIT storage model. Although teraspace enablement is a requirement, when teraspace storage is optional, the result is much better performance. Be aware that this might not be compatible with older versions of Domino.

#### Determining if recompilation is required

Use the following procedures to determine if your C and C++ application programs and service programs are bound to QNOTES/LIBNOTES or enabled for teraspace usage.

For any service programs used by the application, issue the Display Service Program (DSPSRVPGM) CL command. The *BASIC detail must show the following settings.

- Teraspace storage enabled modules =*ALL
- Storage model = *INHERIT
- The *SRVPGM detail must show the LIBNOTES program from library QNOTES. Use of a QDOMINOxxx library is not correct.

If any of these settings are not as described in this list, recompile using the techniques explained here.

For any programs used by the application, issue the Display Program (DSPPGM) CL command. The *BASIC detail must show the following settings:

- Teraspace storage enabled PEP = *YES
- Teraspace storage enabled modules =*ALL
- Storage model = *TERASPACE
- The *SRVPGM detail should show the LIBNOTES program from library QNOTES. Use of a QDOMINOxxx library is not correct.

If any of these settings are not as described in the list, recompile using the techniques explained here.

#### **Recompilation examples**

As an example, assume that you have a C application that uses the Domino C API and it consists of a program, MYPGM, which uses one module, MYMOD. Recreate the module making sure that you specify the TERASPACE and STGMDL parameters as follows (along with any other parameters that are important for the creation of your module):

CRTCMOD MODULE(MYMODLIB/MYMOD) SRCFILE(MYSRCLIB/QCSRC) TERASPACE(*YES *TSIFC) STGMDL(*TERASPACE)

If your application program consists of more than one module, make sure that you recreate each module using these parameters.

Then, recreate the program making sure that you specify the BNDSRVPGM and STGMDL parameters as follows (along with any other parameters that are important for the creation of your program):

CRTPGM PGM(MYPGMLIB/MYPGM) MODULE(MYMODLIB/MYMOD) BNDSRVPGM(QNOTES/LIBNOTES) STGMDL(*TERASPACE)

If your application consists of more than one program, make sure that you recreate each one using these parameters.

In another example, if your C application consists of a service program, MYSRVPGM, which uses one module, MYMOD, specify the same teraspace parameters for the module creation as shown in the CRTCMOD example described earlier. Then, recreate the service program, making sure that you specify the BNDSRVPGM, STGMDL, and ACTGRP parameters as follows (along with any other parameters that are important for the creation of your service program):

CRTSRVPGM SRVPGM(MYSRVLIB/MYSRVPGM) MODULE(MYMODLIB/MYMOD) BNDSRVPGM(QNOTES/LIBNOTES) STGMDL(*INHERIT) ACTGRP(*CALLER)

If your application consists of more than one service program, make sure that you recreate each one using these parameters.

If your application happens to be C++ and uses the Domino C++ API, use the CRTCPPMOD command and specify the same teraspace parameters as shown in the CRTCMOD example described earlier.

For more details, refer to the following documents:

Considerations when developing Domino C and C++ API applications for i5/OS

http://www.ibm.com/support/docview.wss?rs=203&uid=swg21238494

 Domino 7 for i5/OS Application Development Guide (Chapter 2, Application Development Considerations)

http://www-12.lotus.com/ldd/doc/uafiles.nsf/docs/i5osdom7/\$File/apdev400.pdf

Support for IBM Lotus Domino on 64-bit Operating Systems

http://www.ibm.com/support/docview.wss?rs=463&context=SSKTMJ&dc=DB520&uid=swg21
233872&loc=en US&cs=UTF-8&lang=en&rss=ct463lotus

#### Large mail file best practices

Refer to the following Web site for Best practices for large Lotus Notes mail files:

http://www-128.ibm.com/developerworks/lotus/library/notes-mail-files/

### Preventing agents from creating temporary full text indexes

On the Domino server console, you might, at times, see the following message reported to log for various Domino databases:

"Warning: Agent is performing full text operations on database 'mail/dominoapp.nsf' which is not full text indexed. This is extremely inefficient."

This occurs because an agent has been coded to perform a full text search for information within a Domino database, but no full text index exists for the database in question. Unless actions are taken by an administrator to prevent agents from conducting these searches, temporary full text indexes are built on the Domino server to allow the agents to perform their searches. This building of temporary full text indexes can significantly impact performance on your Domino server.

To prevent the building of temporary indexes, include the following line within the NOTES.INI files of your Domino 7 servers:

FT_FLY_INDEX_OFF=1

If you have databases that require that agents perform full text indexes successfully on your servers, the best way to prevent a performance impact is to create the full text indexes manually on the server. By creating a full text index manually (and thus permanently, until it is manually deleted), you eliminate the requirement for an agent to have to create temporary indexes for the same database to perform the necessary searches associated with the agent's processing.

#### Loopback and Domino clustering

i5/OS can also be optimized to take advantage of Domino assets such as database clustering. Using the loopback option to cluster Domino databases on a single i5/OS partition provides an example of efficiency and high availability that is unmatched on other platforms.

# 6.6 Domino 7 performance bottlenecking on the i5/OS

Following are a few questions to get you started on the road to determining the root causes of Domino 7 performance issues on the i5/OS:

- What appears to be the problem?
- Which users are affected by the problem?
- Which sites are affected by the problem?
- Which servers are affected by the problem?
- How does the problem seem to be manifesting itself?
- ► How is the problem causing the system to deviate from your expected performance standard? (Analysis of collected historical performance data is required to answer this question. See 6.5.1, "Collecting Domino 7 performance data on the i5/OS" on page 223 for guidance on collecting performance data.)
- What noticeable changes are there within the environment?

If you find yourself unable to answer these questions immediately, use the techniques listed in this chapter to help bring you closer to the answers and the determination of any necessary resolution.

# 6.6.1 Analyzing the system for performance bottlenecks

When working on Domino 7 issues on i5/OS, you must begin by knowing where to look to identify the types of bottlenecks that your environment might be experiencing. Performance problems for Domino 7 on the i5/OS can be related to CPU, memory, disk, or network. Use the information in this section to collect the necessary data required to provide you with a quality assessment of possible performance bottlenecks on your system.

Perform the following steps to perform a bottleneck analysis:

- 1. From an i5/OS command line, issue the command dspsysval qmodel and press Enter.
- 2. In the Display System Value display (Figure 6-27), verify the model number of the System i machine being analyzed.

	Display System Value
System value : Description :	QMODEL System model number
Model number :	520
Press Enter to continue.	
F3=Exit F12=Cancel	

Figure 6-27 Verifying the System i machine model number

3. From an i5/OS command line, issue the command dspsysval qprcfeat and press Enter to verify the processor feature for the System i machine. See Figure 6-28.

**Note:** The QPRCFEAT system value specifies the processor feature code level for your System i machine. The number identifies the processor being used to operate on data. Regardless of the number of partitions on your system, the processor feature system value will be the same for every partition. Record this value as additional information to provide for support in case you choose to engage them.

	Display System Value
System value : Description :	QPRCFEAT Processor feature
Processor feature :	7456
Press Enter to continue.	
F3=Exit F12=Cancel	

Figure 6-28 Verifying the System i machine processor feature

 From an i5/OS command line, issue the command dspsysval qprcmlttsk and press Enter to verify the Processor multitasking configuration that is in use on your System i machine. See Figure 6-29.

Note: The QPRCMLTTSK (Processor multitasking) system value allows your System i machine to have two sets of task data ready to run for each physical processor. When one task has a cache miss, the processor can switch to the second task when the cache miss for the first task is serviced. It is recommended to always set QPRCMLTTSK to 1 for POWER5[™] models running Domino to improve CPU utilization.

Di	isplay System Value
System value : QPRC Description : Proc	CMLTTSK cessor multi tasking
Processor multi tasking . :	2 0=Off 1=On 2=System-controlled
Press Enter to continue.	
F3=Exit F12=Cancel	

Figure 6-29 Verifying the System i processor multitasking feature

5. With the information collected in the earlier steps, check the performance capabilities for the release of Domino 7 that you are running. Ensure that your total number of mail users has not exceeded the maximum recommendation by referencing the Performance Capabilities Reference associated with the release of the i5/OS that you are running. You can find the latest performance management data for your System i machine in the i5/OS version-correspondent document in the Performance Management for IBM System i Resource Library:

#### http://www.ibm.com/servers/eserver/iseries/perfmgmt/resource.html

To expedite the identification of the processor Commercial Processing Workload (CPW) and the Mail and Calendar User (MCU) numbers associated with your platform, in the reference document associated with your level of i5/OS, search the document by the processor feature value obtained in step 2. This should assist in pointing you to the values that you should be concerned with when dealing with performance on your i5/OS machine. Table 6-5 shows the information for this example.

	Table 6-5	Performance cap	babilities l	reference	data
--	-----------	-----------------	--------------	-----------	------

Model	Processor CPW	MCU
520-0905 (7456)	6000	13300

 From an i5/OS command line, issue the command dspsysval qpfradj and press Enter to verify the configuration on the Performance Adjuster. The recommended setting is to have QPFRADJ assigned a value of 2. See Figure 6-30.

```
Display System Value

System value . . . . : QPFRADJ

Description . . . . : Performance adjustment

Performance adjustment . . . : 2 0=No adjustment

1=Adjustment at IPL

2=Adjustment at IPL and automatic

adjustment

3=Automatic adjustment

F3=Exit F12=Cancel
```

Figure 6-30 Verifying the performance adjuster setting

- From an i5/OS command line, issue the Work with System Status (WRKSYSSTS) CL command. In intervals of approximately 30 seconds, press the F5 key to refresh the values shown. See Figure 6-31. Try to identify the noticeable changes associated with the following values:
  - % CPU Used
  - Non-DB (Page) Faults in system pools 1 (*Machine) and 2 (*Base)
  - Any Wait->Inel values (viewable by pressing the F11 key)
  - Any Act->Inel values (viewable by pressing the F11 key)
  - % system ASP used in excess of 90%
  - Any Pool 1 (*Machine) faults in excess of 5.0 (5 faults per second)

		h	lork witl	h Syste	m Statu	S			RCHAS10
							08/	/07/06	13:22:38
% CPU u	sed	:	66	5.1 A	Auxiliar	ry stora	ge:		
% DB ca	pability	:		.0	System	ı ASP .		:	632.9 G
Elapsed	time	:	00:15:	39	% syst	em ASP	used .	:	10.9919
Jobs in	system .	:	42	38	Total			:	632.9 G
% perm	addresses	:	.0	07	Currer	nt unpro	tect us	sed :	5983 M
% temp	addresses	:	.0	16	Maximu	um unpro	tect .	:	10458 M
Type ch	anges (if	allowed),	press En	iter.					
System	Poo1	Reserved	Max	[	)B	Non	-DB		
Poo1	Size (M)	Size (M)	Active	Fault	Pages	Fault	Pages		
1	865.21	474.45	+++++	.0	.0	.0	.0		
2	17565.03	3.42	6585	.0	.0	.0	.0		
3	5000.00	.05	67	.0	.0	.0	.0		
4	.25	.00	5	.0	.0	.0	.0		
									Bottom
Command									
===>									
F3=Exit F4=Prompt F5=Refresh F9=Retrieve F10=Restart F12=Cancel									
F19=Ext	ended syst	em status		F24=Mor	re keys				

Figure 6-31 Work with System Status display

- 8. From an i5/OS command line, issue the command dspsysval qmaxactlvl. This command shows you the number of threads allowed to simultaneously compete for memory and processor resources. The suggested setting for this system value is No Maximum (*NOMAX). If you notice that this value has been assigned a set number and some of the fields on the WRKSYSSTS screen referenced in step 6 seem to return values that might be of concern to you, discuss the possibility of raising this value with your i5/OS administrator.
- 9. From an i5/OS command line, issue the command WRKDSKSTS to Work with Disk Status. See Figure 6-32. In intervals of approximately 60 seconds, press the F5 key to refresh the values shown. Ensure that the % busy for each value shown remains less than 30%. If you notice values in excess of 30%, you will want to analyze your i5/OS environment to identify and eliminate disk imbalances (See 6.6.3, "Bottleneck analysis for Disk I/O" on page 255 for details).

				Work w	vith Disk St	tatus			R	CHAS10
Flans	ad time.	00.0	8.58					08/0	7/06 1	4:04:22
Liups	cu crinc.	00.0	0.30							
		Size	%	I/0	Request	Read	Write	Read	Write	%
Unit	Туре	(M)	Used	Rqs	Size (K)	Rqs	Rqs	(K)	(K)	Busy
1	4326	30769	10.2	.0	4.0	.0	.0	.0	4.0	0
2	4326	30769	10.2	.0	.0	.0	.0	.0	.0	0
3	4326	30769	10.2	.0	4.0	.0	.0	4.0	.0	0
4	4326	30769	10.2	.0	4.0	.0	.0	4.0	4.0	0
5	4326	30769	10.2	.0	4.6	.0	.0	5.0	4.0	0
6	4326	30769	10.2	.0	4.0	.0	.0	4.0	4.0	0
7	4326	30769	10.2	.0	4.6	.0	.0	5.3	4.0	0
8	4326	30769	10.2	.0	4.0	.0	.0	4.0	4.0	0
9	4326	30769	10.2	.0	4.0	.0	.0	4.0	4.0	0
10	4326	30769	10.2	.0	4.0	.0	.0	4.0	4.0	0
11	4326	35165	10.2	.0	4.0	.0	.0	4.0	4.0	0
12	4326	30769	10.2	.0	6.4	.0	.0	5.3	8.0	0
13	4326	35165	10.2	.0	4.0	.0	.0	4.0	4.0	0
									More	
Comma	nd									
===>										
F3=Exit F5=Refresh F12=Cancel F24=More keys										

Figure 6-32 Work with Disk Status (WRKDSKSTS)

- 10. From an i5/OS command line, issue the command **WRKACTJOB** to Work with Active Jobs. Verify the following details associated with each of your Domino servers:
  - In which pool is each Domino server running? (Viewable by pressing F11.)
  - How many threads are running per Domino server? (Viewable by pressing F11 twice.)
  - How many threads are associated with HTTP jobs?
  - Which jobs are using the highest amount of CPU?
  - Is there a job other than SERVER or HTTP using a high amount of CPU?

**Attention:** If you notice a job related to a Domino server task that is using a high amount of CPU, do not attempt to end the job from WRKACTJOB, as this could cause your entire Domino server to crash. However, shutting down that task from the Domino server console might assist with the recovery of CPU utilization in an emergency situation. Before stopping any task, ensure that the shutdown of that task does not cause your environment any critical loss of functionality when the task is shut down. Monitor how CPU use changes both after that task has been stopped from the Domino server console and after the task is reloaded again in the Domino server console.

- 11. From an i5/OS command line, issue the command WRKDOMSVR to Work with Domino Servers. A list of Domino servers will appear. On the line corresponding to the Domino server being analyzed, type option 8 (Work console) to work with the Domino server console and press Enter.
- 12. The command line that appears at the bottom of the Work with Domino Console screen is not the standard i5/OS command line. This command line is used to issue Domino server commands to the respective Domino server. Table 6-6 lists some of the Domino server commands that you can issue on this display and the caveats to watch for when the Domino server reports the requested data to the console. Type the command on to the console command line, press Enter, and then press the F5 key over approximately five second intervals to view the data returned within the Domino server console.

Domino server console command	Key data provided		
show server	<ul> <li>Compare peak users to MCU rating from step 5 on page 242</li> <li>For mail servers, verify that more than one mail.box is being used by the Domino server</li> </ul>		
show stat database	<ul> <li>Total size of all buffer_pools</li> <li>Database.Database.BufferPool.Maximum.Megabytes</li> <li>Database.Database.BufferPool.Peak.Megabytes</li> <li>Database.Database.BufferPool.PerCentReadsInBuffer should be less than 95%</li> </ul>		
show stat domino (only if HTTP task is running)	Domino.Config.ActiveThreads.Max should be greater than DominoThreads.Active.Peak by a small amount		
sh stat sem	<ul> <li>"SEM not found in server statistics table" in best case</li> <li>If an alphanumeric semaphore code is returned, report the code to your Lotus Support person for additional guidance or analysis</li> </ul>		
<pre>show config NSF_buffer_pool_size_MB</pre>	NSF Buffer Pool size limit in Domino 7. Unless otherwise advised by Lotus, this variable should be assigned a value of 300.		
show config Server_Pool_Tasks	Controls the number of physical threads in the IOCP thread pool, per port, running on the Domino server.		
show config Server_Max_Concurrent_trans	Controls the number of physical threads that are allowed to concurrently execute transactions.		
show config NSF_DBcache_maxentries	Sets the number of databases that a Domino server can hold in its database cache at one time.		
show config NSF_DBUCache_Max_Entries	Allows the Domino server to cache a specified number of database users.		
show config server_show_performance	Will echo back if NOTES.INI parameter is enabled and will report command is not recognized if parameter is not enabled.		

 Table 6-6
 Domino server commands to assist with performance standards

Domino server console command	Key data provided
show config platform_statistics_enabled	Will echo back if NOTES.INI parameter is enabled and will report command is not recognized if parameter is not enabled.

- 13. From the Work with Domino Servers (WRKDOMSVR) display, for a given Domino server, type option 12 (Work object links) and press Enter. This displays a listing of all the files and directories located in the data directory of the Domino server.
- 14. Use the PgUp and PgDn keys to look through the listing of files in the Domino server data directory. Search for files that have an extension of .tmp or .TMP. If you find files of either of these types within your data directory, contact the Lotus Support Center to confirm whether or not these files can be removed.
- 15. For any given database in the Domino server data directory or in a lower directory (type option 5 (Display) and press Enter to display lower directory content), select a random Domino database in the listing and type option 8 (Display attributes) to view the file attributes. In the Display Attributes display (Figure 6-33), verify the File format shown on the second page of the display lists the Domino database as being *TYPE2.

If the file format displays as *TYPE1, consider converting your directories to TYPE2. For more information on the performance and DASD reclamation benefits of the TYPE2 format for your i5/OS model, search for '*TYPE2 Directories" on the i5 Information Center:

http://publib.boulder.ibm.com/iseries/

For additional understanding regarding leveraging TYPE2 in an environment currently using TYPE1 format and running V5R3 or earlier, read Section 4.1.7 of the IBM Redbook *Domino 6 for iSeries Best Practices Guide*, SG24-6937.

Display Attributes /Domino/DOM7SVR1/Data/mail/admin.nsf Object . . . . . : 07/21/06 20:38:33 08/07/06 05:01:00 08/07/06 05:01:00 Attribute change date/time . . . . . . . 08/07/06 05:01:00 Size of object data in bytes . . . . : 17563648 Allocated size of object . . . . . . . 17825792 ***TYPE2** Size of extended attributes . . . . : 0 No *NORMAL Main storage option . . . . . . . . . . . . *NORMAL *NONE More... Press Enter to continue. F3=Exit F12=Cancel F22=Display entire field

Figure 6-33 Verifying the file format of *TYPE2

16. From an i5/OS command line, issue the command NETSTAT *CNN to Work with the TCP/IP Connection Status. See Figure 6-34. In the Local Port column, use the PgDn key to find port 1352 (Notes Port) and ensure that all the references to 1352 have *Listen* indicated in the corresponding State column.

Work with TCP/IP Connection Status						
System: RCHAS10 Type options, press Enter. 3=Enable debug 4=End 5=Display details 6=Disable debug 8=Display jobs						
0pt	Remote Address * *	Remote Port * *	Local Port 2050 smtp 1352	Idle Time 081:49:13 081:48:17 009:49:47	State Listen Listen Listen	
More F3=Exit F5=Refresh F9=Command line F11=Display byte counts F12=Cancel F20=Work with IPv6 connections F22=Display entire field F24=More keys						

Figure 6-34 Verifying port 1352 (Notes Port) in Listen state

- 17. From an i5/OS command line, issue the command CHGTCPA to display the Change TCP/IP Attributes screen. From this display, take note of the following values that are currently set on your system:
  - TCP keep alive
  - TCP receive buffer size
  - TCP send buffer size
  - UDP checksum
  - IP reassembly timeout

These procedures should help you isolate the category or categories of performance bottlenecks being experienced on your system. If you follow this process and do not identify any circumstances that appear to be out of the ordinary, record the data that you have collected and keep it available to provide to the Lotus or System i Support Centers if either of them are engaged.

## 6.6.2 Bottleneck analysis for memory resources

This section provides a procedure for you to follow in analyzing your system for potential performance bottlenecks with memory resources by identifying jobs causing excessive page faults.

Using the Work with System Status (WRKSYSSTS) CL command, an administrator can see if paging/faulting is high on the system. If Performance Tools (5722PT1) and Query Tools (5722QU1) are installed, data from the Collection Services can be used to identify the jobs causing the high paging/faulting.

**Note:** This procedure requires that Performance Tools for the i5/OS (product 5722PT1) be installed on your system (see 6.3.3, "Installing Performance Tools for the i5/OS" on page 211), and that Collection Services is already gathering data (see 6.5.1, "Collecting Domino 7 performance data on the i5/OS" on page 223).

Perform the following steps:

- 1. From the i5/OS command line, issue GO PERFORM and press Enter.
- 2. In the IBM Performance Tools for iSeries screen, type option 2 (Collect Performance Data) and press Enter.
- 3. In the Collect Performance Data screen, make sure the Collection Services status shows Started, as shown in Figure 6-35. Also, record the name of the Collection object library. In this example, this is QMPGDATA.

Collect Performance Data		RCHAS10
Collection Services status: Status	08/03/06	16:40:00
Select one of the following:		
<ol> <li>Start Performance Collection</li> <li>Configure Performance Collection</li> <li>End Performance Collection</li> </ol>		
Selection or command ===>		
F3=Exit F4=Prompt F5=Refresh F9=Retrieve F12=Cance	1	

Figure 6-35 Collect Performance Data display

4. Type the Work with Queries (WRKQRY) command in the i5/OS command line and press Enter to access the i5/OS query tools. Create a new query by typing option 1 (Create) and name the query being created. See Figure 6-36.

Work with Queries						
Type choices, pr	ress Enter.					
Option	1	1=Create, 2=Change, 3=Copy, 4=Delete 5=Display, 6=Print definition 8=Run in batch, 9=Run				
Query Library	MYKWERY QMPGDATA	Name, F4 for list Name, *LIBL, F4 for list				
F3=Exit F4	4=Prompt F5=Refre	sh F12=Cancel				

Figure 6-36 Work with Queries display, creating a new query

5. Specify the file that you want to query by typing option 1 (Select) in front of the Specify File selections option and pressing Enter. See Figure 6-37.

	Define	the Query		
Query : Library :	MYKWERY QMPGDATA	Option . CCSID	:	CREATE 65535
Type options, press 1=Select	Enter. Press F21	to select a	all.	
Opt Query Definition 1 Specify file Define result Select and set Select record Select sort Select collat Specify report Select report Define report Select output Specify proce	tion Option selections t fields equence fields ds fields ting sequence rt column formattin t summary functions t breaks t type and output essing options	ng s form		
F3=Exit F13=Layout	F5=Report F18=Files	F12=Cancel F21=Select	all	

Figure 6-37 Define the Query screen

6. In the Specify File Selections screen (Figure 6-38), query the file QAPMJOBL by specifying the file and referencing the library name recorded in step 3 on page 248.

	Specify File	Selections	
	Specify file	36160110113	
Type choices, press file selection.	Enter. Press F9 to s	specify an additional	
File	QAPMJOBL QMPGDATA *FIRST *FIRST	Name, F4 for list Name, *LIBL, F4 for list Name, *FIRST, F4 for list Name, *FIRST, F4 for list	
F3=Exit F4 F12=Cancel F1	1=Prompt F5=F 13=Layout F24=	Report F9=Add file =More keys	

Figure 6-38 Specify File Selections display

7. In the same Specify File Selections screen, place the cursor in the Member field and press F4.

8. In the Select Member display (Figure 6-39), select the member to query by typing option1 (Select) next to the member of your choice.

Note: The naming convention for members is Qjjjhhmmss. In this:

- ► *jjj* is the Julian date
- ► *hh* is the hour the data started to be gathered
- *mm* is the minute the data started to be gathered
- ► ss is the second where data started to be gathered

Therefore, Q212194713 means the data started to be gathered on the 212th day (which, in 2006 was July 31) at 19 hours 47 minutes and 13 seconds after midnight.

Select Member	
File ID : TO1 File : QAPMJOBL Library : QMPGDATA	
Type option (and Member), press Enter. 1=Select	
Opt         Member         Text          Q088111319        Q08900002          Q212134752        Q212194713	
F11=Display names only F12=Cancel	Bottom



- 9. In the Select Member display, after the member is selected, press Enter three times to return to the Define the Query display.
- 10. In the Define the Query display, type option 1 (Select) in front of Select and sequence fields and press Enter. See Figure 6-40.

Define the Query	
Query:MYKWERYOption:CREATLibrary:QMPGDATACCSID65535	Ξ
Type options, press Enter. Press F21 to select all. 1=Select	
<pre>Opt Query Definition Option    &gt; Specify file selections    Define result fields 1 Select and sequence fields    Select records    Select sort fields    Select collating sequence    Specify report column formatting    Select report summary functions    Define report breaks    Select output type and output form    Specify processing options</pre>	
F3=ExitF5=ReportF13=LayoutF18=FilesF21=Select allSelect options, or pressF3 to save or run the query.	

Figure 6-40 Define the Query display

11. In the Select and Sequence Fields display (Table 6-41), assign each the values noted in Table 6-7 to the respective fields specified. Use the Page Up and Page Down keys to scroll

through the list of field values on the display. Once the fields have been completed, press Enter twice.

Assign value of	to Field	Field description
10	INTNUM	Interval Number
20	DTETIM	Interval Date and Time
30	JBNAME	Job Name
40	JBTFLT	Total Page Faults
50	JBXRFR	Stream File Reads
60	JBXRFW	Stream File writes

Table 6-7 Select and Sequence Field display values

		Select	and Sequence Fields			
Type	sequence n	umber (0-9999) for	the names of up to 500 f	ields to		
αþ		report, press Lift	ei.			
Seq	Field	Text		Len	Dec	
10	INTNUM	Interval	number	5	0	
20	DTETIM	Interval	date and time	12		
	INTSEC	Elapsed i	nterval seconds	7	0	
	JBSSYS	Subsystem	name	10		
	JBSLIB	Subsystem	library name	10		
30	JBNAME	Job nam	e	16		
	JBUSER	Job user		10		
	JBNBR	Job numbe	Job number			
	JBACCO	Job accou	nting code	15		
	JBTYPE	Job type		1		
	JBSTYP	Job subty	pe	1		
	JBTTYP	Task type	Task type			
				More.	••	
F3=Ex	xit	F5=Report	F11=Display names only F12=Cancel			
F13=	Layout	F20=Renumber	F21=Select all	F24=More keys		

Figure 6-41 Select and Sequence Fields display

12.Back in the Define the Query display (Figure 6-42), type option 1 (Select) next to Select sort fields and press Enter.

Define the Query
Query:MYKWERYOption:CREATELibrary:QMPGDATACCSID:65535
Type options, press Enter. Press F21 to select all. 1=Select
<pre>Opt Query Definition Option &gt; Specify file selections Define result fields &gt; Select and sequence fields Select records 1 Select sort fields Select collating sequence Specify report column formatting Select report summary functions Define report breaks Select output type and output form Specify processing options</pre>
F3=ExitF5=ReportF13=LayoutF18=FilesF21=Select allSelect options, or pressF3 to save or run the query.

Figure 6-42 Define the Query display

13. In the Select Sort Fields display (Table 6-43), find the field JBTFLT, and type a sort priority of 10 in the Sort Prty column and a D in the A/D column for the field. Press Enter twice to confirm.

		Sel	ect Sort Fields		
Type sort the nam	priority les of up	(0-999) and A to 32 fields, p	(Ascending) or D (Descen ress Enter.	ding) for	
Sort					
Prty A/D	Field	Text		Len	Dec
	INTNUM	Interva	l number	5	0
	DTETIM	Interva	l date and time	12	
	JBNAME	Job n	ame	16	
10 D	JBTFLT	Total p	age faults	11	0
	JBXRFR	Stream	file reads	11	0
	JBXRFW	Stream	file writes	11	0
				Bot	tom
F3=Exit		F5=Report	F11=Display names only	F12=Cancel	
F13=Layou	it	F18=Files	F20=Renumber	F24=More keys	

Figure 6-43 Select Sort Fields display

			Diamla	v. Donout			
			DISPIA	y Report	1		01
				Report Widt	:n	. :	91
Positi	on to line	• • • • •		Shift to column	1	••	
Line							
••••	1+	2+3.	•••+••••	4+5+.	•••6••••+	7	
		Interval			Total	Strea	
	Interval	date	Job		page	file	
	number	time	name		faults	reads	
000001	6	060731211500	SERVER		211	4	
000002	2	060731201500	SERVER		210	4	
000003	2	060731201500	SERVER		210	3	
000004	3	060731203000	SERVER		210	4	
000005	4	060731204500	SERVER		210	4	
000006	4	060731204500	SERVER		210	4	
000007	5	060731210000	SERVER		210	4	
000008	5	060731210000	SERVER		210	4	
000009	6	060731211500	SERVER		210	4	
000010	7	060731213000	SERVER		210	4	
000011	7	060731213000	SERVER		210	4	
000012	8	060731214500	SERVER		210	4	
000013	8	060731214500	SERVER		210	4	
000014	9	060731220000	SERVER		210	4	
	-					More	
F3=Exi	t F12	=Cancel F	19=Left	F20=Right	F21=Spl	it	

14.Back in the Define the Query display, press F5 to run the query report. An example of query output generated using this process is shown in Table 6-44.

Figure 6-44 Example of query output

Using the INTNUM field, the data can be further queried so that only the data during the business day is viewed, or only data during a certain timeframe is viewed. Notice the Interval date time column. The normal format for that column is yymmddhhnnss, where yy is the year, mm is the month, dd is the day, hh is the hour, nn is the minute, and ss is the second for that interval. Therefore, if the high page faulting started at 8:00 a.m., the query can be refined to only show data from 8:00 a.m. onwards. Find the Interval date time that identifies 8:00 a.m. and make note of the Interval Number. Press F12 to exit the report.

15. Back in the Define the Query display, use the Select records option to refine the query:

- The FIELD will be INTNUM.
- The TEST will be GE (for greater than or equal to).
- The VALUE will be the Interval Number found in the report.

## 6.6.3 Bottleneck analysis for Disk I/O

As stated earlier, there is a finite number of resources on any system. This limit changes from system to system, but it is finite. There is a limited amount of disk space (DASD) on the system, and if you hit the limit, the System i machine will IPL itself. This is not good because you do not want an unplanned IPL. Therefore, you must keep an eye on the DASD. If you are getting close to the limit (100% used), remove some of the objects that are taking up the disk space. The Work with System Status (WRKSYSSTS) CL command allows you to monitor the amount of DASD used on your system. The fields on the upper right-hand side of the display provide information about DASD.

The System ASP field shows the amount of DASD configured in the system auxiliary storage pool (ASP). The % system ASP used field shows how much of the DASD in the system ASP has been used up to this point. Thus, if the system ASP has 87 GB and 51% has been used, that means there is about 42.6 GB of DASD left to be used in the system ASP before it is full. The Total field shows how much DASD is available to the entire system. This includes the system ASP, any configured user ASPs, and any configured independent ASPs. If the Total field and the System ASP field are the same, there are no user or independent ASPs configured on this system.

The Current unprotect used field shows how much temporary storage is currently in use on the system. Temporary storage is included in the % system ASP used field. Temporary storage is released when the job using that storage ends. The Maximum unprotect field shows the maximum amount of temporary storage in use on the system at one point in time. The Maximum unprotect field is the maximum since the last IPL. If the storage on your system is quickly approaching 100%, you have to figure out where that storage is being used.

The first thing you must decide is if the storage being used is temporary storage. Is the Current unprotect used field increasing rapidly? Or is the storage that is being used permanent storage. Is Current unprotect used field not increasing as fast as the % system ASP used field? Permanent storage is not released when the job that used it ends.

If most of the storage driving the system to 100% DASD utilization is temporary storage, figure out which job is using the temporary storage and why. If most of the storage driving the system to 100% DASD utilization is permanent storage, figure out which new objects are taking up the space on your system.

#### Finding the root cause behind rapidly increasing temporary storage

The first step to finding the root cause behind the rapidly increasing temporary storage is to identify the job using all the temporary storage. There are two parts to this process. The first part is to identify a list of likely jobs. To generate that list, use the TASKINFO advanced analysis macro in the System Service Tools.

**Important:** Be careful when you access the System Service Tools. The tools that are pointed to in this section are not dangerous and will not break anything on your system as long as you follow the instructions carefully. However, there are other tools in the System Service Tools that can alter or damage your operating system if you do not use them correctly.

Perform the following steps:

- 1. Start the System Service Tools using the command STRSST.
- 2. Enter your SST user ID and password.
- 3. Type option 1 to Start a service tool.
- 4. Type option 4 for Display/Alter/Dump.
- 5. Type option 1 for Display/Alter storage.
- 6. Type option 2 for Licensed Internal Code (LIC) data.
- 7. Type option 14 for Advanced analysis.
- 8. PgDn to the TASKINFO macro and type option 1(Select) in front of it. Press Enter.
- Enter the following string of characters in the Options field and press the Enter key: -ALL -F 5 -TF 2 -SORT 7

Here:

- -ALL means output all the active jobs and tasks on the system
- -F 5 means output the first five frames of the call stack for each job or task

- TF 2 means timestamps will be output in a date/time format rather than an 8-byte timestamp
- SORT 7 means that all the jobs or tasks will be sorted in descending order by the delta temporary auxiliary storage used. (This is the total temporary storage allocated minus the temporary storage deallocated.)

To get the correct output, it is important to get the spaces in this string in the correct places. The Options string is:

-ALL <space> -F <space> 5 <space> -TF <space> 2 <space> -SORT <space> 7

**Tip:** If you need help on this macro or if you want to see other options, place -H in the Options field and press Enter.

Make sure you have the latest i5/OS PTFs related to temporary storage applied to your system. To find the list of i5/OS PTFs relating to temporary storage, go to the Software Knowledge Base Web site and search for a document called Temporary Storage PTFs:

http://www-912.ibm.com/s_dir/slkbase.nsf/slkbase

## 6.6.4 Bottleneck analysis for network resources

There are several aspects relating to TCP/IP and network configuration that can affect Domino performance on an i5/OS machine. This section discusses the most common issues.

#### Work with TCP/IP Connection Status (NETSTAT *CNN)

The Work with TCP/IP Connection Status (NETSTAT *CNN) screen displays a lot of information about connections to the system. There are several things to look at, but only two items are mentioned here because they relate directly to Domino and performance:

- Ports in a LISTEN state
- Retransmissions

#### Ports in a LISTEN state

A port is a 16-bit number used to communicate between the TCP or higher-level protocol and an application process. A TCP port identifies the ultimate destination within a system. Each process that wants to communicate with another process identifies itself to the TCP/IP protocol by one or more ports.

Ports are analogous to network and system addresses. Just as an Internet address identifies a system on a network, a port identifies a destination on a system. An application (such as a Domino server) might wait for incoming service requests on a port. A client application (such as a Lotus Notes client) sends requests to a specific system and port. Ports numbered less than or equal to 1023 are generally reserved for use by standard TCP and User Datagram Protocol (UDP) application programs such as Simple Mail Transfer Protocol (SMTP) on port 25, TELNET on port 23, and Post Office Protocol (POP3) on port 110. Table 6-8 provides a listing of commonly used ports and their associated protocols.

Port number	Associated Protocol
23	Telnet communication
25	Simple Mail Transfer Protocol (SMTP) inbound transfer
80	Domino HTTP connectivity
110	Domino Post Office Protocol (POP3) connectivity

Table 6-8	TCP	ports	commonly	/ used	within	Domino	server	infrastructure	<i>s</i> :
-----------	-----	-------	----------	--------	--------	--------	--------	----------------	------------

Port number	Associated Protocol		
389	Lightweight Directory Access Protocol (LDAP)		
1352	Lotus Notes Client Connectivity		

For a Domino server to work properly, the correct ports must be in a LISTEN state on the System i machine. When a port is in LISTEN status, it is listening for new connection requests from a client. If a Lotus Notes client attempts to connect to a Domino server on port 1352 and there is no port 1352 in a LISTEN state, the Lotus Notes client gets an error that the server is not responding.

To check your ports, use the NETSTAT *CNN CL command. All the ports in LISTEN status are listed at the beginning. See Figure 6-34 on page 247 for an example of the NETSTAT *CNN command. Notice the local port 1352 in a LISTEN state. This is a Domino server listening for new connection requests.

#### Retransmissions

A *retransmission* occurs when a data packet (like a TCP packet) must be resent. A retransmission can occur if the local system does not receive an acknowledgement for a packet it sent. A retransmission can also occur if the data in the checksum does not equal the number of bits in the TCP packet. The most common cause is if the line speed and/or duplex of the System i machine's line description does not match the hardware it is cabled to. A good general rule of thumb is that if your System i machine is cabled to a switch that is set to auto negotiate, the line description's line speed and duplex should also be set to auto negotiate. If the switch is hard-coded to a speed such as 1GB and full duplex, the System i line description should match those settings.

Retransmissions are not supposed to be common. If you see a lot of retransmissions, it means you are having a problem and it can affect the performance. To identify whether Domino is having a problem with retransmissions, use the information on the NETSTAT *CNN screen by performing the following steps:

1. From the i5/OS command line type the following command and press Enter:

NETSTAT *CNN

- 2. Press the F15 key (Subset) to display a subset of the data on the Work with TCP/IP Connection Status screen.
- 3. On the Subset Connection List display, type 1352 on the Local port range: Lower value field, and press Enter twice.
- 4. Type option 5 (Display details) in front of a connection and press Enter. Pick any connection other than the ones in a LISTEN state.
- 5. PgDn and look for the retransmission information. Make note of how many retransmissions this conversation has had.
- 6. Press the F12 key to return to the Subset of TCP/IP Connections screen and display another connection.

If most of the connections have several retransmissions, it means that you are having a problem and you should check your network to resolve it.

#### **Communications trace and resets**

Sometimes you suspect a network problem, but you cannot find it. An i5/OS communications trace can help you identify problems within your network. There are many types of information that a communications trace can show you. We are only discussing one of them in this section.

For information about how to read an i5/OS communications trace:

- Search for the command STRCMNTRC in the IBM eServer iSeries Information Center at: http://publib.boulder.ibm.com/iseries/
- ► Refer to the IBM reference called, *iSeries TCP/IP Troubleshooting*, at:

http://publib.boulder.ibm.com/iseries/v5r2/ic2924/info/rzaku/rzakumst.pdf

This section discusses communication resets. There is a known problem that can affect Domino server performance that is identified by resets (RST) in a communications trace.

A reset can occur during a TCP/IP conversation due a variety of reasons. A reset is not welcome, and if you are seeing a lot of resets in an i5/OS communications trace, try to find the underlying problem causing them.

One of the possible underlying problems relates to a concept called a *linger value*. Linger refers to how long a socket/session waits to close. The Domino server has a linger value of 20. The i5/OS will reset (RST) any TCP conversation in a TIMEWAIT state that has not closed. The default close time for TCP on the i5/OS is 120 seconds. Due to this configuration, when the Domino linger pops after 20 seconds, a RST is sent because TCP has not closed the session. This results in a lot of resets and can affect performance.

To see whether you are experiencing this linger problem, perform the following steps:

- Identify the active lines on your system on which Domino might be using CFGTCP, option
   1.
- 2. Start a communications trace against one of the lines. You might have to trace all the lines:

STRCMNTRC CFGOBJ(ETHLINE) CFGTYPE(*LIN) MAXSTG(16M) USRDTA(*CALC)

The CFGOBJ parameter is the name of one of the active lines you found in step 1.

3. Let the trace run for a few minutes and then end it using the following command:

ENDCMNTRC CFGOBJ(ETHLINE) CFGTYPE(*LIN)

4. Print the communications trace with the PRTCMNTRC command:

PRTCMNTRC CFGOBJ(ETHLINE) CFGTYPE(*LIN) CODE(*ASCII) SLTCTLD(*ALL) FMTTCP(*YES)
FMTBCD(*YES)

This creates a spooled file called QPCSMPRT.

- Review the communications trace and search for RST. You can use the WRKJOB OPTION(*SPLF) command and option 5 to display the QPCSMPRT file that contains the trace data.
- Use the Find field and the F16 key to search the spooled file for RST. Count the number of times an RST occurs against a Domino conversation. A Domino conversation can be identified by its ports. A Domino conversation will occur on ports such as:
  - Port 1352 for Lotus Notes clients and the SERVER job
  - Port 80 if running the Domino HTTP job
  - Port 25 if running the Domino SMTP job

Use your own judgement to determine if you are seeing too many RST packets, for example, if you ran a 5-minute trace and count 10 RST packets, you should consider investigating your network configuration to fix this problem.

# 6.7 Improving Domino 7 performance expectations on i5/OS

Improving or tuning the performance on a system can really make a difference in situations where your company is unwilling or unable to upgrade or replace the existing hardware or application components. In other cases, where a performance has been assessed on a system as being less than expected or gradually worsening, the potentially corrective adjustment strategies are developed through analysis of the environment to stabilize or raise the standard of response normalcy and capacity on that system.

When you aim to improve performance within an environment, you always run the risk of discovering that the changes made to improve performance can make the situation worse if the root cause of the situation has been misdiagnosed. Because of this, it is critical to track the changes that are made on a system to ensure that you can back out a particular adjustment as required in an effort to restore a system to a higher performance standard.

# 6.7.1 CPU resource performance tuning: Choosing processor priority

The term *interactive* has a specific meaning in i5/OS. It refers to 5250 green screen-based processing with some strong performance implications. Each processor has an Interactive Commercial Processing Workload (Interactive CPW) rating that provides an indication of how much interactive work can be accommodated.

Although Domino users consider much of Domino's mail and applications to be "interactive", in i5/OS terms, the tasks that support this Domino work are actually implemented as batch immediate jobs.

When looking at changing or setting priorities, Domino has tasks with different behavior patterns. Some, such as the SERVER task, behave more like interactive jobs. They become active for a relatively short period of time, typically for some seconds or less, and then wait for the user's next request, usually longer than a minute.

The ADMINP, AMGR, and UPDATE tasks perform in a more batch-like manner, similar to traditional batch jobs, in that, they run constantly for a long time (minutes or even hours). They only pause when they have to wait for disk I/O or at time slice end if another job/thread with higher priority is ready to run. The number of jobs/threads with higher priority (and not in long wait) is higher than the activity level for the pool.

The run priority of jobs on i5/OS is normally set based on the type of work that is being performed:

- Interactive jobs started on a 5250 emulation session run at priority 20 by default
- Traditional batch jobs that are submitted to run in the background run at priority 50 by default

The higher priority of interactive jobs ensures that requests from a user are honored immediately by possibly interrupting a batch job running with lower priority (50). Because interactive usually spends only a short time actively processing, control is returned soon to the batch job or jobs.

All the Domino jobs on i5/OS run as batch immediate jobs and all have a run priority of 20, that is, even Domino tasks with a batch-like behavior compete directly with other tasks or interactive jobs that must respond quickly. In most cases, this does *not* pose any kind of problem.

However, there have been situations where a huge portion of the total CPU utilization is consumed by background tasks such as UPDATE or AMGR. The fact that overall CPU utilization rises high does not necessarily mean that it causes problems. However, when the majority of CPU resources are consumed by high-priority jobs, the response time might increase.

Therefore, if the response time for the Notes clients (and traditional interactive applications, if any) rises exceptionally high during the times when you observe high CPU utilization caused by jobs such as UPDATE or AMGR, it *might* help if you reduce the priority of those tasks.

## 6.7.2 Memory resource performance tuning: Choosing a memory pool to use

A memory pool is a logical division of main memory or storage that is reserved for processing a job or group of jobs. In i5/OS, all the main storage can be divided into logical allocations called *memory pools*. By default, the system manages memory pools. The system manages the transfer of data and programs into memory pools if necessary. You can control how much work can be done in a subsystem by controlling the number and size of the memory pools. The greater the size of the memory pools in a subsystem, the more work can be done in the subsystem.

By default, all the Domino servers run in the BASE memory pool. This is quite adequate in most scenarios. However, there are times when you might want to place a Domino server in its own storage pool to allow you to specify specific priorities, amounts of memory, and so on. The scenario where this becomes important is when Domino is running on the same system that is also hosting interactive, 5250-based applications written in RPG or other languages. Both the Domino tasks and the 5250 jobs run at run priority 20. They compete for the same CPU cycles. Because Domino tends to require much more processing power than traditional i5/OS applications, a heavy Domino application might severely impact the response times of other applications.

If Domino and traditional interactive applications were left to run at the same priority level and in the same memory pool, neither set of applications will run well. In this scenario, it is better to separate the memory pools for the Domino server and the interactive jobs. The reason for doing so, as described earlier, is that the interactive jobs typically stay active for a short time. If Domino tasks stay active for much longer time periods, the pages required by the interactive jobs will be moved out of memory over time. After the jobs become active again, those pages must be moved back into memory. This costs valuable time and increases the response times.

The purpose of separate memory pools is to guarantee a certain amount of memory to a group of jobs, which will not be paged out because other jobs (not part of the same group) require memory. Typically, this group of jobs belongs to the same application or runs in the same subsystem, but that is not necessarily so, for example, you might use the predefined shared pool *INTERACT for all your interactive 5250 applications.

The following list describes the different types of memory pools and how to assign one to Domino servers.

Machine pool (*MACHINE)

This is the pool in which highly shared i5/OS jobs and microcode tasks (License Internal Code) run. The machine pool provides storage for jobs the system must run and that do not require your attention. The size for this memory pool is specified in the system value QMCHPOOL. No user jobs run in this pool.

While iSeries Navigator refers to the pools by name, the machine pool appears as system pool identifier 1 on the Work with System Status (WRKSYSSTS) display. Normally, this pool should have the rate of non-DB faults less than one per second.

Base pool (*BASE)

This is the memory pool where all the Domino jobs run by default. It contains all the memory that is not allocated by other (private or shared) memory pools.

The base pool contains storage that can be shared by many subsystems. The system value QBASPOOL specifies the minimum size of the base pool. Its activity level is specified in the system value QBASACTLVL.

The base pool is used for batch work and miscellaneous system functions. While iSeries Navigator refers to the pools by name, the base pool appears as system pool identifier 2 on the Work with System Status (WRKSYSSTS) display. It is recommended that you keep all the Domino jobs in the *BASE pool, unless you decide to isolate the storage for one or more Domino servers in one of the shared pools (*SHRPOOL1 - *SHRPOOL60).

There can be up to 62 shared memory pools in i5/OS. As the name implies, they can be shared by two or more subsystems. However, to enable automatic performance adjustment for a pool used by a Domino server, it makes sense to assign one of the shared pools to a single Domino subsystem.

The size and activity level of a shared pool and the *expert cache* behavior (*paging option*), can be changed with the Change Shared Pool (CHGSHRPOOL) or Work with Shared Storage Pools (WRKSHRPOOL) CL commands.

After you define the size and activity level for one of the shared pools, use the Change Subsystem Description (CHGSBSD) command to assign the pool to the subsystem. For example, to assign *SHRPOOL3 to the subsystem DOMINO02, enter:

CHGSBSD SBSD(QUSRNOTES/DOMINO02) POOLS((1 *SHRPOOL3))

To assign the *BASE pool to the subsystem again, use the following command:

CHGSBSD SBSD(QUSRNOTES/DOMINOO2) POOLS((1 *BASE))

#### Tuning the NSF_Buffer_Pool_Size_MB parameter

There are four things to check when fine-tuning the NSF_Buffer_Pool_Size_MB parameter:

Monitor how much NSF buffer pool your Domino server uses by running the SHOW STAT DATABASE command on the Domino server console. If BufferPoolPeak is routinely more than 95% of the maximum, the NSF_Buffer_Pool_Size_MB might have to be increased. If you have sufficient main memory, some memory might be freed from some other over-allocated task or job. Otherwise, you might have to consider buying additional memory or upgrading the system.

Following are the statistics you will want to obtain:

- Buffer pool maximum (Database.BufferPool.Maximum)
- Buffer pool used (Database.BufferPool.Used)
- Buffer pool peak (Database.BufferPool.Peak)

- Monitor Database.BufferPool.PerCentReadsInBuffer. When tested under a heavy workload, BufferPoolPeak was seen at 100%, while PerCentReadsInBuffer was under 95%. Under a light load, BufferPoolPeak was under 10%, while PerCentReadsInBuffer was over 97%.
- Monitor nondatabase page faulting by using the WRKSYSSTS CL command or a performance monitor. High faulting rates indicate memory contention, and you might be able to actually improve performance by decreasing NSF_Buffer_Pool_Size_MB.
- Monitor the Domino server's mail router database cache size (which defaults to NSF_Buffer_Pool_Size_MB times a factor of 3). Monitor Mail.DBCacheEntries to see if your system is reaching the maximum available cache size. You can then compare Mail.DBCacheHits to Mail.DBCacheReads to see how effectively your cache is being used.

# 6.7.3 Disk I/O performance tuning

Typically, on the System i machine, all the disks (DASD) are shared by all the jobs, using (system ASP 0). It is possible to limit disk space by dividing out some of the main DASD storage at a physical disk level into 1 - 32 auxiliary storage pools (ASP), composed of one or more disks in each user ASP. In V5R1, the independent ASP (IASP) allows the definition of up to 67 IASPs. The IASP allows a set of disks to be moved to a different i5/OS system in case of a planned or unplanned outage of one system.

Using ASPs is less commonly done these days with the advent of RAID, mirrored disks, and storage area network (SAN) systems. But historically, separating out some ASPs for journal files was essential, so that both the journal and the data are not sharing the same physical unit for performance reasons and can be recovered in the event of a disk crash.

This technique of using ASPs is particularly important to separate the transaction logging files from the Domino data files and directories for performance reasons to minimize the movement of the disk access arm.

#### Creating and changing the size of auxiliary storage pools

After you install new disks, you can create a new ASP with the Dedicated System Tools (DST) menu or the iSeries Navigator. If you want to move an existing disk drive from one pool to another, use DST.

To change the size of an ASP, perform the following steps:

- 1. From the IPL or the Install the System display, select option **3** (Use Dedicated Service Tools). Sign in using the QSECOFR profile.
- 2. From the DST menu, select option 4 (Work with disk units).
- 3. Select option 1 (Work with disk configuration).
- 4. Select option **3** (Work with ASP configuration).
- 5. From the Work with ASP Configuration menu, select the option that matches your task and follow the screen prompts to complete.

# 6.7.4 Network resource performance tuning

There are a number of tools and parameters that can be leveraged to improve network performance on your system. How you configure TCP on your system can affect the performance of the Domino server. This section discusses two types of configuration settings that can greatly impact the performance of your Domino server:

- Interfaces and routes (found under menu options 1 and 2 in the Configure TCP/IP (CFGTCP) display)
- Host table and domain information (found under menu options 10 and 12 in the CFGTCP display).

#### Interfaces and routes

By default, the System i machine load balances network traffic across any configured network interface that shares a common route. As a result, if you have multiple adapters, a different adapter might be used to send data from the machine than the adapter that was used when data came into the machine. This is normal and can help performance.

Unfortunately, some network switches cannot handle this configuration. Some switches generate a route table that include the IP address of the host and the MAC address of the adapter that owns the IP address. When the adapter used for incoming traffic is different from the adapter used for outgoing traffic, this can confuse the switch and cause it to send out ARP broadcasts to build a new route table. If this happens often, you might experience performance problems related to this.

By looking at the CFGTCP menu option 1, you can identify whether your system has multiple adapters. Menu option 1 is the Work with TCP/IP Interfaces screen. Count the number of active line descriptions on that screen. To see if a line description/interface is active, press the F11 key to display the Interface status column. Do *not* count the *LOOPBACK line.

By looking at CFGTCP menu option 2, you can identify how many routes your system has defined and if they are bound to specific interfaces. If each route is bound to a specific interface, this problem cannot occur. If the routes are not bound, you might experience a performance problem.

## Host table and domain information

A Domino server frequently has to resolve its own name. (When we talk about name resolution, we are talking about the process of identifying the IP address that corresponds to a particular Domino server name.) There are two ways in which a Domino server can resolve its name on i5/OS. The first way is by looking up the information in the local i5/OS host table. The second way is by going to the Domain Name Server (DNS) defined in the machine's TCP/IP configuration.

If the Domino server has to go to an external DNS to resolve its name, it means that it is sending a packet out on the network and it has to wait for a response to come back on the network. This takes time and increases the traffic on the network. Thus, it is quicker to allow the Domino server to resolve its name in the local host table. Use menu options 10 and 12 on the CFGTCP menu to configure this.

Menu option number 10 on the CFGTCP menu is the i5/OS local host table. Just like a host table on a PC, this local host table contains a list of names and their corresponding IP addresses. It is recommended that you list the Domino server name in this table. List both the common name and the fully qualified TCP/IP name.

Menu option number 12 on the CFGTCP menu contains information on your domain and Domain Name Server (DNS). In general, you will get better performance with a Domino server by making i5/OS check its local host table before doing a DNS query.

To make i5/OS check its local host table before querying the DNS, set the Host name search priority field to *L0CAL. However, do *not* set this field to Local if you have a DNS configured on the local i5/OS machine. It will not function correctly.

#### Work with Line Descriptions (WRKLIND)

Communication on System i machines occur over lines. When you configure a new line on a System i machine, you have to set several options. Some of the options you have to configure are the physical resource the line will use on the system, the controller for the line, the line speed, the maximum frame size, and duplex information. This section discusses the maximum frame size (also known as maximum transmission unit or MTU).

The MTU is usually configured at the line description level. To confirm that it is true for your system, perform the following steps:

- 1. Access the Configure TCP/IP menu by typing the CFGTCP CL command and pressing Enter.
- 2. Type menu option 2 (Work with TCP/IP routes) and press Enter.
- 3. In the Work with TCP/IP Routes display, use option 5 to display the routes.
- 4. In the Display TCP/IP Route display, check the Maximum transmission unit field. If the value in that field is *IFC, check the TCP/IP interfaces.
- 5. Press F12 to get back to the Configure TCP/IP menu.
- 6. Type menu option 1 (Work with TCP/IP interfaces) and make a note of the active line descriptions on this display.
- 7. In the Work with TCP/IP Interfaces display, use option 5 to display the interfaces. Check the Maximum transmission unit field. If the value in that field is *LIND, the MTU size is set at the line description level.
- To check the MTU on the line description, enter the Work with Line Descriptions (WRKLIND) CL command and press Enter.
- 9. In the Work with Line Descriptions display, type option 5 (Display) in front of the line description and press Enter to display its configuration.
- 10. In the Display Line Description display, look at the Maximum frame size field. This field shows the MTU size for the line.

A lot of customers configure the MTU size large when using fiber or copper. Because the System i machine and the communication lines can handle 8 KB, it is believed that a setting of 8 KB will make conversations faster. The problem is that most switches will not transfer an 8 KB frame/packet. Most switches will break the frame up into smaller frames. This takes time. The more the number of frames that have to be broken up into smaller frames, the more time it takes. This can severely impact your network performance and thus your Domino server performance.

We have found that an MTU of 1496 bytes is a good size for most Domino servers. Consult your network administrator for more information about MTUs and your switch's ability to handle large frames.

Because all the users are connected to either a local area network (LAN) or wide area network (WAN) to your Domino servers, the performance of the network is also crucial to provide decent response times to your users.

The main items that are of concern here are the maximum transmission unit (MTU) size for the line description, send and receive buffer size, port filtering, and duplex settings. For recommendations pertaining to each of these areas, refer to the following sections.

#### Maximum Transmission Unit (MTU) Size

The Maximum Transmission Unit (MTU) Size parameter affects the actual size of the line flows. By increasing the value of this parameter, you can reduce the overall number of transmissions, and therefore, increase the potential capacity of the CPU and the IOP (input/output processor).

Similar parameters also exist on the client. The negotiated value is the minimum of the server and client (and perhaps any bridges/routers). Therefore, increase them all. The recommended setting varies, depending on the communications protocol that is being used:

- ► 4 MB Token Ring = 4060
- 16 MB Token Ring = 16388
- ► Ethernet 802.3 = 1492
- Ethernet version 2 = 1500

To change the MTU size, perform the following steps:

- 1. Type CFGTCP on any i5/OS command line.
- The Configure TCP/IP screen is shown. In the Configure TCP/IP screen, type option 2 (Work with TCP/IP routes) and press Enter.
- 3. In the Work with TCP/IP Routes screen that is displayed, type 2 in the Opt column next to the IP address used by your Domino server.
- 4. In the Change TCP/IP Route screen that is displayed, type the recommendation from above in the Maximum transmission unit (MTU) parameter.

#### TCP/IP buffer size

Web serving performance can be increased by tuning the buffer size that is used by TCP/IP, especially when sending large amounts of data. If your network is reliable, try increasing the buffer size from the default (8000) to 64000. If your network experiences a significant amount of collisions or congestion, you might be able to improve the performance by decreasing the TCP/IP send and receive buffers. This is because it takes less time to detect a bad packet, and less data has to be retransmitted. To change the buffer size, perform the following steps:

- 1. From the Configure TCP/IP screen, type option 3 (Change TCP/IP attributes).
- 2. In the Change TCP/IP Attributes screen, locate the TCP receive buffer size (TCPRCVBUF) and type a new value, locate the send buffer size (TCPSNDBUF) and type a new value, and press Enter.

#### Port filtering

Filtering happens on every communication line. Therefore, ensure that you have the proper hardware configuration to enable this support. Instances of filtering not being set up correctly on a system leading to a communications performance problem are known to have occurred.

The primary concern is with the 2838 Ethernet card. If you have this card, check the part number and ensure that filtering is optimally configured. If the part number is 21H9067 on the 2838 Ethernet card, an external filter is required. The external filter cable with part number 97H7385 is recommended. If the part number on the 2838 Ethernet card is 21H5458 or something else, it has built-in filtering, and you must therefore, not have an external filter because this kind of double filtering can cause problems.

#### **TCPONLY** for Ethernet

TCP/IP performance can be further improved by setting the TCPONLY parameter to *YES on an Ethernet line description. This decreases the TCP/IP code path length by limiting the code that is loaded in the IOP for the line description.

Ethernet supports both half duplex and full duplex. The best performance will be with FULL duplex. However, the duplex setting on the line description must match the setting on the port on the switch if the line is hooked up to a switch. Be especially careful if you set your Ethernet switch or your line description to *AUTO. In many cases, it has been found that performance is severely degraded because the duplex setting did not auto negotiate correctly. It is probably best to configure switches and line descriptions to either *FULL or *HALF clearly. If the line is connected directly to a 8271 Ethernet switch, the switch's port is FULL duplex. Therefore, the duplex setting on the Ethernet line description must be set to FULL. If the line is connected to a "stackable" hub, the duplex setting on the line should be set to HALF to match the hub setting.

**Note:** It is recommended that you do *not* set duplex speed settings on switches and routers to *AUTO, because this setting can change other settings, which might in turn result in dropped network packets.

#### *i5/OS parameter, TCPKEEPALV*

TCPKEEPALV specifies the amount of time, in minutes, that TCP/IP waits before sending out a probe to the other side of a network connection. This probe is sent when the connection is otherwise idle, even when there is no data to be sent. The default value for this parameter is 120 minutes. Setting this value to a smaller number will cause sessions to get cleaned up sooner. To modify the TCPKEEPALV parameter, enter the CFGTCP command and select option **3** (Change TCP/IP attributes). A value of 15 minutes is appropriate.

#### Line speed and duplex

The configuration of the line description being used on the System i machine can greatly affect the overall network performance. As mentioned earlier, the settings of the line description should match the hardware it is cabled to. Thus, if the System i machine is cabled to a 1 GB switch and that switch is set to auto negotiate the fastest line speed and duplex possible, the System i line description should be configured to match the settings. To realize the best possible performance, it would then be expected that the i5/OS line description, if displayed (DSPLIND), will report that it is negotiating at 1GB and full duplex. If it is negotiating at a speed other than 1 GB, it is something that should be looked into as a potential network bottleneck.



7

# Moving your Domino server to the System i platform

This chapter provides guidelines for moving a Domino server running on another platform to the System i platform. This chapter describes the processes for moving a Domino server, through a graphical interface for those who prefer a Windows look and feel, and through a 5250 emulation session for those with a strong i5/OS background.

Following are some of the reasons for moving Domino to the System i platform:

- Higher reliability and availability compared to PC servers
- ► Consolidation of smaller capacity servers to a single, highly scalable environment
- Enhanced integration with i5/OS services and DB2 Universal Database for i5/OS data
- Lower total cost of ownership

# 7.1 Migration considerations

The migration (moving the Domino environment from different server platforms) processes outlined in this chapter assume that the Domino release of Domino for i5/OS is broadly compatible with the Domino release of the server being migrated. In other words, the processes in this chapter do *not* address the Domino release upgrade issues.

Should there be a necessity to upgrade the releases in conjunction with moving a Domino environment, the processes must either be modified for release difference issues, or an additional process can be added (before or after the migration) to upgrade the release.

To move a Domino server running Domino R6 (or an earlier release) to a Domino for i5/OS server running Domino R7, use either of the following fully documented methods:

- Upgrade the source server to Domino 7, using the normal upgrade process for the source platform (described in that platform's documentation). After this, use the moving process described in this chapter to move the source server, now running Domino 7, to a Domino for i5/OS server running Domino 7.
- Use the moving process described in this chapter to transplant the source server running Domino R6, to a Domino for i5/OS running Domino R6. After this, upgrade the Domino for i5/OS server from Domino R6 to Domino 7. This process is described in 5.2.5, "Update Domino Server (UPDDOMSVR)" on page 186.

**Note:** It is recommended that you do *not* run the migration and upgrade processes back-to-back, but allow a few days of normal operation in between to ensure that the first process has successfully completed.

The migration process outlined in the subsequent sections are applicable to any supported Domino platform moving to Domino for i5/OS. The process of moving a Domino server through a graphical interface for those who prefer a Windows look and feel is described first (7.2, "Moving the Domino server using a graphical interface" on page 271).

After this, the process of moving a Domino server through a 5250 emulation session for those with a strong i5/OS background, is described (7.3, "Moving your Domino server using a 5250 emulation session" on page 298).

# 7.1.1 Transaction logging

Special consideration must be provided for transaction logging because the disk structure is different in each platform. Our approach is to disable transaction logging immediately before shutting down and moving the Domino server. It is then enabled after the Domino server is fully migrated and is up and running on i5/OS.

On i5/OS, by default, the transaction logs are placed in the logdir subdirectory of the Domino server data directory. The Domino Administrator client help text recommends placing the transaction logs on their own separate drive. The equivalent on the System i platform is to place them in a separate ASP. However, usually, the benefit is not significant enough to justify the additional complexity. The basis for this is that the System i platform input/output (I/O) architecture makes multiple drives look like a single unit, and so performance improves when drives are added.

# 7.2 Moving the Domino server using a graphical interface

This section shows you how to move your Domino server from a Microsoft Windows environment to an i5/OS environment using a graphical user interface (GUI). The steps involved in this process and the sections that describe them are as follows:

- ► 7.2.1, "Copying ID files to the i5/OS integrated file system" on page 271
- ▶ 7.2.2, "Configuring a Domino for i5/OS server using domwzd.exe" on page 275
- 7.2.3, "Replacing the configuration databases" on page 293
- ▶ 7.2.4, "Moving the data" on page 294
- 7.2.5, "Starting the Domino server" on page 298

# 7.2.1 Copying ID files to the i5/OS integrated file system

Note that when you configure the Domino server on i5/OS, you are moving your Domino environment. Therefore, you must keep your current Domino certifiers.

**Note:** In this example, the directory path for the copied ID files from the existing Window Domino server is /Lotus/DOM7SVR1/Data. This example uses an i5/OS profile of itsouser that has QSECOFR equivalent authority.

Perform the following steps to create a directory path in the i5/OS integrated file system, where the Domino certifier data is to be moved:

 Start the iSeries Navigator and expand File Systems → Integrated File System. Right-click Root and select New Folder (Figure 7-1).



Figure 7-1 Creating a new folder in the integrated file system of i5/OS

2. Enter the New folder name and click **OK** (Figure 7-2). In this example, the New Folder name is Lotus.

-Dom570	? 🛛
New folder name:	Lotus
Options:	Restrict rename and unlink
Scan objects created in folder:	Inherit from parent
	OK Cancel Help

Figure 7-2 New folder name

3. The i5/OS user profile that is used to sign in to the iSeries Navigator is, by default, the directory owner of the newly created integrate file system directory. Because files or directories used by a Domino for i5/OS server must be owned by the QNOTES user profile, correct this. Select the **Root** directory and locate the directory you just created. Right-click the new folder (in this example, it is Lotus) and select **Permissions**, as shown Figure 7-3.

🖉 iSeries Navigator 📃 🗆 🔀								
File Edit View Help								
11   X B C   X C   3 13 0						8 minutes old		
Environment: My Connections			570: Root Include: *.					
🕀 📳 Management Central (Rchassq2)	~	Name Size Type			Chai ^			
E My Connections		🚞 lib			File Folder	1/13		
⊡… <b>j</b> Dom570			9		File Folder	6/5/		
Basic Operations     Work Management     Configuration and Service		Lotus			File Folder	9/25		
			Explore		File Folder	11/1		
			Open		File Folder	3/22		
			Create Shortcut		File Folder	5/22		
			Customize this View	•	File Folder	9/12		
The Users and Groups			New Folder Delete	-	File Folder	1/20		
Databases	_				File Folder	8/30		
🖃 📲 File Systems	-				File Folder	9/15		
🖃 📴 Integrated File System			Rename	_	File Folder	9/22 🗏		
🖻 🔁 Root			Cut		File Folder	3/20		
🕀 🔁 QOpenSys			Copy Paste Back Up		File Folder	3/20		
🕀 🔁 QDLS		٩			File Folder	1/13		
		-		-	File Folder	8/1/		
					File Folder	9/24		
QNetWare			Restore		File Folder	1/13		
			Permissions		File Folder	9/5/		
Hite QNIC			Send		File Folder	6/13		
		-		_	File Folder	2/15		
			Sharing		File Folder	2/14		
Backup, Recovery and Media Servic	~		Journaling NFS Export		File Folder	7/28		
<		< -	Descention	_		>		
My Tasks - Dom570	- <u>2</u> 7	ile Sy_	Properties			~		

Figure 7-3 iSeries Navigator, setting permissions on a folder
The Permissions window (Figure 7-4) shows the ownership and authority pertaining to the directory. Click **Owner** to change the owner of the /Lotus directory to the QNOTES user profile.

O Lotus Permiss	ions - Dom5	70						. 🗆 🗙
Object:								
/Lotus								
Туре:			Owne	er:	Primary Group	): Author	rization List (AU	TL):
Directory			Itsou	ser	(None)	(None	9)	
Name	Read	Write	Execute	Managem	Existence	Alter	Reference	Exclude
鶲 (Public)	V			V				Γ
🔒 🏨 Itsouser	V	V		V		$\overline{\checkmark}$		
🌲 Qdirsrv			V					
🛍 Qnotes	N.	V	V					
🏨 Qnotesdb2	V	V	V					
								Þ
Add	Remove	Customize	]					
Owner	<b>ທີ່ທີ່ທີ່</b> Primary Grou	up Auth	orization List					
				OK	Canc	el /	Apply H	elp ?

Figure 7-4 Default permissions of the /Lotus folder

 In the Owner window, click the plus (+) sign next to All Users. Scroll down and select Qnotes (Figure 7-5). By default, the check box to remove all the permissions from the current owner is selected and must be accepted. Click OK to change the ownership.

🖉 Lotus - Owner				X
Object:				
/Lotus				
Туре:	Current own	ner:		
Directory	Itsouser			
Select new owner:				
Qnetware     Qnfsanon     Qnotes     Qnotes     Qnotesdb2     Qntp     Qpex     Qpgmr     Qpm400     Qrje				
🔽 Remove all permission from	m current owr	ier		
	ОК	Cancel	Help	?

Figure 7-5 Assigning a new owner to the /Lotus directory

- 6. Back in the Permissions window, click **Apply** to finish the ownership change task and have the prior owning profile removed from the Permissions window.
- 7. Perform the following steps to set the correct permissions:
  - a. The (Public) profile has more authority than is necessary. Correct this by selecting the corresponding **Exclude** check box.
  - b. Make sure that all the check boxes (except Exclude) are selected for Qnotes.
  - c. You will see a window similar to the one shown in Figure 7-6. Click OK.

O Lotus Permiss	sions - Dom5	70							
Object:									
/Lotus									
Type:			Owne	er:	Primary Grou	ip: Autho	rization List (AU	TL):	
Directory			Qnot	es	(None)	(Non	e)		
Name	Read	Write	Execute	Managem	Existence	Alter	Reference	Exclude	From AUTL
鶲 (Public)	Г	Г	Г						Г
🔒 Qnotes		V	V						
🔒 Qdirsrv									
🔒 Qnotesdb2	V	V							
Add	Remove	Customize							
Owner	<b>ທີ່ທີ່ທີ່</b> Primary Gro	up Auth	orization List						
						ок	Cancel	Apply	Help ?

Figure 7-6 Corrected directory permissions

- Repeat steps 1 7 to create subdirectories, if necessary. In this example, a subdirectory, /Lotus/DOM7SVR1, and a subdirectory to this subdirectory, /Lotus/DOM7SVR1/Data, are created.
- 9. File Transfer Protocol (FTP) your existing ID files ((cert.id, ou.id (if applicable), server.id, and admin.id (or any other name used for the Domino Administrator ID)) from your workstation to the directory path you just created. In this example, three ID files (cert.id, server.id, and admin.id) are transferred to the /Lotus/DOM7SVR1/Data directory in the i5/OS integrate file system. To do this, perform the following tasks:
  - a. In the workstation or server on which the ID files exist, open a DOS command prompt.
  - b. Switch to the directory where the ID files are stored.
  - c. Start an FTP session with the System i machine by performing the following steps:
    - i. Type ftp *hostname*, where *hostname* is the System i machine. However, an IP address can also be used.
    - ii. Type your i5/OS user name.
    - iii. Type your i5/OS password.
    - iv. Type cd / to switch to the i5/OS integrated file system.

- v. Type cd /Lotus/DOM7SVR1/Data.
- vi. Type bin to switch to binary format.
- vii. Type put admin.id.
- viii.Type put server.id.
- ix. Type put cert.id.
- x. Type bye, and then exit to leave the DOS command prompt.
- 10. Verify that the ID files are placed in the i5/OS integrated file system, as shown in Figure 7-7.

	N			
File Edit View Help				
	Rchas10: Data Include	. * *		
~	Name		Size Type	Changed
	🔳 admin.id	4	4KB ID File	11/8/2006 11:
	🔳 cert.id		3KB ID File	11/8/2006 11:
	🔳 server.id	4	4KB ID File	11/8/2006 11:
		Rchas10: Data Include Rchas10: Data Include R admin.id R cert.id R server.id	Rchas10: Data       Include: *.*         Name       9         Image: admin.id       4         Image:	Rchas10: Data       Include: *.*         Name       Size       Type         Image: admin.id       4KB       ID File         Image: admin.id       3KB       ID File         Image: admin.id       4KB       ID File         Image: admin.id       4KB       ID File         Image: admin.id       4KB       ID File

Figure 7-7 Viewing FTP results through iSeries Navigator

11. Change the ownership and the authority of the ID files, as described in steps 3 - 7.

You are now ready to configure the Domino server on i5/OS.

#### 7.2.2 Configuring a Domino for i5/OS server using domwzd.exe

This section shows you how to configure the Domino for i5/OS server. In this example, a Domino server called dom7svr1 is configured as a first server. The ID files transferred from the Microsoft Windows Domino server (7.2.1, "Copying ID files to the i5/OS integrated file system" on page 271) are used.

The steps described here differ from the configuration process detailed in Chapter 4, "Configuring a Domino 7 server on i5/OS" on page 93, in that, this section shows how to use the existing certifiers. Also, this example assumes that the Domino for i5/OS licensed program is installed. For information about installing the Domino for i5/OS licensed program, refer to Chapter 3, "Installing Domino 7 on i5/OS" on page 43.

**Note:** In this example, the data directory path for the Domino for i5/OS server is /Domino/DOM7SVR1/Data.

Perform the following steps to configure a Domino for i5/OS server using domwzd.exe:

- 1. From the downloaded image in Passport Advantage or from CD 2 of Domino for i5/OS physical media, double-click **domwzd.exe**.
- 2. You are prompted to sign in to your System i machine. Enter a valid i5/OS user ID and password with QSECOFR equivalent authority (Figure 7-8). Click **OK**.

Lotus. Domina	7		IBM.
Server S	👙 Signon to t	the Server	
	System:	DOM570	
the a million	User ID:	ITSOUSER	
- FRE LINE	Password:	*****	
			10 5
	ОК	Cancel	L-GHUS-6N3NPJ
Licensed Materials - Property of I IBM, the IBM logo, Lotus and Not	BM. © Copyright IBM es are trademarks of IB	Corporation 1985, 2006. All Rights R 3M Corporation in the United States,	Reserved.
Java and all Java-based trademai countries, or both. Other company	rks are trademarks of 8 y, product or service na	Sun Microsystems, Inc. in the United imes may be trademarks or service n	States, other narks of others.
Figure 7-8 Signing in	to the Syster	n i machine	

3. In the Welcome to Domino Server Setup window (Figure 7-9), click Next.

Remote	Server Setup for DOM570
	Welcome to Domino Server Setup!
	You are about to set up a new Lotus Domino Server. Setup will ask you a few questions and suggest default options whenever possible to quickly and easily setup your Domino server.
	Setting up Domino on server DOM570
	To change the font for your language settings, click "Fonts"
	To continue with Setup click Next.
Н	elp Sack Next > Cancel

Figure 7-9 Welcome screen from DOMWZD.EXE installation

4. In the First or additional server window (Figure 7-10), select **Set up the first server or stand-alone server** and click **Next**.

Remote	Server	Setup for DOM570
	First or	additional server?
	Is this E domain within a	Domino server the first server or a stand-alone server, or should it join an existing Domino as an additional server? (A Domino domain is a collection of Domino servers and users n organization).
		Set up the first server or a stand-alone server     This will setup a new Domino Server and a new Domino domain.
	<u>]</u>	Set up an additional server This will setup an additional Domino server into an existing Domino domain. This requires that the server is already registered in the Domino Directory (You may need to obtain additional information from your Domino administrator).
H	elp	< Back Next > Cancel

Figure 7-10 Set up the first server or stand-alone server

5. In the Provide server name and title window (Figure 7-11), enter the existing Domino server name that is to be moved. In this example, it is DOM7SVR1. Select the check box against I want to use an existing server ID file and click Browse.

Remote	e Server	Setup for DOM570	
F	Provide	a server name and title	Lotus software
	You mu you can name a	st provide a unique nar not easily change it late s the server name.	ne for your new Domino server. Carefully choose the server name; er. By default, Setup recommends that you use the computer's host
	Ē	Server name:	DOM7SVR1
			For example: Sales1
	Optiona always	l: Provide a short title w change this informatior	rhich describes the purpose or function of this server. (You can n later in the Domino Directory)
	ł	Server title:	For example: Corporate Sales Server 1
		✓ I want to use an e /Domino/Data/serv	xisting server ID file: Browse rer.id
н	lelp		< Back Next > Cancel

Figure 7-11 Entering a Domino server name and title

6. In the Select server ID File window (Figure 7-12), select the server.id file that you FTPed to the i5/OS integrate file system and click **Select**.

Select server ID F	ile	X
Directories	Files	Select
	admin.id server.id cert.id	Cancel
/Lotus/DOM7SVR1	/Data	
File name se	rver.id	
Туре	otes ID file (*.id)	-
Ready		

Figure 7-12 Selecting the server ID file

- 7. Back in the Provide server name and title window, click Next.
- 8. In the Provide the data folder for this Domino server window (Figure 7-13), confirm that the Folder name and path are correct and click **Next**.

Note: If the server.id has a password, you are prompted to type it in.

Remote	e Server	Setup for DOM570
	Provide	e the data folder for this Domino server
	Type th	e name and path of the folder where all of the Domino servers data files will reside.
		Folder name and path: /Domino/DOM7SVR1/Data Browse
	lf you a the dat	are setting up more than one Domino server on this system (partitioned servers), specify ta folder for the desired partition you are configuring.
н	lelp	< Back Next > Cancel

Figure 7-13 Domino server data directory path

9. In the Specify advanced server settings window (Figure 7-14), customize as required (refer to Chapter 4, "Configuring a Domino 7 server on i5/OS" on page 93 for details). Click **Next**.

Remote	e Server Setup for DOM570	×			
	Specify advanced server settings	Lotus software			
	There are a number of additional advanced server settings that can be customized. The setup wizard will automatically configure these settings to values that a typical server would use.				
	Advanced server settings:				
	Parameter	Value			
	Start server after setup Start server with TCP/IP Start Java server controller with TCP/IP Enable server partitioning	No No No Yes			
	Enable BRMS Incremental Save Copy Administrator ID File	NO *ALL			
To change advanced server settings, click Customize.					
н	elp	< Back Next > Cancel			

Figure 7-14 Specifying advanced Domino server settings

10. In the Choose your organization name window (Figure 7-15), because there is an existing hierarchical structure, select I want to use and existing certifier ID file and click Browse.

Remote	e Server	Setup for DOM570	X
	Choose	e your organization name	Lotus software
	The org name. [ Acme.	anization name is usually your company nan Do not choose a long organization name. For	ie. It becomes part of each server and user example, instead of Acme Corporation, use
	Ę	Organization name	ITSO Minimum of 3 characters
		This server's final name will be:	DOM7SVR1/ITSO
		A typical user name will be:	ITSOUSER/ITSO
	<b>=</b> 0	Organization Certifier password:	Confirm password:
		Minimum of 5 characters	
	_	✓ I want to use an existing certifier ID file: /Domino/DOM7SVR1/Data/cert.id	Browse
	To spe	cify additional organization settings click Cus	tomize. Customize
н	lelp		< Back Next > Cancel

Figure 7-15 Choosing the organization name

11. In the Select the organization ID file window (Figure 7-16), locate the existing cert.id file you copied to the i5/OS integrate file system, and click **Select**.

Select the organization ID file				
Directories		Files		Select
	$\square$	admin.id server.id cert.id		Cancel
			_	
/Lotus/DOM7S	VR1/Data			
File name	cert.id			
Туре	Notes ID file (*.i	d)	•	
Ready				

Figure 7-16 Selecting the organization ID file

12. Back in the Choose your organization name window, click Next.

13. Enter the certifier ID's password (Figure 7-17) and click **OK**.

불 Ente	👙 Enter Password 🛛 🛛 🔀		
-	Enter the password for /Lotus/DOM7SVR1/Data/cert.id		
	OK Cancel		

Figure 7-17 Entering the certifier ID password

14. In the Choose the Domino domain name window (Figure 7-18), type the Domino domain name used for the existing Domino server in the Microsoft Windows environment and click **Next**.

Remote	Remote Server Setup for DOM570				
	Choose the Domino domain name	Lotus software			
	As part of setting up the first Domino sa collection of Domino servers and users The Domino domain name can be the name.	erver, Setup creates a new Domino domain, which is a s that share the same Domino Directory. same as the organization name. Choose a short domain			
	Domino domain name	ITSO For example: Acme			
н	elp	<pre></pre>			

Figure 7-18 Specifying the Domino domain name

15. In the Specify an Administrator name and password window (Figure 7-19), select the check box against I want to use an existing Administrator ID file and click Browse.

Remote	Server	Setup for DOM570	
F	Specify an Administrator name and password		
	To create the Administrator's ID, you must provide the administrator's name and password. You can use the name of a specific person, or a last name only to create a generic Administrator ID that can be used by several people.		
	0	First name: Middle:	Last name (or generic account name):
	P		ITSOUSER
	-	Administrator password:	Confirm password:
		Minimum of 5 characters	
	_	✓ ) want to use an existing Administ /Domino/DOM7SVR1/Data/user.id	rator ID file
Н	elp		< Back Next > Cancel

Figure 7-19 Specifying an administrator name and password

16. In the Select the administrator ID file window (Figure 7-20), locate the administrator ID file that you copied to the i5/OS integrate file system and click **Select**.

Select the adn	Select the administrator ID file		
Directories		Files	Select
		admin.id server.id cert.id	Cancel
/Lotus/DOM7S	VR1/Data		_
File name	admin.id		_
Туре	Notes ID file (*.i	d)	-
Ready			

Figure 7-20 Selecting the administrator ID file

17.Back in the Specify an Administrator name and password window (Figure 7-21), verify if the administrator information extracted from the ID file is correct and click **Next**.

Remote	Server	Setup for DOM570		
	Specify	Specify an Administrator name and password		
	To create the Administrator's ID, you must provide the administrator's name and password. You can use the name of a specific person, or a last name only to create a generic Administrator ID that can be used by several people.			
	8.	First name:	Middle:	Last name (or generic account name):
	¶0	Joe		Admin
	<b>~</b> 0	Administrator password:		Confirm password:
		Minimum of 5 characters		
	_	✓ I want to use an existing /Lotus/DOM7SVR1/Data/a	Administrator admin.id	ID file: Browse
He	elp			< Back Next > Cancel

Figure 7-21 Extracted information from the existing administrator ID file

18. Type in the administrator's password (Figure 7-22) and click OK.



Figure 7-22 Entering the administrator's password

19. In the What Internet services should this Domino Server provide window (Figure 7-23), select any Internet services that were used before moving to the System i platform and click **Customize** to make any other relevant changes before clicking **Next** to continue.

**Tip:** It is recommended that you retain a printed copy of the NOTES.INI file of the Domino server being moved. This must be used as a reference for customizing the options.

What Internet services should this Domino Server provide?	Lotus software
Select the Internet services this Domino server will provide. Basic Notes and Domino se are set up by default. (You can always change these options later in the Domino Directo	ervices Iry).
<ul> <li>Setup Internet services for:</li> <li>Web Browsers (HTTP services)</li> <li>Internet Mail Clients (SMTP, POP3 and IMAP services)</li> <li>Directory services (LDAP services)</li> </ul>	
To customize all other Domino services, click Customize.	Cancel

Figure 7-23 Selecting Internet services for the Domino server

20.In the Domino network settings window (Figure 7-24), click **Customize** to make changes, if any, and click **Next** to continue.

Remote	Remote Server Setup for DOM570		
	nino network settings		
	Setup has reliably detected the following network ports on this computer. To add additional ports, click Customize (You can change all settings later in the Domino Directory).		
	Enabled port drivers: TCPIP		
	Setup suggests the host name to use in the Domino Directory for this Domino server based on this computer's network name.		
	Host name: DOM7SVR1.ITSO.COM		
	ustomize the network settings, click Customize.		
He	< Back Next > Cancel		

Figure 7-24 Domino server network settings

21. In the Specify the time zone window (Figure 7-25), select the time zone and click Next.

Remote	Server Se	tup for DOM570
	Specify the time zone Lotus softwa	
	lf you do n will be use	ot provide time zone information, the time zone used by the server's operating system ad.
		Time zone:
		Central Standard Time (CST)
		✓ Observe daylight-saving time
H	elp	< Back Next > Cancel

Figure 7-25 Specifying the time zone

22. In the Secure your Domino Server window (Figure 7-26), accept the defaults unless you have a specific reason to deselect the check boxes. Click **Next**.

Server	Server Setup				
	Secure your Domino Server				
	To increase security and prevent unauthenticated access of databases from the Internet, Setup recommends to configure Access Control Lists of all databases and templates to prohibit Anonymous access.				
	Prohibit Anonymous access to all databases and templates				
	For better managability and administration, Setup will add the system group "LocalDomainAdmins" with "Manager" access to all databases and templates.				
	Add LocalDomainAdmins group to all databases and templates				
	(If you are not sure, leave both options selected)				
H	elp < Back Next > Cancel				

Figure 7-26 Securing the Domino server

23. In the Make optional copies of ID files window (Figure 7-27), select the check box against I want to make additional copies of the ID files, if necessary, and click Next. In this example, this is not done.

Remote	Remote Server Setup for DOM570			
Ē	Make optional copies of ID files			
	Server Setup will create these new ID files:			
	[/Domino/DOM7SVR1/Data/user.id]			
	These ID files will be stored on the server. To make additional copies of these ID files, click the checkbox below and specify where to store them. Otherwise, click Next.			
	I want to make additional copies of the ID files: Browse Browse			
	DA.			
	To continue with Setup click Next.			
н	elp < Back Next > Cancel			

Figure 7-27 Make optional copies of the ID files

24. In the summary window (Figure 7-28) that shows the details of the chosen Domino server setup options, review the server setup options and click **Setup**.

**Tip:** To see what the i5/OS CFGDOMSVR CL command looks like to configure this Domino server, click **View Command**.

mote	e Server Setup for DOM5	70
	Please review and confir	n your chosen server setup options
	Please review the followi	ng options you have chosen for your Domino server setup:
	Setting	Current selection
	Remote server name Release Server type Data directory or partiti Organization name Domino domain name ACL System Group	DOM7SVR1/ITSO 7.0.2 Set up the first server or a stand-alone server /Domino/DOM7SVR1/Data ITSO ITSO Prohibit anonymous access to all databases and templates. LocalDomainAdmins created with "Manager" access to all template
	To make any changes, cl	ick "Back".
	To setup your server with	the above options, click "Setup". View command
Н	felp	< Back Setup Cancel

Figure 7-28 Confirming the Domino server setup options

25. The Server Setup window (Figure 7-29) shows the progress of the configuration.

Server Setup			
Domini	o Server Setup		
		2%	

Figure 7-29 Domino server configuration progress

26. In the Setup summary window (Figure 7-30), you must see a congratulations message stating that the Domino server is successfully configured. Click **Finish** to complete the setup.

Remote	e Server Setup for DOM570
	Setup summary Lotus software
	Congratulations, Domino Server Setup is now complete! For help with the first tasks in configuring your domain click the Help button.
	Click "Finish" to close Setup.
F	telp Finish

Figure 7-30 Congratulations window showing that Domino server setup is complete

Attention: Do not start the Domino server at this point. Replace the configuration databases created by default during the setup process and move all the other configuration and data databases from the earlier Domino for Windows server first.

# 7.2.3 Replacing the configuration databases

By default, the Domino for i5/OS server configuration creates the databases listed in Table 7-1. These databases must be replaced by the ones that were used in the existing Windows Domino server environment. Refer to 7.2.4, "Moving the data" on page 294 for details about how to do this.

Database	Function
AgentRunner.nsf	This database provides Notes agent context to a Java integrated development environment (IDE). After the context is set up, you can build, run, and debug without leaving the IDE. The code executes as it will on the Notes agent.
certlog.nsf ^a	The certification log is a database that keeps a record of the certified users of a Domino server. If a system certifier chooses to create the log, each time the system certifier certifies a new user, a record of that person's certification is added to the database.
certsrv.nsf	The Server Certificate Administration application lets you request server certificates from either an internal or an external Certification Authority (CA) and manage your server certificates in a key ring file. Use this database if you are a server administrator and want to secure your Domino servers with Secure Sockets Layer (SSL) 3.0.
cppfbws.nsf	The Free Time Web Service database allows a Domino server to provide free time information about the users in its Domino Directory through a Web service.
homepage.nsf	Default welcoming page database
Indfr.nsf	<ul> <li>The Lotus Notes/Domino Fault Reports is a database that stores information about faults that occur on Domino servers and Lotus Notes workstations in the domain. Administrators must look at the Lotus Notes/Domino Fault Reports often to check whether:</li> <li>Domino servers or Lotus Notes workstations are experiencing problems</li> <li>There are similar repeated faults across the same or different Domino servers or Lotus Notes workstations</li> </ul>
Indsutr.nsf	<ul> <li>The Lotus Notes/Domino Smart Upgrade Tracking Reports is a database that stores information about smart upgrade attempts that occur from Lotus Notes workstations or Domino servers in the domain. Domino Administrators can, through the Desktop Settings Policies, enable the collection of smart upgrade reports, and distribute the collection points for the reports, if necessary.</li> <li>Administrators must look at the Lotus Notes/Domino Smart UpgradeTracking Reports often to see if:</li> <li>Lotus Notes workstations or Domino servers are smart upgrading successfully</li> <li>Lotus Notes workstations or Domino servers are experiencing smart upgrade problems</li> <li>There are similar repeated smart upgrade failures across the same or different Lotus Notes workstations or Domino servers</li> </ul>

Table 7-1 Default databases created during Domino server configuration

Database	Function
names.nsf ^b	The Domino Directory is the central repository for addressing and server configuration information for users, groups, and servers within a Domino domain. The Domino server accesses the Domino Directory whenever it has to contact a server or user, for example, when sending mail or replicating. All the users and servers within a Domino domain share the same Domino Directory.
reports.nsf	The Reports database allows you to analyze mail usage on the Domino server directly from your Lotus Notes workstation. With this database, you can create reports about information such as top mail users, message volume over time, and routing patterns. These reports can be run immediately or on a scheduled basis. The results can be saved in this database or mailed to one or more mailboxes. You can also view the results of reports run earlier, from one of the several views.

a. These databases *must* be brought over from your existing Windows Domino server environment. All the other databases listed in this table are required only if you have previously configured them and used them in your earlier environment.
b. See footnote a.

# 7.2.4 Moving the data

With the completion of the initial Domino server configuration (7.2.2, "Configuring a Domino for i5/OS server using domwzd.exe" on page 275), you must now transfer your Domino mail and application databases to the i5/OS integrated file system. To accomplish this, use an FTP program of your choice. An example is provided in "Moving data through FTP using the DOS prompt" on page 296.

**Note:** There is no necessity to move the .ft extension directories and their content. These are indexes that are created by the Indexer task in the new Domino for i5/OS server. Also, allow automatically created databases such as mail.box, busytime.nsf, or catalog.nsf to be generated by the Domino server at startup.

Ensure that you do not move only your mail and application databases, but also the special configuration databases and modified templates, such as those listed in Table 7-2.

Database	Function
admin4.nsf	The Administration Request database is the relevant database for observing the activity of the administration process. It contains the Administration Request documents that are automatically created when certain administrative activities are performed in the Domino Directory. It also contains the Administration Log documents, composed by a Domino server's administration process, detailing the modifications made to databases when administration requests are processed. The audience of this database is system administrators, who automatically create Administration Request documents during their work activities.

Table 7-2 Databases to be considered for moving

	Database	Function
	da.nsf	The Directory Assistance database is used to configure the Directory Assistance feature. If your organization includes multiple domains, you can set up directory assistance to enable users to browse and select names from public directories outside their domain, for example, when they address mail, define database access control lists (ACL), or complete a NAMES field in documents. When users send mail to recipients in another domain, directory assistance also allows Domino to resolve the names before sending the memo.
	dc.nsf	A directory catalog is an optional directory database that aggregates information from multiple Domino Directories. There are two types of directory catalogs, Extended Directory Catalog and condensed Directory Catalog.
	resource.nsf	Domino 7 has centralized the processing of room and resource reservations into a new Rooms and Resources Manager (RnRMgr) task. The Rooms and Resources Manager is designed to prevent overbooking of rooms or resources, and is responsible for processing all the workflow relating to reserving a room or resource and accurately updating the Busytime database. The Rooms and Resources Manager handles the functionality previously handled in multiple locations such as the router, the Rooms and Resources Template, and the Schedule Manager. Regardless of where the reservation request is created, that is, either in the Resource Reservations database, a user's calendar, or using the Internet, the reservation request will not have any conflicts with other reservations.
	ddm.nsf ^a	The Domino Domain Monitor database contains event information that is reported by Domino Domain Monitor probes and by other checks that are built into Domino 7 for Domino Domain Monitor. These checks include event generators, which are new checks that run as part of specific server tasks such as router or replicator, and those checks that generated events in earlier Domino releases and have now been modified to report into Domino Domain Monitor with additional information.
	decsadm.nsf	This database is used to configure real-time back-end connectivity between Domino and the external systems when using the Domino Enterprise Connection Services (DECS) add-in task.
	events4.nsf	The Monitoring Configuration database includes a new configuration user interface for use with Domino Domain Monitoring. Use this new interface to set up Domino Domain Monitoring probes and a collection hierarchy of Domino servers that collect information from other Domino servers. A collection server collects two classes of event information, enhanced events and simple events. Enhanced events include events generated by the Domino Domain Monitoring probes, events generated by instrumentation that is new in Domino 7.0, events generated by the Event Generator, and any other event that is not associated with a specific target. A simple event is any event that is not associated with or that does not contain specific target information, for example, most of the events that are reported to the event console are simple events.
	log.nsf ^b	The Notes Log is a database that records and stores information about all types of Domino server and Notes workstation activities.

Database	Function
mtstore.nsf	The Message Tracking Store is the repository for summary information about mail flowing through this server. The summary information includes items such as the originators, recipients, arrival times, and status for all the messages processed by this server. This database is created and written to by the mtc add-in task when message tracking is enabled for this Domino server. The database is read by the message tracking tool in the server administration facility to track the messages sent to or from this server. This database is also used to generate reports on information such as top mail users, message volume over time, and routing patterns by agents in the Reports database. The mtstore.nsf is located in the mtdata subdirectory.

a. Any configured DDM monitored events should be changed from Windows to OS400 (i5/OS).b. The log.nsf database only needs to be moved if you want to keep the Windows environment log until the log documents have expired.

### Moving data through FTP using the DOS prompt

As described earlier in the chapter, the FTP method is recommended to move the existing ID files to the i5/OS integrated file system. Using an FTP GUI utility is acceptable, but using Windows Explorer to move files between an existing Domino server running on Windows to the i5/OS integrated file system is *not* recommended. This is because of the inherent problem of Windows Explorer not checking for file locks and transferring the databases and templates into the wrong code page.

**Attention:** When the databases are transferred using FTP, they are set with the correct coded character set ID of 819.

Perform the following steps to transfer your existing Domino databases and templates from the Windows Domino server to the Domino for i5/OS server:

- 1. Stop the Domino server running on Windows after ensuring that all the Domino administration requests within admin4.nsf have been processed and all the mail messages within the Domino mail boxes have been delivered.
- FTP the desired databases. If you are unfamiliar with FTP, contact IBM or Lotus Support for assistance in moving the data. A generic example, where all the existing mail files are moved from a Domino 7 server running on Windows to the System i machine (running the same release) is described here:
  - a. In your Windows Domino server, open a DOS command prompt.
  - b. Switch to the Window Domino server data directory.
  - c. Type ftp *hostname* (*hostname* is the System i machine. An IP address can also be used).
  - d. Type your i5/OS username.
  - e. Type your i5/OS password.
  - f. Type cd / to switch to the i5/OS integrated file system.
  - g. Type cd /Domino/D0M7SVR1/Data (this is the Domino for i5/OS server data directory).
  - h. Type bin to switch to the binary format.
  - i. Type put databasename.nsf (In situations where you are transferring all the desired databases, you might also consider using the **mput** command and disabling the prompts through the **prompt** command.)

- j. Type put templatename.ntf (In situations where you are transferring all the desired templates, you might also consider using the **mput** command and disabling the prompts through the **prompt** command")
- k. Create a mail subdirectory and correct ownership (in this example, this is /Domino/DOM7SVR1/Data/mail) using the steps documented in 7.2.1, "Copying ID files to the i5/OS integrated file system" on page 271.
- I. Type cd mail to switch to the newly created mail subdirectory.
- m. Type prompt to disable prompting.
- n. Type mput *.nsf to transfer all the mail files.
- o. Type quit to exit your FTP session.
- p. Type exit to close the DOS prompt window.
- 3. Correct the ownership of all the transferred files. This can be done through a graphical user interface, as shown in 7.2.1, "Copying ID files to the i5/OS integrated file system" on page 271. For purposes of ease and speed, this example switches to a 5250 emulation method.
  - a. Start a 5250 emulation session to the System i machine and sign in.
  - a. From the i5/OS command line, type CHGOWN OBJ('/Domino/DOM7SVR1/Data/*') NEWOWN(QNOTES) to correct the ownership of any transferred databases and templates in the data directory.
  - b. From the i5/OS command line, type CHGOWN OBJ('/Domino/DOM7SVR1/Data/mai1/*') NEWOWN(QNOTES) to correct the ownership of the transferred mail files.

**Tip:** If this Domino server is also a Web server and therefore many more subdirectories are involved in being FTPed and ownership corrected, contact Lotus Support and inquire about the CHGOWNALL i5/OS integrated file system tool.

- 4. Update the Domino server's NOTES.INI with the desired settings from the earlier Windows Domino server environment, if necessary.
- 5. Add the IP address that was used in the earlier Windows Domino server environment to i5/OS, using the CFGTCP CL command option 1.
- 6. With the earlier Windows Domino server shut down, start the IP interface and verify that it is reachable through a PING command and thus available for your newly configured Domino for i5/OS server.

# 7.2.5 Starting the Domino server

After you have replaced the configuration databases and have moved all the data from the Windows Domino server to the Domino for i5/OS server (and set their file owner and permissions on i5/OS), you are ready to start your Domino for i5/OS server. Perform the following steps:

- 1. Start iSeries Navigator and expand **Network**  $\rightarrow$  **Servers**  $\rightarrow$  **Domino**.
- 2. Right-click your Domino for i5/OS server and select Start  $\rightarrow$  Server (Figure 7-31).



Figure 7-31 Starting the Domino server using iSeries Navigator

# 7.3 Moving your Domino server using a 5250 emulation session

This section shows you how to move your Domino server from a Microsoft Windows environment to an i5/OS environment using a 5250 emulation session. The general steps are:

- 7.3.1, "Copying ID files to the i5/OS integrated file system" on page 298
- 7.3.2, "Configuring a Domino for i5/OS server using CFGDOMSVR" on page 302
- 7.3.3, "Replacing the configuration databases" on page 308
- 7.3.4, "Starting the Domino server" on page 309

#### 7.3.1 Copying ID files to the i5/OS integrated file system

Consider that when you configure the Domino server on i5/OS, you are moving your Domino environment. Therefore, you must keep your current Domino certifiers.

**Note:** In our example, the directory path for the copied ID files from the existing Window Domino server is /Lotus/DOM7SVR1/Data. This example uses an i5/OS profile of itsouser, which has QSECOFR equivalent authority.

Perform the following steps to create a directory path in the i5/OS integrated file system where the Domino certifier data is to be moved.

- 1. Create the directory and subdirectories in the i5/OS integrated file system where the Domino data is to be moved:
  - a. Start a 5250 emulation session and sign in.
  - Enter the Create Directory (CRTDIR) CL command and press F4 to prompt the command.
  - c. In the Create Directory screen, type in the directory name and set the public authority, as shown in Figure 7-32.

**Tip:** You can also use the following command: CRTDIR DIR('/Lotus') DTAAUT(*EXCLUDE) OBJAUT(*NONE)

Create Directory	(CRTDIR)
Type choices, press Enter.	
Directory //Lotus'	
Public authority for data > *EXCLUDE Public authority for object > *NONE + for more values Auditing value for objects *SYSVAL Scanning option for objects *PARENT Restricted rename and unlink *NO	<pre>Name, *INDIR, *RWX, *RW *INDIR, *NONE, *ALL *SYSVAL, *NONE, *USRPRF *PARENT, *YES, *NO, *CHGONLY *NO, *YES</pre>
F3=Exit F4=Prompt F5=Refresh F12=Cance F24=More keys	Bottom el F13=How to use this display

Figure 7-32 Creating a directory in the integrated file system of i5/OS

Repeat this step to create any desired subdirectory or subdirectories as well. In our example, we also create /Lotus/DOM7SVR1 and /Lotus/DOM7SVR1/Data. The CRTDIR CL commands for this are:

CRTDIR DIR('/Lotus/DOM7SVR1') DTAAUT(*EXCLUDE) OBJAUT(*NONE) CRTDIR DIR('/Lotus/DOM7SVR1/Data') DTAAUT(*EXCLUDE) OBJAUT(*NONE)

- 2. The i5/OS user profile that was used to sign in to the 5250 emulation session is by default the directory owner of the newly created integrate file system directories. Because any files or directories used by a Domino for i5/OS server must be owned by the QNOTES user profile, correct this. Perform the following steps:
  - Enter the Work with Object Links (WRKLNK) CL command and press F4 to prompt the command.

b. Locate the directory created in the step described for Figure 7-32, type option 9 next to it and press Enter (Figure 7-33).

Work with Object Links					
Dire	ctory : /				
Type 9=V	options, press Enter Work with authority	^. 10=Move	13=Change attr	bibute	
Opt 9	Object link usr var www Domino Lotus QDLS QFileSvr.400 QIBM	Type DIR DIR DIR DIR DIR DIR DIR DIR	Attribute	Text	
Parar ===>	neters or command	DIK			More
F3=E) F22=[	kit F4=Prompt F5= Display entire field	-Refresh	F9=Retrieve F F23=More option	12=Cancel	F17=Position to

Figure 7-33 Work with Object Links screen

3. In the Work with Authority screen (Figure 7-34), press the F19 (Change owner) function key to change the ownership of the directory.

```
Work with Authority
                                   /LOTUS
Object . . . . . .
                     . . . . . :
0wner
                                   ITSOUSER
      . . . . .
                 . . . . . . . .
                                   *NONE
Primary group
              . . . . . . . . .
Authorization list . . . . . .
                                   *NONE
Type options, press Enter.
 1=Add user 2=Change user authority
                                        4=Remove user
                            --Object Authorities--
                  Data
                 Authority Exist Mgt Alter Ref
Opt User
    *PUBLIC
                 *EXCLUDE
    ITSOUSER
                 *RWX
                              Х
                                   Х
                                          Х
                                                Х
     QDIRSRV
                 *χ
    QNOTESDB2
                 *RWX
                                                                        Bottom
Parameters or command
===>
                                F17=Top
F15=Change authorization list
                                          F18=Bottom
                                                       F19=Change owner
F20=Change primary group
                                F24=More keys
```

Figure 7-34 Work with Authority screen

4. In the Change Owner screen (Figure 7-35), enter QNOTES for the New owner field and press Enter.

Change	Owner (CHGOW	N)
Type choices, press Enter.		
Object	'/LOTUS' QNOTES *YES *NO	Path name Name *NO, *YES *NO, *YES
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	Bottom F13=How to use this display

Figure 7-35 Changing the owner for the /Lotus directory

- 5. Refresh the screen with F5 and you will see that the ownership has been corrected.
- 6. Repeat steps 2 5 for the subdirectories that were created.
- FTP your existing ID files (cert.id, ou.id if applicable, server.id and admin.id or any other name used for the Domino Administrator ID) from your workstation to the directory path you just created. In this example, three ID files (cert.id, server.id and admin.id) are

transferred to the /Lotus/DOM7SVR1/Data directory in the i5/OS integrate file system by performing the following steps:

- a. On your workstation or server on which the ID files exist, open a DOS command prompt.
- b. Switch to the directory where the ID files are stored.
- c. Start an FTP session with the System i machine by performing the following steps:
  - i. Type ftp *hostname* (*hostname* is the System i machine. An IP address can also be used).
  - ii. Type your i5/OS username.
  - iii. Type your i5/OS password.
  - iv. Type cd / to switch to the i5/OS integrated file system.
  - v. Type cd /Lotus/DOM7SVR1/Data.
  - vi. Type bin to switch to binary format.
  - vii. Type put admin.id.
  - viii.Type put server.id.
  - ix. Type put cert.id.
  - x. Type bye and then exit to leave the DOS command prompt.
- 8. Correct the ownership of the ID files by using the following Change Owner (CHGOWN) CL command:

CHGOWN OBJ('/Lotus/DOM7SVR1/Data/*') NEWOWN(QNOTES)

9. You are now ready to configure the Domino server on the System i machine.

#### 7.3.2 Configuring a Domino for i5/OS server using CFGDOMSVR

This section shows you how to configure the Domino for i5/OS server. In this example, a Domino server called dom7svr1 is configured as a first server. The ID files transferred from the Microsoft Windows Domino server are used, as discussed in 7.3.1, "Copying ID files to the i5/OS integrated file system" on page 298.

The steps described in this section differ from the configuration process shown in Chapter 4, "Configuring a Domino 7 server on i5/OS" on page 93. This section shows how to use the existing certifiers. Also, this example assumes that the Domino for i5/OS licensed program is installed. For information about installing the Domino for i5/OS licensed program, refer to Chapter 3, "Installing Domino 7 on i5/OS" on page 43.

**Note:** In this example, the data directory path for the Domino for i5/OS server is /Lotus/DOM7SVR1/Data.

Perform the following steps to configure a Domino for i5/OS server:

- 1. From an i5/OS command line, type the Configure Domino Server (CFGDOMSVR) CL command and press F4 to prompt the command.
- 2. In the Configure Domino Server screen, enter the name of the Domino server being moved. In the option field, type *FIRST and press F10 for more options. Enter details for the Data directory and Organization fields (Figure 7-36) and press PgDn.

```
Configure Domino Server (CFGDOMSVR)
Type choices, press Enter.
Server name .... > DOM7SVR1
Option . . . .
                                 *FIRST
                                               *FIRST, *ADD, *REMOVE...
Data directory .
                                 /Lotus/DOM7SVR1/Data
Organization . . .
                                 ITS0
                                                                    More...
                                 F12=Cancel
                                              F13=How to use this display
F3=Exit
         F4=Prompt
                     F5=Refresh
F24=More keys
```

Figure 7-36 Configuring the Domino Server with the CFGDOMSVR CL command

3. Enter the Domino Administrator name and password (Figure 7-37). Take special care with the password length. Also specify your time zone and whether you want to observe daylight savings time. Press PgDn.

Configure Dom	nino Server ((	CFGDOMSVR)
Type choices, press Enter.	·	
Administrator: Last name	Administrato	or
First nameMiddle namePasswordMinimum password lengthInternet passwordTime zoneDaylight savings timeWeb browsers	Domino dom1no 6 *ADMIN CST *YES *http	0-31 GMT,EST,CST,MST,PST,CET *YES, *NO *NONE, *ALL, *HTTP, *IIOP
Internet mail packages + for more values Directory services	*SMTP *NONE	<pre>*NONE,*ALL,*IMAP,*POP3 Character value, *NONE</pre>
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	More F13=How to use this display

Figure 7-37 CFGDOMSVR command, additional parameters

4. Because the eventual plan is to have another Domino server running on the System i machine, *PARTITION is specified in the Advanced services field (Figure 7-38). Do so if you want to have more than one Domino server running on the same i5/OS partition. Also, specify *N0 for the Replace Configuration parameter to make sure that the new ID files are not created. Press PgDn to view the other settings.

**Note:** Make sure that you enter the correct Network Name where the default is NETWORK1. In this example, because TCPIP Network is used on the Windows Domino server, it has to be changed.

Configure Domin	no Server (CFC	GDOMSVR)
Type choices, press Enter.		
Connection services	*DECS *PARTITION	*DECS, *NONE *NONE, *ALL, *PARTITION
Default ACL settings	*ADMGRP	*NONE, *ANONYMOUS, *ADMGRP
Text 'description'	*BLANK	
Addition	al Parameters	
SMTP services (obsolete)          News readers (obsolete)          Replace configuration          Domain name          Network name          Country or region code	*DOMINO *NONE *NO *ORG TCPIP Network *BLANK	Character value Character value *YES, *NO
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel F	more F13=How to use this display

Figure 7-38 CFGDOMSVR command, additional parameters

- 5. In the screen shown in Figure 7-39, indicate that you are using the existing IDs. Otherwise, the configuration process creates new certifiers. Indicate the ID path (in the i5/OS integrated file system) and the ID password for each of the following:
  - Organizational unit (if the Domino server is registered under one)
  - Certifier
  - Administrator

Press PgDn.

```
Configure Domino Server (CFGDOMSVR)
Type choices, press Enter.
Organizational unit:
 Name . . . . . . . . .
                                  *BLANK
 ID file . . . . . . .
                                  *GEN
 ID file's password . . . . .
                                  *ADM
Certifier ID:
                                  /Lotus/DOM7SVR1/Data/cert.id
 ID file . . .
                .
 ID file's password . . .
                                  dom1no
Administrator ID:
 ID file . . .
                                  /Lotus/DOM7SVR1/Data/admin.id
 ID file's password . . . .
                                  dom1no
                                                                      More...
F3=Exit
          F4=Prompt
                     F5=Refresh
                                  F12=Cancel
                                               F13=How to use this display
F24=More keys
```

Figure 7-39 CFGDOMSVR command, specifying the existing ID files and passwords

6. Specify the directory path to the existing Server ID file (Figure 7-40) and enter a password if a password is associated with it (in most cases this might not be the case because this requires the manual entry of a password every time the Domino server is started). Set the other parameters as necessary. For the Internet address field, enter the host name or the IP address to be used. Press PgDn.

Configure Dom	ino Server (C	FGDOMSVR)		
Type choices, press Enter.				
Server ID: ID file	/Lotus/DOM7S	VR1/Data/server.id		
ID file's password	*NOPWD *NO *YO *YES *YES *NOENCRYPT DOM7SVR1.ITS	*YES, *NO *YES, *NO, *JSC, *ALL *YES, *NO *YES, *NO *ENCRYPT, *NOENCRYPT 0.COM		
Bind HTTP	*YES *NO	*YES, *NO *YES, *NO More		
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	F13=How to use this display		

Figure 7-40 CFGDOMSVR command, specifying the Server ID file and Internet address

7. In the next screen (Figure 7-41), type in the fully qualified Domino Server host name. Often, administrators specify the subsystem and object names field with the same as the Domino sever name. Press Enter to finish the configuration.

Configure Dom	ino Server ((	CFGDOMSVR)	
Type choices, press Enter.			
Server host name DOM7SVR1.ITSO.COM			
Subsystem and object names Collation	DOM7SVR1 *STD *ALL *NONE *NO *NO	Name, *GEN *STD,CS,DA-DK-AA,DE,E2-ES *DOMDIR, *DTADIR, *ALL *NONE,*ALL,*MINIMUM *YES, *NO *YES, *NO	
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	Bottom F13=How to use this display	

Figure 7-41 CFGDOMSVR command, final additional parameters

8. The following message is shown to indicate that the CFGDOMSVR command is in process and how far along it is complete:

"27: Percent of files copied to the server data directory."

9. After the setup is complete, you receive the following message:

"Command CFGDOMSVR ended successfully."

Attention: *Do not start the Domino server at this point.* You must first replace the configuration databases created by default during the setup process and move all the other configuration and data databases from the earlier Domino for Windows server.

#### 7.3.3 Replacing the configuration databases

By default, the Domino for i5/OS server configuration creates the databases listed in Table 7-1 on page 293. These databases must be replaced by the ones that were used in the existing Windows.

You must also transfer your Domino mail and application databases to the i5/OS integrated file system. Make sure that you move your mail and application databases, as also the special configuration databases and modified templates, such as those listed in Table 7-2 on page 294.
**Note:** You do not have to move the .ft extension directories and their content. These are indexes that are created by the Indexer task in the new Domino for i5/OS server. Also, allow the automatically created database such as mail.box, busytime.nsf or catalog.nsf to be generated by the Domino server at startup time.

Perform the following steps to transfer your existing Domino databases and templates from the Windows Domino server to the Domino for i5/OS server:

- 1. Stop the Domino server running on Windows after ensuring that all the Domino administration requests within admin4.nsf have been processed and all the mail messages within the Domino mail boxes have been delivered.
- 2. FTP the desired databases. Refer to 7.2.4, "Moving the data" on page 294 for the detailed steps.

## 7.3.4 Starting the Domino server

After you have replaced the configuration databases and have moved all the data from the Windows Domino server to the Domino for i5/OS server (and set their file owner and permissions on i5/OS), you are ready to start your Domino for i5/OS server. Perform the following steps:

- 1. Enter the Start Domino Server (STRDOMSVR) and press F4 to prompt the command.
- In the Start Domino Server screen (Figure 7-42), specify the Domino server name (in this example, this is DOM7SVR1) and press Enter.



Figure 7-42 Starting the Domino server



# **Problem determination**

As this topic can fill an entire book, this chapter covers only a few of the more imperative issues that you might face when administering a Domino server on the System i platform. This chapter is designed to give you some insight into the basic troubleshooting and problem determination practices.

Generally, the areas for cause and concern in troubleshooting and problem determination of a Domino server are:

- Server crash
- Server hang
- Performance

This chapter takes you through topics such as the data that is normally required to assist in determining the root cause, and how to collect it. It also provides additional debug parameters, which you can leverage in your day-to-day operations, in order to help troubleshoot the common items that might arise in your production environment.

# 8.1 Server crash

A Domino server crash is the moment when one of the Domino tasks ends in error and as a result, all the other Domino tasks are ended. Unfortunately, this results in the Domino server no longer responding to any of the user requests. During the crash or abnormal end, the Notes Server Diagnostic (NSD) tool is invoked to collect relevant data to diagnose the cause of the crash.

The following events are known to crash a Domino server:

► ENDJOB

Domino jobs do not correctly process the signal from an End Job (ENDJOB) command. If you issue an ENDJOB command against a single Domino job, it can crash the entire Domino server. To correctly end a single Domino job, use the Domino server console command TELL JOBNAME QUIT, for example, TELL ROUTER QUIT.

► ENDSBS

The End Subsystem (ENDSBS) command issues an ENDJOB command against all the jobs running in the subsystem specified by the SBS parameter. As stated earlier, Domino jobs do not handle the END Job command gracefully. You can safely issue the ENDSBS command against a Domino subsystem if all the Domino jobs running in that subsystem are already ended.

ENDDOMSVR with OPTION(*IMMED)

The *IMMED option must not be used unless the End Domino Server (ENDDOMSVR SERVER(servername) OPTION(*CNTRLD)) command fails to end the Domino server. The reason for this is that the *IMMED option in the ENDDOMSVR command issues an ENDSBS *IMMED. If the Domino jobs are still running, this ENDSBS *IMMED crashes the Domino server.

PWRDWNSYS

End the Domino server in a controlled manner before issuing the Power Down System (PWRDWNSYS) command. One of the commands that a PWRDWNSYS runs is the ENDSBS command. As stated earlier, if the Domino server is not already ended, this ENDSBS crashes the Domino server.

GO SAVE option 21

To run a complete system save, go to the SAVE menu and select option 21. This can be referred to as a GO SAVE option 21. This option issues an ENDSBS SBS(*ALL) OPTION(*IMMED). As mentioned earlier, an ENDSBS crashes the Domino server if the Domino jobs are not already ended. Therefore, you must end the Domino server in a controlled manner before issuing the GO SAVE option 21.

Cancelling a BRMS backup of an active Domino server

The reason this might occur is that when BRMS is backing up an active Domino server, it is essentially like an active job on the Domino server. Just as performing an ENDJOB against a Domino job can cause a crash, a cancel of a save has that possibility as well. Ongoing enhancements continue to greatly reduce the possibility of a crash. Thus, although the chance still exists, far more often than not, the Domino server must remain running if a save is cancelled.

Prior crashes

When a Domino server is cleanly shut down, all references to shared memory and semaphores are removed cleanly. If the Domino server crashes, this is not always the case, and orphaned shared memory and/or semaphores can be the result. If the restarted Domino server tries to access the previously orphaned shared memory and/or

semaphores, it might take exception and crash again. For information about cleaning up orphaned shared memory or semaphores, refer to 8.1.8, "Cleaning up the orphaned shared memory or semaphores" on page 326.

Database corruption

Every time a Domino server crashes, it has the unfortunate potential to corrupt data. If data does become corrupt and the Domino server tries to allocate that object at a later date, the server might take exception and crash. The chance of this occurring can be lessened if the Domino server has transaction logging (TL) enabled.

# 8.1.1 More about the Notes Server Diagnostic tool

The Notes Server Diagnostic tool on the System i platform is different from it's counterpart on other platforms in terms of layout and content. In Domino 7, modifications have been made to NSD. Therefore, it looks different and is easier to read and includes more details as well.

In Domino 7, NSD also collects the call stacks for all the processes or jobs associated with the Domino server at the time of the crash. This is a useful modification to have, especially if you have the thread ID debug enabled. For information about enabling the thread ID debug, refer to 8.4, "Additional troubleshooting parameters" on page 349.

NSD displays the information shown in Table 8-1.

Number	Part	Function
1	NSD file name, system name, Domino release information	Indicates the date and time of the NSD, name of the system, and the Domino release
2	Call stack for falling process	Tells what thread reported the failure and what it was doing at the time of crash
3	Dump job call stacks	Reports what each individual thread running on the Domino server was doing at the time of crash
4	User environment	Shows environment variables set on the system
5	Job log of current job	Message IDs, the job that was dumped at the time of the failure
6	Notes.ini	Shows the contents of the Domino server's Notes.ini file
7	Pid.nbf	Shows the contents of the pid.nbf file at the time of failure
8	List of active jobs	Reports the results of WRKACTJOB
9	Display job of current job	Job status, definition and run attributes, spooled output files, job call stack, job locks, job record locks, library lists, open files, and overrides
10	Domino console entries	Shows console entries leading up to time of the crash

Table 8-1 NSD information on the System i platform

Following is a list of what the NSD will *not* tell you:

- ► Cumulative PTFs, Group PTFs, or, if an IPL is necessary, for a PTF to apply
- ► The model or feature code (hardware) or whether LPAR is used
- Based on the NSD alone, any hot fixes or interim fixes that might be applied to the Domino code

An important thing to bear in mind about the NSD file is that on the System i platform, it appears legible if you open it from a 5250 emulation session. However, if you drag and drop it from the IBM_TECHNICAL_SUPPORT directory to a client PC workstation, it retains the EBCDIC format and looks as shown in Figure 8-1.

📕 nsd_08_03_06@19_27_19.nsd - Notepad
File Edit Format View Help
aÄ-"‰•-aÄÖÖ÷âàÙñaÄ□£□aÉÂÔmãÅÅÈŎÉÅÁÓmâä××ÖÙãa•⊄"mðømðómðö ñùmò÷mñùK•⊄"⊡%⊡% â…™¥…™z@@@@@@@AÖÔ÷âàÙñ⊡%Ä□£…z@@@@@@@@@a`r@A¤‡@@ó@ñùzò÷zñù@òðöö%@U%â``¢£…"z@ öåz@@@@@@@@@@öâòð@gwù_``_r¢_z@@@@@@aòùòóð@g%
0−f €@噀%−•Z@Ť%''@å÷ðòmð÷ðùòððöoҤ'' `@ðùk@òððöo@@@@@@@@@@@@@_%_%_%
L
L
NÖÅz@ðò÷ø÷öaøðöäAâaâÁùáAù@@@@ãÈùAAĂz@ð§÷"□%
ÓĂmĂ™…□£…mã~™…□,,òmmÆ×ñòf™££~m−□™"m£@@@@@@@@@@@@@@@@@@@i÷@@@@oÁĂùàäÈ@øóĄâ×Éī%
_£_™□,,mf™□£m_□™£)@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
a
alk
∀−•ℓ−×−±□
$A-\bullet (^{n})^{n}$
∩````````````````````````````````````
0□,,O5£@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
O # A = • • = -''UD ,,,
%
©\$©\$©\$©\$©\$©\$©\$©\$©\$©\$\$`````````````````
t–@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
~_ð¢¦□‰£mmÆ×ñó~_𢢉‡¦□‰£m£@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
$f^{\infty}, m, M, m, M, m, M, m, M, M, M)$
%
öâ£∃¤"£Å"∃•¤–©©©©©©©©©©©©©©©©©©©©©©©©©©©©©©©©©©©©
Ö£□¤"£Å" • ¤−ŧ£@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

Figure 8-1 NSD in EBCDIC format

The NSD file shows you the invocation stack trace of the failing thread and the call stacks of all the other Domino jobs in the partition. Basically, what this provides is a snapshot of the functions and arguments in the sequence that they were called. The snippet of the Domino server console that is also provided indicates what happened immediately before and during the time of the error. Figure 8-2 is an example of thread details included in an NSD file.

######################################			PID: 8710	job: 027876/QNOTES/SERVER
l Lib Name	Pgm Name	Mod Name	Statement	Procedure Name
QSYS QSYS QDOMIN0702 QDOMIN0702 QDOMIN0702 QDOMIN0702 QDOMIN0702 QSYS QSYS	QLESPI QPOWPINT LIBNOTES LIBNOTES LIBNOTES LIBNOTES LIBNOTES QPOWPTHR QPOWPINT	QLECRTTH QPOWSPTHR THREAD NLTHREAD OSSEM OSSEM QPOWCOND QPOWCOND	0000000017 0000000019 0000000018 0000000023 0000000025 0000000025 0000000017 0000000049 000000086	LE_Create_Thread2FP12cr pthread_create_part2 ThreadWrapper NAMELookupThread OSWaitEvent WaitOnNativeSemaphore WaitForThreadSem pthread_cond_wait wait20Qp0wPthreadCondit

Figure 8-2 Thread call stack details

You can also run call stack information independently of a crash, by issuing the following command from the Domino server console:

load NSD

Call stack information is particularly useful in a Domino server hang if debug or memcheck is enabled.

## Fault recovery operation

The fault recovery system in Domino 7 is configured the same way it is on UNIX platforms, with the exception that the fault recovery system is enabled by default on i5/OS. The fault recovery settings are located in the Domino server document and accessible through the Configuration tab from the Domino Administrator or a Lotus Notes client.

**Note:** The AS400_DOMSVR_RESTART environment variable is no longer supported and has been replaced by the Maximum Fault Limits settings in the Domino server's configuration document.

When upgrading from Domino 6 to Domino 7, the current Domino server settings for fault recovery are retained and the Domino server's configuration document is updated accordingly.

Refer to the Fault Recovery section in the Lotus Domino Administrator 7 Help database for more information.

#### Specifying a diagnostic program for fault recovery

There is no longer a Cleanup Script Name field in the Domino server configuration document in which you must place CALL QNOTES/NSD. This has been replaced by the Run This Script After Server Fault/Crash field, in which you might configure a call to your own recovery diagnostic program, such as CALL MYLIB/MYDIAG. If you do not have one, this field must be blank. Any user diagnostic will be run before the Domino NSD program.

The Domino NSD program can be turned on and off by the Run NSD To Collect Diagnostic Information field. Normally, this must be enabled so that critical diagnostic information is generated. This information is useful to the Lotus and IBM support team for solving server problems.

## 8.1.2 Troubleshooting Domino server crashes

As explained at the beginning of this chapter, an NSD is generated whenever a Domino server crashes or is ended abnormally. In order to troubleshoot the crash, you must first locate the NSD. In older versions of Domino, the NSD was generated in the Domino server data directory but starting with more recent versions of Domino 6 and also with all the releases of Domino 7, the NSD is created in a subdirectory of the Domino server data directory. This subdirectory is called IBM_TECHNICAL_SUPPORT. Each NSD file has a date/time stamp indicating when the recycle occurred, for example, nsd_08_13_06@01_45_06.nsd.

**Note:** Domino 7.0.2 provides the following additional new functionality on the Work with Domino Servers (WRKDOMSVR) display:

- Option 14 = Work with support files
- Option 15 = Work with NSDs
- Option 16 = Dump server call stacks

If you are running Domino 7.0.2 or later, to view an NSD from the Work with Domino Servers (WRKDOMSVR) display, press F23 (More Options). You can then type option 15 (Work with NSDs) next to a specific Domino server. This takes you directly to the IBM_TECHNICAL_SUPPORT subdirectory. Locate the desired NSD and type option 5 to display the contents.

If you are not yet running 7.0.2, use the WRKDOMSVR command, and then select option 12 (Work object links) to go into the data directory. From here, use the PgDn key until you see the IBM_TECHNICAL_SUPPORT subdirectory. Enter option 5 to go into the subdirectory and use the PgDn key until you find the corresponding NSD file.

The layout of the NSD header has changed and is easier to read. Figure 8-3 shows an NSD header.

/Domino/DOM7SVR1/Data/IBM_TECHNICAL_SUPPORT/nsd_08_13_06@01_45_06.nsd Server: DOM7SVR1 Date: Sun August 13 01:45:06 2006 ITS0 System: 0S: 0S400 Release: V5R4M0 Notes Version: Release 7.0.2 September 26, 2006 <00 Section: Notes Process Info 60>

Figure 8-3 NSD header information

Figure 8-4 shows a crash stack. Look for entries such as *exception*, *kill*, *fatal*, *panic*, *child died*, or *fault* in the crash stack. In the first entry (immediately preceding the error) you will see the last valid function being executed. Work vertically up (backwards) and note the processes just before the exception to find clues (although not definitive answers) about what the Domino server was doing just before the recycle. These clues must be reviewed and evaluated in the context of other information. In the example shown in Figure 8-4, for instance, take the entry ConsolidateBIBs and search the Lotus customer support knowledge base for this entry. Refer to Knowledge Base under the Self Help section in the following Web site in order to access a Technote and a matching SPR:

http://www.ibm.com/software/support/

In this instance, our search found Technote 1239923, *Domino server crashes during BRMS backup on ConsolidateBIBs*. This was reported as a known crash and references that the issue was reported to Quality Engineering as SPR# DROO6MYQRW and has been addressed in 7.0.1 FP1 and the base of 7.0.2.

If the Domino server crash you are investigating reports an entry for Child_Died or the console line Child Stopped by Signal -1, it might indicate that something outside Domino caused the server to crash. Often, QHST indicates that a Domino task took exception just before the Domino server reported the NSD. If this is the case, investigate why the task took exception and led to the NSD.

Finally, it is important to note that the crash stack and the failing process is *not* always the cause of the crash but more indicative of a symptom (as illustrated earlier).

Figure 8-4 shows a crash stack.

JOB: 081167/0USER/07RCSRVS THREAD: 0x281			
	297		QCMDEXC
CL PEP	0	Q1ACOBK	Q1ACOBK
Q1ACOBK	311		
_CL_PEP	0	Q1ACBK	Q1ACBK
Q1ACBK	308		
_QRNP_PEP_Q1ARBK	0	Q1ARBK	Q1ARBK
Q1ARBK	5128		
_C_pep	0	Q1AXCMD	Q1AXCMD
main	109		
	356		QCAPCMD
_CXX_PEP	13	QNNINSDB	QNNINSDB
main	85		
QnninsdbSave_Main	89	QNNINSDBP	QNNINSDBP
do_fullFP9Vary_listc	66		
Save_Brm_FilesFP10file_entryi	229		
Write_chgs_to_fileFUiT1PcT3Pi	3		
NSFBackupGetChangeInfoSize	5	NSFSEM7	LIBNOTES
iNSFBackupGetChangeInfoSize	11	BACKUP	
ConsolidateBIBs	80		
OSMemoryLock	1	MEMORY	
LockMemHandle	2		
Panic	29	OSPANIC	
fatal_error	33	BREAK	
OSFaultCleanup	1	CLEANUP	
OSFaultCleanupExt	86		
OSRunExternalScript	39		
system_a	2	STDLIB_A	
system	6	QC2SYS	QC2SYS
	297		QCMDEXC
_C_pep	0	NSD	NSD
main	89		

Figure 8-4 Crash call stack example

# 8.1.3 My Domino server keeps crashing or does not start

"What should I do?" is the first question that an administrator asks when faced with such a situation. Following is a list of some of the things to check during the initial investigation:

Review the NSDs. Check whether the invocation stack trace or last entries in the console snippet are the same as in the earlier crashes. If they are, it might be due to corruption or a condition that is already known. Check the Lotus support Web site for any known issues relating to the crashes. If it is corruption related, you might have to issue the FIXUP command against the Domino server when it is ended. Refer to 8.1.5, "Consistency checks and FIXUP" on page 320 for more information.

Also, if the problem relates to a specific task other than the SERVER task, you might have the option to temporarily remove the offending task from the ServerTasks= line of the Domino server's NOTES.INI file in order to at least get your Domino server up and running until the root cause is determined and a permanent resolution provided.

Is the Domino server shut down for backup at night? If so, find out if the last server shutdown was successful by looking for an NSD at the time of the shutdown. If one exists, it indicates that your Domino server did not shut down properly. If it does not exist, check the backup log job log to see if there were any noted errors concerning Domino databases. Lastly, check to whether the backup is still active. If it is, is this expected?

- If it is the ROUTER task that keeps failing, try renaming the MAIL.BOX (or boxes if multiple ones are used) to bring relief. If the Domino server remains stable then, it means that a mail message in the renamed mail.box was at fault, and Support must be contacted to fully diagnose the problem. If the Domino server continues to crash on the ROUTER task even after this action, it is likely that you have to invoke a router debug. Contact Support for the appropriate router debug parameters.
- If the crash is on the Hypertext Transfer Protocol (HTTP) task, you might be asked to enable HTTP thread logging, so that the database that is being accessed through a Web browser at the time of the crash can be specifically pinpointed. Information about enabling this additional logging is provided in 8.4, "Additional troubleshooting parameters" on page 349.
- Are you receiving insufficient memory at startup or shortly thereafter? If so, have you checked for any orphaned shared memory or semaphores? If you have only one Domino server on your system, with the Domino server ended, you must verify that no shared memory or semaphores are actively referenced. If they are, they must be cleared and the server restarted to see if a positive impact occurs. For further information about how this is done, refer to 8.1.8, "Cleaning up the orphaned shared memory or semaphores" on page 326.
- Have there been any recent code changes to your environment? Have you recently upgraded the i5/OS? If so, have you verified if you have the necessary i5/OS PTF levels? Have you updated your antivirus software to a newer version that is not compatible with your current version of Domino? Perhaps patches have to be applied.
- Have there been any hardware changes since the Domino server was last stable? If so, evaluate if any of them might be a factor in the Domino server instability.
- Look for relevant messages in the QSYSOPR or QHST that might be related to your Domino server. This can be done through the DSPMSG MSGQ(QSYSOPR) command to display the QSYSOPR message queue or through DSPLOG to display the history log (QHST). Because QHST can be quite lengthy, use the F4 key to prompt the DSPLOG command to pick a specific time or timeframe for review.
- Check the spooled files for user QNOTES, especially for the QNNINSTS and SERVER job logs. If the logging level displayed in the job logs is not sufficient, increase the logging level and restart the Domino server and wait for the next failure. The login level can be increased by issuing the following command:

CHGJOBD JOBD (QUSRNOTES/Dominosubsystemname) LOG(4 0 *SECLVL)

If you are not sure of your Domino server's subsystem name, use the WRKDOMSVR command to verify the same.

- Are there authority issues? Are there any authority error messages in the job logs or spooled files? Are there QNOTES ownership issues? Do all Domino server data directory objects have QNOTES ownership? As a general rule, any object that exists in the Domino server data directory and subdirectories must be owned by QNOTES. The i5/OS Edit File (EDTF) CL command can be used to easily check this.
- Is a Domino job still listed under the Domino server's subsystem? If a job is listed in END status and the Domino server is ended, this might be the culprit. If the job remains in the END status for some time, you might have to issue the End Job Abnormal (ENDJOBABN) command to clear the job before attempting to restart the Domino server.

If you feel that you have exhausted all these possibilities and the Domino server keeps crashing or does not start, contact Lotus support.

# 8.1.4 Crash data to be collected before engaging Lotus support

If you find that you have to contact Lotus support to determine why your Domino server is crashing or does not start, the following data might be requested from you to determine the root cause of the problem:

- Any recent NSDs from the last few days
- ► If console logging is enabled on your server, the console.log from the data directory
- A list of the current Lotus hot fixes on your system (DSPPTF OUTPUT(*PRINT))
- The history log (DSPLOG OUTPUT(*PRINT))
- The QSYSOPR message queue (DSPMSG MSGQ(QSYSOPR) OUTPUT(*PRINT))

## 8.1.5 Consistency checks and FIXUP

The consequences of a Domino server crash means down time. Obviously, the time spent in down mode depends on the steps that have to be taken to recover the server. However, if you have the Domino Directory set to automatic recovery in the event of a crash, Domino will restart and begin it's own recovery. A consistency check is invoked by the server at recovery startup.

A consistency check is similar to the FIXUP server task. Consistency checks are performed when a database is found to be in an unknown state, corrupt state, or the integrity is questionable:

- An unknown state occurs when the database is not closed properly. This can occur if the database is open at the time of the crash.
- A corrupt state can occur in several places. These relate to bad tables, notes, folders, bitmaps, and so on.
- Questionable integrity occurs when a database header or index has entries that appear to be invalid.

When you restart a Domino server, the server quickly searches for any unlogged databases that were modified, but improperly closed because of a server failure, power failure, hardware failure, and so on. A few minutes after server startup, the server task runs consistency checks on these databases in an attempt to fix any inconsistencies resulting from partially written operations caused by a failure. When users attempt to access one of these databases and a consistency check has not yet been run on the database, users see the following message:

"This database cannot be opened because a consistency check of it is in progress."

**Important:** You must never cancel the consistency check of a file.

If corruption is found to be affecting your Domino server, run Domino utilities to remedy the situation. The following methods are available to try and fix corruption not addressed by the consistency check during startup:

- Run FIXUP using the FIXUP tool in the Files tab. Use this method to run FIXUP on one database or a few databases. You can easily select the databases and you do not have to use command-line options. However, you cannot use the Domino Administrator until FIXUP finishes.
- Run FIXUP using the Task Start tool. Use this method to run FIXUP on all the databases. You can continue to use the Domino Administrator when FIXUP runs and you do not have to use command-line options.

- ► Run FIXUP using live console. Use this method if you prefer to use command-line options.
- Run FIXUP using a Program document. Use this method to schedule FIXUP to run at particular times.

Remember that after you set up transaction logging, FIXUP is usually no longer required or is used to bring databases back to a consistent state during startup.

Note: These concepts also apply to the UPDALL and COMPACT utilities.

For more information about these Domino utilities, refer to the Administrator help, which details FIXUP, UPDALL, and COMPACT.

### Run Domino Command (RUNDOMCMD)

A method that is specific to the System i platform is the i5/OS CL command called Run Domino Command (RUNDOMCMD). This command is used to issue Domino console commands when the server is ended. This is sometimes required when trying to address integrity issues with databases that are constantly in use, such as the Domino directory (names.nsf). It has little or no effect if the server is left running.

The Run Domino Command (RUNDOMCMD) sets up the environment that allows the command to be run regardless of whether the Domino server is active or not. When the Domino server is not active, you can run batch processing-type commands such as FIXUP, COMPACT, and UPDALL.

To use the RUNDOMCMD command, you must have one of the following authority:

- *ALLOBJ special authority
- *USE authority to the RUNDOMCMD object (object type *CMD) in the QSYS library and *USE authority to the QNNINRUN object (object type *PGM) in the QNOTES library

Figure 8-5 shows how to use the RUNDOMCMD command to run the FIXUP task against the names.nsf database on a Domino server called DOM7SVR1. On any i5/OS command line, type RUNDOMCMD and press F4 to prompt the command. In the Run Domino Command (RUNDOMCMD) screen that is displayed, enter the necessary parameters.

Run Domino	Command (RUND	DOMCMD)
Type choices, press Enter.		
Server name	DOM7SVR1	
Command	CALL PGM(QDOM	IINO702/FIXUP)
Run in batch	*YES *JOBD	*YES, *NO *JOBD, *YES, *NO
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	Bottom F13=How to use this display

Figure 8-5 Example of RUNDOMCMD command running FIXUP against names.nsf

If you want to run the FIXUP utility against every object on the Domino server, you must not specify any parameters, as shown in Figure 8-6.

 Run Domino Command (RUNDOMCMD)

 Type choices, press Enter.

 Server name
 > DOM7SVR1

 Command
 > < > > CALL PGM(QDOMIN0702/FIXUP)

 Run in batch
 *YES
 *YES, *NO

 Allow multiple threads
 *JOBD
 *JOBD, *YES, *NO

Figure 8-6 Example of RUNDOMCMD running FIXUP against all objects on a Domino server

You also have the capability to utilize utility switches within the RUNDOMCMD command. Figure 8-7 shows an example of the FIXUP command being issued with the "-j" switch if you happen to have transaction logging enabled on your Domino server. The switch is therefore desired.

Run Domino	Command (RUNDO	MCMD)	
Type choices, press Enter.			
Server name>	DOM7SVR1		
Command > '-j')	CALL PGM(QDOMI	NO702/FIXUP)	PARM('names.nsf'
Run in batch	*YES *JOBD	*YES, *NO *JOBD, *YES,	*N0
			Bottom

Figure 8-7 Example of RUNDOMCMD running FIXUP against names.nsf using the -j switch

Although these examples reference the FIXUP utility, the same logic applies to other Domino commands such as UPDALL or COMPACT.

For additional information about RUNDOMCMD, refer to 5.2.7, "Run Domino Command (RUNDOMCMD)" on page 189.

## 8.1.6 Transaction logging

If transactional logging is not a feature of your Domino server at the time of a crash, you must consider enabling it on your Domino server. The major benefits of enabling transaction logging are a reduced chance of data corruption from server crashes and quicker recovery when the Domino server starts backup after a crash.

The basis for this is that transactional logging captures all the changes made to a database and writes them to a transaction log. The logged transactions are then written to disk in a batch, either when the resources are available or when scheduled.

A transaction is a related series of changes made to a database on a server, for example, opening a new document, adding text, and saving the document is one transaction. The advantages of using transaction logging is that in situations where you have large indexes or data files, the rebuild process time can be significantly less instead of having to rebuild the file from scratch.

For more information about transactional logging, refer to the Domino Administrator help database. Also note that although the help text suggests that you place the transaction logs on a separate drive for performance considerations, on the System i platform this does not really result in a gain and only adds to the complexity of the environment. It is therefore recommended that you take the defaults and place the transaction logs on the same drive, which, for the System i platform, is the system ASP.

# 8.1.7 Automatic Diagnostic Collection Tool

The Domino 7 administrator can automate some data collection by setting up the automatic diagnostic collection tool to collect diagnostic data after server or client crashes. This data is then sent to a mail-in database after the server or client restarts. Although this feature is available for the client also, we will only be discussing the server configuration in this section.

To set up automatic data collection on your Domino server, you use the Domino server Configuration Settings document. You can also enable or disable Fault Analyses from this tab in the Server Configuration Settings document. Perform the following steps:

- 1. From the Domino Administrator client, click the Configuration tab.
- 2. Select Server  $\rightarrow$  Configurations.
- 3. Select the Server Configuration document you want to edit and click Edit Configuration.

4. In the Configuration Settings document, click the **Diagnostics** tab and complete the fields as shown in Figure 8-8.



Figure 8-8 Configuration Settings document, Diagnostics tab

Table 8-2 shows the field definitions.

Field	Action
Mail-in database for diagnostic reports	Select the mail-in database to which you want the diagnostic report for server crashes mailed
Maximum size of diagnostic message including attachments (in MB)	Enter the maximum size of the entire message that automatic diagnostic data collection will create, including all the attachments (NSD, console output, user defined files, and so on)
Maximum size of NSD output to attach (in MB)	Enter the maximum size of the NSD log that can be attached to the document created by the automatic diagnostic data collection. (Automatic diagnostic data collection collects data and then creates documents in a mail-in database.)
Maximum amount of console output file to attach (in KB)	Use the default value of 10240, or enter another value between 10MB and 1KB. 10240 is the upper limit. This value represents the portion of the CONSOLE.LOG file to be sent, beginning with the end of the file and moving towards the beginning.

Field	Action
Diagnostic file patterns	Enter a file name pattern that Domino will search for. If the pattern is located, and it is listed in the file DIAGINDEX.NBF, the file will be attached to the message that is sent to the mail-in database. DIAGINDEX.NBF contains all the files associated with the crashing instance of the client or the server, for example, following is a file pattern: addin_log*.txt
	are located based on this pattern
Remove diagnostic files after a specified number of days	<ul> <li>Choose one of the following:</li> <li>No: (Default) Choose No to accept the default of never automatically deleting the diagnostic files created on the server.</li> <li>Yes: Choose Yes to enter the number of days after which the diagnostic files on the server are to be deleted.</li> </ul>
Number of days to keep diagnostic files	Accept the default value of 365 days, or enter another value representing the number of days after which the diagnostic files are to be deleted from the server. (This field displays only if you choose Yes for Remove diagnostic files after a specified number of days.)
Run Fault Analyzer on Fault DBs on this server	Determines if the Fault Analyzer will run on this Domino server and process any automatic diagnostic collection databases on the server. If none are found, the task will exit.
Run Fault Analyzer on	Choose whether you would like the Fault Analyzer to find all the mail-in databases on the server, or if you want to manually specify which databases will be processed.
Databases to run Fault Analyzer against	Enter the list of the databases the Fault Analyzer will process.
Remove attachments from duplicate faults	If faults are found to be an exact or partial match for an existing fault, if this field is set to Yes, any attachments on the new occurrence of the fault will be removed to save space.

The main benefit of the automatic diagnostic collection tool is the ability to know which diagnostic files that correspond to a server crash are created, and where they reside in, so that they can be collected. One of the features is the idea of a *diagnostic directory*, which is a common place where all the diagnostic files reside. The default location is <data directory>/IBM_TECHNICAL_SUPPORT.

Putting all the files in the same directory is not enough to allow you to definitively know which files are associated with a given server crash. Therefore, a new file is created in the data directory of the client or server to track the diagnostic files that have been created on the machine since startup. This file is called diagindex.nbf, and is created at startup when the console.log file is created.

If you are restarting after a crash, the previous diagindex.nbf file is renamed prior to creating the new one. Any Notes/Domino programs that use the underlying log creation functions register the file name of the diagnostic file being created into this index file. Any non-Notes/Domino processes can also append their titles to this file because it is an American Standard Code for Information Interchange (ASCII) text file.

When a Domino server restarts after a crash, a new executable called SENDDIAG loads. This program is responsible for processing the diagindex.nbf file that corresponds to the crash that just occurred. It searches through the index and extracts each of the diagnostic files that were generated. It also parses out (from the NSD) the Notes name, Notes/Domino version, operating system (OS) version, start time, crash time, error message, and the call stack of the thread that crashed. It then creates a mail message with all this information and sends it to the mail-in database that has been configured to receive this information.

One of the results of this is that the diagnostic data is created, but when the data is deleted, is up to the user. This data has the potential to use a lot of space. Administrators configure the duration for which these diagnostic files are kept within the Domino server Configuration Settings document. Every time a Domino server starts, a new executable called FILERET is invoked. This executable scans the diagnostic directory for files with the pattern_*cmachine name*. that exceed the configured number of days for which to keep the diagnostic files (default of 365 days), and removes them.

The database attaches to it the necessary diagnostics data files. If you place a call to Lotus support, these are likely to be the files requested by them to help determine the root cause of the problem. The administrative section is editable. Thus, if you find a matching SPR during your own investigation or if you open a PMR with Lotus support, you have the option to record the details in order to remain organized.

For further information about the setup and the usage of the automatic diagnostic collection tool, refer to the Domino 7 Administrator help database.

# 8.1.8 Cleaning up the orphaned shared memory or semaphores

After a Domino server crash or abnormal end, it might be necessary to address the orphaned shared memory or semaphores. This is required only if you have just experienced rampant crashing and your Domino server does not come up, or if at startup or shortly thereafter, you receive errors reporting *insufficient memory*.

If this is the case, a couple of options are available to you. The most popular option is available only from Support. A tool that contains the Delete Domino Shared Memory (DLTDOMSMEM) command and the Delete Domino Semaphores (DLTDOMSEM) command is available. This tool cleans up all the shared memory and semaphores that are specific to any given Domino server, provided it has been ended first.

If you have only one Domino server running on your system, the following options are also available to you:

- Using the iSeries Navigator to manually delete the shared memory or semaphores
- Using the i5/OS command line to manually delete the shared memory or semaphores

Attention: These options must be used only under the guidance of Lotus Support because deleting or clearing the shared memory or semaphores incorrectly can lead to further problems.

Although it has not been mentioned, for System i machines with multiple Domino servers or a single Domino server, IPLing the system cleans up problems relating to shared memory or semaphores. This must, however, be used as the last option, and used only when you are *certain* that the problem lies with orphaned or damaged shared memory or semaphores.

#### **DLTDOMSMEM and DLTDOMSEM**

If you have contacted Lotus Support, and have been provided the save file that contains the DLTDOMSMEM and DLTDOMSEM CL commands, after following the installation instructions, you will have these two i5/OS commands available.

The DLTDOMSMEM command deletes the Domino-shared memory that is specific to the Domino server that has been ended (Figure 8-9). Fill in the following fields:

- ► Server name: Domino server name. *ALL is also allowed
- ► Force if not owned by QNOTES: Default is *NO
- Delete shared memory: Default is *YES. If you want to see what shared memory is being referenced by the Domino server when it is active, you can choose *NO, run the command, and review the resulting report.

```
Delete Domino Shared Memory (DLTDOMSMEM)
Type choices, press Enter.
Server name .
                    . . . . . . > DOM7SVR1
                          Additional Parameters
Force if not owned by QNOTES . .
                                  *N0
                                                *NO, *YES
Delete shared memory . . . . .
                                  *YES
                                                *NO, *YES
                                                                      Bottom
F3=Exit F4=Prompt
                     F5=Refresh
                                  F12=Cancel
                                               F13=How to use this display
F24=More keys
```

Figure 8-9 The DLTDOMSMEM command screen

The DLTDOMMEM command deletes the Domino-shared semaphores that are specific to the Domino server that has been ended (Figure 8-10). Fill in the following fields:

- Server name: Domino server name. *ALL is also allowed.
- Force if not owned by QNOTES: Default is *NO
- Delete semaphore : Default is *YES. If you want to see which semaphores are being referenced by the Domino server when it is active, you can choose *NO, run the command, and review the resulting report.

Delete Domino Semaphores (DLTDOMSEM)						
Type choices, press Enter.						
Server name > DOM7SVR1						
Additional Parameters						
Force if not owned by QNOTES *NO*NO, *YESDelete semaphore						
Bottom F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display F24=More keys						

Figure 8-10 The DLTDOMSEM command

## Using the iSeries Navigator to delete the shared memory or semaphores

The ability to view and delete or clear the shared memory and semaphores through a graphical user interface is performed using the iSeries Navigator. This option should be used only if you have one Domino server on your system and it has been ended, or if you have multiple Domino servers and have ended all of them. Perform the following steps:

- 1. Start the iSeries Navigator and sign in to your System i machine as QSECOFR or a profile with equivalent authority.
- 2. Click the plus (+) sign next to your System i machine.
- 3. Select Application Development → Interprocess Communication (Figure 8-11). Click Semaphores.

🖉 iSeries Navigator		annen an	
File Edit View Help			
l 🖻 🖻 🗙 😭 🥸 🚺 🛇			
Environment: My Connections	Dom570: Interprocess Communication		
🕀 🛞 Management Central (Rchassq2)	Name	Description	
My Connections     Dom570     Basic Operations     Work Management     Work Management     Work Management     Metwork     Discrete Server Administration     Security     Users and Groups     Databases     Databases     Aplication Development     Micro Application Development     Micro Application     Kernel Message Queues     Shared Memory	¥yKernel Message Queues Semaphore Sets ≫ Shared Memory	IPC Kernel Message Queues IPC Semaphore Sets IPC Shared Memory	

Figure 8-11 Using the iSeries Navigator to see the semaphores and shared memory

4. In the right-hand panel, note the entries with the Owner as QNOTES. These are the entries that you will be highlighting and deleting if your Domino server or servers are ended (Figure 8-12).

To delete a semaphore, select the semaphore and click **Delete**, or right-click the semaphore and select **Delete**.

**Tip:** To delete multiple entries at once, you can either hold down the Ctrl key and select the corresponding entries one by one, or, if all the entries are consecutive entries, select the first of the entries to be deleted, and by holding down the Shift key, select the last entry to be deleted.

🧭 iSeries Navigator					
File Edit View Help					
1 h fi 🗙 😭 🥩 📆 🛇					302
Environment: My Connections	Dom570: Ser	maphore Sets			
🕀 📳 Management Central (Rchassq2)	Identifier	Key	Number of Semaphores	Owner	
My Connections	2	1644168475	1	Qsys	
🖻 🖞 Dom570	2 3	1711277339	1	Qsys	
Basic Operations	10	-166572030	3	Qnotes	
Work Management     Work     Work Management     Work     Work	11	-166572029	3	Qnotes	
Configuration and Service	103	-166768638	3	Qnotes	
E R Tabaarahad Casuar Administration	104	-166768637	3	Qnotes	
Integrated Server Administration					
Here and Groups					
Application Development					
Interprocess Communication					
Kernel Message Queues					
Semaphore Sets     Shared Memory					

Figure 8-12 Using the iSeries Navigator to work with semaphores

5. Click **Shared Memory**. In the right-hand panel, note the entries where the owner is QNOTES. These are the entries that you will be highlighting and deleting if your Domino server or servers are ended (Figure 8-13). Follow the instructions provided in the previous step (to delete semaphores) for deleting multiple shared memory entries.

**Note:** If you do not see the Owner field populated when looking at shared memory, it is probably because you are running V5R4 of the client. To resolve this, update the client to SP4 for iSeries Navigator.

Ø iSeries Navigator					
<u>File Edit View H</u> elp					
x 🖻 🖻   X 😭   🥩 🔢 🔍					0 minutes o
Environment: My Connections	Dom570: Sh	ared Memory			
🕀 🛞 Management Central (Rchassq2.rchland.ibm)	Identifier	Кеу	Segment Size	Number Attached	Owner
🗄 📲 My Connections	1792	-134180805	12000000	0	Qnotes
🖃 🖷 📴 Dom 570	128	704701608	160	0	Qnotes
🗄 😼 Basic Operations	1793	-134180804	12000000	0	Qnotes
🕀 📴 Work Management	129	704701609	160	0	Qnotes
	201	0	131072	1	Qsys
	<b>3//</b> 898	-134180837	12000000	0	Qnotes
E Security	130	704701610	160	0	Qnotes
Osers and Groups	2 899	-134180836	12000000	0	Qnotes
	259	704701804	160	0	Qnotes
	131	704701611	160	0	Qnotes
	<b>&gt;// 900</b>	-134180835	12000000	0	Qnotes
	132	704701612	160	0	Qnotes
Kernel Message Oueues	901	-134180834	12000000	0	Qnotes
F Semaphore Sets	133	704701613	160	0	Qnotes
Shared Memory	262	704701807	160	0	Qnotes
+ AFP Manager	134	704701614	160	0	Qnotes
🕀 🖷 🖪 Rchassq2.rchland.ibm.com	263	704701811	160	0	Qnotes

Figure 8-13 Using the iSeries Navigator to work with shared memory

- 6. If you are wondering what the shared memory segment is attached to before you delete it, you can determine this by selecting the Identifier field, right-clicking it, and selecting **Properties**.
- 7. In the Shared Memory Properties window's (Figure 8-14), Jobs Attached tab, you can see if any active job is currently using the shared memory segment.
  - Last attachment: Shows the date and the time that the last job attached to the shared memory segment
  - Last detachment: Shows the date and the time that the last job detached from the shared memory segment.
  - Last action performed: Shows information about the last job that attached to or detached from the shared memory segment. This information includes the following:
    - Job name: The name of the last job that attached to or detached from the shared memory segment. This information is not available if the job has ended or if the job is not initialized for asynchronous signals. A signal is a mechanism by which a job might be notified of an event or might be affected by an event occurring in the system.
    - User: The name of the user who owns the job. This information is not available if the job has ended or if the job is not initialized for asynchronous signals.
    - Number: The number of the job. This information is not available if the job has ended or if the job is not initialized for asynchronous signals.

- Process identifier: The process identifier for the last job that attached to or detached from the shared memory segment.
- Type: Identifies whether the last job attached to or detached from the shared memory segment. If the program cannot determine whether the last action was an attach or a detach, the value shown is "Not available".
- Jobs currently attached: The list of jobs that are currently attached to the shared memory segment includes the following:
  - Job name: The name of the job currently attached to the shared memory segment
  - User: The name of the user who owns the job
  - Number: The number of the job
  - Times attached: The number of times the job has attached to the segment.

**Note:** After deleting all the shared memory, you might see that some of the shared memory is still listed in the column. This is fine as long as the key value is all zeros.

Shared Memory Pro	perties - Dom	1570		? 🔀	
General Jobs Attache	d Permissions				
Last attachment:		09/22/06, 14	4:13:20		
Last detachment:	ast detachment: 09/22/06, 14:13:21				
Last action performe	ed				
Job name:					
User:					
Number:					
Process identifier:		201			
Type:		Detach			
Jobs currently attache	ed:				
Job Name	User	Number	Times Attached		
Cirepl	Onotes	094210	1		
Cldbdir	Onotes	094208	1	=	
Adminp	Qnotes	094201	1		
Update	Qnotes	094199	1		
Colsrv400	Qnotes	094197	1		
Qnninbrm	Qnotes	094195	1	~	
		ОК	Cancel	Help	

Figure 8-14 Shared memory properties

#### Using a 5250 session to view the shared memory or semaphores

You might prefer to use the i5/OS command line to view the shared memory or semaphores. This section provides the method in which to accomplished this. There are methods to clear or delete the shared memory or semaphores. However, these are not covered in this book because the margin for error outweighs the requirement to show how this is done. Instead, use the DLTDOMSMEM and DLTDOMSEM CL commands mentioned earlier in this section.

Perform the following steps:

- 1. Using a 5250 emulation session, sign in to your System i machine.
- With the Domino servers ended, type the following command on an i5/OS command line: CALL PGM(QP0ZIPCS) PARM('-Emsa')

This command creates a spooled file with the file name IPCS, which you can access by using the Work with Spool Files (WRKSPLF) command or the Work with Jobs (WRKJOB) command and option 4.

3. Note the entries where QNOTES is the Owner. The sample output from the command looks as shown in Figure 8-15.

IP	IPC STATUS AS OF Thu Nov 16 16:35:32 2006					
SH/	ARED MEMORY:					
Т	ID KEY	MODE	OWNER	GROUP	CREATOR	CGROUP
М	1792 OXF800903B	RW-RW	QNOTES	*NONE	QNOTES	*NONE
М	128 0X2A00E4A8	RWRW-	QNOTES	*NONE	QNOTES	*NONE
М	1793 0XF800903C	RW-RW	QNOTES	*NONE	QNOTES	*NONE
М	129 0X2A00E4A9	RWRW-	QNOTES	*NONE	QNOTES	*NONE
М	1 0X0000000	T-RW-RW	QSYS	*NONE	QSYS	*NONE
	ATTACH LIST:					
	NUMATT APID					
	1 58					
М	898 0XF800901B	RW-RW	QNOTES	*NONE	QNOTES	*NONE
М	130 0X2A00E4AA	RWRW-	QNOTES	*NONE	QNOTES	*NONE
М	899 0XF800901C	RW-RW	QNOTES	*NONE	QNOTES	*NONE
М	259 0X2A00E56C	RWRW-	QNOTES	*NONE	QNOTES	*NONE
М	131 0X2A00E4AB	RWRW-	QNOTES	*NONE	QNOTES	*NONE
М	900 0XF800901D	RW-RW	QNOTES	*NONE	QNOTES	*NONE
М	132 0X2A00E4AC	RWRW-	QNOTES	*NONE	QNOTES	*NONE
М	901 0XF800901E	RW-RW	QNOTES	*NONE	QNOTES	*NONE
F3:	=Exit F12=Cancel	F19=Left F2	20=Right	F24=More ke	ys	

Figure 8-15 Sample output from the CALL QP0ZIPCS command

# 8.2 Unresponsiveness and slowdown of a Domino server

Describing your Domino server as being in a "hung" state generally means that the server is unresponsive. This means that you cannot enter commands on the Domino server console or even if you can enter commands, no data is returned from them. In this frozen state, no new connections are allowed, and the existing connections are unresponsive or are dropping off and not reconnecting again. This occurs despite all the tasks in the Domino subsystem appearing to be active and working. Unfortunately, however, the uptime of the server is not serving any real purpose.

A slowdown is similar, but varies, in that, the Domino server console is still responsive and some work is getting down, but the client response time is poor and the Domino server appears sluggish.

What is important here is that the Domino server might be unresponsive or slowing down for a number of reasons. It is therefore, best to check certain things before rushing in to end the current life cycle of the active server.

Following are some of the likely reasons:

- It could be a system resource issue. A runaway task might be causing CPU spikes (use the WRKACTJOB command or the WRKSYSACT command if the commands are available).
- There could be an unbalanced or even failing disk unit (use WRKDSKSTS).
- A BRMS backup or some other process might be holding a lock on a critical object, which might eventually clear (use WRKACTJOB).
- The memory in the *BASE pool might have been exhausted due to an irregular functionality, or all the active threads in the pool might have been used up (use WRKSYSSTS).
- It could be a network issue or a faulty Ethernet card in the System i machine (use NETSTAT).

# 8.2.1 Data to be provided to Lotus Support

Ideally, the following debugs will be set on the Domino server prior to a reported hang or slowdown. If this is the first time that the issue is occurring, it is likely that the settings are not enabled, and determining the root cause might not be possible. In order to properly debug a slowdown or hang, the following NOTES.INI parameters must be set and the Domino server restarted:

- ► DEBUG_SHOW_TIMEOUT=1
- ► DEBUG_CAPTURE_TIMEOUT=10
- DEBUG_THREADID=1
- CONSOLE_LOG_ENABLED=1

When these parameters are enabled, semaphore-related activity will be populated to the console log and to a file called SEMDEBUG.TXT, which exists in the IBM_TECHNICAL_SUPPORT subdirectory of the Domino server in question. If the hang or slowdown is related to semaphore activity, this populated file will be instrumental in determining the root cause of the problem.

If semaphore timeouts are encountered on your Domino server, you will see entries, such as those shown in Figure 8-16, posted to the Domino server console log and within the SEMDEBUG.TXT file.

```
THREAD [02AB:0123] WAITING FOR FRWSEM 0x030B Collection semaphore (@0BE65A20)
 (R=0,W=1,WRITER=0080:015E,1STREADER=0000:0000) FOR 30000 ms
THREAD [01FE:0220] WAITING FOR FRWSEM 0x0244 open database semaphore
 (@00ECBDD2)
 (R=0,W=1,WRITER=0080:015E,1STREADER=0000:0000) FOR 30000 ms
```

Figure 8-16 Semaphore timeout example

In addition to this debug, when a hang or slowdown condition occurs, perform the following tasks:

 Issue the Dump Domino Server Call Stack (DMPDOMSVRC) command and specify the affected Domino server. This dumps the thread activity for all Domino jobs to i5/OS spool files.

**Note:** As mentioned earlier, starting with Domino 7.0.2, the ease of collecting or working with data is greater. Optionally, you can dump the Domino server call stacks using option 16 (Dump server call stacks) from the WRKDOMSVR screen.

- If the Domino server console is still responsive to commands, try issuing the show task debug command and pressing F5 to see if the results are displayed. Optionally, if you have chosen not to have enabled console logging, press F6 to print out the results to a spool file, which can later be reviewed.
- 3. If the hang or slowdown is possibly related to the HTTP task, issue tell http show thread state to report what the threads are processing. Depending on what is found, you might also be asked to enable HTTP thread logging.

**Note:** Prior to Domino 7, the functionality to dump the Domino server thread activity or the Domino job activity was available only after downloading a tool from the Domino for i5/OS Web site. Although you can still use this tool, which provides the DMPSVRSTKS and DMPDOMCLL CL commands when running Domino 7, the commands that are provided and reside in the QDOMINO7*xx* library (where *xx* is the release you are running; for 7.0.2, this is QDOMINO702) must be used.

4. After this debug is set and the necessary actions taken, contact Lotus Support and provide them the resulting data. The easiest way is to bring up the iSeries Navigator and navigate to Basic Operations → Printer Output (Figure 8-17).

🕗 iSeries Navigator				
File Edit View Help				
📽   II 🕨 🤤 📴   X 🖻 🖻   X 😭	ە 🛐 🕸			1 minutes old
Environment: My Connections	Dom570: Printe	r Output User: Weiser		
🕀 🎚 Management Central (Rchassq2)	File Name	User-specified Data	User	Status
My Connections Dom570 Messages Printer Output Printer Output Printer S Sconfiguration and Service Vork Management Printer S Vork Mana	Server Update Event Http Amgr Adminp Replica Router Sched Rnrmgr Ldap Smtp Amgr Qprint		Weiser Weiser Weiser Weiser Weiser Weiser Weiser Weiser Weiser Weiser Weiser Weiser	Ready to print Ready to print
🗄 🖓 Intelligent Agents	4			F

Figure 8-17 Viewing DMPDOMSVRC output through the iSeries Navigator

5. From this point, you can simply select each spool file and drag it to your PC's desktop to copy it locally, and thus be able to provide as an e-mail attachment to Support. To retrieve the other files that are required, such as console.log and semdebug.txt, navigate to File Systems → Integrated File System → Root and go down to your Domino server's IBM_TECHNICAL_SUPPORT subdirectory in which the files reside (Figure 8-18). Select the files and drag them to your PC's desktop. You can then send all the files to Support.

Chillening Navigator				HARMAN REPORTED AND AN ADDRESS OF	
	194161262				
File Edit View Help					
16   X 🖻 🖻 🗙 🗗 🎯 🔢 🛇					
Environment: My Connections		Dom570: IBM_TECHNICAL_SU	UPPORT	Include: *.*	
🗄 🖓 Integrated Server Administration	^	Name	Size	Туре	Changed
🕀 🤀 Security		configspecific_DOM7S	36KB	DXL File	10/16/2006
🕀 👹 Users and Groups		Configspecific_DOM7S	33KB	DXL File	10/19/2006
		configspecific_DOM7S	33KB	DXL File	10/19/2006
Generation State	≣	configspecific_DOM7S	33KB	DXL File	11/10/2006
Integrated File System		configspecific_DOM7S	33KB	DXL File	11/14/2006
E Root		🗷 console.log	2KB	Text Document	11/21/2006
		console_DOM7SVR1	2KB	Text Document	10/16/2006
		Console_DOM7SVR1	2KB	Text Document	10/16/2006
t+ dev		console_DOM7SVR1	2KB	Text Document	10/16/2006
DOCUME~1		Console_DOM7SVR1	2KB	Text Document	10/24/2006
		Console_DOM7SVR1	2KB	Text Document	10/30/2006
		console_DOM7SVR1	2KB	Text Document	11/13/2006
🖃 📲 Domino		Console_DOM7SVR1	2KB	Text Document	11/13/2006
🖻 🧰 DOM7SVR1		Console_DOM7SVR1	2KB	Text Document	11/13/2006
🖻 💼 Data		console_DOM7SVR1	2KB	Text Document	11/14/2006
E DFC		console_DOM7SVR1	2KB	Text Document	11/14/2006
⊡ doc		console_DOM7SVR1	2KB	Text Document	11/14/2006
🕀 🛄 domino		Console_DOM7SVR1	2KB	Text Document	11/14/2006
🕂 📃 gtrhome		Console_DOM7SVR1	2KB	Text Document	11/14/2006
		Console_DOM7SVR1	2KB	Text Document	11/15/2006

Figure 8-18 Locating the console.log file using iSeries Navigator

# 8.2.2 Detailed explanation of the semaphore debug

In a multitasking environment, there is often a requirement to synchronize the execution of various tasks or to ensure that one process is completed before another begins. This requirement is facilitated by the use of a software switch known as a semaphore or a flag. The function of this is similar to a railway signal, that is, allowing only one train on the track at a given time. A semaphore timeout is similar to a railway signal set in one state for too long, probably because the train has broken down.

## An example of a semaphore timeout

An example of a semaphore timeout in Domino is when the INDEXER task has to completely rebuild an index, it locks a semaphore so that other tasks cannot use the index until it is rebuilt. If a user task tries to open that index when it is being rebuilt, it has to wait for the indexer to finish the rebuild, and then unlock the semaphore. As a result, the user task is stuck until that semaphore is unlocked. When it is stuck waiting for the semaphore, it keeps track of how long it has been waiting. If it is stuck for more than 30 seconds, it is considered a semaphore timeout, and in debug mode, a message is logged to the Domino server console.

Domino administrators often become alarmed at the presence of numerous semaphore appendages to the console log. This occurs if the site experiences performance problems and Domino server hangs are common.

The task continues to wait for the semaphore, timing out every 30 seconds until the semaphore is unlocked or the task is ended. For most operations, a task might only wait a few microseconds and not time out. With a complicated view on a large database, the task might have to wait several minutes for the index semaphore.

If an important semaphore is locked by a task and is never unlocked, all the tasks can be stopped waiting for that semaphore. This can happen in several ways. The most common is where a task locks the semaphore and then crashes. This can also happen if a task locks the semaphore and then goes into an endless loop or it gets an error and forgets to unlock it.

Semaphore deadlock can occur when two tasks try to lock two different semaphores in a different order, for example, Task A locks Semaphore 1 and then tries to lock Semaphore 2. Meanwhile, Task B has already locked Semaphore 2 and is now trying to lock Semaphore 1. Task A is stuck waiting for Semaphore 2 and Task B is waiting for Semaphore 1. This is a deadlock situation.

#### Determining if a semaphore timeout has occurred

If the issue is a semaphore timeout, you will see the sem.timeouts statistic in the Domino server console. To view this statistic, type the following Domino server console command:

```
sh stat sem.timeouts
```

If the problem has occurred, you will see something similar to the following, depending on the nature of the semaphore timeout:

Sem.Timeouts = 430D:58 0A13:42 030B:28 0116:26 0A12:21

**Note:** The statistic sem.timeouts will *not* appear in the Statrep database if you are not experiencing semaphore timeouts.

The first number is the semaphore ID. The ID tells us what the semaphore is used for, for example, 0x030B is the collection semaphore used by the Notes Index Facility (NIF). The second number is a decimal number that shows the number of times the semaphore timeout occurred. Table 8-3 shows a listing of semaphore IDs. It is not unusual to get semaphore timeouts in a heavily used server.

Semaphore	Function	
0x0244	NSF per database semaphore	
0x410F	OS File system semaphore	
<b>0</b> x0266	NSF per database full text semaphore	
0x4245	NSF database opening semaphore	
0x030B	NIF collection semaphore	
0x430D	NAMELookup semaphore	
0x0A13	Log commit semaphore	
0x0116	Console semaphore	
0x0A12	Buffered log package semaphore	
0x030B	Collection semaphore	
0x4117	Handle table free chain consistency semaphore	

Table 8-3 Semaphore IDs

Semaphore	Function	
0x0A0B	Session table semaphore	
0x4113	Handle table movement semaphore	
0x33D5	AdminP's semaphore for ACL modification	
0x5708	BSAFE semaphore (RSA encryption stuff)	
0x0255	NSF B-Tree semaphore	
0x0294	Directory Manager Queue semaphore	
0x1120	Transfer queue lock semaphore	
0x4253	Internal control semaphore	

# 8.3 Performance problems

To properly investigate a performance problem, Domino administrators must be familiar with their environment. This means that they must know the normal CPU usage, the normal memory faulting, and the normal disk I/O for their Domino servers. This is what is considered a baseline. To better become familiar with the Domino environment on your System i machine, use the following performance checklist provided in this section.

The performance checklist can be run through with just a few System i and Domino commands. These commands allow you to check most of the major i5/OS aspects that might affect you Domino server's performance.

Run the following i5/OS commands and write down the output or results. If you are unfamiliar with any of the commands or steps, contact Lotus Support for assistance. Refer to Chapter 6, "Domino 7 performance tuning on i5/OS" on page 195 for details about how to perform the following steps:

1. DSPSYSVAL SYSVAL(QMODEL)

Write down the model number of your System i machine.

2. WRKHDWRSC TYPE(*PRC)

Write down the Processor Capacity Card and the Interactive Card information.

3. DSPSYSVAL SYSVAL(QMAXACTLVL)

Make sure that this system value is set to *NOMAX

- 4. WRKACTJOB
  - Write down the system CPU
  - Write down the CPU of individual Domino jobs
  - Write down the run priority of the Domino jobs
  - Write down the storage pool the Domino jobs are running in
- 5. WRKSYSSTS
  - Write down the paging/faulting in the *MACHINE pool
  - Write down the paging/faulting in the storage pool where Domino is running
  - Write down any ineligible jobs in the storage pool where Domino is running
  - Write down the % System ASP used and the current unprotected used values

- 6. WRKDSKSTS
  - Write down the % busy for the disk units in the ASP where Domino is running
  - Write down any disk units that have a % busy significantly higher than other units
- 7. NETSTAT *CNN
  - Check port 1352 connections for any retransmissions
- 8. WRKDOMCSL SERVER(<ServerName>)
  - Run the SHOW STAT SEM Domino command
  - Run the SHOW SERVER Domino command
    - Check Peak number of sessions because too many sessions might indicate network issues
    - Check Transactions: No transactions might mean a Domino server hang

# 8.3.1 High server workload

You notice that the CPU usage on your system is high and the user response time is poor. The following questions will help you qualify what is happening to the CPU:

- ▶ Is the CPU higher than you expect? Or is the CPU higher than it used to be?
- What was the CPU like yesterday? Last week?
- Have you seen CPU spikes in Domino jobs earlier? If so, which job was it, and was there any pattern? Same time of day? Same day of the week?
- High CPU usage might be caused by a loop or by a large spike in the amount of work that a job has to process, for instance, if the ROUTER job starts taking up a lot of CPU, the job might be looping on a single piece of e-mail (which is a problem) or someone might have just sent a mass e-mail to 1000 users (which is normal because mass mailing can cause the CPU to spike when it is delivering the messages).

# 8.3.2 Finding the root cause of high CPU

Start by determining the jobs generating the extra CPU. If you have the iSeries Performance Tools (5722-PT1) loaded on the system, use the WRKSYSACT command.

**Note:** For more information about 5722PT1 tools, refer to 6.2.4, "Performance Tools for iSeries (5722-PT1)" on page 202.

The WRKSYSACT command lists all the job threads and tasks on the system in the order of CPU percentage, with the threads taking the largest amount listed first.

Press the F10 key to refresh the statistics on the screen.

If the threads taking the most CPU are always the same, these are the ones that must be taken note of. Write down the thread number, job name, job user, and job number.

If you do not have the iSeries Performance Tools (5722-PT1) loaded on the system, use the WRKACTJOB command to determine which jobs are taking up large amounts of CPU. The difference between WRKSYSACT and WRKACTJOB is that WRKSYSACT shows jobs and tasks. The WRKACTJOB command shows only jobs.

**Tip:** For more information about i5/OS command-line performance commands, refer to 6.2.1, "Performance and i5/OS commands" on page 199

When you are in the Work with Active Jobs (WRKACTJOB) screen, sort the jobs by CPU so that the jobs taking up the most CPU are at the top of the list. To do this, perform the following tasks:

- 1. Place the cursor on the CPU% column.
- 2. Press the F16 key to sort the jobs by CPU (Shift+F4).
- 3. Press F10 to watch the CPU changing and check if the same jobs are always at the top of the list. If the process taking up the most CPU is always the same, this might be the job that is generating the excessive CPU (Figure 8-19).

Write down the job name, job user, and job number, which can be obtained by pressing the F11 key twice.

	Work with	Active Jobs	RCHAS10
			08/12/06 16:23:10
CPU %: 50	Elapsed time: 0	0:45:43 Active :	jobs: 206
Type options, press	s Enter.		
9=Exclude 10=D	isplay call stack	11=Work with locks	5
12=Work with thre	eads 14=Work wit	h mutexes	
	Current		
Opt Subsystem/Job	User Type	CPU % Function	Status
SERVER	QNOTES BCI	35.3 PGM-SERVER	SELW
HTTP	QNOTES BCI	20.1 PGM-HTTP	SELW
STATS	QNOTES BCI	7.4 PGM-STATS	SELW
UPDATE	QNOTES BCI	6.2 PGM-UPDATE	SELW
SCHED	QNOTES BCI	.1 PGM-SCHED	SELW
ROUTER	QNOTES BCI	.1 PGM-ROUTER	SELW
RNRMGR	QNOTES BCI	.1 PGM-RNRMGR	SELW
REPLICA	QNOTES BCI	.1 PGM-REPLICA	SELW
QNNINSTS	QNOTES BCH	.1 PGM-QNNINSTS	S EVTW
			More
Parameters or comma	and		
===>			
F3=Exit F5=Refree	sh F7=Find	F10=Restart stat	tistics
F11=Display elapse	d data F12=Cance	1 F23=More option	s F24=More keys

Figure 8-19 WRKACTJOB display, sorted by CPU %

Now that you have narrowed down the problem to a particular job, identify which thread in the job is generating the extra CPU:

- 1. Run the WRKACTJOB command and find the job you identified earlier.
- 2. Type option 5 (Work with) in front of that job and press Enter to work with the job information. In the Work with Job screen, make a note of that job number.
- 3. Type menu option 20 (Work with threads, if active) to display the threads in that job. If there are multiple threads running in this job, continue to check each individual thread to identify which thread is generating the extra CPU utilization. Under normal conditions a thread can periodically be seen entering and exiting a RUN status.

4. The Total CPU column indicates how much time (in seconds) that particular thread has been in the processor.

**Note:** The value in the Total CPU column does *not* directly relate to the CPU percentage of the job.

If a thread is generating most of the extra CPU utilization, you might notice that it has a larger value in the Total CPU column than the other threads. Or, you might notice that the thread is constantly in a RUN status. Remember that more than one thread might be responsible for the excess CPU.

Write down the thread identifier for the threads you believe might be responsible for generating the extra CPU utilization.

Now that you have identified the job and the thread that might be generating the extra CPU, look at the thread's call stack and see if you can recognize what that thread is doing. This can be done in a variety of ways:

- ► Using the Domino 7 Dump Job Call Stacks (DMPJOBCLLS) command
- ► Using the Dump Domino Server Call Stacks (DMPDOMSVRC) command
- ► The traditional method of option 20 (Work with threads, if active) from the Work with Job menu, and then option 10 (Display call stack) from the Work with Threads screen.

When displaying what you believe is the offending server thread taking up high CPU, for example, you see a screen similar to the one shown in Figure 8-20.

Display Call	Stack		
			System: ASO9
Job: SERVER User: QNOIES N	umber: 081142		
Thread: 00000084			
		ILE	ILE
Procedure	Statement	Module	program
NSFNoteUpdateExtended2	000000043	NTUPWRAP	LIBNOTES
DbMonitorEvalNote	0000000596	MONITORS	LIBNOTES
MonitorEvalNoteFP16DBCONTEXT_STRUCTUi	U19 000000730	MONITORS	LIBNOTES
NSFComputeMainFormula2	0000001431	CNSFWRAP	LIBNOTES
Eval7ComputeFv	0000001764	COMPUTE	LIBNOTES
ComputeVariants8RootNodeFv	0000001397	COMPNODE	LIBNOTES
ComputeVariants14AtFunctionNodeFv	0000001171	COMPNODE	LIBNOTES
Execute_10AtAbstractFv	0000001813	ATABSTRACT	LIBNOTES
Abstract	000000001	ABSTRACT	LIBNOTES
AbstractInternal	8000000008	ABSTRACT	LIBNOTES
DoChunks	000000005	ABSTRACT	LIBNOTES
FindChunksInText	000000021	CHUNK	LIBNOTES
FindEndOfTextChunk	000000034	CHUNK	LIBNOTES
NextLine		CHUNK	LIBNOTES
Cstrpbrk	000000004	CSTR	LIBNOTES
			Bottom
F3=Exit F10=Update stack F11=Display in	struction F12=	Cancel	

Figure 8-20 Display Call Stack screen

In the example call stack shown in Figure 8-19, notice the *DbMonitorEvalNote* procedure and the *FindChunksInText* procedure. Monitors are used for both kinds of mail rules that are set in an individual's mail file, and mail rules that can be set for the entire Domino server in the Domino 7 code.

The procedure FindChunksInText indicates that the thread is searching for something in the text of a document. This call stack is telling you to look at mail rules (specifically, for mail rules that might be searching the body or the subject of an e-mail for certain words or phrases).

Tip: Usually, some procedure in the call stack will tell you what a particular thread is doing.

If you cannot identify the issue causing the excessive CPU at this point, gather some information and traces when the problem is occurring, and contact Lotus Support.

8.3.3, "Gathering data for high CPU usage" on page 341 explains information and traces.

# 8.3.3 Gathering data for high CPU usage

Perform the following steps to gather data when the CPU is running high on your system:

1. Collect the job log for the job you identified earlier by issuing the following command:

DSPJOBLOG JOB(xxxxx/user/jobname) OUTPUT(*PRINT)

In this command, *xxxxxx* is the six-digit job number you noted earlier. This command generates a spooled file called QPJOBLOG.

**Tip:** If the current logging level is insufficient, you might be requested by Support to increase the logging level. Use the following command for this:

chgjobd jobd(qusrnotes/subsystemname) log(4 00 *seclvl)

- 2. Provide the necessary system value information by using the following i5/OS commands:
  - DSPSYSVAL QMODEL: System model number
  - DSPSYSVAL QPRCFEAT: Processor feature
  - DSPSYSVAL QPRCMLTTSK: Processor multitasking
  - DSPSYSVAL QPRFADJ: Performance adjustment
- 3. Enter the following Domino server console commands so that the output gets written to the LOG.NSF and the console log:
  - SH SERVER DEBUG
  - SH USER
  - SH DIRECTORY
  - SH TRANSACTIONS
  - SH TASKS DEBUG
  - SH SCHED
  - SH STATS
  - SH MEMORY DUMP
  - TELL ROUTER SHOW QUEUE
  - TELL ROUTER LIST
  - TELL AMGR STATUS
  - TELL HTTP SHOW THREAD STATE

 Make a copy of LOG.NSF from the Domino server, whose job is using the extra CPU. If you have console logging enabled, you can send in the console log, rather than the log.nsf.

Use a Lotus Notes client and open the LOG.NSF database of the Domino server generating the high CPU utilization. Select **File**  $\rightarrow$  **Database**  $\rightarrow$  **New Copy**. Ensure that you change the new file name to something other than LOG.NSF.

5. Collect the system history log (QHST) with the following command:

DSPLOG OUTPUT (*PRINT)

This command generates a spooled file called QPDSPLOG.

6. Gather the system operator message queue with the following command:

DSPMSG MSGQ(QSYSOPR) OUTPUT(*PRINT)

This command generates a spooled file called QPDSPMSG.

7. Generate a list of the program temporary fixes (PTFs) installed on the system with the following command:

DSPPTF OUTPUT(*PRINT)

This command generates a spooled file called QSYSPRT.

- Dump the call stacks for the Domino server using the DMPDOMSVRC command. This
  creates spool files for each of the Domino server's jobs and for the pid.nbf database.
- 9. Gather information about the TCP/IP connections to the system:

NETSTAT *CNN

Press F6 to print the information on the Work with TCP/IP Connection Status screen. This command generates a spooled file called NETSTAT.

10. Collect a TPROFS Performance Explorer Trace (PEX Trace) as long as you have more than 0.5 processing power on the LPAR:

**Tip:** For more information about TPROFS (PEX trace), refer to *Collecting and Analyzing PEX Trace Profile Data*, which is available on the Web at:

http://www.ibm.com/servers/eserver/iseries/perfmgmt/pdf/tprof.pdf

- a. Create a library to store the data in, with the following command: CRTLIB LIB(MYLIB)
- b. Add a PEX definition that describes the data you want to collect:
- Enter the following command and press Enter:

CALL QCMD

Issue the following command:

ADDPEXDFN DFN(JOB1) TYPE(*TRACE) JOB((xxxxxx/user/jobname)) TASK(*NONE) MAXSTG(100000) INTERVAL(1) TRCTYPE(*SLTEVT) SLTEVT(*YES) BASEVT(*PMCO)

In this command, *xxxxxx* is the six-digit job number you noted earlier in step 1.

The screen might report nothing, but if you look at the lower level messages using DSPJOBLOG, you will see that your PEX definition is added (Figure 8-21).

```
ADDPEXDFN DFN(JOB1) TYPE(*TRACE) JOB((040153/USER/JOBNAME)) TASK(*NONE) MA
XSTG(100000) INTERVAL(1) TRCTYPE(*SLTEVT) SLTEVT(*YES) BASEVT((*PMCO))
Member JOB1 added to file QAPEXDFN in QUSRSYS.
Member JOB1 file QAPEXDFN in QUSRSYS changed.
Definition JOB1 added.
```

Figure 8-21 Using DSPJOBLOG for your current session for lower-level information

**Note:** This PEX definition is only good when the job you specified in the JOB parameter is running on the system. After that job ends, this definition is useless. Delete the definition using the following Remove PEX Definition (RMVPEXDFN) command:

RMVPEXDFN DFN(JOB1)

c. Start the PEX trace with the following command:

STRPEX SSNID(TRACE1) DFN(JOB1)

Let the trace run for 2 - 3 minutes when the CPU is high.

d. End the PEX trace:

SBMJOB CMD(ENDPEX SSNID(TRACE1) DTALIB(MYLIB)) JOB(ENDPEX)

Wait for the batch job to end before proceeding with the next step.

e. Verify the status of the job using the following command:

WRKSBMJOB

Wait for the job called ENDPEX to have a status of OUTQ.

f. If you have the Performance Tools for iSeries (5722-PT1) loaded on your system, you can print the PEX report:

SBMJOB CMD(PRTPEXRPT MBR(TRACE1) LIB(MYLIB) TYPE(*PROFILE)
PROFILEOPT(*SAMPLECOUNT *PROCEDURE)) JOB(PRTPEX)

This command generates a spooled file called QPVPERPT in the batch job you submitted. In this example, the batch job you submitted is called PRTPEX. Use the command WRKJOB JOB(PRTPEX) to find the spool file.

If you do not have the Performance Tools for iSeries (5722-PT1) loaded on your system, send the library containing the PEX data to Lotus Support.

## 8.3.4 Using the iSeries Navigator to investigate a performance issue

Domino and System i administrators must be proactive in monitoring performance over an allotted period of time. Refer to 6.1, "Defining Domino 7 performance on the i5/OS" on page 196, where the methods and strategy are well documented.

However, in this instance, iSeries Navigator is used to view statistical information to troubleshoot a Hypertext Transfer Protocol (HTTP) performance issue, in much the same way that it was used to gather information in 8.3.3, "Gathering data for high CPU usage" on page 341.

Assume that a system CPU is running at 98 per cent, and the Domino server console is accepting, but not responding, to commands. Trying to open an HTTP session takes a long

time, and eventually times out with no page to display. If you have iSeries Access for Windows installed on a client PC workstation and have configured Management Central (refer to 6.2.3, "Management Central" on page 201), you will be amazed at the details you can access using this interface. The following process explains how to access some of these details:

- 1. Start the iSeries Navigator client on your workstation to view the list of System i machines available to you.
- 2. Click the **plus** (+) icon next to the system experiencing the performance issue.
- 3. Right-click Work Management and select System Status.
- 4. Under the System Status window's (Figure 8-22) General tab, you can see the CPU usage, the total number of jobs in the system, the number of jobs that are active, the total disk space capacity, and the percentage of disk capacity used.

🖬 System Status - Dom570
Last refresh: 9/14/06 11:24:11 AM Elapsed time: 00:02:30
General Jobs Processors Memory Disk Space Addresses
CPU usage (elapsed): 49.5 %
Jobs
Total: 882
Active: 440
Addresses used
Permanent: 0.027 %
Temporary: 0.035 %
Total disk space: 493.96 GB
System disk pool
Capacity: 493.96 GB
Usage: 66.115 %
Reset Statistics
Close Help ?

Figure 8-22 System status from iSeries Navigator
- 5. Under the Jobs tab, click the **Active Jobs** button.
- 6. This displays the Active Jobs window (Figure 8-23). If you click a column name, for example, CPU %, the list of processes is displayed in increasing order, from the lowest in CPU percentage to the highest in CPU percentage. Double-clicking the column name again changes the sort order from highest to lowest.

۰	🗯 Active Jobs - Dom570									
File	File Edit View Help									
D										
Elap	osed time: 00:00:	00								
Job	Job Name Detailed Status Current User Type CPU % Priority Count									
ارچ	Danger	Waiting for dequeue	Qsys	Subsystem	0.0	0	1			
۲	Adminp	Waiting for select	Qnotes	Batch immediate	0.0	20	2			
۲	Amgr	Waiting for select	Qnotes	Batch immediate	0.0	20	2			
۲	Amgr	Waiting for select	Qnotes	Batch immediate	0.0	20	2			
۲	Calconn	Waiting for condition	Qnotes	Batch immediate	0.0	20	1			
۲	Cldbdir	Waiting for condition	Qnotes	Batch immediate	0.0	20	3			
۲	Clrepl	Waiting for select	Qnotes	Batch immediate	0.0	20	2			
۲	Event	Waiting for select	Qnotes	Batch immediate	0.0	20	8			
۲	Logasio	Waiting for condition	Qnotes	Batch immediate	0.0	20	2			
۲	Qnninbrm	Waiting for signal	Qnotes	Batch immediate	0.0	20	1			
۲	Qnninsts	Waiting for event	Qnotes	Batch - Server	0.0	20	1			
۲	Replica	Waiting for select	Qnotes	Batch immediate	0.0	20	3			

Figure 8-23 Using the iSeries Navigator to list the active jobs

7. To see further performance details of a job, right-click a job and select **Properties**. The window shown in Figure 8-24 is displayed.

• 090979/Qnotes/Se	rver Properties - Dom570
Server Security General Pe	Date/Time International Threads Resources Other rformance Printer Output Messages Job Log
Job name:	Server
User:	Qnotes
Number:	090979
Туре:	Batch immediate - Server
Job user identity:	Qnotes
Detailed status:	Waiting for select
Function:	Server program
Entered system:	9/14/06 11:21:10 AM
Started:	9/14/06 11:21:10 AM
Subsystem:	Domino16
Library:	Qusrnotes
Job description name:	Domino16
Library:	Qusmotes
	OK Cancel Help ?

Figure 8-24 Job properties using iSeries Navigator

8. In the Properties window, select the **Performance** tab and then click the **Elapsed Performance Statistics** button. A window similar to the one shown in Figure 8-25, providing detailed information about the job, is displayed.

**Note:** The Average response time field and the Interactive transactions field will *not* display when the elapsed performance statistics are shown for a thread.

💿 090979/Qnotes/Server Elapsed Perfo 🖃 🗖 🔀							
Job name: Server User: Qnotes Number: 090979							
Last refresh: 9/1 4/06 4:47:30 PM							
Elapsed time: 05:05:42							
Performance statistics of	alculated over e	lapsed time ——					
CPU:							
Percentage:	0.2	%					
Time:	77311	milliseconds					
Database percentage:	0	%					
Database time:	0	milliseconds					
Disk I/O rate:	0.7	per second					
Synchronous:	0.6	i per second					
Asynchronous:	0.1	per second					
Disk I/O count:	14085						
Synchronous:	11082						
Asynchronous:	3003						
Page fault rate:	0.1	per second					
Average response time:		seconds					
Interactive transactions: 0							
Refresh Now Timed Refresh Reset Statistics							
	Close	Help ?					

Figure 8-25 Elapsed performance statistics of a job

Table 8-4 provides details about each of the statistics listed for the performance statistics calculated over the elapsed time.

CPU statistic	Description
Percentage	The percentage of available processing unit time that is used by the job or thread during the elapsed time. For multiprocessor systems, this value is the average across all processors.
Time	The amount of processing unit time that is used by the job or thread during the elapsed time, in milliseconds.
Database percentage	The percentage of total processing unit that is used for database processing during the elapsed time. For multiprocessor systems, this value is the average across all processors.
Database time	The amount of processing unit time that is used for database processing during the elapsed time, in milliseconds.

Table 8-4 Elapsed performance statistics

CPU statistic	Description
Disk I/O rate	The average number of disk I/O operations performed by the job or thread during the elapsed time, per second. This value is the sum of the asynchronous and synchronous disk I/O operations.
Disk I/O rate, Synchronous	The average number, per second, of synchronous (physical) disk I/O operations performed by a job or thread during the elapsed time. This value is the sum of the synchronous database and nonadjustable reads and writes.
Disk I/O rate, Asynchronous	The average number of asynchronous disk I/O operations performed by the job or thread during the elapsed time, per second. This value is the sum of the asynchronous database and the nondatabase reads and writes.
Disk I/O count	The number of disk I/O operations performed by the job or thread during the elapsed time. This value is the sum of the asynchronous and synchronous disk I/O operations.
Disk I/O count, Synchronous	The number of synchronous (physical) disk I/O operations performed by the job or thread during the elapsed time. This value is the sum of the synchronous database and nondatabase reads and writes.
Disk I/O count, Asynchronous	The number of asynchronous (physical) disk I/O operations performed by the job or thread during the elapsed time. This value is the sum of the asynchronous database and nondatabase reads and writes.
Page fault rate	The average number of times, per second, that an active program references an address that is not in main storage during the elapsed time.
Average response time	The average interactive transaction response time for the job during the elapsed time, in seconds.
Interactive transactions	The number of user interactions for the job during the elapsed time, for example, the number of times a person pressed a function key.

- 9. Back in the Active Jobs window, other useful details about a job are available. If you right-click a job and select **Details**, you see a list of options, as shown in Figure 8-26.
  - *Call Stack* displays the procedures being invoked by the initial thread of the job.
  - Library List displays the libraries in use by the selected job.
  - *Locked Objects* displays the initial locks, and from this screen, you get the lock holders, which is similar to the WRKOBJLCK command on the i5/OS command line.
  - *Open Files* allows you to view open library objects and open file system objects by selected job.
  - *Threads* displays a list of all the threads after the initial thread of the job, along with their status, and other invaluable properties pertaining to the job.
  - Transactions displays a list the transactions of the selected job.
  - Elapsed Performance Statistics displays detailed performance information for a job or thread.

Although each of these have their own uses (and should be explored when time permits) in our example, the Threads option is explored further. Select **Threads**.

🗯 Active Jobs - Dom570								
File Edit View Help								
▶ ∎ ▶ ₹	□ ■ ▶ ♀ × ☎ ♀ ▼ ○ ○ 10 minutes old							
Elapsed time: 00:14	h:06							_
Job Name	Detailed Status		Current User	Туре	CPU %	Run Priority	Thread Count	
Qzrcsrvs	Waiting for time interval		Ahoerle	Prestart batch	1.3	20	1	
Event	Waiting for select		Qnotes	Batch immediate	1.0	20	14	
Event	Waiting for select		Qnotes	Batch immediate	0.9	20	26	
Event	Waiting for select		Qnotes	Batch immediate	0.9	20	14	
Event	Waiting for select		Qnotes	Batch immediate	0.8	20	14	
Event	Waiting for select		Qnotes	Batch immediate	0.8	20	14	
Server	Waiting for select	Decet Stati	etice	Batch immediate	0.4	20	48	
Qpwfservso	Waiting for dequeue	Reset State	5005	Prestart batch	0.4	20	1	
Websphere_	Waiting for Java progran	Printer Out	put	Batch - Server	0.2	20	251	
Server	Waiting for select	Job Log		Batch immediate	0.2	20	80	
Server	Waiting for select	Details	C 🕴 🕑	all Stack		20	71	
Server	Waiting for select	Book	Li	brary List		20	68	
Server	Waiting for select	Kepiy	Lo	ocked Objects		20	69	
Server	Waiting for select	Release	0	pen Files	•	20	76	
Server	Waiting for select	Release	Т	hreads		20	73	
Server	Waiting for select	Move	Т	ransactions		20	78	
Server	Waiting for select	Delete/End		Land Dev Company Cha	L'alian	20	66	
Server	Waiting for select	Monitor		apseu Performance Sta	lusues	20	77	
Server	Waiting for select		La	ast SQL Statement		20	77	
Server	Waiting for select	Propertie	s	Batch immediate	0.1	20	68	~

Figure 8-26 Job detail options from iSeries Navigator

10. In the Threads window that is displayed, locate the threads taking up the highest CPU, right-click it and select **Properties**. Again, the CPU column can be sorted by double-clicking it. Note down the details shown in the Thread Properties window (Figure 8-27) because this might be important in identifying the problem.

If a problem exists, often, many of the threads will report waiting for lock, and some appear to be running. If the thread remains waiting for an extended period of time, you can select the locked objects from the Details menu to view the object on which the thread is waiting to get a lock. You can then view the other jobs and threads that hold a lock on the object and are preventing this thread from getting its lock. If, for example, a thread is trying to update an object in a database, and another thread tries to update that same object, a lock is put on the object, allowing only one thread to update at a time. The other thread has to wait until the first thread is done with the updates to be able to access that object. This is used to preserve the integrity of the data within the object.

Other possible thread status values are:

- Job Held
- Held (n)
- Stopped by a signal
- Waiting for save while active checkpoint
- Waiting for condition
- Waiting for dequeue
- Waiting for event
- Waiting for activity level
- Waiting for Java program

- Waiting for lock
- Waiting for lock space
- Waiting for mutex
- Waiting for select
- Waiting for semaphore
- Waiting for signal
- Waiting for thread
- Waiting for time interval
- Unknown

**Note:** When Waiting for lock is shown in a Thread Properties window, additional information that identifies the object being locked is displayed. When the object being locked is an i5/OS object, you will see a 10-character object name, its library, and the object type. When the object being locked is an internal object, you will see a 30-character object name, its library, and its object type. Remember, for internal objects, you require Job Control (*JOBCTL) special authority to see the 30-character name.

👶 00000171 P	roperties - Dom570							
General Performance								
Thread:	00000171 (initial thread)							
Detailed status:	Detailed status: Waiting for select							
Current user:	Qnotes							
Type:	Initial							
Job:	Server							
User:	Qnotes							
Number:	090979							
Disk pool group:								
	OK Cancel Help ?							

Figure 8-27 Thread properties using iSeries Navigator

# 8.4 Additional troubleshooting parameters

Unfortunately, there is no hard or fast rule about how to troubleshoot a Domino issue. So many variables exist that the best approach is to continually narrow the scope of the problem until you are confident that you have determined the root cause. Often, this process involves turning on additional logging for the function that you are investigating. If you encounter a situation, and the problem is not self-evident from the initial diagnostic data at hand, Lotus Support might present you with a set of debug parameters to further help in troubleshooting the situation.

Many NOTES.INI debug parameters exist. This section describes only a small subset of the ones that you might be asked to use in order to determine the root cause of a problem. Enable these debug parameters by editing the Domino server's NOTES.INI file or through the **set config** Domino server console command.

**Attention:** The debug parameters provided here must only be used if you are already familiar with them or if you have been advised to do so by Lotus Support. Also note that some additional levels of setting might be available for a given parameter.

Following is a list of the general debug parameters:

Console_Log_Enabled=1

This is Domino's dynamic debug outfile for trapping error messages to a log file (other than the LOG.NSF). The console logging can be switched on and off with the start consolelog and stop consolelog commands.

Console_Log_Max_kbytes=100000

This parameter sets a size limit to the CONSOLE.LOG file. Setting the Console_Log_Max_kbytes to 100000 results in the CONSOLE.LOG file being limited to 100 MB in size. On hitting that limit, it will wrap.

Debug_Threadid=1

Enabling this debug parameter provides more information about each entry posted to the Domino server console, including job number, process ID (PID), and thread number. This is extremely useful when combined with other utilities to determine the last activity by a thread prior to a crash, or what a particular thread was doing during a hang or slowdown situation.

Log_View_Events=1

This records to the console whenever views are rebuilt.

Following is a list of the hang debug parameters:

Debug_Show_Timeout=1

This parameter, combined with the Debug_Capture_Timeout=10 parameter, allows for the population of a file called SEMDEBUG.TXT, which exists in the IBM_TECHNICAL_SUPPORT subdirectory, and is vital to determine the root cause for server slowdowns or hangs.

Debug_Capture_Timeout=10

This parameter, combined with the Debug_Show_Timeout=1 parameter, allows for the population of a file called SEMDEBUG.TXT, which exists in the IBM_TECHNICAL_SUPPORT subdirectory, and is vital to determine the root cause for server slowdowns or hangs.

Following is a list of the Simple Mail Transfer Protocol (SMTP) debug parameters:

SMTPDebug=4

Enabling this debug parameter logs all the inbound SMTP protocol conversations to include commands and responses along with some of the text, but not the body of the messages.

SMTPDebugIO=3

This debug parameter is used to log all the data received by the SMTP listener task.

SMTPClientDebug=1

This debug parameter is used to log all the outgoing SMTP protocol conversations for all the external messages transferred by the router task.

SMTPDebugControls=3

This assists in determining a variety of issues involving SMTP to include reverse DNS queries and blacklists.

SMTPDebugDNSBL=1

This assists in determining issues when utilizing the blacklists function.

SMTPSaveImportErrors=3

This provides the SMTP listener task to save all the inbound messages during import, and then delete all the messages that have successfully been received and written to mail.box. This leaves only the messages that fail to be imported in the mail.box. These messages are saved to a temp file for review.

MIME_Save_Convert_Failures=1

Enabling this setting results in the copying of messages that failed conversion, to a separate database called CFDB.NSF.

Following is a list of the mail routing debug parameters:

► Log_MailRouting=40

This posts to the Domino console, all the transfer messages, message queues, and full document information involving mail.box.

DebugRouter=3

This debug parameter also increases the logging level for router activity.

Debug_TCP_Resolver=1

This debug parameter increases the logging of the TCP/IP name lookup function and assists in determining DNS issues.

Debug_Directory_Assistance=1

This provides for high-level logging of directory assistance activities.

Debug_NameLookup=1

This enhances the logging of the name lookup function.

DebugRouterLookUp=3

This displays how the router task resolves a name lookup.

Following is a list of the agent manager debug parameters:

Debug_AMGR=*

This increases all aspects of logging for the Agent Manager task.

Log_AgentManager=1

This specifies that the execution of partially and completely successful events are logged.

Following is a list of the update debug parameters:

Log_Update=2

Setting this debug parameter posts to the Domino console when the Indexer starts and stops and when the Indexer updates the views and full text indexes for specific databases. It also records the names of the views being updated.

Debug_NIF_Update=1

Enabling this debug parameter provides for a report when an the Update task is started and stopped. This report includes the database name, the view name, and the user name of the update. Most importantly, if an error is encountered it prints out the error message during the rebuild or creation of the view involved.

Debug_NIF=1

This parameter prints out information concerning the opening, closing, and updating of significant indexing events and must be used rarely because of the excessive output.

Following is a list of the POP3 debug parameters:

POP3Debug=4

This serves the same purpose as the SMTPDebug parameter, except that it does so for the POP3 task.

► POP3DebugIO=3

This serves the same purpose as the SMTPDebugIO parameter, except that it does so for the POP3 task.

POP3ClientDebug=1

This serves the same purpose as the SMTPClientDebug parameter, except that it logs the entire conversation for the POP3 task.

Following is a list of the LDAP debug parameters:

LDAPDebug=7

Increases whatever is reported by the LDAP task to assist in lookups, but will also have a potential performance impact on the LDAP server depending on usage.

Following is a list of the ADMINP debug parameters:

Debug_ADMINP=1

This debug parameter provides for the administration process to save its schedule information each time the schedule is updated.

Following is a list of the Network and connectivity debug parameters:

Debug_TCP_All=1

This provides low-level TCP/IP session information and must be used rarely because of the amount of logging and possible impact to Domino server performance.

Debug_TCP_Errors=1

This is similar to the Debug_TCP_All=1 parameter, in that, it provides low-level information about TCP-related errors that are encountered.

Log_Connections=1

When this debug parameter is set, the Domino server console displays the Notes network port, the network address of the requesting system, and the network address of the destination server.

► Log_Sessions=1

Enabling this parameter posts each individual session to the Domino server console, and includes the user and the version of the Notes client being used.

Debug_TCP_Session=1

This enables debug information about when sessions are opened and closed to the Domino server console.

Following is a list of the full text index debug parameters:

Debug_FTV_Search=1

This displays information about full-text searches and statistics.

Debug_FT_Stream=1

This records every document that is full-text indexed by the Domino server.

Debug_FTV_Index=1

This displays debug information about the indexer when updating full-text indexes.

Following is a list of the replication debug parameters:

Log_Replication=4

This debug parameter specifies whether the start and the end of replication sessions are posted to the Domino server console. If using the value of 4, it reports replication all the way down to field-level replication. If set to 3, it records down to the note level, and if set to 2, it reports activity at the database level.

Debug_REPL_Time=1

This parameter posts to the Domino server console the time a replication action took.

Debug_REPL_All=2

This parameter provides additional information about each document that is not replicating.

Following is a list of the HTTP debug parameters:

► HTTPAgentDebug=4

This is used to help debug Java agents within HTTP.

AgentThreadDebug=1

This assists in determining which HTTP agent is being processed at the time of a server failure.

HTTPEnableThreadDebug=1

This generates htthr files detailing all the HTTP thread activity.

HTTPLogFormatAscii=1

This allows the HTTP log files to be written in ASCII instead of Extended Binary Coded Decimal Interchange Code (EBCDIC).

DebugShowJavaAgentTID=1

This allows for determining which worker or control thread spawns which Java thread when executing a Java agent. It also prints out the agent name.

Following is a transaction logging debug parameter:

Debug_RM_Debug=1

This debug parameter reports high-level information about the actions that the recovery manager is taking against each database.

Following is a memory overwrite debug parameter:

Debug_Checkmarkers=1

This debug parameter is used to help diagnose memory overwrites.

Following is a compact debug parameter:

Debug_DBCompact=1

This debug parameter provides additional high-level details about the compact task activity.

Following is a reports debug parameter:

Debug_Reports=1

This allows for additional logging of reports that are run from reports.nsf.

Following is a list of the memory-related debug parameters:

Debug_Showleaks=2

This enables memory usage tracking in conjunction with memory dump to help determine if a leak exists.

Debug_TrapLeaks_ShowStack=1

This assists in debugging potential memory leaks.

NSD_RUN_MemCheck=1

This provides for memory-related debug, and is described in 8.4.1, "MEMCHECK".

#### 8.4.1 MEMCHECK

In a situation where it is not easy to determine the boundaries of a hang, including MEMCHECK in the debug data may assist in determining the root cause of a problem. MEMCHECK provides indepth information about memory, memory pools and blocks, and other system variables. This might prove to be invaluable in instances such as a performance issue or a potential memory leak, irrespective of the information included in an NSD.

MEMCHECK was added to the Domino for iSeries code in Release 6.0.5 and Release 6.5.4. Before those Releases, MEMCHECK did not run on the iSeries platform.

There are two ways to trigger MEMCHECK on the System i platform:

From the Domino server console type:

load memcheck -k curr -d err -v 2

Insert the notes.ini variable:

NSD_RUN_MEMCHECK=1

The first method is a Domino server console command. The last parameter in the string (-v 2) is the verbose level of the output. This can be 1, 2, 3, or 4. Running this Domino server console command creates a text file called memcheck_mm_dd_yy@hh_nn_ss.log (mm is the month, dd is the day, yy is the year, hh is the hour, nn is minutes, and ss is seconds), in the IBM_TECHNICAL_SUPPORT subdirectory.

The second method is a Domino server NOTES.INI parameter. If a Domino server crash occurs when this parameter is set, the MEMCHECK output is incorporated into the NSD file that is created.

You can invoke the Domino server console command to run MEMCHECK only. Alternatively, you can type LOAD NSD from the Domino server console. With the debug parameter active, MEMCHECK data is produced as part of an NSD, also located in the IBM_TECHNICAL_SUPOPORT directory.

Figure 8-28 shows an example of MEMCHECK output.

```
Browse : 20.log
Record : 1 of 7683 by 14 Column : 1
                                              96 by 79
Control :
....+...1....+...2....+...3...+...4...+...5...+...6....+...7...+...
0
Section: Notes Memory Analyzer (memcheck) (Time 17:07:20)
0
Arguments: QDOMIN0702/MEMCHECK -k curr -d err -v 2
Copyright (c) IBM Corporation 1987, 2006. All Rights Reserved.
<@@ ----- Notes Memory Analyzer (memcheck) -> Shared Memory Analysis (Time
17:0
Open shared memory DPOOL key=0xf8000800
** Analyzing shared memory DPOOL 'key=0xf8000800' size=9460336
Number of Shared Pools = 13
Number of Small Shared Pools = 9
F3=Exit F10=Display Hex F12=Exit F15=Services F16=Repeat find
F19=Left F20=Right
```

Figure 8-28 Example of MEMCHECK output



9

# Domino 7 backup and recovery using BRMS

The successful backup of data is vital for any production software solution. Without this capability, the cost of missing or lost data can bring potential hardship to a company. This chapter covers the System i solution of backing up Domino data using Backup, Recovery, and Media Services (BRMS) to provide for a 24x7 online solution.

BRMS is a separate, chargeable i5/OS product (5722-BR1) that can be purchased for use on any System i machine. It allows both full and incremental backups, and restores to tape devices, automated tape libraries, save files, and TSM servers.

The objective of this chapter is to cover, at a fairly high level, the backup and recovery process. This chapter describes the methods of using the iSeries Navigator graphical user interface (GUI) and of using a 5250 emulation session. This provides administrators with the option of using either method to leverage the BRMS software to best save the Domino for i5/OS data.

**Note:** For traditional built-in i5/OS save and restore features, which do not include the ability to save Domino servers when they are running, refer to the IBM Redbooks *Lotus Domino for AS/400 R5: Implementation*, SG24-5592 or *Domino 6 for iSeries Best Practices Guide*, SG24-6937. Although both these publications reference earlier releases of Domino, they are still relevant for backing up your Domino 7 data.

BRMS supports the online backup of Domino servers when they are active. This online backup implies that the Domino server databases on i5/OS can be saved when they are in use, and thus require no save when active synchronization points. This is considered as true online backup support.

The ability to first use Domino and BRMS together existed when Domino R5.0.2c was released. This provided for full online backups of Domino servers. Subsequently, starting with R5.0.8.01, the ability to also perform incremental saves was added. The marriage between these two products has continued to build with the releases of Domino 6, 6.5, and now Domino 7.

This chapter uses the documentation provided from the BRMS Web page, the IBM Redbook *Domino 6 for iSeries Best Practices Guide*, SG24-6937, and Lotus technical documents. These resources are available in the following Web sites:

► IBM Systems - iSeries Backup Recovery and Media Services for iSeries

http://publib.boulder.ibm.com/infocenter/iseries/v5r4/topic/books/sc415345.pdf

BRMS iSeries Navigator Client Student Guide V5R4

http://www.ibm.com/servers/eserver/iseries/service/brms/pdf/StudentGuide54.pdf

► Domino 6 for iSeries Best Practices Guide, SG24-6937

http://www.redbooks.ibm.com/abstracts/sg246937.html?Open

Lotus Software Knowledge base

http://www.ibm.com/software/lotus/support

**Note:** The BRMS software is a chargeable licensed program (5722BR1) and is shipped with every System i machine. It can be used and evaluated free of charge for 70 days. If you want to continue using the product, contact IBM Direct or your IBM Business Partner to purchase the software.

# 9.1 How Backup, Recovery, and Media Services works with Domino

This section explains BRMS concepts and terminology. It then details how the BRMS product provides for the backing up of Domino data when the Domino server is active.

#### 9.1.1 Backup, Recovery, and Media Services concepts

BRMS concepts are the fundamentals for understanding the terminology used, and what they mean. This section briefly describes some of the common terms and how sometimes the same word mentioned in iSeries Navigator is slightly different in a 5250 emulation session. Following is a list of these terms:

Media	A tape cartridge that holds the saved data
Media identifier	A name given to a physical piece of media
Media class	A logical grouping of media with similar physical or logical characteristics, for example, density
Control group	A group of items, for example, libraries or stream files, to back up, and the attributes associated with how to back them up. iSeries Navigator references these control groups as <i>policies</i> .
Policies	A set of defaults that are commonly used, for example, device or media class. Generally used defaults are in the BRMS system policy. Backup-related defaults are in the BRMS backup policy.

#### 9.1.2 How Domino online backups work

Full online backups of a Domino server consist of database files and changes files. The change files contain all the updates to a database when it is being backed up. These two objects are bound together during the backup in order to provide for restoration of databases in the event of a recovery. Incremental online backups build on this by also including the saves of the transaction logs.

BRMS uses a concept called a *package* to bind the backup of the databases to the change files and the associated transaction logs. When a full online backup is run, the Domino server uses the Package Identifier (PKGID) parameter in the Save Object using BRM (SAVBRM) CL command to specify the package association between the databases and the changes files. During the backup, the Domino server also references the Recovery Exit Program (RCYEXITPGM) parameter to specify a Domino server exit program, which BRMS calls after the package is recovered.

Online backups of Domino servers are stored in the BRMS history information as packages. The number of elements in the package is determined by the type and number of online backups performed. In the case of full online backups, the package number is 2. For every subsequent incremental online backup, 1 is added to the full package number. The maximum package number is 99, which allows for a full online backup, and 97 incremental online backups for each Domino server.

When you request BRMS to recover a Domino server database that is saved as a package, BRMS restores the entire package consisting of the database files, changes files, and transaction logs. After these are all restored, BRMS calls the Domino server exit program, which in turn applies the transaction log changes to the restored databases.

#### 9.1.3 Configuring Backup, Recovery, and Media Services to work with Domino

This section explains the setup process of configuring BRMS to work with Domino on your System i machine and how to customize it for your environment. The initial requirement is to have the BRMS (5722BR1) licensed program installed along with a recent group PTF. For i5/OS V5R3, the BRMS group PTF identifier is SI23620, and for V5R4 it is SI23622.

For administrator-based or GUI-based restores, you must have iSeries Navigator installed on a PC workstation and the BRMS plug-in installed, in order to be able to save or restore data outside the traditional 5250 emulation session options.

#### Initializing Backup, Recovery, and Media Services

When BRMS (5722BR1) is first installed on i5/OS, there will be nothing defined for it to run with Domino. The process for setup though is quite simple. If the Domino licensed program (5733LD7) is installed and a Domino server is already configured, you only have to issue either the Start Maintenance for BRM (STRMNTBRM) command or the Initialize BRMS (INZBRM) for *DATA CL command to create the new Domino control groups that can be used or copied to backup your Domino server. If you subsequently add additional Domino servers, you only have to rerun either of these CL commands to have new corresponding control groups created for the new Domino servers.

If, for example, you have one Domino server configured when you issue the Initialize BRMS (INZBRM) command, you will see the following two control groups created:

- QLTSDOM00 (saves just the one Domino server)
- QLTSSVR (saves all the Domino servers)

If more Domino servers are configured and the initialize BRMS CL command is rerun, you will see additional QLTSDOMxx BRMS control groups for each Domino server configured. An administrator then has the choice of saving Domino servers individually or saving them all through the QLTSSVR control group. If neither of these are wanted, a third option exists to create a new customized control group to save any combination of Domino servers within the control group.

**Note:** Any customization that is performed to the automatically created BRMS control groups, that is, the ones that start with the letter Q, are overridden each time the Start Maintenance for BRM (STRMNTBRM) command or the Initialize BRMS (INZBRM) for *DATA CL command is run. If you want to customize the control groups, they must be copied to another naming convention. Many administrators choose to create controls with the same name as the Domino server being saved, or, if they are saving multiple Domino servers, the name of the control group gives an indication of its function.

By default, the types of objects that are backed up are files with the extensions of *.ns?, *.nt?, and *.box because they are the objects that are core to the function of your Domino server.

Although many customers find that the default BRMS control groups for their Domino servers are sufficient to save the vital Domino data required for disaster recovery, BRMS also provides the ability to fully customize the backup to include other integrated file system objects, for example, notes.ini, jpeg files, or gif files, that are not saved by the initial Domino server control groups, which saves only the databases, templates, and mail boxes.

Attention: When saving these other integrated file system objects, the Domino server must be ended.

For more details about how to customize the integration of BRMS with Domino, refer to the following Web site:

http://www.ibm.com/servers/eserver/iseries/service/brms/dominitbrm.html

# 9.1.4 Save and restore the scenarios of Domino data using Backup, Recovery, and Media Services

This section lists some common scenarios used to save Domino data and to recover Domino data through BRMS. Each scenario can be performed using the iSeries Navigator client or a 5250 emulation session, depending on whether your choice is graphical-based or command line-based.

The save scenarios include the following:

- Domino full online backup
- Domino incremental online backup

The restore scenarios from either full or incremental online backup include the following:

- Recovery to the same Domino server with the same name
- Recovery to the same Domino server, but with a different name
- Recovery to a different Domino server with the same name
- Recovery to a different Domino server with a different name

As you can see, many options are available for data recovery. For example purposes, this chapter details only a few of these scenarios. Being familiar with the process in general will hopefully allow you to logically perform any of these scenarios after reading this chapter.

In all the examples shown in this chapter, the following software levels are used. Thus, the screen captures in this chapter reflect these software levels. If you are using different software levels, your screen captures might vary.

- iSeries Navigator V5R4 with BRMS plug-in installed
- Domino server 7.0.2
- ▶ i5/OS V5R4

## 9.2 Performing a full online backup of a Domino server

This section shows you how to perform a full online backup of a Domino server using BRMS through iSeries Navigator (refer to 9.2.1, "Using iSeries Navigator to perform the full online backup") and through a traditional 5250 emulation session (refer to 9.2.2, "Using a 5250 emulation session to perform the full backup" on page 365).

It should be understood that periodic full offline backups of the System i machine, either through the traditional save methods or through BRMS is a must. Although the online backup of the Domino server via BRMS saves the Domino data, it will not provide for complete disaster recovery.

The information in this section also assumes that the setup of your BRMS environment is already complete and that your are familiar with BRMS in general. If not, refer to the following Backup Recovery and Media Services Web page for additional information:

http://www.ibm.com/servers/eserver/iseries/service/brms

**Note:** The setup required to provide for Domino full online backup is minimal. There is no need to enable transaction logging unless desired and there are no additional services required. As long as the Domino R7 (5733LD7) licensed program is installed on the system along with BRMS (5722BR1), the capability exists out of the box to run full online backups.

#### 9.2.1 Using iSeries Navigator to perform the full online backup

In order to save your Domino server using iSeries Navigator, perform the steps described in this section. These steps assume that the initial setup with regard to media is already complete and that BRMS is configured to work with Domino on your system. For more information, refer to 9.1.3, "Configuring Backup, Recovery, and Media Services to work with Domino" on page 359.

Perform the following steps:

1. From the iSeries Navigator client, expand **Backup**, **Recovery and Media Services** and select **Backup Policies**, as shown in Figure 9-1.



Figure 9-1 BRMS backup policies available through iSeries Navigator

2. As shown in Figure 9-2, right-click the Domino server policy in the right-hand panel and select **Run Now**.



Figure 9-2 Starting the full online save of a Domino server

3. Immediately after starting the full online save, unless you have changed the policy to not allow for overrides, the Run Backup Policy window (Figure 9-3) is shown. You are prompted to accept the default settings or change them. The default for a new backup policy is a full online backup. Therefore, you only have to click **OK** to begin the save.

🖉 Run Backup Policy Dom7svr1 - Backup Overrides 🛛 🛛 🔀					
Backup activity for all backup items in policy					
Ose policy setting: Full					
C Override policy setting: Full					
Retention for backup information					
O Use policy settings					
C Override policy settings:					
O Days (1-9999): 35					
C Permanently					
$\square$ Ignore backup policy omits. This does not affect omitted items in backup lists.					
OK Cancel Help ?					

Figure 9-3 Option to override backup settings

4. An initial screen stating that the status is starting is displayed. The screen eventually changes to show the Completed status (Figure 9-4).

🐵 'Run 'Dom7svr1' backup policy' Status	- 0 🛛
File Help	
Status: Completed	
Target Systems and Gr Status	
— 📱 Rchassq2 Completed	

Figure 9-4 Backup policy status showing Completed

- 5. To see what is saved, go back to your backup policies view (Figure 9-2 on page 362), right-click your policy, and select the **Backup History** option.
- 6. In the Backup History window (Figure 9-5), define the days you want to include. Alternatively, accept the defaults for all. Click **OK**.

Backup Histor	ry - Include 📃 🗆 🔀
Policy:	Dom7svr1
Media pool:	All
Backup dates:	All
From: Au	igust 14, 2006 💼 to: 🛛 August 14, 2006 💼
Volume:	All
Completion status:	All
Disk pool number:	All
Disk pool name:	All
Expiration dates:	All
From: Au	igust 14, 2006 🛫 to: 🛛 August 14, 2006 🛫
Type of backup:	All
System:	Local system
Backed-up items	
Type: All	
Name: All	
	OK Cancel Help ?

Figure 9-5 Backup history include options

7. The Backup History window (Figure 9-6) shows the results of prior saves.

🗟 Backup History - Rchassq2								
File Edit View Help								
📽 🗣 🗛 🗙 I	📽 🔍 🛧 🔲 🋐							
Policy: Dom7svr1 S	System: Usibm:	zq.rchassq2						
Backed Up Item	Туре	Date	Time	Backup Type	Volume	Expiration	Objects Saved	Objects Not Saved
🚞 All directory data		8/14/06	10:59:20 AM	Full	Savefile	8/14/06	50	0
🚊 All directory data		8/14/06	10:59:31 AM	Full	Savefile	8/14/06	50	0
🚊 All directory data		8/14/06	10:59:43 AM	Full	Savefile	8/14/06	6	0
Qusrbrm	Library	8/14/06	10:59:50 AM	Media Information	Savefile	8/14/06	19	0
All directory data		8/14/06	4:00:35 PM	Full	Savefile	8/14/06	50	0
All directory data		8/14/06	4:01:00 PM	Full	Savefile	8/14/06	50	0
All directory data		8/14/06	4:01:22 PM	Full	Savefile	8/14/06	6	0
Qusrbrm	Library	8/14/06	4:01:29 PM	Media Information	Savefile	8/14/06	19	0
1 - 8 of 8 objec	:ts							

Figure 9-6 Backup history results

You have now performed a full online save of a Domino server using iSeries Navigator. If you want to see what is saved, double-click the individual entries to verify the objects that are backed up.

For additional information about what functionality is available and how to effectively use the iSeries Navigator with BRMS, refer to the Backup Recovery and Media Services for iSeries, which is available in the following Web site:

http://www.ibm.com/servers/eserver/iseries/service/brms/pdf/StudentGuide54.pdf

#### 9.2.2 Using a 5250 emulation session to perform the full backup

In order to save your Domino server using a 5250 emulation session, perform the steps described in this section. These steps assume that the initial setup with regard to media is already complete and that BRMS has been configured to work with Domino on your system. Refer to 9.1.3, "Configuring Backup, Recovery, and Media Services to work with Domino" on page 359 for details.

**Important:** The Save Domino Server using BRMS (SAVDOMBRM) CL command must *never* be used outside of a backup control group or policy. The command must only be used with the *EXIT entries within a BRMS backup control group or policy.

Perform the following tasks:

- 1. Start a 5250 session to your System i machine. In an i5/OS command line, enter the Start Backup using BRM (STRBKUBRM) CL command and press F4 to prompt the command.
- 2. In the Start Backup using BRM (STRBKUBRM) screen (Figure 9-7), type the Domino server control group name in the Control group field and press Enter. This example accepts the defaults and submits the backup to batch.

Start Backup	using BRM (ST	RBKUBRM)
Type choices, press Enter.		
Control group > Schedule time Submit to batch	DOM7SVR1 *IMMED *YES	*BKUGRP, *SYSGRP, *SYSTEM hhmm, *IMMED *YES, *CONSOLE, *CTLSBS, *NO
Starting sequence: Number	*FIRST *FIRST *CTLGRPATR	1-9999, *FIRST Name, *FIRST *CTLGRPATR, *BKUPCY, *N0
Job description	*USRPRF *JOBD	Name, *USRPRF Name, *LIBL, *CURLIB Name, *JOBD
Library	*CTLGRPATR	Name, *LIBL, *CURLIB *CTLGRPATR, *FULL, *INCR
Retention type	*CTLGRPATR 35 *PROCESS	*CTLGRPATR, *DAYS, *PERM 1-9999 *PROCESS, *IGNORE
F3=Exit F4=Prompt F5=Refresh F24=More keys	F12=Cancel	F13=How to use this display

Figure 9-7 Start Backup using BRM (STRBKUBRM) CL command

 Check the status of the save by issuing the Work with Submitted Jobs (WRKSBMJOB) CL command to monitor the status until it completes and goes to OUTQ status, as shown in Figure 9-8.

Work wit	n Submitted Jobs RCHASSQ2
Submitted from :	*JOB
Type options, press Enter. 2=Change 3=Hold 4=End 5=Wo 8=Work with spooled files	rk with 6=Release 7=Display message
Opt Job User Type DOM7SVR1 WEISER BATCH	Status Function OUTQ
Parameters or command	Bottom
F3=Exit F4=Prompt F5=Refrest F12=Cancel F17=Top F18=Botto	n F9=Retrieve F11=Display schedule data m

Figure 9-8 Work with Submitted Jobs (WRKSBMJOB) results

4. To view the results of your save, issue the Work with Media Information (WRKMEDIBRM) CL command. As shown in Figure 9-9, the Saved Item column in the Work with Media Information screen reflects the name of the Domino subsystem and the Save Type reflects *LTSONL, which indicates a full online backup of a Domino server.

**Note:** In the i5/OS releases prior to V5R4, the saved item indicated a type of *LINK, followed by the numeral "2", meaning that the online backup is a full save.

Work with Media Information					R	CHASSQ2	
Position to Da	ate						
Type options, 2=Change 9=Work with	press Ent I=Remove saved ob;	ter. 5=Displa jects .	ay 6=1 ••	Work with	media	7=Restore	
Saved Opt Item DOM7SVR1 DOM7SVR1 DOM7SVR1 QUSRBRM	Save Date 8/15/06 8/15/06 8/15/06 8/15/06	Save Time 14:30:32 14:30:59 14:31:23 14:31:30	Save Type *LTSON *LTSON *LTSON *QBRM	Parallel Devices L L	Volume Serial *SAVF *SAVF *SAVF *SAVF	File Sequence 0 0 0 0	Expire Date *NONE *NONE *NONE *NONE
F3=Exit F5=Refresh F11=Object detail F12=Cancel F23=More options						Bottom	

Figure 9-9 Work with Media Information (WRKMEDIBRM) results

For more information about performing BRMS backups using a 5250 emulation session, refer to Backup Recovery and Media Services for iSeries document, which is available on the Web at:

http://publib.boulder.ibm.com/infocenter/iseries/v5r4/topic/books/sc415345.pdf

## 9.3 Performing a Domino incremental online backup

This section explains how a Domino incremental backup is performed using BRMS through iSeries Navigator (refer to 9.3.2, "Using the iSeries Navigator to perform an incremental backup" on page 376) and through a 5250 emulation session (refer to 9.3.3, "Using a 5250 emulation session to perform an incremental backup" on page 377).

It should be understood that periodic full offline backups of the System i machine, using either traditional save methods or using BRMS, is a must. Although the online backup of the Domino server through BRMS saves the Domino data, it does not provide for complete disaster recovery.

**Important:** If you are performing one full online save of your Domino servers weekly, and then the daily incremental online backups, you must remember that an incremental save must be performed immediately *before* the full online save in order to provide point-in-time (PIT) recovery. Otherwise, a window stating that PIT cannot be accomplished is displayed.

The main reasons that administrators implement incremental saves are:

- To recover a database to a specific point-in-time
- To speed up the duration of the save as incremental backups only save objects that have changed
- To reduce the number of tapes required for the save, which in turn, can reduce retention costs

The information provided here assumes that the setup of your BRMS environment is already complete and that your are familiar with BRMS in general. If not, refer to the following Backup Recovery and Media Services Web page for additional information:

http://www.ibm.com/servers/eserver/iseries/service/brms

#### 9.3.1 Changes required to provide for Domino incremental backups

The following configuration changes are required regardless of whether you plan to perform the incremental backups and recoveries using iSeries Navigator or a 5250 emulation session:

- Archival transaction logging must be enabled
- The BRMS additional service must be added to the Domino server
- The control group or policy configured to perform incremental backups must be updated

**Note:** For further information about transaction logging, refer to the help database (help7_admin.nsf) within the Domino Administrator client.

#### Enabling archival-style transaction logging

Perform the following steps to enable archival-style transaction logging:

1. From the Domino Administrator client, edit the Domino server document and click the **Transactional Logging** tab (Figure 9-10).

Server: DOM7SVR1/ITSO - IBM Lotus Notes
File Edit View Create Actions Text Help
]◇:]∦℡೧┗) ]B//♪!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
] Address ↓ ] <⊐ ▼ ⇒ ∽ 🙆 @ Q [*] ▼
🐼 Welcome 📖 ITSO's Directory - Server\Server 🗙 🕼 Server: DOM7SVR1/ITSO 🗙
Save & Close Oreate Web Examine Notes Certificate(s) Cancel
Server: DOM7SVR1/ITSO DOMIN0570.RCHLAND.IBM.COM
Basics Security Ports Server Tasks Internet Protocols MTAs Miscellaneous Transactional Logging
Basics
Transactional logging: Disabled
Quotas
Quota enforcement: Check file size when extending the file

Figure 9-10 Domino server document, Transactional Logging tab

 If the Transactional logging field is set to Disabled, change it to Enabled. You are then prompted to change the settings. Change the Logging style field to Archived (Figure 9-11).

**Note:** If you currently have transaction logging enabled for a style other than archival, change and restart the Domino server when time permits.

When enabling transaction logging, a suggestion to place your logs on a separate drive is made. Because of the System i machine's architecture for single-level storage, it has been found that this does not provide any additional performance gain. It is therefore recommended that you use the defaults to create the logs on the same auxiliary storage pool (ASP).

Save & Close Ocreat	e Web Examine Notes Certificate(s)	Cancel	
Server: DOM7SV	R1/ITSO DOMINO570.RCHLAN	D.IBM.COM	reitori (1972)
Basics Security Ports	Server Tasks   Internet Protocols   MTAs	Miscellaneous	Transactional Logging
Basics			
Transactional logging:	^r Enabled		
Log path:	^r logdir _		
Logging style:	^C Archived		
Automatic fixup of corrupt databases:	^C Enabled .		
Runtime/Restart performance:	『Favor runtime』▼		
Quotas			
Quota enforcement:	^C Check file size when extending the file		

Figure 9-11 Transactional logging set to Archived style

3. End the Domino server and restart it for the transaction logging change to take effect. When the Domino server is ended, add *BRMS as additional service to your Domino server, as described in the next section.

#### Adding the BRMS additional service to the Domino server

Add the BRMS additional service to the Domino server by using either the iSeries Navigator or a 5250 emulation session.

#### Using the iSeries Navigator

To make the change using the iSeries Navigator, perform the following steps:

- 1. Start the iSeries Navigator to your System i machine and select Network  $\rightarrow$  Servers  $\rightarrow$  Domino.
- 2. Ensure that your Domino server is ended and right-click your Domino server and select **Properties**.
- 3. In the Domino server Properties window (Figure 9-12), click the Services tab.

DOM7SVR1 Properties - Rcha	issq2
Basics Internet Mail Servic	es   Locale   Network Configuration   Initialization File
Start when TCP/IP is starte	ed No
Basic information	
Server name:	DOM7SVR1/ITSO
Subsystem :	DOM7SVR1
Server title:	
Domain name:	пто
Server type:	Domino
Data directory:	/DOM7SVR1/DATA
Server status:	Stopped
Administrator:	Joe Admin
	OK Cancel Help ?

Figure 9-12 Domino server properties using iSeries Navigator

4. Select **Backup, Recovery and Media Services** in the Disabled column, click **Enable**, and click **OK**.

#### Using a 5250 emulation session

To add the BRMS additional service to the Domino server using a 5250 emulation session, perform the following steps:

1. Sign in to the 5250 emulation session and end the Domino server by using the following End Domino Server (ENDDOMSVR) CL command:

ENDDOMSVR SERVER (servername)

- 2. Type CHGDOMSVR SERVER(servername) and press F4 to prompt the command.
- 3. In the Change Domino Server (CHGDOMSVR) display (Figure 9-13), use PgDn to go to the Additional services field and enter *BRMS. Press Enter to save your changes.

**Note:** The *BRMS additional service is required only for incremental saves. This is reflected on adding QNNINBRM to the ServerTasks line of the Domino server's notes.ini file. If this service is enabled and transaction logging is not enabled or is not set to archival style, you see the following message at the startup of your Domino server:

"Error 11 occurred in QNNINBRM upon."

Change Domino Server (CHGDOMSVR)							
Type choices, press Enter.							
Server host name	'DOM7SVR1.ITS	50.COM'					
Subsystem and object names Additional services + for more values	DOM7SVR1 *BRMS	Name, *SAME *SAME,*NONE,*ALL,*MINIMUM					
Collation	*STD	*SAME, *STD, CS, DA-DK-AA					
Enable Server for DB2 Default data store	*NO *SAME	*SAME, *YES, *NO *SAME, *NSF, *DB2					
F3=Exit F4=Prompt F5=Refresh F13=How to use this display	F10=Additiona F24=More keys	Bottom al parameters F12=Cancel s					

Figure 9-13 Adding the BRMS additional service using the CHGDOMSVR command

#### Updating a BRMS backup policy

The control group or policy configured to perform incremental backups must be updated. This section shows you how to do this, first by using the iSeries Navigator and then from a 5250 emulation session.

#### Using the iSeries Navigator

Perform the following steps using the iSeries Navigator to update your BRMS backup policy:

1. Start the iSeries Navigator and expand **Backup**, **Recovery and Media Services** and select **Backup Policies**.

2. As shown in Figure 9-14, right-click the Domino server policy in the right-hand panel and select **Properties**.



Figure 9-14 Selecting the backup policy Properties option from the iSeries Navigator

3. In the Domino Policy Properties window (Figure 9-15), click During to proceed.

**Note:** If you receive a BRMS warning regarding the formatting of the policy, click **OK** because this is normal the first time the policy is viewed or used through the iSeries Navigator.

Ø Dom7svr1	Properties - Rchassq2	X
Policy:	Dom7svr1	
Description:	DOM7SVR1	
Last changed:	8/14/06 10:33:58 AM	
Changed by:	Weiser	
– Backup activ	ities	
B	Refore During After	
	OK Cancel Help	?

Figure 9-15 Domino Policy Properties window

4. In the During Backup window (Figure 9-16), click the **Activity** tab and select the radio button against **Customized**. Then click the **Customize** button.

🕗 Dom7svr1 Properties - During Backup
Dom7svr1 Properties - During Backup What   Where   Media Retention   Save File Retention   TSM Server Retention   Activity   Type of backup activity: Full Changes only Customized   Customize Click Customize to specify full' and 'changes only' backup activities for your backup items on different days. You can also customize what days any actions will run. Allow overrides when policy is run or scheduled Type of changes-only backup: Changes since last full backup (cumulative) Changes since last full backup (incremental)
OK Cancel Help ?

Figure 9-16 Domino Policy Properties: During Backup window (Activity tab)

5. The Activity - Customize window (Figure 9-17) is shown. This example shows that each day is currently set to perform a full online backup, which is the default settings.

O Activity - Customize
For each backup item, specify what type of backup you want to occur on each day of the week. Backup items:
Items to Back Up or Action Type Sun Mond Tue Wed Thu Frid Sat
Legend for backup types:
Note: When the policy is run using these settings, the backup or actions will only occur on the days that have an activity and match the days that are scheduled to run.
OK Cancel Help ?

Figure 9-17 Activity - Customize window

6. In this example, Sunday is left for a full online backup, but the remaining days of the week are changed to perform incremental online backups. To change each day, click the associated box twice (Figure 9-18). Click **OK** three times to save your changes.

O Activity - Customize									X
For each backup item, specify what type of backup you want to occur on each day of the week. Backup items:									
Items to Back Up or Action	Туре	Sun	Mond	Tue	Wed	Thu	Frid	Sat	
📽 DOM7SVR1	Domino	<b>V</b>	<b>~</b>	<ul> <li>Image: A second s</li></ul>	~	✓			
L L	egend for ba.	ckup typ	)es:						
	No backup	D 🔽 Cł	nanges o	nly 🔽	Full back	up			
Note: When the policy is run ( have an activity and match the	using these s days that are	settings, e sched	the back uled to ru	uporac n.	tions will:	only oc	cur on t	he days th	at
				c	к	Can	cel	Help	?

Figure 9-18 Customizing backup activity for incrementals

You have now configured your backup policy using the iSeries Navigator to implement incremental backups.

#### Using a 5250 emulation session

Perform the following steps using a 5250 emulation session to update your BRMS backup control group, otherwise referred to in GUI terms as a backup policy:

 Start a 5250 session to your System i machine and issue the Work with Backup Control Groups (WRKCTLGBRM) CL command to modify your backup control group to provide for incremental saves (Figure 9-19).

```
Work with Backup Control Groups
                                                               RCHASSQ2
Position to . . .
                                    Starting characters
Type options, press Enter
                                         4=Delete
 1=Create
           2=Edit entries
                              3=Copy
                                                    5=Display
 6=Add to schedule 8=Change attributes
                                         9=Subsystems to process ...
               Full
                         Incr
                                    Weekly
               Media
   Control
                         Media
                                    Activity
Opt Group
               Policy
                        Policy
                                    SMTWTFS Text
   *BKUGRP
               *BKUPCY
                         *BKUPCY
                                    *BKUPCY Backs up all user data
              SAVSYS
   *SYSGRP
                         SAVSYS
                                    *BKUPCY Backs up all system data
                         SYSTEM
   *SYSTEM
                                     *BKUPCY Backs up the entire system
               SYSTEM
                         Z060814002 *BKUPCY D0M7SVR1
2 DOM7SVR1
               SAVF
   QLTSDOMOO
               Z060814000 Z060814001 *BKUPCY D0M7SVR1
   QLTSSVR
               QLTSSVR
                         QLTSSVR
                                    *BKUPCY Online backup of all Lotus ser
                                                                    Bottom
F3=Exit
            F5=Refresh
                        F7=Work with BRM scheduled jobs
F9=Change backup policy
                        F23=More options
                                          F24=More keys
```

Figure 9-19 Work with Backup Control Groups display

2. Enter option 2 (Edit entries) to edit your control group and press Enter.

3. In the Edit Backup Control Group Entries screen, under the Weekly Activity column, the letter F indicates that on those days, you are scheduled to perform full online backups. Because you want to perform incrementals backups, change the Monday through Saturday entries to the letter I (see Figure 9-20) to indicate that an incremental save must now be taken. Press Enter, F3, and enter the option 1 to save the change.

**Note:** The entry under the Weekly Activity column might show *DFTACT, which corresponds to default activity. Change this to the letter I for the days on which you want to run the incremental saves, unless you decide to modify the system default activity itself.

Edit	Backup Cont	rol Group	Entries		RCHASSQ2		
Group : DOM7SVR1 Default activity *BKUPCY Text DOM7SVR1							
Type information, press	Enter.						
Backup List Seq Items Type	Auxiliary Storage Pool Device	Weekly Activity SMTWTFS	Retain Object Detail	Save While Active	SWA Message Queue		
10 *EXIT 20 *EXIT		FFFFFF					
30 *EXIT		FFFFFF					
E2-Evit EE-Dofnoch	E10-Change	itom F	11-Dical	av avita	Botto	m	
F12=Cancel F14=Displ	ay client om	it status	F24=M	ore keys			

Figure 9-20 Edit Backup Control Group Entries display

You have now configured your backup policy to implement incremental backups.

#### 9.3.2 Using the iSeries Navigator to perform an incremental backup

Perform the steps described here to use the iSeries Navigator to perform an incremental backup of a Domino server. This section assumes that the required setup is performed as explained in 9.3.1, "Changes required to provide for Domino incremental backups" on page 368. Perform the following tasks:

1. Start the iSeries Navigator and expand **Backup**, **Recovery and Media Services**. Click **Backup Policies** to see the list of the available backup policies on the system. Right-click the corresponding policy and select **Run Now**, as shown in Figure 9-2 on page 362.

 A Backup Overrides window is shown, indicating that your backup policy is customized (Figure 9-21). Click **OK** to continue.

🖉 Run Backup Policy Dom7svr1 - Backup Overrides 🛛 🛛 🔀				
Backup activity for all backup items in policy				
Customized				
C Override policy setting: Full				
Retention for backup information				
Ose policy settings				
C Override policy settings:				
🔿 Days (1-9999): 35				
© Permanently				
🔲 Ignore backup policy omits. This does not affect omitted items in backup lists.				
OK Cancel Help ?				

Figure 9-21 Backup Overrides reflecting Customized

3. This takes you to a window that indicates the status of the backup, which eventually changes to Completed (Figure 9-4 on page 363).

#### 9.3.3 Using a 5250 emulation session to perform an incremental backup

This section assumes that the required setup has been performed as explained in 9.3.1, "Changes required to provide for Domino incremental backups" on page 368 before using a 5250 emulation session to perform an incremental backup of a Domino server.

After the setup of the BRMS control group is completed, the steps to perform the incremental backup are the same as for a full online backup. From an i5/OS command line, the backup can be started using the Start Backup using BRM (STRBKUBRM) CL command. Refer to 9.2.2, "Using a 5250 emulation session to perform the full backup" on page 365 for details.

### 9.4 Recovering data from a Domino full online backup

The first decision in any restore is about which objects must be recovered and which is the best place to restore the objects. When restoring Domino data, the first requirement is that the data must be restored to the data directory or the subdirectory of a Domino server. Whether that Domino server is active or is never started, for example, a dummy server, is up to the administrator who is performing the restore.

There are advantages and disadvantages to both the options. With a restore to the data directory or subdirectory of the original active Domino server, it can be assumed that the user or users who require the data already have access to the server. Therefore, access is not an issue. The problem lies in the fact that restoring over an existing database is not desired because of the potential for inconsistent results because it must delete the database before

the restore process can begin. Thus, if you are restoring an object to the same location where it was originally located, the existing database must first be deleted or renamed. In most cases, unless the database is totally corrupt, it is better to rename it in case you have problems with the restore.

Another consideration that you must keep in mind when restoring to the same Domino server is the fact that duplicate replica IDs now exist and replication between the two databases might occur and wipe out what has just been recovered. If restored to a subdirectory of the original active server, the administrator does not have to worry about deleting or renaming the database. However, the administrator must still be concerned about the two replicas potentially replicating between themselves and possibly losing the recovered data. The obvious advantage is that the user already knows the location of the database and will not have to browse for it.

Restoring Domino databases to a dummy server (one that is never started and used solely for data recovery purposes) has the advantage of not having to worry about replication issues and also because of the fact that if a restore should somehow fail to an active Domino server, problems can arise as a result of that. If problems occur when restoring to a dummy server, there is no potential impact to active users. Further, because the server is not active and cannot be accessed from a Lotus Notes client, restoring to a dummy server allows the administrator to provide users with access to the data through the System i machine's Net Server functionality. This is due to the fact that because the dummy server is never started, there is no issue with users mapping drives to the data directory and subdirectories. The user with a mapped drive can then open the database as if it were local, and retrieve the required data. This requires administrator intervention to inform the user of the location on the System i machine and also means that they must have a corresponding i5/OS user profile to access.

If the data is restored to another active Domino server that is in the same domain, the advantage is that the user already has access to the server, and there is little concern over the replica ID. One exception to this is if the scheduled replication is performed between the servers and the connection document includes the replication for all the databases. When putting the database on a different server, the user must be informed of the database's new location and must have access to the Domino server.

Some of the advantages and disadvantages of each of the recovery methods discussed, are summarized in Table 9-1.

Recovery method	Advantage	Disadvantage
Recovering Domino data to the existing location of the data	<ul> <li>User already knows the location of the data</li> <li>Best used when existing database is corrupt and not usable</li> </ul>	<ul> <li>Potential for deletion of existing file and restore process failing, and all data is lost</li> <li>Only provides for specific window in time. If only one document is required, restoring over existing database is not helpful.</li> </ul>

Table 9-1 Comparison of Domino data recovery methods

Recovery method	Advantage	Disadvantage	
Recovering Domino data to the subdirectory of the original active Domino server	<ul> <li>No issue with deletion of the original database replica during recovery</li> <li>User already has access to Domino server through Lotus Notes client</li> </ul>	<ul> <li>Duplicate replica IDs on the same Domino server might lead to replication of nondesired data</li> <li>If problems occur during restore process, it might affect the active Domino server</li> </ul>	
Recovering Domino data to a dummy Domino server	<ul> <li>No issue if problems occur during restore because the Domino server is never started</li> <li>Users can map network drive to access databases as if they were local on the PC workstation</li> </ul>	<ul> <li>User must be made aware of the location of the data</li> <li>User must have an i5/OS user profile and access to restore the database</li> </ul>	
Recovering Domino data to another Domino server in the domain	<ul> <li>No issue with duplicate replica IDs as long as connection documents are correctly set up</li> <li>User already has access to Domino server through Lotus Notes client</li> </ul>	<ul> <li>If problems occur during the restore process, it might affect the active Domino server</li> <li>Users must be told where the data is located, and require access to the other Domino server</li> </ul>	

**Important:** If you are performing an incremental restore to a dummy Domino server or to another Domino server in the domain, extensive setup is required due to transactional logging. Refer to the following Web page for details:

http://www.ibm.com/servers/eserver/iseries/service/brms/domRecoveryIncremental.
html

#### 9.4.1 Using iSeries Navigator to restore data from full online backup

This example restores a Domino database from a full online backup using the same name, but to a location that is different from the one it existed on originally. To do this using the iSeries Navigator, perform the following steps:

1. Start iSeries Navigator and right-click **Backup**, **Recovery and Media Services**. Select the option for **Restore**, as shown in Figure 9-22.

🧭 iSeries Navigator						
<u>File E</u> dit <u>V</u> iew <u>H</u> elp						
X 🖻 🛍 🗙 🖆 🥩 👿 🛇			77			
Environment: My Connections Rchassq2: Backup, Recovery and Media Services						
🖭 📳 Management Central (Rchassq2)	Name	Description	n			
My Connections     Rchassq2     Basic Operations     Grading Security     Security     Grading Security     G	Media Media Media	cies Create, ru es Display mo Display an	in, display and maintain backup policies we policy information d add media and manage backed up items on			
Rest	tore		Ш			
My Tasks - Rchassq2     Print     Add a connection     Man     Glob     Prop	t Reports cup and Recovery Log Maintenance age Devices bal Policy Properties perties	nd Media Services Tas tem blicy properties data 	ks View backup history Display backup and recovery lo Manage devices Movement tasks P Help for related tasks			

Figure 9-22 Starting the restore process from iSeries Navigator
- 2. Click OK in the Restore help screen.
- 3. In the Backup History Include window (Figure 9-23), because all the Domino data resides in the i5/OS integrated file system, if you are looking to restore specific files, change the Backed-up items Type field to **Directories or files**. If you know the specific integrated file system directory, specify that as well, or just list the object name. Click **OK** to continue with the restore process.

Backup Histor	v - Include		
Policy:			
Medie neel			
Media pool:			
Backup dates:			
From: Au	gust 15, 2006 🚔	to:	August 15, 2006 🚔
Volume:	All		
Completion status:	All	<b>T</b>	
Disk pool number:	All		
Disk pool name:	All		
Expiration dates:	All		
From: Au	gust 15, 2006 🗧	to:	August 15, 2006 🚍
Type of backup:	All	-	
System:	Local system	-	
_ □ Backed-up items		_	
Type: Directories	orfiles	-	
Directory: All			
File: jadmin	nst		
parantin			
		<u>ok</u>	Cancel Help ?

Figure 9-23 Backup history using the Directories or files option

4. In the Backup History window (Figure 9-24), right-click the object (in this example, it is the jadmin.nsf database) to restore and select **Restore**.

Backup History - Ro	hassq2						_ 🗆 🗙
File Edit View Help							
📽 🔍 👆 🗶 🔳 🗊						-	7 minutes old
System: Usibmzq.rchassq2	File: jadmin.n	sf					
Backed Up Item	Туре	Path	Date	Time	Backup Type	Volume	Expiration
🔜 jadmin.nsf	File	Directory '/DOM7SVR 1/DATA/mail'	8/15/06	4:31:51 PM	Full	Restore	8/15/06
						Media	
						Media Set	
						Delete	
						Details	
Restores the selected item.							_

Figure 9-24 Recovering a specific file from the backup history

5. The Restore - Welcome window (Figure 9-25) of the Restore Wizard is shown. The Restore Wizard assists you in restoring the data. Click **Next**.

Restore - We	Icome - Rchassq2
	Welcome to the Restore Wizard. This wizard takes you through the steps needed to restore any backed up iSeries data. To use the restore options in this wizard, you must have the required authority to system objects. Click Help for more information on what authority is needed. Help Click Cancel at any time to cancel the wizard.
	< Back Next > Finish Cancel Schedule

Figure 9-25 The Restore Wizard

6. In the Restore - Restore Using Same Name window (Figure 9-26), you are prompted to decide if you want to restore to the same name or a new name. In this example Yes, use same name is selected because we are recovering with the same file name but to a different location. Click Next.

Restore - Restore	9 Using Same Name - Rchassq2			
	you want to restore the object using the same name?			
	Yes, use same name			
	No, change to new name: jadmin.hsf			
		< Back Next > Fir	ish Cancel	Schedule

Figure 9-26 Restore using same name

7. On the Restore - Restore to Same Location window (Figure 9-27) we select the **No**, **restore to a different location** option and then click **Browse** to the specify the new location to restore the data. Click **Next**.

Restore - Restore to Same Location - Rchassq2	
Do you want to restore the backed up items to the same location in which they were saved?	
C Yes, restore to the same location:	
/DOM78VR1/DATA/Restore	
No, restore to a different location;	
/DOM7SVR1/DATA/Restore Browse	
	[
< Back Next > Finish Canc	el Schedule

Figure 9-27 Restoring to a different location

8. In the Restore - Summary window (Figure 9-28), information is available in the Details button and further options exist from the Advanced Options and the Schedule buttons. In this example, the defaults are accepted. Click **Finish**.

Q Restore - Sun	nmary - Rchassq2	2	N
	Click Finish to res available before ru	tore the selected items now. Click Schedule to restore the items at a later time. Be sure to mount the volumes you need or make sure they are unning the restore.	<b>^</b>
	Items to restore:	1 Details	
	Devices:	Automatically select devices	
	Volumes needed:	Volume	
	New location:	/DOM/SVR1/DATA/Restore	-
•		Advanced Ontione	
		< Back Next > Finish Cancel , Schedule	
		Schedule	

Figure 9-28 Restore summary window

9. In the Restore Items Status window (Figure 9-29), you receive a notification that the restore request is being processed. The status eventually changes to Completed.

Q 'Restore Items (3)' St	atus	
File Help		
• • •		
Status: Completed		
Target Systems and Gr	Status	
— 📱 Rchassq2	Completed	

Figure 9-29 Completion of object recovery from Domino full online backup

### 9.4.2 Using a 5250 emulation session to restore data from a full online backup

In this example, a Domino database is restored from a full online backup using the same name but to a location that is different from the one it existed on originally. To do this using a 5250 emulation session, perform the following steps:

1. Start a 5250 emulation session. From an i5/OS command line, enter the Work with Link Information (WRKLNKBRM) CL command to specify the i5/OS integrated file system directory where the object resides. Alternatively, you can use the Work with Media Information (WRKMEDIBRM) CL command to browse through the save history. Because the location of the object to be restored is known, this example uses the WRKLNKBRM command.

From an i5/OS command line, issue the WRKLNKBRM command and press F4 to prompt the command.

2. In the Work with Link Information screen (Figure 9-30), in the Directory field, specify the i5/OS integrated file system directory where the object you want to restore is located. Press Enter.

**Note:** The WRKLNKBRM command Directory field is case-sensitive with regard to the i5/OS integrated file system directory.

Work with Link Infor	mation (WRKLNKBRM)
Type choices, press Enter.	
Directory > '/DO	M7SVR1/DATA/mail'
Save type *ALL	*ALL, *FULL, *CUML, *INCR,
<pre> + for more values Select dates:</pre>	
From date *BEG To date *END	IN Date, *BEGIN, *CURRENT, nnnnn Date, *END, *CURRENT, nnnnn
From system*LCLOutput*	*, *PRINT
F3=Exit F4=Prompt F5=Refresh F12= F24=More keys	Bottom Cancel F13=How to use this display

Figure 9-30 Work with Link Information (WRKLNKBRM) command screen

3. In the Work with Link Information screen, the results are displayed, as shown in Figure 9-31. Type option 9 (Work with directory information) next to the desired link location and press Enter.

Work with Link Information	RCHASSQ2 08/14/06 18:02:18
Type options, press Enter. 4=Remove 9=Work with directory information	
Opt Directory 9 /DOM7SVR1/DATA/mail	<b>.</b>
Command	Bottom
F3=Exit F4=Prompt F5=Refresh F9=Retrieve F12=Can F22=Display entire field . (C) COPYRIGHT IBM CORP. 1998, 2006. ALL RIGHTS RESERVED.	cel F17=Position to

Figure 9-31 Results of the WRKLNKBRM command

4. In the Work with Directory Information screen (Figure 9-32), enter option 9 to get down to the desired object to restore.

Work with Directory Information RCHASSQ2 08/14/06 18:05:54 Directory . . . : /DOM7SVR1/DATA/mail Type options, press Enter. 4=Remove 5=Display 7=Restore 9=Work with objects Date Time Save Volume Expiration **Objects** Not Saved Туре Serial Date Saved Saved 0pt Saved 9 08/14/06 17:51:20 *FULL *SAVF 08/14/06 1 0 Bottom Command ===> F3=Exit F4=Prompt F5=Refresh F9=Retrieve F12=Cancel F17=Position to F22=Display entire field

Figure 9-32 Work with Directory Information display

5. In the Work with Objects screen (Figure 9-33), type option 7 (Restore) next to the object to be restored and press Enter. In this example, this the database jadmin.nsf.

	Work with Objects	0	RCHASSQ2 8/14/06 18:09:13
Directory /DC	DM7SVR1/DATA/mail		0,11,000 10,00,10
Saved date/time . : 08/	/14/06 17:51:20		
Type options, press Enter. 4=Remove 5=Display 7	7=Restore		
		Volume	
Opt Object 7 jadmin.nsf		Serial *SAVF	Size 18874368
Command			Bottom
		510.0	<b>F17 D</b>
F3=EXIT F4=Prompt F5=F F22=Display entire field	kerresn Fy=Ketrieve	F12=Cancel	FI/=POSITION to

Figure 9-33 Work with Objects display

6. In the Select Recovery Items screen (Figure 9-34), type option 7 (Specify object) next to the saved item and press Enter.

```
Select Recovery Items
                                                                   RCHASSQ2
                                           Select action . . . . : *ALL
                                           Select volume
                                                                 . :
Type options, press Enter.
  1=Select 4=Remove
                        5=Display 7=Specify object
   Saved
                Save
                         Save
                                       Parallel Volume
                                                          File
                                                                      Expire
                                Save
                                       Devices Serial
Opt Item
                Date
                         Time
                                Type
                                                          Sequence
                                                                      Date
7 DOM7SVR1 8/14/06 17:51:20 *LTSONL
                                             *SAVF
                                                                    8/14/06
                                                                        Bottom
                       F9=Recovery defaults
                                              F11=Object View
F3=Exit
          F5=Refresh
F12=Cancel
             F14=Submit to batch
                                   F16=Select
```

Figure 9-34 Recovering an object from a Domino full online backup

 In the Restore Object display (Figure 9-35), specify a different name or location in which to restore the object. In this example, the jadmin.nsf database is being restored, using the same name but to a different location. Press Enter.

```
Restore Object (RST)
Type choices, press Enter.
Objects:
                               > /DOM7SVR1/DATA/mail/jadmin.nsf
 Name . .
                                               *INCLUDE, *OMIT
 Include or omit
                               > *INCLUDE
                                 /DOM7SVR1/DATA/Restore/jadmin.nsf
 New object name
                    Name . . . . . . .
 Include or omit
                                               *INCLUDE, *OMIT
                                 *OMIT
 New object name
                                 *SAME
                                                                    More...
F3=Exit
         F4=Prompt
                     F5=Refresh
                                 F10=Additional parameters
                                                            F12=Cancel
F13=How to use this display
                                 F24=More keys
```

Figure 9-35 Restoring Domino database using the same name but to a different directory

A status screen is flashed, as shown in Figure 9-36. Eventually, you are back to an i5/OS command line. To check the status of your restore, issue the Display Job Log (DSPJOBLOG) CL command and press F10. Use PgUp to verify if the restore completed without error. Alternatively, check the i5/OS integrated file system directory that you restored the file to.

Select Recovery Items	RCHASSQ2
: Display Recovery Items	RCHASSQ2 : 18:19:24 :
Remaining items : 1 Remaining objects : 50 Remaining size : .4096 M 100	0.0 %
: Saved Save Volume Item Date Time Type Serial File *LINK 8/14/06 17:51:38 *FULL *SAVF :	Exp Objects : Seq Date Saved : 8/14/06 50 :
: : : Press ATTN key to cancel recovery after current it :	em completes.

Figure 9-36 Display Recovery Items display

### 9.5 Recovering data from a Domino incremental online backup

As mentioned in 9.4, "Recovering data from a Domino full online backup" on page 377, many options exist when restoring data. The major difference between full online restores and incremental online restores is the complexity. Tape management during incremental restores is crucial because the tapes from the full save are required along with all the tapes from the incremental saves up until the time of the desired restore.

If you are recovering data to the current Domino server, the recovery process is quicker and easier, but as mentioned earlier in this chapter, there are certain disadvantages associated with it. Recovering to a different Domino server has certain advantages that might appeal to you, but requires additional setup. For information about the steps required to recovery incremental Domino data to a different Domino server refer to the following Web site:

http://www.ibm.com/servers/eserver/iseries/service/brms/domRecoveryIncremental.html

### 9.5.1 Using iSeries Navigator to restore from incremental online backup

When restoring Domino data, if the data is from after the last incremental backup, another incremental backup must be issued prior to the recovery request. Otherwise, if the desired data is from before the last save, there is no necessity for an immediate incremental save, and the following steps can be performed:

- 1. Start iSeries Navigator. Right click **Backup, Recovery and Media Services** and select **Restore** (see Figure 9-22 on page 380).
- 2. On clicking **OK** in a general information window, you see the Backup History Include window (see Figure 9-23 on page 381). Accept the defaults if you are not sure of the data

location, or you can be as specific as you want. This example shows how to restore a specific database, specifying "Directories or files" for type and "jadmin.nsf" for file (see Figure 9-24 on page 381). Click **OK**.

3. In the Backup History window (Figure 9-37), right-click the object to restore (in this example, jadmin.nsf database) and select **Restore**.

🗟 Backup History - R	chassq2						_ 🗆 🖂
File Edit View Help							
📽 🔍 👆 🗙 🔳 😈							7 minutes old
System: Usibmzq.rchassq2	File: jadmin.r	nsf					
Backed Up Item	Туре	Path	Date	Time	Backup Type	Volume	Expiration
📄 jadmin.nsf	File	Directory '/DOM7SVR 1/DATA/mail'	8/15/06	4:31:51 PM	Full	Restore	8/15/06
						Media	
						Media Set	
						Delete	
						Details	
					-		
Restores the selected item.							11.

*Figure 9-37 Recovering a specific file from the backup history* 

- 4. The Restore Wizard is started. Click **Next** in the Restore Welcome window (Figure 9-25 on page 382).
- 5. In the Restore Specify Date and Time window (Figure 9-38), select the **Restore backup to specific date and time** option. Specify the date and time criteria and click **Next**.

Restore - Spe	cify Date and Time - Rchassq2	y want	and a farming the farming	annan fanna	_ 🗆 🛛
	The selected items were saved betwe time between these dates, or restore t Backups to restore:	en the following dates ar o the latest backup and a	d times. Do you want to restore the lates pply subsequent transactions that may b	st backups, restore the ea be available on the system	rliest backups, restore to a point in 1?
	Backup Item	Earliest Backup	Latest Backup		
	File jadmin.nst in directory 100M7	8/1 5/06 4:10:24 PM	8/15/06 4:31:51 PM		
	C Restore to latest backup				
	C Restore to earliest backup				
	Restore backup to specified date	and time:			
	From: 0/15/06 4:10:24 PM	to: 0/15/06 4:21:51 PM			
	Date: Aug 15, 2006	10. John 200 4.31.311 M			
	Time: 4:22:51 PM				
	C Restore to latest backup and appl	v available transactions t	o the current time		
	C Restore to latest backup and appl	, v available transactions t	o a specified date and time:		
	From: 8/15/06 4:31:51 PM	,			
	Date: Aug 15, 2006				
	Time: 4:31:51 PM				
			Help		
			< Back N	lext > Finish	Cancel Schedule

Figure 9-38 Restore - Specify Date and Time options

- 6. In the Restore Restore Using Same Name window (Figure 9-26 on page 382), you are prompted to decide whether you want to restore to the same name or to a new name. Select **Yes, use same name** because you are recovering with the same file name but to a different location. Click **Next**.
- In the Restore Restore to Same Location window (Figure 9-27 on page 382) select No, restore to a different location option. Click Browse to specify the new location to restore the data. Click Next.
- 8. In the Restore Summary window (Figure 9-28 on page 383), clicking **Details** provides more information and clicking **Advanced Options** and **Schedule** provide further options. In this example, the defaults are accepted. Click **Finish**.

**Attention:** Figure 9-38 indicates that a full online backup was performed just after 4:10 p.m. and that at least one incremental was attached and was run just after 4:31 p.m. This provides recovery to any point-in-time (PIT) within this time period. In this example, the recovery is at 4.22 p.m. because the user received an e-mail at 4:21 p.m. and accidently deleted it at 4:30 p.m., and now wants to recover it.

9. In the Restore Items Status window (Figure 9-29 on page 383), you receive a notification that the restore request is being processed, and eventually see a screen which states that the restore is completed.

**Note:** As the Help window that pops up during the restore suggests, you can confirm the restore using the Task Activity under Management Central or can check the Domino server console for a message stating the media recovery is complete. You must be able to verify that the restored database did recover to the desired point-in-time.

### 9.5.2 Using a 5250 session to restore data from an incremental online backup

Perform the following steps to use a 5250 emulation session to restore Domino server data from an incremental backup:

1. Start a 5250 emulation session, and from an i5/OS command line, enter the Work with Link Information (WRKLNKBRM) CL command to specify the i5/OS integrated file system directory where the object resides (Figure 9-30 on page 384).

- 2. In the Work with Link Information screen, the results are displayed as shown in Figure 9-31 on page 384. Type option 9 (Work with directory information) next to the desired link location and press Enter.
- 3. In the Work with Directory Information screen, enter option 9 to get down to the desired object to restore (Figure 9-39).

Work with Directory Information					oformation	09/15/06	RCHASSQ2
Dire	ctory	.: /DOM	17SVR1/DA	ATA/mail		08/15/00	17:21:24
Type 4=F	options, pr Remove 5=[	ress Enter. )isplay 7=	Restore	9=Work	with objects		
Opt 9	Date Saved 08/15/06	Time Saved 16:31:51	Save Type *FULL	Volume Serial *SAVF	Expiration Date 08/15/06	Objects Saved 1	Not Saved O
Comma	and						Bottom
=== <i>&gt;</i> F3=E> F22=[	===> F3=Exit F4=Prompt F5=Refresh F9=Retrieve F12=Cancel F17=Position to F22=Display entire field						

Figure 9-39 Work with Directory Information screen

4. In the Work with Objects screen, type option 7 (Restore) next to the object to be restored and press Enter. In this example, this the jadmin.nsf database (Figure 9-40).

Work with Objects		08/15/06	RCHASSQ2
Directory : /DOM7SVR1/DATA/mail		00/15/00	17.24.10
Saved date/time . : 08/15/06 16:31:51			
Type options, press Enter. 4=Remove 5=Display 7=Restore			
	Volume		<u>.</u>
7 jadmin.nsf	Serial *SAVF		Size 18874368
Command			Bottom
===>			
F3=Exit F4=Prompt F5=Refresh F9=Retrieve F22=Display entire field	F12=Cancel	F17=Pos	ition to

Figure 9-40 Work with Objects display

5. In the Select Recovery Items screen (Figure 9-41), press F9 (Recovery defaults). This provides administrators the facility to specify the date and the time of the object to be recovered to. Select the saved item to be restored by entering option 1 (Select) next to it and press Enter.

**Note:** The Save Type column reports *LTSINC, which indicates that an incremental save exists to recover from. If this reports *LTSONL, only a full online recovery is possible.

		Selec	t Recov	very Items		ŀ	RCHASSQ2
Type options	, press Ent	er.	əv 7-	Selec Selec	ct action ct volume	· · · · · · · · · · · · · · · · · · ·	: *ALL :
1-361600	4-Kelliove	2-015h1	ay /-	specify of	Jeci		
Saved Opt Item 1 DOM7SVR1	Save Date 8/15/06	Save Time 16:31:51	Save Type *LTSIN	Parallel Devices IC	Volume Serial *SAVF	File Sequence	Expire Date 8/15/06
F3=Exit F5= F12=Cancel	Refresh F14=Submit	F9=Recov to batc	ery def h F16	aults F 5=Select	11=0bject	View	Bottom

Figure 9-41 Selecting recovery items

6. In the Restore Commands Defaults screen (Figure 9-42), use PgDn to see the option for Lotus point-in-time and type in the desired date and time. Press Enter.

Restore Command Defaults	
Type information, press Enter.	
Restore to library *SAVLIB	Name, *SAVLIB
Auxiliary storage pool *SAVASP	Name, *SAVASP, 1-32
Document name generation *SAME	*SAME, *NEW
System resource management *ALL	*ALL, *NONE, *HDW, *TRA
Apply journaled changes:	
Restore journal receivers *YES	*YES, *NO
Apply option *NONE	*NONE, *APPLY, *REMOVE
Ending date *CURRENT	Date, *CURRENT
Ending time *CURRENT	Time, *CURRENT
Lotus point-in-time:	
Ending date 8/15/06	Date, *CURRENT, *FULL
Ending time 16:22:51	Time, *CURRENT, *FULL
Create parent directories *NO	*NO, *YES
Parent directories owner *PARENI	Name, *PARENI
	Battom
F12=Cancel	Bottom

Figure 9-42 Restore Command Defaults display

7. You are now back at the Select Recovery Items screen. Type option 7 (Specify object) next to the saved item and press Enter (Figure 9-43).

	Select Recovery Items				RC	CHASSQ2	
Type options, 1=Select	press Enter 4=Remove 5	=Display	7=S	Seleo Seleo Specify ol	ct action ct volume bject	:	*ALL
Saved Opt Item 7 DOM7SVR1	Save 5 Date 8/15/06 16	Save S Time T :31:51 *	ave ype LTSINC	Parallel Devices	Volume Serial *SAVF	File Sequence	Expire Date 8/15/06
F3=Exit F5= F12=Cancel	Refresh F9 F14=Submit t	=Recover o batch	y defa F16=	ults Fi Select	11=Object	View	Bottom

Figure 9-43 Recovering an object from a Domino incremental backup

8. In the Restore Object screen (Figure 9-44), specify a different name or location in which to restore the object. In this example, the jadmin.nsf database is being restored, using the same name but to a different location. Press Enter.

```
Restore Object (RST)
Type choices, press Enter.
Objects:
                               . > /DOM7SVR1/DATA/mai1/jadmin.nsf
 Name .
                                                 *INCLUDE, *OMIT
                               . > *INCLUDE
 Include or omit .
                                   /DOM7SVR1/DATA/Restore/jadmin.nsf
 New object name
                  . .
                          . . .
                                 > '/QSYS.LIB'
 Name . . .
                                                 *INCLUDE, *OMIT
 Include or omit
                                   *OMIT
 New object name
                                   *SAME
                                                                       More...
         F4=Prompt
                      F5=Refresh
                                   F10=Additional parameters
                                                               F12=Cancel
F3=Exit
F13=How to use this display
                                   F24=More keys
```

Figure 9-44 Restoring Domino database using the same name but a different directory

A status screen is flashed (Figure 9-45). Eventually you are taken back to an i5/OS command line. To check the status of your restore, issue the Display Job Log (DSPJOBLOG) CL command, press F10, and use the PgUp key to verify if the restore completed without error. Alternatively, check the i5/OS integrated file system directory that you restored the file to.

	Select	Recovery Items	RCHASSQ2	2
:	Displa	y Recovery Items	RCHASSQ2	<u>}</u>
: Remaining	items :	3	12:01:56	;
: Remaining	size :	52 136.7245 M 100.0 %		:
: Saved	Data Time	Save Volume	Exp Objects	; ;
: item : *LINK	8/15/06 16:10:46	*FULL *SAVF	Date Saved 8/15/06 50	:
: *LINK : *LINK	8/15/06 16:22:24 8/15/06 16:31:51	*FULL *SAVF *FULL *SAVF	8/15/06 1 8/15/06 1	:
:				:
:				:
: Press ATTN ke	ey to cancel recove	ery after current item compl	etes. :	

Figure 9-45 Display Recovery Items screen

### 9.6 Integrated file system directories used by BRMS

This section explains the i5/OS integrated file system directories that are populated by Domino and BRMS when online backups are implemented.

### 9.6.1 Directories used when implementing full online backups

The following i5/OS integrated file system directories are used by BRMS when implementing full online backups of a Domino server:

/BRMSCHGS

This directory and the subdirectories under it reside within the Domino server data directory and contain the changes that occur to each Domino object during the full online backup.

► /BRMSINFO

This directory and the subdirectories under it reside within the Domino server data directory and contain the database instance ID (DBIID) information about the state of the files at the time of the full online backup. This directory is also used by incremental online saves to determine if an incremental request must revert to a full request because of the DBIID having changed.

### 9.6.2 Directories used when implementing incremental online backups

The following i5/OS integrated file system directories are used by BRMS when implementing the incremental online backups of a Domino server:

/BRMS

This subdirectory resides within the Domino server data directory and contains the copied full transaction logs from the QNNINBRM addin task. The files build up here until an incremental online save is performed.

**Note:** The copied log files start with a period (.) and end with a .LOG extension. To be able to see them in the i5/OS integrated file system from a 5250 emulation session, change your display options for the Work with Objects Links (WRKLNK) CL command to *ALL. To do this, use the following command:

WRKLNK DSPOPT(*ALL)

/BRMS/COPIEDLOG

This subdirectory resides within the Domino server data directory and contains a copy of the partial transaction log at the time of the incremental online save.

▶ (/BRMS/INCRSAVE

This subdirectory resides within the Domino server data directory and is a temporary location for the full copied transaction logs. When the incremental online save request is made, the copied logs under the BRMS subdirectory are moved here first before being saved and deleted from the directory.

► /BRMS/LASTPARTIALLOG

This subdirectory resides within the Domino server data directory and contains a snapshot of the current partial log when the QNNINBRM addin task finds a full log to copy to the BRMS subdirectory.

### 9.7 Customization options available through the notes.ini file

During the course of using BRMS to back up Domino servers, administrators might want to change the default settings. This section describes three of the most common settings used, what they are used for, and what variables can be used. The following parameters are specified in the notes.ini file of the Domino server:

SAVDOMBRM_FILES_IN_GROUP=xx

This parameter defines how many objects are saved in each group, where xx equals a value from 1 -120. The greater this value, the faster your online Domino backups will complete but longer the database recovery will take. Also, if you set this value high, the time to save each group takes longer (overall save will still go quicker) and the potential for timeouts exists. The default value for this parameter for Domino R7 is 50, even if the parameter does not exist in the notes.ini file.

BACKUP_TIMEOUT=xx

This parameter defines the timeout value in minutes. If the backup of a group exceeds the value, a timeout is posted to the backup and potentially, none of the changes that occurred to those group of objects during the save are merged back into the database. This does *not* mean the databases were not saved, just that during the save of the group, any changes to these databases might not have been included in the backup. The default value for this parameter for Domino R7 is 15, even if the parameter does not exist in the notes.ini file.

BACKUP_NO_TIMEOUT=xx

This parameter defines whether a timeout is observed or not. If set to 1, the backup will process as long as necessary to merge the changes that occurred to the objects during the backup to the objects' state at the beginning of the backup. The value of 1 indicates no backup timeout is set. The default value for this parameter for Domino R7 is 0, indicating that the BACKUP_TIMEOUT is observed.



# Α

## Configuring Domino for i5/OS to use System i Secure Sockets Layer

This appendix explains the setup required to leverage System i Secure Sockets Layer (SSL), otherwise known as system SSL, with Domino for i5/OS. At this point in time, this can be carried out only with Domino Hypertext Transfer Protocol (HTTP).

By adding this capability, the System i machine is providing administrators with the ability to use hardware to speed up SSL traffic. The performance enhancement is a welcome addition to the system advantages of running Domino on i5/OS.

It is important to note that this capability exists irrespective of whether you have or do not have an actual hardware cryptography card installed on the System i machine. This will be referenced as software-only encryption, and must result in better response times over SSL, than when using the traditional built-in Domino SSL capability.

This appendix discusses this software-only encryption feature.

For more information about this capability and about using hardware cryptography cards, refer to the following sources of information:

Domino HTTP Hardware Cryptography using iSeries SSL:

ftp://ftp.software.ibm.com/as400/web/domino/pdf/crypto.pdf

► IBM System i Information Center (under Networking → Networking Security)

http://publib.boulder.ibm.com/iseries/

 iNotes Web Access on the IBM eServer iSeries Server, SG24-6553, which is available on the Web at:

http://www.redbooks.ibm.com/redbooks/pdfs/sg246553.pdf

### System requirements

This section details the software requirements for configuring Domino on i5/OS to run with system SSL-enabled.

Following are the software requirements:

- 5722-SS1 Option 34, Digital Certificate Manager
- 5722-DG1, IBM Hypertext Transfer Protocol (HTTP) Server for iSeries
- 5722-AC2, Crypto Access Provider 56-bit for AS/400 or 5722-AC3, Crypto Access Provider 128-bit for AS/400
- Domino 6.0.4, 6.5.2, or later release

### Steps to set up Domino to use system SSL

Following are the steps involved in configuring Domino for i5/OS to use system SSL:

- 1. Enable the Digital Certificate Management (DCM) server.
- 2. Create a local Certificate Authority (CA).
- 3. Create a certificate store.
- 4. Create a certificate for Domino using software encryption.
- 5. Assign a certificate to Domino.
- 6. Configure Domino to use System SSL.

#### **Enabling the Digital Certificate Management server**

DCM is configured by using the *ADMIN instance of the System i HTTP server. Start the *ADMIN instance of the HTTP if it is not already running. To do this, use the following Start TCP/IP Server (STRTCPSVR) CL command:

STRTCPSVR SERVER(*HTTP) HTTPSVR(*ADMIN)

Access the DCM server by using your Web browser (Internet Explorer® is recommended) with port 2001. You are prompted to sign in using your i5/OS user profile and password. After you enter your credentials, a window similar to the one shown in Figure A-1 is displayed. Click **Digital Certification Manager**.

**Note:** The screen captures provided in the examples describes in this appendix show Microsoft Windows XP and Internet Explorer. Your display might vary if you are using a different operating system and Web browser.



Figure A-1 iSeries Tasks window

### **Creating a local Certificate Authority**

Creating a local certificate authority is an excellent way of testing the SSL setup before purchasing a certificate from a trusted Internet certificate authority. Perform the following steps:

1. In the Digital Certificate Manager window (Figure A-2) click the **Create a Certificate Authority (CA)** link located in the left navigation bar.



Figure A-2 Digital Certificate Manager

2. In the Create a Certificate Authority (CA) window (Figure A-3), fill in the requested information and click **Continue**.

**Note:** The certificate you are creating is the root certificate, and will be used for issuing other certificates to include the Domino certificate. It is recommended that in the Certificate Authority (CA) name field, you identify its relationship with the certificate authority.

🖹 Digital Certificate Manager - M	Aicrosoft Internet Explorer				
File Edit View Favorites Tool	is Help				A.
🕒 Back 🝷 🕑 - 💌 🛃	🏠 🔎 Search 🤺 Favorites 🍕	3 🔗 - چ 🛽	g • 🔜 🚯 😐	<b>8</b>	
Address 🛃 http://dom570:2001/QIBM	I/ICSS/Cert/Admin/gycucm1.ndm/main0				✓ → Go
Links 👸 IBM Business Transformation H	Homepage 🛛 👸 IBM Internal Help Homepag	e  🙆 IBM Standard So	oftware Installer 🛛 😒 Win	dows Marketplace 👩 IBM Syst	ems Workload Estimator
Google +	🖌 💽 Search 🔹 🚿 💁 383 block	ked 😽 Check 🔹	🦎 AutoLink 🝷 🗐 Auto	əFill 🔁 Options 🥒	
		Digital Cert	ificate Manag	er	0 IBM.
	Create a Certificate Author	ity (CA)			
81200	Certificate type: Certificate Autho Certificate store: Local Certificate	ority (CA) e Authority (CA)			
Select a Certificate Store	The system will create a certificate	with a private key and	d store the certificate in	the Local Certificate Authority	(CA) certificate store.
Expand All Collapse All	Key size:	1024 🛩 (bits)			
Manage User Certificates	Certificate store password:	•••••	(required)		
Create New Certificate Store	Confirm password:	•••••	(required)		
Create a Certificate Authority (CA)		Certific	ate Information		
Manage CRL Locations	Certificate Authority (CA) name:	ITSO-CA		(required)	
Manage LDAP Location	Organization unit:				
Manage PKIX Request Location	Organization name:	ITSO		(required)	
<u>eturn to iSeries Tasks</u>	Locality or city:	Rochester			
Comparting	State or province:	Minnesota		(required:minimum of 3	characters)
Secure Connection	Country or region:	US (required)			
	Validity period of Certificate Aut	hority (CA) (2-7300):	1095 (days)		
	Continue Cancel				
3					Scola intranet

Figure A-3 Creating a Certificate Authority (CA)

- Digital Certificate Manager Microsoft Internet Explorer - 🗆 🗙 File Edit View Favorites Tools Help 🔇 Back 🝷 🕗 🔹 😰 🏠 🔎 Search 🤺 Favorites 🤣 🔗 🎍 📓 🝷 📙 🖇 🚇 🕞 👻 🛃 Go Address an http://dom570:2001/QIBM/ICSS/Cert/Admin/qycucm1.ndm/main0 Links 👸 IBM Business Transformation Homepage 👸 IBM Internal Help Homepage 👸 IBM Standard Software Installer 1 😻 Windows Marketplace 💰 IBM Systems Workload Estimator Google -💽 🖸 Search 🔹 🐗 💁 383 blocked 🛛 🥸 Check 🔹 💐 AutoLink 🔹 🗐 AutoFill 🛃 Options 🔌 0 IBM. **Digital Certificate Manager** Install Local CA Certificate Certificate type: Certificate Authority (CA) Certificate store: Local Certificate Authority (CA) Select a Certificate Store A certificate for your Certificate Authority (CA) was created and stored in the local Certificate Authority (CA) certificate store. Expand All Collapse All You must install the Certificate Authority (CA) certificate in your browser so the browser can verify certificates that your CA issues. Click the following link to install the certificate in your browser. Your web browser will display several windows to help you complete the installation of the certificate. Manage User Certificates <u>Create New Certificate Store</u> Install certificate <u>Create a Certificate Authority</u> After installing the certificate, select Continue so you can provide the policy data that will be used for signing and issuing certificates (CA) with this Certificate Authority (CA). Manage CRL Locations Manage LDAP Location Continue Cancel Manage PKIX Request Location Return to iSeries Tasks Secure Connection
- 3. In the Install Local CA Certificate window (Figure A-4), click Install Certificate.

Figure A-4 Installing the local CA Certificate

4. A File Download dialog box opens (Figure A-5). Click Open.

File Dow	nload - Security Warning
Do you	want to open or save this file?
	Name: CA.cer Type: Security Certificate, 572 bytes From: dom570 Open Save Cancel
1	While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not open or save this software. <u>What's the risk?</u>

Figure A-5 File download

5. In the Certificate information window (Figure A-6), click Install Certificate.

Certifica	ite 🔹 🕄 🔀
General	Details Certification Path
	Certificate Information
This inst Aut	; CA Root certificate is not trusted. To enable trust, all this certificate in the Trusted Root Certification horities store.
_	Issued to: ITSO-CA
	Issued by: ITSO-CA
	Valid from 8/16/2006 to 8/16/2009
1	Install Certificate Issuer Statement
	ОК

Figure A-6 Certificate information

6. In the Welcome to the Certificate Import Wizard, click Next (Figure A-7).



Figure A-7 Certificate Import Wizard: Welcome

7. In the Certificate Store window (Figure A-8), accept the default and click Next.

Certificat	e Import Wizard	
Certific Cert	ate Store ficate stores are system areas where certificates are kept.	
Wind	lows can automatically select a certificate store, or you can specify a location for	
	Automatically select the certificate store based on the type of certificate	
(	Place all certificates in the following store	
	Certificate store: Browse Browse	
	< Back Next > Cancel	

Figure A-8 Certificate Import Wizard: Certificate Store

8. In the Completing the Certificate Import Wizard window (Figure A-9), click Finish.



Figure A-9 Certificate Import Wizard: Completion

9. A security warning is displayed (Figure A-10). Click **Yes**.

Security	Warning 🔀
	You are about to install a certificate from a certification authority (CA) daiming to represent:
•	ITSO-CA
	Windows cannot validate that the certificate is actually from "ITSO-CA". You should confirm its origin by contacting "ITSO-CA". The following number will assist you in this process:
	Thumbprint (sha1): 3812FE7C 693833C3 AF7BEA8D D2EF11B7 639C82B4
	Warning: If you install this root certificate, Windows will automatically trust any certificate issued by this CA. Installing a certificate with an unconfirmed thumbprint is a security risk. If you click "Yes" you acknowledge this risk.
	Do you want to install this certificate?
	Yes No

Figure A-10 Security Warning message

10.A pop-up window stating that the import is successful is displayed (Figure A-11). Click **OK** twice.

Certific	ate Import Wizard 🛛 🔀
٩	The import was successful.
	ОК

Figure A-11 Certificate Import Wizard successful

- 11. You are taken back to the Install Local CA Certificate window (Figure A-4 on page 402). Click **Continue**.
- 12. In the Certificate Authority (CA) Policy Data window (Figure A-12), accept the defaults and click **Continue**.



Figure A-12 Certificate Authority (CA) Policy Data

13.On receiving the message that the policy data for the CA is accepted (Figure A-13), click **Cancel** because you have now completed this section.

Digital Certificate Manager - Microsoft Internet Explorer	
File Edit View Favorites Tools Help	
🔾 Back 🔹 📀 - 💌 😰 🏠 🔎 Search 🤺 Favorites 🍘 🔗 - چ 🖾 - 🛄 🖇 🚇 🚭	
Address 🕘 http://dom570:2001/QIBM/ICSS/Cert/Admin/gycucm1.ndm/main0	💌 ラ Go
🗄 Links 截 IBM Business Transformation Homepage 👸 IBM Internal Help Homepage 👔 IBM Standard Software Installer 1 Windows Marketplace 🧃 IBM Systems W	orkload Estimator
🗧 🖸 🖸 🖸 🖸 🖸 🖸 🖸 🚱 Sa Sa Shocked 🖓 Check 🔹 🍀 AutoLink 🔹 🗐 AutoFill 🌄 Options 🖉	
Digital Certificate Manager         Policy Data Accepted         Message The policy data for the Certificate Authority (CA) was accepted.         Select a Certificate Store         Expand All         Collapse All         Continue         Cancel	<b>O</b> IBM.

Figure A-13 Policy data accepted for the CA

### **Creating a Certificate Store**

Perform the following steps to create a certificate store:

- 1. Starting again from the Digital Certificate Manager window (Figure A-2 on page 400, click Create New Certificate Store.
- 2. In the Create New Certificate Store window (Figure A-14), select ***SYSTEM** and click **Continue**.

**Note:** If the option for *SYSTEM does not appear in the window, this indicates that it has already been configured. You can then proceed to "Creating a certificate for Domino using software encryption" on page 409.



Figure A-14 Creating a new certificate store

3. In the Create a Certificate in New Certificate Store window (Figure A-15), select ***NO** to *not* create a certificate in the certificate store, and click **Continue**.



Figure A-15 Create a Certificate in New Certificate Store window

4. In the Certificate Store Name and Password window (Figure A-16), type a Certificate store password, confirm the password, and click **Continue**.

🕙 Digital Certificate Man	nager - Microsoft Internet Explorer	_ 🗆 🔀
File Edit View Favorit	tes Tools Help	
🚱 Back 🝷 🌍 - 🕨	👔 🛃 🏠 🔎 Search 🤺 Favorites 🚱 🔗 + 🌺 🛛 👻 🛄 贀 🙆 🥞	
Address 🙆 http://dom570:2	2001/QIBM/ICSS/Cert/Admin/qycucm1.ndm/main0	🛩 芛 Go
Links 🗃 IBM Business Transf	formation Homepage 🛭 👸 IBM Internal Help Homepage 🛛 👸 IBM Standard Software Installer 🛭 😒 Windows Marketplace 🥑 IBM System	ns Workload Estimator
Google -	💌 🔀 Search 🔹 🛷 🔊 383 blocked 🛛 🎸 Check 🔹 🌂 AutoLink 🔹 🗐 AutoFill 💀 Options 🔌	
	Digital Certificate Manager	0 IBM.
	Certificate Store Name and Password Certificate store: *SYSTEM	
Select a Certificate S	You must enter a password for the new certificate store and enter the password again to confirm it.	
	Certificate store password: (required)	
Expand All Collaps	Se All Confirm password: (required)	
<u>Create Certificate</u> <u>Create New Certificate St</u>	tore Continue Cancel	

Figure A-16 Entering the Certificate Store password

5. The Certificate Store Created window (Figure A-17) indicates that the Certificate Store is created. Click **OK**.



Figure A-17 Certificate Store Created

### Creating a certificate for Domino using software encryption

Perform the following steps to create a certificate for Domino using software encryption:

- 1. In the upper left hand side of the Digital Certificate Manage window (Figure A-2 on page 400), click **Select a Certificate Store**.
- 2. In the Select a Certificate Store window (Figure A-18), select ***SYSTEM** and click **Continue**.

🕙 Digital Certificate Manager - Mic	rosoft Internet Explorer	_ 🗆 🔀
File Edit View Favorites Tools	Help	2
🚱 Back 🝷 🕑 🕤 💌 🛃 🦿	🏠 🔎 Search 📌 Favorites 🔗 🔗 è≧ 🔯 + 📙 😵 😐 🥞	
Address 🗃 http://dom570:2001/QIBM/IC	SS/Cert/Admin/qycucm1.ndm/main0	🛩 📄 Go
Einks 🗃 IBM Business Transformation Hom	nepage 👸 IBM Internal Help Homepage 👸 IBM Standard Software Installer 🛭 🐒 Windows Marketplace 🧃 IBM Systems I	Workload Estimator
Google -	🕐 🔀 Search 🔹 🚿 🖓 383 blocked 🛛 🐴 Check 🔹 👯 AutoLink 🔹 😓 AutoFill 💀 Options 🖉	
	Digital Certificate Manager	0 IEM.
	Select a Certificate Store Select the certificate store that you want to open.	
Select a Certificate Store	<ul> <li>Local Certificate Authority (CA)</li> <li>*SYSTEM</li> </ul>	
Expand All Collapse All	Continue Cancel	
<u>Create Certificate</u> <u>Create New Certificate Store</u>		
<ul> <li>Install Local CA Certificate on Your PC</li> </ul>		

Figure A-18 Selecting a Certificate Store

3. In the Certificate Store and Password window (Figure A-19), enter the password that you defined earlier and click **Continue**.

Digital Certificate Manager - Microsoft Internet Explorer	
File Edit View Favorites Tools Help	A
🔇 Back • 🚫 • 😰 🚮 🔎 Search 🤺 Favorites 🤣 😥 • 🌺 🖾 • 🧾 💈 👜 🚭	
Address 🕘 http://dom570:2001/QIBM/ICSS/Cert/Admin/qycucm1.ndm/main0	🛩 🄁 Go
🗄 Links 🍘 IBM Business Transformation Homepage  👸 IBM Internal Help Homepage 👸 IBM Standard Software Installer 🛭 😻 Windows Marketplace 👩 IBM Syste	ems Workload Estimator
🛿 Google - 💽 Search - 🧭 💁 383 blocked 👫 Check - 🎘 AutoLink - 🗐 AutoFill 🔤 Options 🖉	
Digital Certificate Manager Certificate Store and Password Enter the certificate store password.	0 IBM.
Certificate type:         Server or client           Certificate Store         *SYSTEM           Certificate store:         *SYSTEM           Certificate store path and filename:         /QIBM/USERDATA/ICSS/CERT/SERVER/DEFAULT.KDB	
Expand All       Collapse All         • Create Certificate       Continue         • Create New Certificate Store       Reset Password	

Figure A-19 Entering the Certificate Store password

4. In the Current Certificate Store window (Figure A-20), confirm your current certificate store and click the **Create Certificate** link located in the left navigation frame.



Figure A-20 Current Certificate Store information

5. In the Create Certificate window (Figure A-21), select **Server or client certificate** and click **Continue**.

Digital Certificate Manager - Microsoft Internet Explorer	_ 🗆 🛛
File Edit View Favorites Tools Help	2
🔾 Back + 📀 - 😠 😰 🏠 🔎 Search 🤺 Favorites 🚱 🔗 - 🌺 🛛 + 🛄 😵 🙆 🥞	
Address 🗃 http://dom570:2001/QIBM/ICSS/Cert/Admin/qycucm1.ndm/main0	🛩 🔁 Go
🗄 Links 🐉 IBM Business Transformation Homepage 👸 IBM Internal Help Homepage 👸 IBM Standard Software Installer 😻 Windows Marketplace 👩 IBM Systems Workloa	d Estimator
🕴 🖸 Google - 💽 Search - 🦚 🔤 383 blocked 👫 Check - 🍀 AutoLink - 🗐 AutoFill 🛃 Options 🖉	
Digital Certificate Manager         Create Certificate         Select a Certificate Store         Expand All         Collapse All         Fast Path	0 IBM.
<u>Create Certificate</u>	

Figure A-21 Create Certificate

### 6. In the Select a Certificate Authority (CA) window (Figure A-22), select Local Certificate Authority (CA) and click Continue.

Note: If you are using an external certificate, this is where you must select it.



Figure A-22 Selecting a Certificate Authority

7. In the Create Certificate window (Figure A-23), fill out the required fields with information about your system and company, and click **Continue**.

Digital Certificate Manager - Microsoft	t Internet Explo	rer		_ 🗆 🗙
File Edit View Favorites Tools Help				
🕒 Back 🝷 🐑 🔹 🛃 💋	🔎 Search   🔶 F	Favorites 🚱 🔗 🍓 🗷 🔹 📃	9 🕲	
ddress 🗃 http://dom570:2001/QIBM/ICSS/Cer	t/Admin/qycucm1.n	dm/main0		🛩 🋃 Go
inks 👹 IBM Business Transformation Homepage	👸 IBM Internal I	Help Homepage 🛛 👸 IBM Standard Software Installer	r 🛭 😻 Windows Marketplace 🛯 🕹 IBM Systems	Workload Estimator
Google - 🗸	Search 🔹 🚿	👺 383 blocked 🛛 🍄 Check 🔹 🌂 AutoLink	🕶 🤤 AutoFill 🛛 🔁 Options 🥒	🕴 🔁 🔹
		Digital Certificate M	lanager	0 IEM.
Cre Cer Cer	eate Certificate rtificate type: Serv rtificate store: *S	e rer or client YSTEM		
Select a Certificate Store Use	this form to create	e a certificate in the certificate store listed above.		
Expand All Collapse All	size:	1024 💌 (bits)		
Cer	rtificate label:	ITSO Certificate	(required)	
Fast Path		Certificate Information		
Create Certificate				
Create New Certificate Store Con	mmon name:	ITSO	(required)	
<u>PC</u> Org	ganization unit:			
Manage Certificates Org	ganization name:	ITSO	(required)	
Manage Applications	ality or city:	Rochester		
Manage Certificate Store Sta	te or province:	Minnesota	(required minimum of 3 characters)	
Manage CRL Locations	nter en province.		(required.minimum or 5 cital acters)	
Manage LDAP Location	untry or region:	US (required)		
Manage PKIX Request Location		Subject Alterna	tive Name	~
Done		Connect Allerita		Local intranet

Figure A-23 Creating a certificate

8. In the Select Applications window (Figure A-24), a message stating that your certificate is created is displayed along with a list of applications to select from. (In this example, because an application identifier for Domino is not yet available, none of the boxes are selected.) Click **Continue**.



Figure A-24 Select Applications display



9. In the Application Status window (Figure A-25), click OK.

Figure A-25 Application Status

### Assigning a certificate to Domino

The System i machine uses Application Identifiers (AppID) to associate certificates with applications. Perform the following steps to create a new AppID for Domino:

- 1. Continuing from the previous section, in the left navigation frame of the window, select Manage Applications → Add Application.
- 2. In the Manage Applications window (Figure A-26), click Continue.

Digital Certificate Manager - Microsoft Internet Explorer	- 🗆 🔀
File Edit View Favorites Tools Help	
😋 Back 🔹 📀 - 💌 🖻 🏠 🔎 Search 🤸 Favorites 🤣 🔗 🎍 🖾 👻 📙 😫 🧐 🚭	
Address 🕘 http://dom570:2001/QIBM/ICSS/Cert/Admin/qycucm1.ndm/main0	🗸 🏳 📀
🗄 Links 🝘 IBM Business Transformation Homepage 🛛 IBM Internal Help Homepage 📓 IBM Standard Software Installer 1 🕸 Windows Marketplace 🕑 IBI	M Systems Workload Estimator
🗄 Google 🗸 💽 Gearch 🔹 🛷 🎦 383 blocked 🥙 Check 🔹 🌂 AutoLink 🔹 🗐 AutoFill 🔩 Options 🥒	1 📆 🔹
Digital Certificate Manager	0 IBM.
Manage Applications	
Select the type of action that you want to perform.	
View application definition - Display application information.	
Select a Certificate Store Update certificate assignment - Assign a certificate to be associated with an application or remove with an application.	e the certificate associated
Expand All Collapse All O Define CA trust list - Select which Certificate Authorities (CAs) the application will trust.	
Fast Path Set Path Image: Add application - Add an application that uses certificates to identify itself.	
Create Certificate     Remove application - Remove an application that will no longer use certificates for identification.	
<u>Create New Certificate Store</u> Update application definition - Up date information about an application.	
Install Local CA Certificate on Your     O Validate application - Validate information about an application.     PC	
Manage Certificates	
Manage Applications     View application definition     Update certificate assignment     Define CA trust fist     Add application     Brease particular	
Volume application definition     Validate application	
▶ <u>Manage Certificate Store</u>	
Manage CRL Locations	
Done	Scal intranet

Figure A-26 Manage Applications display

3. In the Add Application window (Figure A-27), select **Server - Add a server application** and click **Continue**.



Figure A-27 Add Application

 Fill in the fields displayed in the window shown in Figure A-28, where the Application User Profile must be QNOTES and the radial button for Client authentication supported must be set to Yes. This process is what provides Domino access to the *SYSTEM certificate store files. Click Add.

File       Edit       View       Favorites       Tools       Help         Address       Address       Thtp://domS70i2001/QIBM/ICSS/Cert/Admin/qycucm1.ndm/main0       Image: Certificate Manager       Image: Certificate Manager         Add       Application       Application type: Server       Application TD: DOMINO	//   • • • ]M.*
Address  Address  Address  Address  Address  Add Application Application type: Server Annication TD: DOMINO	! <b>₹</b> • 3Mø
Digital Certificate Manager         Image: Control of the second sec	3Mø
Annication ID: DOMINO	<ul> <li></li> </ul>
Select a Certificate Store	
Exit program information	
Expand All Collapse All Exit program: *NONE	
Fast Path     Exit program library:	
Create Certificate     Threadsafe:     No	
<u>Create New Certificate Store</u> <u>Multithreaded job action:</u> Use system value only	
Install Local CA Certificate on Your	_
Manage Certificates         Application user profile:         QNOTES	
▼ <u>Manage Applications</u> Define the CA trust list: ○ Yes ⊙ No	
■ Update certificate assignment Client authentication supported: ③ Yes ○ No	
■ <u>Add application</u> Client authentication required: ○ Yes ⊙ No	
■ Remove application ■ Update application definition Certificate revocation processing: ③ Yes ○ No	
Validate application	
Manage Certificate Store Enter either the application description message information or an application description.	
<u>Manage CRL Locations</u> Application description message information	
Manage LDAP Location      Message file:	
<u>Manage PKIX Request Location</u> Message file library:	
Ketum to isteres Tasks	
Secure Connection	_
Appucation description: Domino	<b>M</b>

Figure A-28 Adding application parameters
5. After receiving a message that the application is added, as shown in Figure A-29, click **OK**.

🛎 Digital Certificate Manager - Microsoft Internet Explorer	
File Edit View Favorites Tools Help	
Back • O • 🗶 😰 🎧 🏸 Search 🏋 Favorites 🚱 🖾 • 🎯 🖄 • 🛄 🖏 🦉	
Address an http://dom570:2001/QIBM/ICSS/Cert/Admin/qycucm1.ndm/main0	💽 💽 🚱
Digital Certificate Manager	0 IEM.
Add Application	
Message The application has been added.	
Select a Certificate Store	

Figure A-29 Application added successfully

6. In the Manage Applications window (Figure A-30), select **Update certificate assignment** and click **Continue**.

Digital Certificate Manager - Mic	crosoft Internet Explorer	
File Edit View Favorites Tools	Help	2
🕝 Back 🔹 🕥 🕤 💌 🛃 🦿	🏠 🔎 Search 🤺 Favorites 🤣 🔗 - چ 📓 - 📃 🚯 🙆 🚭	
Address Address Address Address	SSS/Cert/Admin/qycucm1.ndm/main0	💌 🔁 Go 🛛 💼
	Digital Certificate Manager	0 IEM.
	Manage Applications Select the type of action that you want to perform.	
Select a Certificate Store Expand All Collapse All	<ul> <li>View application definition - Display application information.</li> <li>Update certificate assignment - Assign a certificate to be associated with an application or remove th with an application.</li> <li>Define CA trust list - Select which Certificate Authorities (CAs) the application will trust.</li> </ul>	e certificate associated
Fast Path     Create Certificate	<ul> <li>Add application - Add an application that uses certificates to identify itself.</li> <li>Remove application - Remove an application that will no longer use certificates for identification.</li> </ul>	
<u>Create New Certificate Store</u> <u>Install Local CA Certificate on Your</u> <u>PC</u> <u>Manage Certificates</u>	Validate application - Validate information about an application.     Validate application - Validate information about an application.	
<ul> <li>Manage Applications</li> <li>View application definition</li> <li>Update certificate assignment</li> </ul>	Continue Cancel	

Figure A-30 Manage Applications, selecting the Update certificate assignment option

7. In the Update Certificate Assignment window (Figure A-31), select Server - Add, change, or remove certificate assignment for a server application and click Continue.



Figure A-31 Update Certificate Assignment

 This brings you to the Update Certificate Assignment window shown in Figure A-32, where the Application ID added earlier is listed. Select the Application ID and click Update Certificate Assignment.

	income explorer	
ile Edit View Favorites Tools		A
dress 🕘 http://dom570:2001/QIBM/	t/Admin/qycucm1.ndm/main0	💌 🛃 Go 🕴 📆 🗸
	Digital Certificate Manager	Ø IEM.
	OS/400 TCP Central Server None assigned	<u>^</u>
Che Chart ante antenant	OS/400 TCP Database Server None assigned	
	OS/400 TCP Data Queue Server None assigned	
Select a Certificate Store	OS/400 TCP Network Print Server None assigned	
	OS/400 TCP Remote Command Server None assigned	
xpand All Collapse All	OS/400 TCP Signon Server None assigned	
ast Path	OS/400 TCP/IP Telnet Server None assigned	
Create Certificate	OS/400 DDM/DRDA Server - TCP/IP None assigned	
Create New Certificate Store	OS/400 Chuster Security None assigned	
<u>C</u>	OS/400 - Host Servers None assigned	
Manage Certificates	OS/400 TCP File Server None assigned	
View applications View application definition	Management Central Server None assigned	
Define CA trust list	IBM Directory Server None assigned	3
Add application Remove application	OS/400 VPN Key Manager None assigned	
Validate application definition	Webserver Search Engine None assigned	
Manage Certificate Store	HTTP Server Monitor None assigned	
Manage CRL Locations	OS/400 TCP/IP FTP Server None assigned	
Manage PKIX Request Location	DOMINO None assigned	
urn to iSeries Tasks	· Anutime you change certificate selections you may need to and your converged sta	art it again to have the change take effect
Secure Connection		are it again to have the change take effect.
	Update Certificate Assignment Cancel	~
Select a Certificate Store  Expand All Collapse All  Expand	OS/400 TCP Central Server       None assigned         OS/400 TCP Database Server       None assigned         OS/400 TCP Data Queue Server       None assigned         OS/400 TCP Data Queue Server       None assigned         OS/400 TCP Network Print Server       None assigned         OS/400 TCP Remote Command Server       None assigned         OS/400 TCP Remote Command Server       None assigned         OS/400 TCP IT Felnet Server       None assigned         OS/400 DDM/DRDA Server - TCP/IP       None assigned         OS/400 TCP File Server       None assigned         OS/400 VPN Key Manager       None assigned         OS/400 VPN Key Manager       None assigned         OS/400 TCP/IP FTP Server       None assigned         OS/400 TCP/IP FTP Server       None assigned         OS/400 TCP/IP FTP Server       None assigned         DOMINO       None assigned         DOMINO       None assigned         E	art it again to have the change take effect.

Figure A-32 Updating the certificate assignment

9. Select the certificate to assign to Domino and click Assign New Certificate (Figure A-33).

🕙 Digital Certificate Manager - Mi	Aicrosoft Internet Explorer	
File Edit View Favorites Tools	s Help	
Address 🛃 http://dom570:2001/QIBM/I	/ICSS/Cert/Admin/qycucm1.ndm/main0	🕶 🔁 Go 🕴 📆 🔻
	Digital Certificate Manager	0 IBM.
Carlow Carlow	Update Certificate Assignment Application type: Server Application ID: DOMINO	
Select a Certificate Store	Select the certificate that you want to assign to the application.	
Expand All Collapse All	Certificate Common name	
▶ Fast Path	ITSO Certificate ITSO	
<u>Create Certificate</u> <u>Create New Certificate Store</u>	Note: Anytime you change certificate selections, you may need to end your server and start it again to have the cha	ange take effect.
<u>Install Local CA Certificate on Your</u> <u>PC</u>	Assign New Certificate View Validate Cancel	
<u>Manage Certificates</u> <u>Manage Applications</u> <u>View application definition</u>		

Figure A-33 Assigning a new certificate

10.A message is now displayed, as shown in Figure A-34, stating that the certificate is assigned to the application.

🖉 Digital Certificate Manager - Micr	osoft Internet Explor	er	l formanie f	_ 🗆 🔀
File Edit View Favorites Tools	Help			
Address 🕘 http://dom570:2001/QIBM/ICS	S/Cert/Admin/qycucm1.ndi	n/main0		🔽 🎦 Go 🔰 📆 🔻
		Digital Certif	icate Manager	0 IBM.
	Update Certificate	Assignment		
A SOTA	Message The certifica	te was assigned to the application.		
Select a Certificate Store	Application type: Serv	er		
	Application ID: DOMI	no n: DOMINO		
Expand All Collapse All			×	
	Certificate currently a	ssigned: ITSO Certificate		
▶ <u>Fast Path</u>	Remove Cer	ificate Assignment		
<u>Create Certificate</u>				
<u>Create New Certificate Store</u>				
Install Local CA Certificate on Your     PC	Select the certificate th	it you want to assign to the applica	tion.	
Manage Certificates	Certificate	Common name		
✓ <u>Manage Applications</u>	<ul> <li>ITSO Certificate</li> </ul>	ITSO		
View application definition     Update certificate assignment     Define CA trust list     Add application     Remove application	Note: Anytime you cha	nge certificate selections, you may	need to end your server and start it again	n to have the change take effect.
Update application definition     Validate application	Assign New Ce	rtificate View Valida	Cancel	
<u>Manage Certificate Store</u>				

Figure A-34 Certificate update complete

#### Configuring Domino to use System Secure Sockets Layer

Perform this final task to complete the setup that is essential to have your Domino server on i5/OS utilize the operating system's SSL, which leads to faster client response time OVER port 443 traffic. Perform this task for each of the Domino servers you want to use System SSL. Perform the following steps:

1. Edit the NOTES.INI file of the Domino server and add the following parameters:

SYSTEM_SSL_HTTP=1 SYSTEM_SSL_APPLICATION_ID=DOMINO

Table A-1 provides an explanation of these parameters.

NOTES.INI parameter	Required or not	Description
SYSTEM_SSL_HTTP=1	Yes	Tells Domino to utilize the System i SSL application programming interface (API) instead of Domino's SSLPlus for HTTP
SYSTEM_SSL_APPLICATION_ID=	Yes	References the Application ID created in the DCM for this particular Domino server
SYSTEM_SSL_TIMEOUT=	No	The number of seconds until the SSL V3.0 session identifier expires. This number can range from 0 - 86400 and defaults to 30000 (eight hours).

Table A-1 Available NOTES.INI parameters related to using system SSL

2. Edit the Domino server document. Select the **Ports** tab and then the **Internet Ports** subtab. Under the Web subtab (Figure A-35), click the twistie next to SSL port status and select **Enabled**. Click **Save and Close**.

Save & Close Oreate Web Examine Notes Certificate(s) Cancel	
Server: DOM7SVR1/ITSO DOM7SVR1.RCHLAND.IBM.COM	0
Basics   Security   Ports   Server Tasks   Internet Protocols   MTAs   Miscellaneous   Transactional Logging   S	Share
Notes Network Ports Internet Ports Proxies	
SSL settings	
SSL key file name: ^r keyfile.kyr	
SSL protocol version (for use "Negotiated	
Accept SSL site certificates: C Yes @ No	
Accept expired SSL certificates:	
Web Directory Mail DIIOP Remote Debug Manager Server Controller	
web (HTTP/HTTPS)	
TCP/IP port number: 『80』	
TCP/IP port status:	
Enforce server access ^{I''} No I  settings:	
Authentication options:	
Name & password: Yes	
Anonymous:	
SSL port number: ⁷ 443 J	
SSL port status: Enabled	
Choose whether the SSL Port is enabled or disabled for HTTP/H	ITTI

Figure A-35 Enabling SSL for the Domino server HTTP task

3. Your setup is now complete. End and restart your Domino HTTP server when time permits. You will then begin to see the benefits of running Domino on i5/OS and using System i SSL to speed up secure HTTP traffic.



Β

# Adding presence awareness to the Domino 7 environment

This appendix describes the steps that are necessary to complete the IBM Lotus Sametime Limited Use integration with your Domino 7 environment on the System i platform.

The IBM Lotus Sametime Limited Use version of Sametime is a limited version of the full Sametime product. The full version of Sametime supports presence awareness, instant messaging, and Web conferencing functionality. The IBM Lotus Sametime Limited Use version of Sametime supports presence awareness and instant messaging capabilities, but does not support Web conferencing. It ships with all Domino 7.0 servers.

This chapter also explains how to install Sametime 7 Limited Use for i5/OS, using the installer obtained from Passport Advantage.

For more information about Lotus Sametime, refer to the following Web site: http://www-142.ibm.com/software/sw-lotus/products/product3.nsf/wdocs/homepage

For more information about IBM Lotus Sametime for i5/OS, refer to the following Web site: <a href="http://www.ibm.com/servers/eserver/iseries/sametime/">http://www.ibm.com/servers/eserver/iseries/sametime/</a>

# Installing Sametime 7 Limited Use on i5/OS

This section explains the steps involved in installing the Sametime Limited Use program on i5/OS.

**Important:** Customers who are entitled to the Instant Messaging Limited Use version of Lotus Sametime receive and install only the *BASE product option of Lotus Sametime (5724J23).

Perform the following steps to install the Sametime 7 Limited Use program:

1. Uncompress the file obtained from Passport Advantage. Click **OK** in the window shown in Figure B-1, to continue.



Figure B-1 WinZip Self-Extractor program Sametime Limited Use program

2. Specify a local folder to extract the files to (Figure B-2), and click Unzip.

WinZip Self-Extractor [C86ZUNA.exe]				
To unzip all files in C86ZUNA.exe to the specified folder press the Unzip button.	Unzip			
Unzip To Folder:	Run WinZip			
C:\Sametime7Ltd	Close			
Overwrite Files Without Prompting     When Done Unzipping Run:	About			
EXPLORER reads st. html	Help			
Licensed to IBM				

Figure B-2 WinZip Self-Extractor directory

3. The files are created, as shown in Figure B-3.

Sametime7Ltd		N		_ 🗆 🛛
File Edit View Favorites	Tools Help	14		A.
🕒 Back 👻 🕥 – 🏂	🔎 Search 📔	Folders		
Address 🛅 C:\Sametime7Ltd				🗸 🄁 Go
Folders	×	Name 🔺	Size	Туре
<ul> <li></li></ul>		Q5724J23IM C724J23IM C724J23IM C724J23IM C724J24J23IM C724J24J23IA	539,439 KB 6 KB 10 KB 969 KB	File HTML Document HTML Document Adobe Acrobat Document
		< <u> </u>		>

Figure B-3 Sametime Limited Use files

4. On any i5/OS command line, run the following commands to create a library and an empty save file for the Sametime software:

```
CRTLIB MYLIB
CRTSAVF MYLIB/Q5724J23IM
```

5. Open a DOS command window and transfer the file Q5724J23IM to the System i machine through file transfer protocol (FTP), as shown in Example B-1.

Example: B-1 Using FTP to transfer Sametime 7 file

```
C:\>cd Sametime7Ltd
C:\Sametime7Ltd>ftp sametime7.itso.com
Connected to SAMETIME7.ITSO.com.
220-QTCP at SAMETIME7.ITSO.COM.
220 Connection will close if idle more than 5 minutes.
User (SAMETIME7.ITSO.com:(none)): lguiriga
331 Enter password.
Password:
230 LGUIRIGA logged on.
ftp> bin
200 Representation type is binary IMAGE.
ftp> put Q5724J23IM MYLIB/Q5724J23IM
200 PORT subcommand request successful.
150 Sending file to member Q5724J23IM in file Q5724J23IM in library MYLIB.
226 File transfer completed successfully.
ftp: 552384624 bytes sent in 66.36Seconds 8323.43Kbytes/sec.
ftp> quit
221 QUIT subcommand received.
```

```
C:\Sametime7Ltd>
```

6. On any i5/OS command line, run the following Restore License Program (RSTLICPGM) command:

```
RSTLICPGM LICPGM(5724J23) DEV(*SAVF) OPTION(*BASE) LNG(2924)
SAVF(MYLIB/Q5724J23IM)
```

 To verify if Sametime is successfully installed, go to any i5/OS command line and execute the Display Software Resources (DSPSFWRSC) CL command. The result is shown in Figure B-4.

		D	isplay Software Resources	
			System:	RCHAS10
Resource			Ĵ	
ID	Option	Feature	Description	
5722XW1	*BASE	2924	iSeries Access Base	
5722XW1	1	5101	iSeries Access Option 1	
5724J23	*BASE	5050	Lotus Sametime Instant Messaging	
5724J23	*BASE	2924	Lotus Sametime Instant Messaging	
5733LD7	*BASE	5050	Lotus Domino 7 (5724E62)	
5733LD7	*BASE	2924	Lotus Domino 7 (5724E62)	
5733LD7	1	5050	Lotus Domino 7: C API	
5733LD7	12	5050	Lotus Domino 7: Release 7.0.2	
5733LD7	12	2924	Lotus Domino 7: Release 7.0.2	
5733SC1	*BASE	5050	IBM Portable Utilities for i5/0S	
5733SC1	*BASE	2924	IBM Portable Utilities for i5/0S	
5733SC1	1	5050	OpenSSH, OpenSSL, zlib	
5733W60	*BASE	5050	WebSphere Application Server for OS/400 V6	
5733W60	2	5102	WebSphere Application Server V6 ("Base")	
				More
F3=Exit	F11=Dis	play libr	aries/releases F12=Cancel	
F19=Displ	ay trade	emarks		
F3=Exit F19=Displ	F11=Dis ay trade	play libr marks	maries/releases F12=Cancel	More

Figure B-4 Display Software Resources screen

# Adding Sametime 7 Limited Use to a Domino 7 server

In the example described in this section, a new Domino 7 server called SAMETIME7 is registered and configured. Refer to Chapter 4, "Configuring a Domino 7 server on i5/OS" on page 93 for details about configuring Domino for i5/OS servers.

**Important:** A System i machine can run multiple Domino servers on the same system. Although it is possible to add Sametime to an existing production Domino server, this configuration is not recommended. Instead, consider creating a new Domino server for running Sametime. The new Domino server can reside on the same system as your existing production Domino servers.

Perform the following steps to add Sametime to a Domino server, using the Add Sametime to Domino (ADDLSTDOM) CL command:

- 1. Stop the Domino server that you want to add Sametime to.
- 2. In the i5/OS command line, type the following command and press Enter:

ADDLSTDOM SERVER(SAMETIME7)

**Note:** Sametime will use the Domino Directory as the Directory type by default, and will not allow Hypertext Transfer Protocol (HTTP) tunneling. For information about more options when adding Sametime to a Domino server, refer to the Lotus Sametime 7.0 for i5/OS documentation Web site:

http://www.lotus.com/ldd/notesua.nsf/a08df36b2299a8bc8525665d006dce40/58f02f 65b21ea1728525706d004b4a7e?OpenDocument

3. Press Enter to end the terminal session, as shown in Figure B-5.

```
Switching to the server identity...
10% ...
Setting up authentication system...
30% ...
Setup of the authentication system completed.
55% ...
Sametime Server setup completed successfully.
100% ...
Press ENTER to end terminal session.
```

Figure B-5 Adding Sametime to a Domino for i5/OS server

 To verify if Sametime is added correctly to the Domino server, go to the Domino server's notes.ini file and check if the lines shown in Example B-2 are added.

Example: B-2 Sametime lines added to the Domino server's notes.ini file

```
ServertTasks=...., STAddin2
SametimeInstallType=COMPLETED
SametimeDirectoryType=DOMIN0
SametimeServerConfig=OnDomino
LSTJava1=/QIBM/ProdData/Lotus/Sametime/java
LSTJava2=/QIBM/ProdData/Lotus/Sametime/stcore.jar
LSTJava3=/QIBM/ProdData/Lotus/Sametime/stmtgmanagement.jar
LSTJava4=/QIBM/ProdData/Lotus/Sametime/dsig.zip
LSTJava5=/QIBM/ProdData/Lotus/Sametime/stnotescalendar.jar
LSTJava6=/QIBM/ProdData/Lotus/Sametime/xml-apis.jar
LSTJava7=/QIBM/ProdData/Lotus/Sametime/mail.jar
LSTJava8=/QIBM/ProdData/Lotus/Sametime/activation.jar
JavaUserClassesExt=LSTJava1,LSTJava2,LSTJava3,LSTJava4,LSTJava5,LSTJava6,LSTJava7,
LSTJava8
SameTimeLog=STLog.nsf
SametimeConference=STConf.nsf
JavaOS400RegisterNatives=stnotespw,stauthmgr,stutility,stconfigur
STProgramDirectory=/Domino/SAMETIME7/Data
SametimeBootstrap=/Domino/SAMETIME7/Data/sametime.ini
SametimeVersion=7.0
```

# Verifying if Sametime is working correctly

After Sametime is installed and added to the Domino server, go to the Domino server console to see if Sametime starts successfully. Perform the following steps to verify if Sametime is running correctly:

1. In the i5/OS command line, run the following command to start the Domino server where you added Sametime:

STRDOMSVR SERVER(SAMETIME7)

- In the i5/OS command line, run the following command to see the Domino server console: WRKDOMCSL SERVER(SAMETIME7)
- 3. Using the Domino server console (Figure B-6), you can see when the Sametime server is running.

**Note:** Most of the Sametime services are disabled because this is a Limited Use edition.

```
Work with Domino Console
                                              Server: SAMETIME7
Previous subcommands and messages:
  08/01/2006 13:45:15 Sametime: Service [Material Manager] is disabled.
  08/01/2006 13:45:15
                        Sametime: Service [Capacity Monitor] is disabled.
  08/01/2006 13:45:15 Sametime: Service [Broadcast Gateway] is disabled.
  08/01/2006 13:45:15 Sametime: Service [Broadcast Controller] is disabled.
  08/01/2006 13:45:15 Sametime: Service [A/V MMP] is disabled.
  08/01/2006 13:45:15 Sametime: Service [Interactive Streamed Media Service]
  is disabled.
  08/01/2006 13:45:15 Sametime: Service [H.323 MCU] is disabled.
                        Sametime: Service [Activity Provider] is disabled.
  08/01/2006 13:45:15
  08/01/2006 13:45:15
                        Sametime: Starting service [Sametime Links].
  08/01/2006 13:45:45
                        Sametime: Service [Sametime Links] started
successfully.
  08/01/2006 13:45:45 Sametime: All services started successfully.
  08/01/2006 13:45:45 Sametime: Server startup successful.
  08/01/2006 13:47:08 Sametime Server: Running
Enter a Domino subcommand.
 ===>
F3=Exit F5=Refresh
                       F6=Print
                                  F9=Retrieve
F17=Top F18=Bottom
                      F21=Command line
```

Figure B-6 Domino server console showing Sametime starting

At this point, Sametime is ready to be used with the Lotus Notes client. However, if a Lotus Notes client is installed before Sametime is added to the Domino server, the presence awareness and instant messaging capabilities are *not* enabled.

Perform the following steps to enable the Lotus Notes client with presence awareness and instant messaging capabilities:

1. Open the Lotus Notes client and click the **Office** tab located at the bottom left of the status bar (Figure B-7). Click **Edit Current** from the list.

💮 L	uis Guirigay - Inbox - IBM	Lotus	Notes					_ 2
File E	Edit View Create Actions H	elp						
] 🔿 (	l 💪 • 🕑 🖾 🕼 : 📄	A	b 🛍 🔒 🗋 :	ይ 🖓 🖓 🖓 🖓	ት 🖪 🕁	) - <b>-</b>	Q 🗄	
Addr	ess					-	↓ → < 🔞	® Q* ▼
] (		nosisteoti						
	🚯 Welcome 📓 Workspace	× 🖾	Luis Guirigay - Ii	nbox ×				
$\bigotimes$	🕅 Mail 🔻			alu a) (Baatuta Alla		Datata) (Caller	ulla al Caldere	
	for Luis Guirigay		w memo j Re	ply • [Reply to All	Forward •		Op • Folder	Copy into New + Chat + Tools + View Unread
	A		^   W	ho 🔺 🔤	∧ Date ∽	Time	Size ~	Subject ^
3	Inbox (5)	*		Bryan Page	08/04/2006	09:14 AM	2,456	Invitation: Redbook review (Aug 7 09:30 CDT)
2	Drafts	*		Domino Administrator	08/04/2006	09:41 AM	1,085	Domino servers update
61	Follow Up	*	1	Emilio Penedo	08/04/2006	09:15 AM	1,729	Fw: Invitation: Redbook review (Aug 7 09:30 CDT)
	Junk Mail	*	1	John Weiser	08/04/2006	09:44 AM	1,045	Weekly review
	📆 Trash	*		Philip McGibney	08/04/2006	09:18 AM	1,064	Comments
<b>&gt;</b>	⊕ 🔲 Views							
	🗉 🚞 Folders							
1	🗉 🚳 Tools							
~								
<b>S</b>								
1								
8								
I								
1								
								Home (Network Dialup) Home (Notes Direct Dialup)
	<b>F H H H</b>							Internet
								Office (Network)
	on DOM7SVR1/ITSO					F	review 🔺	Travel (Notes Direct Dialup) Edit Current
		101010101						▲) 之 ▲) [22 ▲] [Office 🛛 🖬

Figure B-7 Editing the current Location document

2. In the Servers tab of the Location document, enter the Sametime server name against the IBM Lotus Sametime server field (Figure B-8). Click **Save & Close**.

Connection Configuration Wizard	Save & Close Cancel
Location: Office (Ne	etwork)
Basics Servers Ports Mail	Internet Browser   Replication   Instant Messaging   Advanced   Administration
Servers	
Home/mail server:	『DOM7SVR1/ITSO』
Passthru server:	۲ 
Catalog/domain search server:	° _
Domino directory server:	° _
IBM Lotus Sametime server:	[™] sametime7.itso.com

Figure B-8 Entering the Sametime server name in the Location document

3. In the Log on to instant messaging dialog box (Figure B-9), enter your Lotus Notes user ID and Internet password, and click **Log on**.

Log on to in	nstant messaging ? 🗙
Enter you	r instant messaging password
User name	Luis Guirigay/ITSO
Password	
15	Save your password
	Log on Cancel

Figure B-9 Logging on to Sametime server

**Note:** The requested password is the Internet password. This is located in the Person document, as shown in Figure B-10.

Save & Close	amine Internet Certificate	e(s) DExamine Notes Certificate(s) 🗴
Person: Luis Gu	irigav/ITSO	uis Guirigay/ITSO@ITSO
r croon. Euro du	ingujinoo -	dunge), roo erroo
Basics Work/Home Of	her   Miscellaneous   C	Certificates   Roaming   Administration
Basics		
First name:	^r Luis _	
Middle name:	C _	
Last name:	^r Guirigay _	
User name:	[®] Luis Guirigay/ITSO Luis Guirigay <u>a</u>	
Alternate name:		
Short name/UserID:	『Iguiriga 』	
Personal title:	r _ •	
Generational qualifier:		
Internet password:	Enter Password	
	(9027A026CEF111EA5	5640A4A40CDA8BEE)
Preferred language:	Г 	

Figure B-10 Person document

4. The Lotus Notes client is now using the presence awareness and instant messaging capabilities provided by Sametime, as shown in Figure B-11.



Figure B-11 Lotus Notes client using Sametime presence awareness and instant messaging functions

If single sign on (SSO) is already configured in your Domino environment, you can enable the Lotus Notes client to use it. Using this capability, the Lotus Notes client will not prompt for the Internet password to sign in to the Sametime server. To enable SSO in the Lotus Notes client, perform the following steps:

- 1. In the Lotus Notes client, select File  $\rightarrow$  Preferences  $\rightarrow$  User Preferences.
- In the User Preferences window, select Instant Messaging → General, as shown in Figure B-12, and enable the Log onto instant messaging using single sign-on (SSO) option. Click OK.



Figure B-12 Enabling SSO in the Lotus Notes client

# Adding presence awareness to Domino Web Access

Domino Web Access integrates an instant messaging capability so that users can chat with their coworkers online and maintain an instant messaging list that shows the online status of other users. The instant messaging awareness feature also displays the online status next to the names of people in mail messages, views, and folders.

There are some additional steps that must be performed to complete the Sametime integration with Domino Web Access:

- 1. Create Connection documents.
- 2. Set up Domino SSO authentication between the Domino Web Access server and the Sametime server.
- 3. Specify the Sametime server configuration for Domino Web Access users.
- 4. Replicate names.nsf, and restart servers.

Attention: All these changes must be made in your Domino Web Access server.

For additional information about integrating Sametime with Domino Web Access, refer to the IBM Technote 1159197, *Complete steps to configure Sametime integration with DWA 6.5.x available*, which is available in the following Web site:

http://www.ibm.com/support/docview.wss?uid=swg21159197

#### **Creating Connection documents**

You require Connection documents for the Domino Web Access and the Sametime servers if the Sametime server is not in the same domain as the Domino Web Access server. Also, if the Sametime server is in the same domain as the Domino Web Access server, but is not clustered with the registration server, you require a Connection document in order to replicate the Domino Directory. Perform the following steps:

- 1. In the Domino Web Access server (Figure B-13), create a Connection document:
  - Enter the Sametime server's name in the Destination server field.
  - Enter the Domino Web Access server's name in the Source server field.

Save & Close 🗶	ancel		
Server Connectio	n and a second sec	(Sile	
Basics Replication/Rou	ting Schedule Comments Administration		
Basics			
Connection type:	『Local Area Network』 💌	Usage priority:	🖥 Normal 🛛 💌
Source server:	DOM7SVR1/ITSO	Destination server:	SAMETIME7/ITSO 🛛 🔳
Source domain:	『ITSO』	Destination domain:	『ITSO』
Use the port(s):	『TCPIP』	Optional network address:	^ℤ sametime7.itso.com _
Choose Ports			

Figure B-13 Domino Web Access Server Connection document

- 2. In the Sametime server (Figure B-14), create a Connection document:
  - Enter the Domino Web Access server's name in the Destination server field.
  - Enter the Sametime server's name in the Source domain field.

Save & Close 🛞 Cancel	
Server Connection	Sel 1
Basics Replication/Routing Schedule Comments Administra	ation
Basics	
Connection type: Cocal Area Network	Usage priority: Rormal .
Source server: SAMETIME7/ITSO	Destination server: ^C DOM7SVR1/ITSO ▼
Source domain: ITSO	Destination domain: ITSO _
Use the port(s): ^{IF} TCPIP	Optional network ^r dom7svr1.itso.com address:
Choose Ports	

Figure B-14 Sametime Server Connection document

Note: For more information about Connection documents, refer to the following Web site:

http://www-12.lotus.com/ldd/doc/domino_notes/7.0/help7_admin.nsf/f4b82fbb75e942 a6852566ac0037f284/f4f7bc235c42319d8525706f0065b03c?OpenDocument

#### Setting up Domino single sign-on authentication

Domino SSO authentication allows Web users to log in once to a Domino or WebSphere server, and then access any other Domino or WebSphere server in the same DNS domain that is enabled for SSO, without having to log in again.

In a multiple server environment, it is possible that one or more servers in your Domino domain are already configured for Domino SSO, and the Domino Directory already contains a Domino Web SSO configuration document. When you install Sametime, it creates a Web SSO configuration document called LtpaToken, unless one already exists in the Domino Directory. If an LtpaToken configuration document already exists, Sametime does not attempt to alter it.

**Note:** For more information about Domino SSO, refer to the following Web site:

http://www-12.lotus.com/ldd/doc/domino_notes/7.0/help7_admin.nsf/f4b82fbb75e942 a6852566ac0037f284/13d0f1088e35bc0c8525706f0065d9f0?0penDocument Perform the following steps to set up Domino SSO:

 From the Domino Administrator client, click the Configuration tab, expand the Server section and click All Server Documents. Select Web → Create Web SSO Configuration (Figure 9-46).

JITSO Domain				
People & Groups   Files   Server   Me	ssaging Replicat	tion Configuration		
Server: DOM7SVR1/ITSO Build V702_07092006 on OS400 V5R4M0 Use Directory on: Current Server				
Server     Gurrent Server Document	Add Server	🖉 Edit Server 🕥 Add	to Cluster 🐽 Delete Server	⊗Web ▼ Chat▼
All Server Documents	Domain	Server Name	Title	Create Virtual Server
	<b>▼ITSO</b>			Create File Protection
		DOM7SVR1/ITSO	Messaging Server	Create Realm
External Domain Network Inf.		DOM7SVR2/ITSO	Application Server	View Current Configurations
External bornal invervior inv     S Messaging     Declastics		SAMETIME7/ITSO	IM Server	Create Web SSO Configuration

Figure 9-46 Creating Domino SSO document

- 2. In the Web SSO Configuration document (Figure B-15), change the fields to the following values:
  - DNS Domain = your Domino domain

In this example, itso.com is used.

- Domino Server Names = your Domino servers

In this example, DOM7SVR1/ITSO,SAMETIME7/ITSO is used.

🕒 Save & Close 🔗 Keys 🛞 Cancel	
Web SSO Configuration for :	Signa general
Basics Comments Administration	
Token Configuration	Token Expiration
Configuration Name: LtpaToken 🛛	Expiration (minutes): 30 🛛
Organization:	Idle Session Timeout: 🗖 Enabled
DNS Domain: [®] itso.com _	
Map names in LTPA ⁽⁷⁾ Disabled (1) tokens:	
Participating Servers	
Domino Server Names: DOM7SVR1/ITSO, SAMETIME7/ITSO	

Figure B-15 Web SSO Configuration document

3. Select Keys  $\rightarrow$  Create Domino SSO Key (Figure B-16).

🕒 Save & Close 🔗 Ke	ys 🔻 🛞 Cancel		
Web SSO ( Impor	te Domino SSO Key J. rt WebSphere LTPA Keys	- and	Seres.
Basics Comments Admir	nistration		
Token Configuration	7	Token Expiration	
Configuration Name:	^r LtpaToken _	Expiration (minutes):	^r 30 <u>a</u>
Organization:	7 	Idle Session Timeout:	Enabled
DNS Domain:	ritso.com _		
Map names in LTPA tokens:	⁷ Disabled _ 💌		
Participating Servers			
Domino Server Names:	[™] DOM7SVR1/ITSO, SAMETIME7/ITSO <b>_</b> ▼		

Figure B-16 Creating Domino SSO Key

4. Click **OK** to continue (Figure B-17).

Web SSO Configuration
Successfully created Domino SSO key.
ок

Figure B-17 Successfully created Domino SSO key

- 5. Back in the Web SSO Configuration document, click Save & Close.
- 6. From the Domino Administrator client, click the **Configuration** tab, expand the **Server** section and click **All Server documents**.
- 7. In your Domino Web Access server document, under the Internet Protocols  $\rightarrow$  Domino Web Engine tab (Figure B-18), edit the following values in the HTTP Sessions section:
  - Session authentication = Multiple servers (SSO)
  - Web SSO Configuration = LtpaToken

ITSO Domain UB Server: DOM7SVR1/ITSO ×	
Save & Close Oreate Web	
Server: DOM7SVR1/ITSO dom7svr1.itso.com	1010101 COL
Basics   Security   Ports   Server Tasks   Internet Protocols   MTAs   Miscellaneous	Transactional Logging Shar
HTTP Domino Web Engine DIIOP LDAP	
HTTP Sessions	Java Servlets
Session authentication:	Java servlet support: $^{\square}$ No
Web SSO Configuration: LtpaToken	Servlet URL path: ^C /se
Maximum active sessions: ^C 1000 J	Class path: do

Figure B-18 Domino Web Access Server document

8. Repeat the previous step for the Sametime server (Figure B-19).

ITSO Domain UB Server: SAMETIME	E7/ITSO X L Server: SAMETIM	E7/ITSO >	Cancel		
Server: SAMETIME7	//ITSO SAMETIME7.	ITSO.CO	DM	interior Con	, e
Basics Security Ports Server	r Tasks Internet Protocols	MTAs	Miscellaneous	Transactional Logging	Sam
HTTP Domino Web Engine DIK	OP LDAP	•			
HTTP Sessions				Java Servlets	
Session authentication:	^C Multiple Servers (SSO)			Java servlet support:	ீ Do
Web SSO Configuration:	🖥 LtpaToken 🛛 💌			Servlet URL path:	୮/se
Maximum active sessions:	ິ 1000 ຼ			Class path:	^r do

Figure B-19 Sametime Server document

#### Specifying the Sametime server configuration for Domino Web Access users

To enable instant messaging and set the Sametime server for all the Domino Web Access users at one time, use the Instant Messaging settings in the Configuration Settings document, Domino Web Access tab. After you perform this task, individual users can enable or disable instant messaging on their local Domino Web Access clients by setting a User Preference.

**Note:** For more information about creating the Configuration Settings documents, refer to the following Web site:

http://www-12.lotus.com/ldd/doc/domino_notes/7.0/help7_admin.nsf/f4b82fbb75e942 a6852566ac0037f284/0646f18e7e0bb0428525706f0065c7ce?0penDocument

Perform the following steps:

- 1. From the Domino Administrator client, click the **Configuration** tab, expand the **Server** section, and click **Configurations**.
- Select the Configuration Settings document for the Domino Web Access server and click Edit Configuration (Figure B-20).

People & Groups Files Server Messaging Replication Configuration				
n OS400 V5R4M0	Use Directory on:			
Add Configuration	tion 🕖 Delete Configuration			
Server Name Pa	arameters			
DOM7SVR1				
	Add Configuration Pa Server Name Pa DOM7SVR1			

Figure B-20 Editing the Configuration Settings document for Domino Web Access server

3. In the Configuration Settings document, click the **Domino Web Access** tab and go to the Instant Messaging section (Figure B-21). Set the values according to Table B-1.

**Note:** For more information about the fields in a Configuration Settings document refer to the following Web site:

http://www-12.lotus.com/ldd/doc/domino_notes/7.0/help7_admin.nsf/f4b82fbb75e
942a6852566ac0037f284/5c963b000ee5eb0d8525706f0065cf3a?0penDocument

Instant Messaging	
Instant messaging features:	『Enabled』
Online awareness:	Enabled .
Allow secrets and tokens authentication:	^r Disabled _ 💌
Set an IBM Lotus Sametime server	^𝑘 sametime7.itso.co
hostname for all DWA users (useful for clustered configurations):	m_
Loading \stlinks from Domino application server:	^C Enabled _ 💌
Prefer Sametime Connect for browsers:	^r Enabled . •
Pass the organization name (commonly used when Domino is configured for xSP):	^r Disabled▼
Directory type used by IBM Lotus Sametime server:	^r Domino Directory 』▼

Figure B-21 Configuration Settings document, Instant Messaging section

Table B-1 shows the Instant Messaging values.

Table B-1 Configuration Settings document, Instant Messaging values

Field	Value
Instant messaging feature	Enable
Online awareness	Enabled
Allow authentication of secrets and tokens	Disabled
Set an IBM Lotus Sametime server host name for all DWA users (useful for clustered configurations)	sametime7.itso.com
Load \stlinks from Domino application server	Enabled
Prefer Sametime Connect for browsers	Enabled
Pass the organization name (commonly used when Domino is configured for xSP)	Disabled
Directory type used by IBM Lotus Server	Domino Directory

- 4. Replicate the changes to your Sametime server.
- 5. After all the changes have been replicated to the Sametime server, restart the Domino Web Access server and the Sametime server.

6. Using Domino Web Access, sign in with any user account and click **Preferences** (Figure B-22).

🕙 Mail - Microsoft Inte	rnet Explorer				_ 6
File Edit View Favor	ites Tools Help				
🚱 Back 🔹 🕥 - [	🗴 😰 🏠 🔎 Search  🛧 Fa	vorites 🛛 Media	<b>€</b>	🎍 🖻 • 🚺	3
Address 🕘 http://dom7svr1.itso.com/mail/guiriga.nsf/iNotes/Mail/?OpenDocument&PresetFields=s_ViewLabel;Inbox,s_ViewName;(%24Inbox)&KIC&UNH=37nae2gkupkq1u11dj6gk1btck					
Links 🍯 Search the Web wi	th Lycos 🛛 👸 IBM Business Transformation	n Homepage 🛛 👸 IB	M Internal Help Hor	mepage 🛛 👸 IBM S	Standard Software Installer
Welcome, Luis Guirigay 🕽	IM Disconnected				Preferences Logout He
Welcome  Mail  Cale	endar • To Do • Contacts • Note	book 🔻			Lotus. Domino''' Web Access
My Mail	Inbox				
🙆 Inbox	🚱 🕅 New 🔹 Reply 🔹 Forward	• Move • Follow	Up 🔻 Mark Rea	d 🔻 View 🔻 Too	ls • 🚑 👸
🕅 Drafts	Who	Date	Time	Size	Subject
🛐 Sent	John Weiser	08/04/2006	09:44AM	104	5 Weekly review
💕 Follow Up	Domino Administrator	08/04/2006	09:41AM	108	5 Domino servers update
🚇 Junk Mail	Philip McGibney	08/04/2006	09:18AM	106	4 Comments
🛱 Trash	! Emilio Penedo	08/04/2006	09:15AM	172	9 Fw: Invitation: Redbook review (Aug 7 09:30 CDT
🗄 🔲 Views	🖻 Bryan Page	08/04/2006	09:14AM	245	5 Invitation: Redbook review (Aug 7 09:30 CDT)
🗀 Folders					
🗄 🚳 Tools					

Figure B-22 Domino Web Access user with no presence awareness or instant messaging capabilities

7. In the Preference window (Figure B-23), enable Instant messaging and click OK.

	Preferences - Mi	icrosoft Internet Explorer
	Basics	This mail file belongs to: Luis Guirigay/ITSO
Ē	Mail	
_		Display Options
Ð	Calendar	Display this tab when starting: Welcome
	International	For all list-type views:
Đ	Delegation	• Show all documents as a scrollable list
	Security	O Show documents one page at a time (faster load time)
	Archivo	Search
	Alciive	Enable full-text indexing for searching
	Offline	Personal categories
	Logout	[Type here to add a new category]
		Business
		Friends
		Family
		Default Mail Client
		Domino Web Access is NOT the default Mail Client Make Default
		Instant messaging
		Enable Instant messaging
		Performance Optimizations
		Reuse child windows
		Snell Check Default Dictionary
		Set this as the default dictionary: Server Default
		OK Cancel Help

Figure B-23 Domino Web Access user preferences

8. Figure B-24 shows the integration between Domino Web Access and Sametime.

Mail - Microsoft Inter	net Explorer			
File Edit View Favori	tes Tools Help			
🕒 Back 🔹 🐑 🔹	👔 😰 🏠 🔎 Search   📌 Favorit	es 🔇 Media 🧭	۵. 🍦 🗟	a • 🧾 🍇
Address 🙆 http://dom7svr1	.itso.com/mail/lguiriga.nsf/iNotes/Mail/?OpenD	ocument&PresetFields=s_	ViewLabel;Inbox,s_	ViewName;(%24I
Links 🍯 Search the Web wit	h Lycos 🛛 👸 IBM Business Transformation Ho	mepage 🛛 👸 IBM Interna	Help Homepage	ど IBM Standard
Welcome, Luis Guirigay 🙎	I Am Active			
Welcome 🔻 Mail 🔻 Cale	ndar • To Do • Contacts • Noteboo	k 🔻		
My Mail	Inbox			
🙆 Inbox	🚱 🔊 New 🔻 Reply 🔻 Forward 🔻 M	love - Follow Up - M	ark Read 🔻 View	- Chat - Too
🕅 Drafts	Who _▲	Date	Time	Size
🚯 Sent	🖻 🔗 Bryan Page	08/04/2006	09:14AM	2456
🕺 Follow Up	A Domino Administrator	08/04/2006	09:41AM	1085
🕲 Junk Mail	! 🗢 Emilio Penedo	08/04/2006	09:15AM	1729
Trash	! John Weiser	08/04/2006	09:44AM	1045
H III Views	🙎 Philip McGibney	08/04/2006	09:18AM	1064
Eoldorr				

Figure B-24 Domino Web Access user with presence awareness and instant messaging enabled

#### Sametime not working with Domino Web Access

If Sametime is not working properly with Domino Web Access, it is recommended that you check the following areas:

- Test your SSO
- Use Fully Qualify Domain Names (FQDN)
- Check ports blocking
- Set Internet Explorer default settings
- Verify your network configuration

For more information, refer to the IBM Technote 1158798, *Troubleshooting problems with Chat and Awareness in DWA 6.5.x*, in the following Web site:

http://www.ibm.com/support/docview.wss?uid=swg21158798



С

# Domino Access for Microsoft Outlook

This appendix describes the steps involved in configuring the Microsoft Outlook® client to access a Domino for i5/OS server.

IBM Lotus Domino Access for Microsoft Outlook provides the following benefits:

- Keeps the Microsoft Outlook client on the user's desktop
- Low user retraining
- No costs associated with desktop change
- All the benefits of Domino are now available to the Microsoft Outlook user

Domino Access for Microsoft Outlook delivers the leading messaging, calendar and scheduling, and personal information management services of Lotus Domino to Microsoft Outlook users. Organizations currently using Microsoft Exchange for their messaging infrastructure can move to security-rich, scalable, and reliable Domino server software, without changing from the familiar client software on the desktop, and without user retraining.

Domino Access for Microsoft Outlook helps improve user and organizational productivity. Lotus Domino Access for Microsoft Outlook allows Microsoft Outlook users to benefit from the advanced functionality of the Domino server:

- Gives you the opportunity to run your messaging infrastructure on any of the wide range of supported hardware and operating system platforms
- Lets Microsoft Outlook users take advantage of Domino-based collaboration capabilities such as discussion forums, teamrooms, and reference databases from a Web browser on their workstation
- Allows Microsoft Outlook users, including those using Microsoft Outlook 2000 and 2002 (XP), to productively work with their e-mail, calendar, and address books when offline
- Leverages award-winning Domino replication and network compression, which helps improve performance of offline synchronization and helps make online interactions more efficient
- Extends the benefits of advanced failover capabilities and server-level antispam features of Domino to Microsoft Outlook users.

# Requirements

Domino Access for Microsoft Outlook allows Microsoft Outlook 2000, 2002 (XP), or 2003 users to connect to a Domino server.

Following is a list of client requirements:

- Windows OS (Window 2000 Professional or Windows XP Professional)
- Microsoft Outlook 2000 or Outlook XP with SP3, and Outlook 2003 with SP1
- ► Domino server running 6.5.1 or later
- Mail databases created using a Mail7.NTF, Mail7ex.NTF, or DWA7.NTF template

# New features in Domino R7

Domino Access for Microsoft Outlook offers the following enhancements in Domino 7:

- Domino R7.0
  - Native support for Internet standards, including X.509 and Secure Multipurpose Internet Mail Extensions (S/MIME)
  - Client software performance enhancements, reducing the time to launch the application, compared to 6.5.3
  - Installation option for separate program and data directories. Allows configuration of more than one user on the same machine using Windows operating system security.
  - New mail notification. User options include playing a sound, briefly changing the mouse cursor, and showing an envelope icon in the notification area
  - Option to use a local copy of your global address book. This can be a full copy of the directory or a condensed directory catalog to save space on your workstation.
- Domino R7.0.1
  - Mail rules run automatically on all messages as they come into the in box.
  - Native Microsoft Outlook new mail notification.
  - Use of Microsoft Outlook local archive settings for both manual and automatic archiving. Messages removed from the main PST in Lotus Domino Access for Microsoft Outlook software are removed from the server store. Conversely, messages that are moved from a local archive to the PST are added to the server store.
  - Microsoft Outlook 2003 PST format. The new file format is automatically used if running a Microsoft Outlook 2003 client. This capability enables local file sizes to increase to 20 gigabytes.
  - Support for alternate names

# Installation and configuration

Perform the following steps to configure a Domino Access for Microsoft Outlook user:

- 1. Register a new Domino user using the Domino Administrator client interface.
- 2. In the user workstation, verify that Microsoft Outlook is the default e-mail program:
  - a. Open Internet Explorer.
  - b. Go to **Tools**  $\rightarrow$  **Internet Options**.
  - c. In the Internet Options window, click the **Programs** tab and select **Microsoft Office Outlook** for e-mail, as shown in Figure C-1.

4	You can speci for each Intern	y which program Windows automatica et service.	ally uses	
	HTML editor:	Notepad	~	
	E-mail:	Microsoft Office Outlook	~	
	Newsgroups:	Outlook Express	~	
	Internet call:	NetMeeting		
	Calendar:	Microsoft Office Outlook	~	
	Contact list:	Microsoft Office Outlook	~	
Reset \ Intern	Web Settings et Explorer shoul	You can reset Internet Explorer to th home and search pages. d check to see whether it is the defau	ne default t browser	

Figure C-1 Selecting the default e-mail program in the user's workstation

3. In the user's workstation, open Internet Explorer and go to the following URL (replace itso.com with your server's fully qualified Internet host name):

http://www.itso.com/DAO/setup.exe

4. In the File Download window (Figure C-2), accept the download file and click Save.

File Dov	wnload 🛛 🕅
2	Some files can harm your computer. If the file information below looks suspicious, or you do not fully trust the source, do not open or save this file.
	File name: setup.exe
	File type: Application
	From: dom7svrw.itso.com
	This type of file could harm your computer if it contains malicious code.
	Would you like to open the file or save it to your computer?
	Open Save Cancel More Info
	Aways ask before opening this type of file

Figure C-2 Downloading the Domino Access for Microsoft Outlook setup file

5. A status bar indicates the download process, as shown in Figure C-3. When complete click **Open**.

Download com	iplete
Dowr	nload Complete
Saved:	
setup.exe from a	dom7svrw.itso.com
Downloaded:	36.0 MB in 10 sec
Download to:	C:\DAO\setup.exe
Transfer rate:	3.60 MB/Sec
Close this dial	og box when download completes
	and the second se
	Open Open Folder Close

Figure C-3 Domino Access for Microsoft Outlook setup file download completed

6. The IBM Lotus Domino Access for Microsoft Outlook installation wizard starts (Figure C-4). Click **Next**.



Figure C-4 Domino Access for Microsoft Outlook installation wizard

- 7. Accept the terms in the software license agreement and click Next.
- Register your user and organization license, select the installation type (single user or multiuser) and click Next.

**Installation type:** If you are a member of the Windows Administrator group, you can choose whether to perform a single user or a multiuser installation on a workstation. If you are not a member of this group, the installation is a single user installation by default.

- Single user installation: Use this method if only one person uses Domino Access for Microsoft Outlook in the workstation. This type of install creates only one data directory.
- Multiuser installation: Use this method if more than one person uses Domino Access for Microsoft Outlook in the workstation. This type of installation allows the creation of data directories specific to each user. This means that each user can have their own local files, which can provide some measure of security.

9. In the Install Directory window (Figure C-5), select the installation folder. In this example, the default is used. Click **Next**.

波 IBM Lot	us Domino Access for Microsoft Outlook - InstallShield Wizard 💦 🔀	
Install Dir Click Next t different fo	ectory o install to this folder, or click Change to install to a Ider.	
	Install IBM Lotus Domino Access for Microsoft Outlook to: C:\Program Files\DominoForOutlook\ Change	
InstallShield -	< Back Next > Cancel	

Figure C-5 Specifying the Domino Access for Microsoft Outlook installation directory

10. In the Custom Setup window (Figure C-6), decide whether you want the Single Logon Feature to be installed, and click **Next**.

BIBM Lotus Domino Access for Microsoft Outlook	x - InstallShield Wizard 🛛 🔀
Custom Setup	
Select the program features you want installed.	
Click on an icon in the list below to change how a feature is ins	stalled.
IBM Lotus Domino Access for Microsoft Outle	Feature Description Windows XP, 2000 and NT only. Allows you to log into your operating system and access your DAMO client without having to re-enter your password. This feature will not work with a Multid liser installation
	This feature requires 0KB on
	your hard drive.
Install to:	
	Change
InstallShield	
Help Space < Back	Next > Cancel

Figure C-6 System Setup

11. In the Ready to Install the Program window (Figure C-7), click Install.

😼 IBM Lotus Domino Access for Microsoft Outlook - InstallShield Wizard 👘 🔀	
Ready to Install the Program	
The wizard is ready to begin installation.	
Click Install to begin the installation.	
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.	
InstallShield	
< Back Install Cancel	

Figure C-7 Starting the Domino Access for Microsoft Outlook installation

12.A status bar indicates the installation process. You will be prompted to type in your user name and the Domino server name, as shown in Figure C-8. In this example, the fully qualified Internet host name of the Domino server is specified. Click **Next**.

IBM Lotus Domino Access fo	or Microsoft Ou	tlook Setup	
Welcome to IBM Outlook setup. E your Domino serv user name and D	Lotus Domino Acce Depending on how y ver you may only ner omino server name	ess for Microsoft rou connect to ed to enter your	
Your name	Marielle Penedo		
	For example: Mary	Smith	
Domino server name	dom7svrw.itso.con	1	
Examples:	Maple/IBM maple.ibm.com www.xxx.yyy.zzz	(Local) (Global - *Recor (Global IP Addre	nmended") ess)
Data Directory C:\Program	n Files\DominoForO	utlook\	Browse
If you do not know the your administrator.	e name of your Dom	ino server, contac	*
< Back	Next >	Cancel	

Figure C-8 Domino Access for Microsoft Outlook setup

13. You are prompted for your user.id password, as shown in Figure C-9. Type it and click OK.

IBM Lotus Domino Access for Mic	crosoft Outloo
Please enter Domino password for: Marielle Penedo/IT/ITS0	OK
*****	Cancel

Figure C-9 Domino Access for Microsoft Outlook user password

14.A MAPI profile is created, as shown in Figure C-10. Click Finish.

IBM Lotus Domino Access for Microsoft Outlook Setup	
This portion of IBM Lotus Domino Access for Microsoft Outlook setup is complete! Setup will now create and configure a MAPI profile.	
Push "Finish" to continue.	
K Back Finish Cancel	

Figure C-10 MAPI profile created

15. The IBM Lotus Domino Access for Microsoft Outlook installation wizard is completed (Figure C-11). Click **Finish**.

🛃 IBM Lotus Domino Acces	s for Microsoft Outlook - InstallShield Wizard 🛛 🔯	
	InstallShield Wizard Completed	
	Setup has finished installing IBM Lotus Domino Access for Microsoft Outlook.	
	< Back Finish Cancel	

Figure C-11 Domino Access for Microsoft Outlook installation wizard completed

16.Start the Microsoft Outlook client.

17. You are prompted to choose a profile, as shown in Figure C-12. Select the profile with your Domino server name and click **OK**.

Choose Profile	
Profile Name:	ado's mail on DOM7SVRW New
	OK Cancel Options >>

Figure C-12 Selecting a profile

18. Type in your Domino user ID password (Figure C-13) and click OK.

Domino Password for Marielle Penedo/IT/ITSO			
	ОК		
Password: xxxxxx	Cancel		
Save this password			

Figure C-13 Specifying the Domino user ID password

19. Wait for the Initial Setup process to complete. This is done only the first time you use Domino Access for Microsoft Outlook. See Figure C-14.

Initial Setup		
Initial setup is in progress. Pla This may take several minute	ease allow your mailfile to be populated. s.	
Initializing	0%	
Receiving	PENDING	
Updating Folders	PENDING	
Updating Unread Marks	PENDING	
Processing C&S Info	PENDING	
Overall Status	0% Searching for Receive - 890 of 1133 - DOM7SVRW/SERVERS/ITSO	

Figure C-14 Initial setup process

20. When the initial setup process is complete, your Microsoft Outlook interface is started and a Welcome to IBM Lotus Domino Access for Microsoft Outlook message is displayed (Figure C-15).



Figure C-15 Microsoft Outlook client using Domino Access for Microsoft Outlook

# **Related publications**

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this IBM Redbook.

## **IBM Redbooks**

For information about ordering these publications, see "How to get IBM Redbooks" on page 454. Note that some of the documents referenced here might be available in softcopy only.

- AS/400 Performance Management V3R6/V3R7, SG24-4735
- ► Domino for iSeries Sizing and Performance Tuning, SG24-5162
- Domino 6 for iSeries Best Practices Guide, SG24-6937
- ▶ iNotes Web Access on the IBM eServer iSeries Server, SG24-6553
- ► Lotus Domino for AS/400 R5: Implementation, SG24-5592
- ► Lotus Domino 6 Multi-Versioning Support on the IBM eServer iSeries Server, SG24-6940
- Managing OS/400 with Operations Navigator V5R1 Volume 1: Overview and More, SG24-6226
- Performance Considerations for Domino Applications, SG24-5602
- Domino 7 Performance Tuning Best Practices to Get the Most Out of Your Domino Infrastructure, REDP-4182
- Domino 7 Server Consolidation: Best Practices to Get the Most Out of Your Domino Infrastructure, REDP-4181
- ► Lotus Domino Domain Monitoring, REDP-4089

# Other publications

The following publications are also relevant as further information sources:

- Backup Recovery and Media Services for iSeries http://publib.boulder.ibm.com/infocenter/iseries/v5r4/topic/books/sc415345.pdf
- BRMS iSeries Navigator Client Student Guide V5R4M0 http://www.ibm.com/servers/eserver/iseries/service/brms/pdf/StudentGuide54.pdf
- Collecting and Analyzing PEX Trace Profile Data http://www.ibm.com/servers/eserver/iseries/perfmgmt/pdf/tprof.pdf
- Domino 7 Administrator help http://doc.notes.net/domino_notes/7.0/help7_admin.nsf
- Domino 7 for i5/OS Application Development Guide http://www-12.lotus.com/ldd/doc/uafiles.nsf/docs/i5osdom7/\$File/apdev400.pdf
- Domino 7 Upgrade Guide http://doc.notes.net/uafiles.nsf/docs/domino7b2/\$File/v7 admin upgrade.pdf

- ► Domino for i5/OS Help (i400hlp.nsf), included with Domino 7 for the i5/OS
- Domino HTTP Hardware Cryptography using iSeries SSL ftp://ftp.software.ibm.com/as400/web/domino/pdf/crypto.pdf
- iSeries TCP/IP Troubleshooting http://publib.boulder.ibm.com/iseries/v5r2/ic2924/info/rzaku/rzakumst.pdf
- Lotus Integration Technologies for SAP ftp://ftp.software.ibm.com/software/lotus/info/Domino/SAPandDomino042002.zip
- ► Performance Tools for iSeries Version 5, SC41-5340

### **Online resources**

The following Web sites are also relevant as further information sources:

- Backup Recovery and Media Services
   http://www.ibm.com/servers/eserver/iseries/service/brms
- Lotus Software Knowledge base http://www.ibm.com/software/lotus/support
- IBM Passport Advantage http://www-306.ibm.com/software/howtobuy/passportadvantage/
- Lotus Domino for i5/OS Extended product updates http://www.ibm.com/servers/eserver/iseries/domino/support/extprod.html
- Lotus Domino for i5/OS Domino 7 updates http://www.ibm.com/servers/eserver/iseries/domino/support/mr70.html
- Lotus Documentation, Release Notes http://www.lotus.com/ldd/notesua.nsf/RN
- Domino for i5/OS Developer Resources http://www.ibm.com/servers/eserver/iseries/domino/devresources.html
- Lotus product documentation repository http://www-10.lotus.com/ldd/notesua.nsf
- System i logical partitioning http://www.ibm.com/eserver/iseries/lpar
- IBM eServer Workload Estimator http://www-912.ibm.com/estimator
- Lotus Performance knowledge domain of the IBM developerWorks http://www-128.ibm.com/developerworks/lotus/performance/
- IBM Training and Certification http://www-306.ibm.com/software/sw-training/
- Performance Management for System i5 Web page: http://www.ibm.com/systems/i/pmsystemi5/
- iDoctor for iSeries Web site at: https://www-912.ibm.com/i_dir/iDoctor.nsf
- Troubleshooting application performance: New tools for data collection http://www-128.ibm.com/developerworks/lotus/library/app-troubleshooting2/
- ► The Enterprise Mail workload benchmark

http://www-128.ibm.com/developerworks/lotus/library/domino7-enterprise-performa
nce/

Getting Started with Management Central

http://publib.boulder.ibm.com/infocenter/iseries/v5r4/topic/rzaih/rzaksinstlmc.
htm

Lotus Support

http://www.support.lotus.com

- Considerations when developing Domino C and C++ API applications for i5/OS http://www.ibm.com/support/docview.wss?rs=203&uid=swg21238494
- Support for IBM Lotus Domino on 64-bit Operating Systems

http://www.ibm.com/support/docview.wss?rs=463&context=SSKTMJ&dc=DB520&uid=swg21
233872&loc=en_US&cs=UTF-8&lang=en&rss=ct463lotus

Best practices for large Lotus Notes mail files:

http://www-128.ibm.com/developerworks/lotus/library/notes-mail-files/

- i5/OS Information Center http://publib.boulder.ibm.com/iseries/
- ► Lotus Sametime

http://www-142.ibm.com/software/sw-lotus/products/product3.nsf/wdocs/homepage

► IBM Lotus Sametime for i5/OS

http://www.ibm.com/servers/eserver/iseries/sametime/

► Lotus Sametime 7.0 for i5/OS documentation

http://www.lotus.com/ldd/notesua.nsf/a08df36b2299a8bc8525665d006dce40/58f02f65b 21ea1728525706d004b4a7e?OpenDocument

- IBM Technote 1158798, Troubleshooting problems with Chat and Awareness in DWA 6.5.x http://www.ibm.com/support/docview.wss?uid=swg21158798
- IBM Technote 1159197, Complete steps to configure Sametime integration with DWA 6.5.x

http://www.ibm.com/support/docview.wss?uid=swg21159197

Connection documents

http://www-12.lotus.com/ldd/doc/domino_notes/7.0/help7_admin.nsf/f4b82fbb75e942 a6852566ac0037f284/f4f7bc235c42319d8525706f0065b03c?OpenDocument

Domino SSO

http://www-12.lotus.com/ldd/doc/domino_notes/7.0/help7_admin.nsf/f4b82fbb75e942 a6852566ac0037f284/13d0f1088e35bc0c8525706f0065d9f0?0penDocument Creating Configuration Settings documents

http://www-12.lotus.com/ldd/doc/domino_notes/7.0/help7_admin.nsf/f4b82fbb75e942 a6852566ac0037f284/0646f18e7e0bb0428525706f0065c7ce?0penDocument

Configuration Settings document settings

http://www-12.lotus.com/ldd/doc/domino_notes/7.0/help7_admin.nsf/f4b82fbb75e942 a6852566ac0037f284/5c963b000ee5eb0d8525706f0065cf3a?OpenDocument

# How to get IBM Redbooks

You can search for, view, or download IBM Redbooks, IBM Redpapers, Hints and Tips, draft publications, and Additional materials, as well as order hard copy of IBM Redbooks or CD-ROMs, at this Web site:

ibm.com/redbooks

# Help from IBM

IBM Support and downloads

ibm.com/support

IBM Global Services

ibm.com/services

# Index

## Symbols

\$UpdateQueue 233 *BASE option 13, 44 pool 261 *MACHINE pool 230

# Α

activity trends 3, 206 Add PEX Definition (ADDPEXDFN) 227 Add Sametime to Domino (ADDLSTDOM) 426 adding BRMS service to a Domino server 370 adding Sametime 7 Limited Use to a Domino 7 server 426 additional Domino server 128 configuring with CFGDOMSVR 151 configuring with domwzd.exe 137 handling the server ID 135 registering the server 129 verifying connection to registration server 137 additional language support 66 installing using Language Pack Installer 66 installing using LODRUN 74 admin.id 274. 301 admin4.nsf 205.294 administering Domino 7 for i5/OS 159 administrator 116 Administrator client 178, 194 administrator ID 122 ADMINP task 352 agent manager task 351 AgentRunner.nsf 293 analyzing disk I/O 255 memory resources 247 network resources 257 performance bottlenecks 241 antispam 4 applications 2, 199 architecture 2 archival transaction logging 369 automatic diagnostic collection tool 323 auxiliary storage pools 263 availability 6

# В

Backup, Recovery, and Media Services (BRMS) 102, 357–358 changes for Domino incremental backups 368 concepts 358 configuring to work with Domino 359 control groups 359 directories used 394

Domino online backups 358 full online backup of Domino server 361 incremental online backup of Domino server 368 Initialize BRMS (INZBRM) 359 notes.ini settings 395 package 359 recovery of Domino full online backup 377 recovery of Domino incremental online backup 387 Save Domino Server using BRMS (SAVDOMBRM) 365 Save Object using BRM (SAVBRM) 359 Start Backup using BRM (STRBKUBRM) 366 Start Maintenance for BRM (STRMNTBRM) 359 Work with Backup Control Groups (WRKCTLGBRM) 375 Base pool (*BASE) 262 baseline 197 billing 118 bottleneck 197 Busytime database 4

# Ç

C API option 13, 44 capacity planning 15 cert.id 274, 301 Certificate Authority (CA) 400 Certificate Store 407 certifier ID 121 certlog.nsf 293 certsrv.nsf 293 Change Current Directory (CHGCURDIR) 183 Change Domino Server (CHGDOMSVR) 107, 116, 182 Change Job Type (CHGJOBTYP) 200 Change Owner (CHGOWN) 136, 302 Change Shared Pool (CHGSHRPOOL) 262 Change Subsystem Description (CHGSBSD) 262 Change TCP/IP Attributes (CHGTCPA) 200, 247 Change TCP/IP Domain (CHGTCPDMN) 24 changing the Domino server configuration 182 cleaning up orphaned shared memory or semaphores 326 cluster enabled Domino 7 clustering 118, 240 collaborative applications 2 collation 126 collecting Domino performance data 223 collecting information for Lotus Support 320 Collection Services 203 starting 223 commands ADDLSTDOM 426 ADDPEXDFN 227 CFGDOMSVR 94, 113, 303 CFGTCP 24

CHGCURDIR 183 CHGDOMSVR 107, 116, 182 CHGJOBTYP 200 CHGOWN 136, 302 CHGSBSD 262 CHGSHRPOOL 262 CHGTCPA 200, 247 CHGTCPDMN 24 DLTDOMSEM 326 DLTDOMSMEM 326 DMPDOMSVRC 8, 184, 334 DSPDOMCSL 182 DSPPTF 19, 33 DSPSFWRSC 426 DSPSYSVAL 15, 199, 241 EDTF 183 ENDDOMSVR 185 ENDJOB 312 ENDJOBABN 319 ENDPEX 229 ENDSBS 186, 312 ENDTCP 102, 123 ENDTCPSVR 102, 123 INZBRM 359 LODRUN 45, 55 MKDIR 135 NETSTAT *CNN 257 PING 30, 137 PRTACTRPT 215 PRTPEXRPT 229 PWRDWNSYS 312 RSTLICPGM 45, 58, 211 RUNDOMCMD 189, 321 SAVBRM 359 SAVDOMBRM 365 SBMDOMCMD 183 SETDOMENV 188 STRBKUBRM 366 STRDOMSVR 185, 309 STRMNTBRM 359 STRPEX 228 STRPFRCOL 200 STRPFRTRC) 200 STRTCP 102, 123 STRTCPSVR 102, 123 UPDDOMSVR 32, 186 **VFYTCPCNN 30** WRKACTJOB 183, 192, 244 WRKCTLGRM 375 WRKDOMCSL 183 WRKDOMSVR 180, 245 WRKDSKSTS 213, 244 WRKHDWRSC 199 WRKLIND 200, 265 WRKLNK 183 WRKLNKBRM 383, 389 WRKMEDIBRM 367 WRKPTFGRP 17 WRKQRY 249 WRKSBMJOB 367

WRKSBS 191 WRKSHRPOOL 262 WRKSYSACT 214 WRKSYSSTS 212, 243 WRKSYSVAL 231 common name 23 communication line descriptions 265 communications 198 trace 259 compact task 321, 354 Configure Domino Server (CFGDOMSVR) 94, 113, 303 configuring an additional server 151 Configure TCP/IP (CFGTCP) 24 configuring additional Domino server 128, 137 handling the server ID 135 registering the server 129 using CFGDOMSVR 151 using domwzd.exe 137 verifying connection to registration server 137 Backup, Recovery, and Media Services (BRMS) for Domino 359 Domino Access for Microsoft Outlook 443 Domino for i5/OS to use System i SSL 397 Domino server with existing id files 275, 302 first Domino server 94 special authorities 96, 113, 128 TCP/IP on i5/OS 27 consistency check 320 console.log 325, 350 control group 358 copying ID files 111 corrupt data 313 cppfbws.nsf 293 CPU usage 338 CPW (Commercial Processing Workload) 242 Create Directory (MKDIR) 135 creating certificate for Domino using software encryption 409 Certificate Store 407 local Certificate Authority (CA) 400 system monitor 216 temporary full text indexes 240 critical fix packs 12

#### D

da.nsf 295 data directory 182 recovery 378 data directory 115 database corruption 313 database indexing 233 Database.BufferPool.Maximum 262 Database.BufferPool.Peak 262 Database.BufferPool.Peak 262 Database.BufferPool.PerCentReadsInBuffer 263 Database.BufferPool.Used 262 daylight savings time 109, 117, 173 DB2 Universal Database for i5/OS 6 dc.nsf 295

ddm.nsf 205, 295 debug parameters 349 decsadm.nsf 295 Delete Domino Semaphores (DLTDOMSEM) 326 Delete Domino Shared Memory (DLTDOMSMEM) 326 deleting Domino server 178 orphaned shared memory or semaphores 326 diagindex.nbf 325 Digital Certificate Management (DCM) server 398 disk 198 I/O performance tuning 263 space 15 disk I/O 255 Display Domino Console (DSPDOMCSL) 182 Display Program Temporary Fix (DSPPTF) 19, 33 Display Software Resources (DSPSFWRSC) 426 Display System Value (DSPSYSVAL) 15, 241 Display System Values (DSPSYSVAL) 199 displaying Domino jobs 166 domain monitoring 3 Domain Name System (DNS) 25 Domino 2 administrator 116 architecture 2 clustering 7, 240 configuration databases 293 data directory 115 database indexing 233 debug parameters 349 domain monitoring 3 domain name 24, 105, 119 fix packs 12, 33 language pack 14 large mail files 239 licenses 50 Maintenance Releases (MRs) 12, 39 naming conventions 22 network configuration 173 NOTES.INI 176, 183 performance tools 205 release 39 release notes 13 server document 24 server host name 125 server name 114 version 39 Domino 7 enhancements 3 Domino 7 for i5/OS 5, 13, 378 adding the BRMS service 370 additional language support 66 administering 159 capacity planning 15 CL commands 179 collecting performance data 223 configuring a first server 94 configuring an additional Domino server 128 configuring to use System i SSL 397 disk requirements 15

display jobs 166 full online backup 361 Group PTFs 16 hardware requirements 14 incremental online backup 368 installation methods 45 installing 44 measuring performance 212 memory requirements 15 multiple language support 14 multiversion capable releases 34, 39, 61 multiversioning 8 network configuration 173 NOTES.INI 176, 183 obtaining software 14 online backups 358 performance tuning 195 product options 13 Program Temporary Fixes (PTFs) 12, 16, 33 recovery of full online backup 377 recovery of incremental online backup 387 software requirements 15 TCP/IP considerations 22 updating the Domino server release 186 upgrading 32 verifying installed 59 versions 12 what happens at installation time 46 Domino 7.0.2 316 Domino Access for Microsoft Outlook 441 installation and configuration 443 new features in Domino 7 442 requirements 442 Domino Administrator client 178, 194 Domino Change Manager 206 Domino database performance considerations 236 Domino Directory 24 upgrade considerations 36 Domino directory type 171 Domino Document Manager 9 Domino Domain Monitoring (DDM) 205 Domino Enterprise Connection Services (DECS) 118 Domino Enterprise Server 50 Domino extended products 8 Domino eXtensible Markup Language (DXL) 5 Domino fax for i5/OS 8 Domino HTTP server 107, 117 Domino HTTP task 170 Domino LDAP server 107, 117 Domino Messaging Server 50 Domino Monitoring Configuration database 205 Domino Off-Line Services (DOLS) 117, 126 Domino plug-in for iSeries Navigator 7, 85, 161 Domino server command 183 console 182 crash 312, 316 hang 350 partitioning 102, 118 properties 167

Domino Server Installation wizard 45, 53 multiversion considerations 62
Domino Server Language Pack Installer 66
Domino Server Setup wizard (domwzd.exe) 94, 96, 137
Domino Utility Server 50 domwzd.exe 275
Dump Domino Server Call Stack (DMPDOMSVRC) 334
Dump Domino Server Call Stacks (DMPDOMSVRC) 8, 184

# Ε

Edit File (EDTF) 183 editing NOTES.INI 176, 183 enabling archival style transaction logging 369 automatic diagnostic collection tool 323 Digital Certificate Management (DCM) server 398 teraspace 237 encryption 397 End Domino Server (ENDDOMSVR) 185 End Job (ENDJOB) 312 End Job Abnormal (ENDJOBABN) 319 End Performance Explorer (ENDPEX) 229 End Subsystem (ENDSBS) 186, 312 End TCP/IP (ENDTCP) 102, 123 End TCP/IP Server (ENDTCPSVR) 102, 123 ending Domino job 312 Domino server 102, 123, 185 Java Server Controller 186 events4.nsf 205, 295 extended products 8 EZ-Setup 95

# F

fault analysis 323 recovery 315 fax 8 fix packs 12, 33 FIXUP 318, 320 full online backup 361 directories used 394 recovery 377 full text index 353

# G

Group PTFs 16 verifying 17

#### Η

hardware requirements 14 hierarchical names 22 high server workload 338 homepage.nsf 293 host name 24, 125 host table 264 HOSTS file 26 hotfixes 12, 33 HTTP server 107, 117 HTTP Server Plug-in for Domino 21 HTTP task 319, 334, 353

## l

i5/OS analyzing disk I/O 255 memory resources 247 network resources 257 performance bottlenecks 241 architecture 5 Backup, Recovery, and Media Services (BRMS) 357-358 cluster enabled Domino 7 configuring Domino to system SSL 397 disk requirements 15 Domino CL commands 179 Domino server jobs 183 Group PTFs 16 hardware requirements 14 host table 264 installing Domino 7 for i5/OS 44 installing performance management tools 206 iSeries Navigator 7, 161 logical partition (LPAR) 40 managing resources 230 measuring performance 212 memory 230 memory requirements 15 performance bottlenecks 198 Performance Explorer 207 Performance Tools 211 Program Temporary Fixes (PTFs) 16 software requirements 15 system values 231 TCP/IP considerations 22 IBM HTTP Server Plug-in for Domino 21 IBM Lotus Domino Document Manager 9 IBM Lotus Enterprise Integrator (LEI) 9 upgrade considerations 38 IBM Lotus QuickPlace 9 IBM Lotus Sametime 9, 423 upgrade considerations 37 IBM Lotus Sametime Limited Use 423 adding to a Domino server 426 IBM Passport Advantage 14 IBM Systems Workload Estimator 15, 44 IBM Tivoli Analyzer for Lotus Domino 3 ID files, copying 111 iDoctor 204 IIOP task 170 IMAP task 171 incremental online backup 368 directories used 394 recovery 387 incremental saves 102 independent ASP (IASP) 263 indexer task 351

Initialize BRMS (INZBRM) 359 installation methods for Domino 7 for i5/OS 45 installing 211 Domino for i5/OS 44 additional languages 66 using InstallShield 46 using iSeries Navigator 53 using LODRUN 55 using LORUN 55 using RSTLICPGM 58 using setup.exe 46 verifying install 59 Domino plug-in for iSeries Navigator 85 Performance Explorer 207 performance management tools 206 Performance Tools for the i5/OS 211 Sametime 7 Limited Use on i5/OS 424 InstallShield 45 insufficient memory 326 integrating Sametime and Domino Web Access 432 integration 6 with SAP 5 Interactive Commercial Processing Workload (Interactive CPW) 260 Internet Cluster Manager 170 Internet Inter-ORB Protocol (IIOP) 117 Internet Mail Access Protocol (IMAP) 117 Internet password 430 IOPs 199 iSeries Navigator 7, 161 configuring a Domino server 127 creating a system monitor 216 deleting a Domino server 178 deleting shared memory or semaphores 328 displaying Domino jobs 166 Domino plug-in 7, 161 Domino server properties 167 editing NOTES.INI 176 endpoint systems 209 full online backup of Domino server 361 incremental online backup of Domino server 376 installing Domino 53 installing the Domino plug-in 85 investigating a performance issue 343 launching the Domino Administrator client 178 memory resource performance analysis 222 restoring Domino data from full online backup 380 restoring Domino data from incremental online backup 387 setting up Management Central 207 starting Collection Services 225 starting Domino services 161 stopping Domino services 163 system groups 210 verifying Domino installed 59

#### J

Java Server Console 21, 192 Java Server Controller 185, 192 starting 102, 123 jconsole.exe 193 job monitors 215

#### Κ

knowledge management 2

# L

language pack 14, 66 language support 14, 66 large mail files 239 LDAP server 107, 117 LDAP task 171, 352 licensing 50 line description 27, 265 line speed and duplex 267 linger value 259 Linux 4 Indfr.nsf 293 Indsutr.nsf 293 Load and Run (LODRUN) 45, 55 local Certificate Authority (CA) 400 log.nsf 205, 295 logical partition (LPAR) 40 loopback 240 Lotus access for SAP solutions 5 Lotus Domino Administrator client 178, 194 Lotus Domino Document Manager 9 Lotus Domino Fix Packs 12 Lotus Domino Maintenance Releases (MRs) 12 Lotus Domino plug-in for iSeries Navigator 85 Lotus Domino Program Temporary Fixes (PTFs) 12, 16, 33 Lotus Enterprise Integrator (LEI) 9 upgrade considerations 38 Lotus Notes for Linux 4 Lotus Quickplace 9 Lotus Sametime 9, 423 upgrade considerations 37 Lotus Sametime Limited Use 423

#### Μ

Lotus Support 320

machine pool (*MACHINE) 262 mail file best practices 239 mail policies 4 mail routing debug 351 main.box 351 main memory 230 main storage 198 Maintenance Releases (MRs) 12, 39 Maintenance Updates (MUs) 12 Management Central 201 performance analysis 215 setting up 207 managing resources on the i5/OS 230 maximum frame size (MTU) 265 MCU (Mail and Calendar User) 242

adding to a Domino server 426

measuring performance 212 media 358 class 358 identifier 358 MEMCHECK 354 memory 15 leaks 354 overwrite 354 pool 261 memory resources 247 methods to configure a Domino server 94 Microsoft Outlook access to Domino 441 installation and configuration 443 new features in Domino 7 442 requirements 442 migration considerations 270 monitors 215 moving the Domino environment 270 moving your Domino server using a 5250 emulation session 298 using a graphical interface 271 mtstore.nsf 296 multilingual database support 14 multiple language support 14 multi-version capable releases 186 multiversion capable releases 34 displaying Domino server information 181 preparing for 40 primary release 39 multiversioning 8, 39 configuring a Domino server 98, 113 considerations when installing Domino code 61

#### Ν

name aliasing 24 names.nsf 24, 294 upgrade considerations 36 naming Domino servers 22 national language considerations 66 network compression 124 network configuration 173 network resource performance tuning 264 network resources 257 Notes Indexing Facility (NIF) 233 Notes Server Diagnostic tool (NSD) 312 NOTES.INI 176, 183, 349 Notesbench results 6 NSD files 184 NSF_Buffer_Pool_Size_MB 232, 262

# 0

obtaining Domino 7 software for i5/OS 14 online backup 358, 361, 368 directories used 394 recovery of full online backup 377 organization 23, 103, 115 organizational units 23, 104 ou.id 274, 301 Outlook access to Domino 441 installation and configuration 443 new features in Domino 7 442 requirements 442

#### Ρ

package 359 partitioning 102, 118 Passport Advantage 7, 14, 46 PercentAvailSysResources 232 performance 196 adjuster 231 analysis memory resource 222 baseline 197 bottleneck 197 bottlenecks analyzing 241 Domino database considerations 236 monitors 215 using iSeries Navigator to investigate 343 performance analysis using Management Central 215 performance bottlenecks analyzing disk I/O 255 analyzing memory resources 247 network resources 257 performance checklist 337 Performance Explorer (PEX) 200, 204, 226 installing 207 Performance Management for System i5 201 performance management tools installing 206 Performance Monitor 203 performance statistics 346 performance tools for Domino 205 Performance Tools for iSeries (5722-PT1) 199, 202, 211 performance tuning 195 disk I/O 263 network resource 264 person document 24 ping 30, 137 policy 358 lockdown 4 policy-based administration 4 POP3 task 171, 352 port 257 filtering 266 Post Office Protocol Version 3 (POP3) 117 Power Down System (PWRDWNSYS) 312 preparing for multiversioning 40 primary release 39 Print Activity Report (PRTACTRPT) 215 Print PEX Report (PRTPEXRPT) 229 private pool 230 problem determination 311 Domino debug parameters 349 performance 337 Sametime not work with Domino Web Access 439 server crash 312 server hang 350

using iSeries Navigator 343 processor load 198 priority 260 product options 13 Program Temporary Fixes (PTFs) 12, 16, 33 verifying 18

#### Q

QACTJOB 231 QADLACTJ 231 QADLTOTJ 231 QBASACTLVL 231, 262 QBASPOOL 231, 262 QDYNPTYADJ 231 QDYNPTYSCD 231 QMAXACTLVL 231, 244 QMCHPOOL 231 QNNINBRM 371, 394 QNOTES user profile 46, 319 QPFRADJ 231, 243 **QPRCFEAT 241** QPRCMLTTSK 231, 242 QTOTJOB 231 Quarterly Maintenance Updates (QMUs) 12 Quickplace 9 **QUSRNOTES library** 46

# R

recovery of full online backup 377 Redbooks Web site 454 Contact us xiii registering a Domino server 129 release 39 release notes 13 reliability 6 replication 353 reports task 354 reports.nsf 294 requirements disk 15 hardware 14 memory 15 software 15 resource.nsf 295 resrc7.ntf 35 Restore License Program (RSTLICPGM) 45, 58, 211 restoring Domino databases 378 retransmissions 258 RnRMgr 35 Rooms and Resources Manager (RnRMgr) task 4, 35 Rooms and Resources Reservation Database (RRD) 36 router task 319, 338, 351 Run Domino Command (RUNDOMCMD) 189, 321

#### S

Sametime 9, 423

upgrade considerations 37 Sametime Limited Use 423 adding to a Domino server 426 SAP integration 5 Save Domino Server using BRMS (SAVDOMBRM) 365 Save Object using BRM (SAVBRM) 359 scalability 6 Secure Sockets Layer (SSL) 397 security 4 sem.timeouts 336 semaphore 312 timeout 335 semaphores 326 semdebug.txt 333, 350 server crash 312, 316 server document 24 server hang 350 server host name 125 server ID file 123 clearing the password 136 handling the file for additional server 135 server name 114 server.id 274, 301 Server.Load 206 Set Domino Environment (SETDOMENV) 188 setup.exe 46, 95 shared pool 230 Simple Message Transfer Protocol (SMTP) 117 Simple Object Access Protocol (SOAP) 4 single sign-on (SSO) 431 SMTP task 25, 171, 351 software encryption 409 software requirements 15 software-only encryption 397 sorting characters 173 spam 4 Start Backup using BRM (STRBKUBRM) 366 Start Domino Server (STRDOMSVR) 185, 309 Start Maintenance for BRM (STRMNTBRM) 359 Start Performance Collection (STRPFRCOL) 200 Start Performance Explorer (STRPEX) 228 Start Performance Trace (STRPFTTRC) 200 Start TCP/IP (STRTCP) 102, 123 Start TCP/IP Server (STRTCPSVR) 102, 123 starting 185 Collection Services 223 Domino server 102, 123, 185, 298, 309 Domino services 161 Java Server Console 193 Java Server Controller 185 statrep.nsf 205 STLINKS directory 37 STLINKS.SAV directory 38 stopping Domino server 102, 123, 185 Domino services 163 storage pool 230 Submit Domino Command (SBMDOMCMD) 183 subsystem 180, 191 support 320

support files 183 dump server call stacks 184 NSD files 184 system ASP 263 System i host name 24 system monitor 215 creating 216 system values 231

# Т

tasks ADMINP 352 agent manager 351 compact 321, 354 HTTP 319, 334, 353 **IIOP 170** IMAP 171 indexer 351 LDAP 171, 352 POP3 171, 352 QNNINBRM 371, 394 reports 354 router 319, 338, 351 SMTP 25, 171, 351 UPDALL 233 UPDATE 233, 352 TCP/IP 22 activating 30 buffer size 266 configuring on i5/OS 27 Domain Name System (DNS) 25 host files 26 interface 27 name aliasing 24 verifying 30 technical support files 183 dump server call stacks 184 NSD files 184 teraspace 237 threads 348 time zone 109, 173 transaction logging 270, 313, 368 debug parameter 353 troubleshooting 311 ADMINP task 352 agent manager task 351 automatic diagnostic collection tool 323 cleaning up orphaned shared memory or semaphores 326 collecting information 320 Domino debug parameters 349 Domino server crashes 316 Domino server won't start 318 full text index 353 HTTP task 319, 353 indexer task 351 LDAP task 352 MEMCHECK 354 memory leaks 354

overwrite 354 network and connectivity 352 performance 337 POP3 task 352 reports task 354 router task 319, 351 Sametime not work with Domino Web Access 439 server crash 312 server hang 350 SMTP task 351 transaction logging 353 update task 352 using iSeries Navigator 343

#### U

UPDALL task 233 Update Domino Server (UPDDOMSVR) 32, 186 UPDATE task 233, 352 updating the Domino server 40, 186 upgrading 32, 40 Domino Directory considerations 36 LEI considerations 38 Rooms and Resources Manager task considerations 35 Sametime considerations 37 using setup.exe 46

# V

Verify TCP/IP Connection (VFYTCPCNN) 30, 137 verifying Domino installed 59 Group PTFs 17 individual PTFs 18 Sametime Limited Use installed 426 Sametime working correctly 428 TCP/IP 30 version 39 versions of Domino 7 for i5/OS 12

#### W

Web Administrator client 193 Web applications 2 Web services 4 Web Services Description Language (WSDL) 4 Work with Active Jobs (WRKACTJOB) 183, 192, 244 Work with Backup Control Groups (WRKCTLGBRM) 375 Work with Disk Status (WRKDSKSTS) 213, 244 Work with Domino Console (WRKDOMCSL) 183 Work with Domino Servers (WRKDOMSVR) 7, 180, 245 Work with Hardware Resources (WRKHDWRSC) 199 Work with Line Description (WRKLIND) 200 Work with Line Descriptions (WRKLIND) 265 Work with Link Information (WRKLNKBRM) 383, 389 Work with Media Information (WRKMEDIBRM) 367 Work with Object Links (WRKLNK) 183 Work with PTF Groups (WRKPTFGRP) 17 Work with Queries (WRKQRY) 249 Work with Shared Storage Pools (WRKSHRPOOL) 262

Work with Submitted Jobs (WRKSBMJOB) 367 Work with Subsystems (WRKSBS) 191 Work with System Activity (WRKSYSACT) 214 Work with System Status (WRKSYSSTS) 212, 243 Work with System Values (WRKSYSVAL) 231 Work with TCP/IP Connection Status (NETSTAT *CNN) 257 working with Domino servers 180 Workload Estimator 15, 44





(1.0" spine) 0.875"<->1.498" 460 <-> 788 pages

# **Implementing IBM Lotus Domino 7 for i5/0S**



Guidelines for deploying and administering Domino 7 on i5/OS

Latest information about Domino for i5/OS performance tuning

Tips for moving Domino servers to the IBM System i platform With the introduction of IBM Lotus Notes and Domino 7, IBM Lotus continues to set the standard for innovation in the messaging and collaboration market that Lotus defined two decades ago. With Lotus Notes and Domino 7, IBM has enhanced the scalability, security features, administration, interoperability, productivity, and performance, enabling companies to achieve the most from their infrastructure.

Upgrading to the latest version of Lotus Notes and Domino can help your organization realize high return on investment, potentially lower the cost of ownership, and help improve user productivity and business responsiveness.

This IBM Redbook targets system administrators who plan to implement or upgrade to Domino 7 for IBM i5/OS in their organization. It provides tips and techniques to help you successfully deploy and administer Domino 7 servers on i5/OS. The primary focus is to explain the installation, configuration, and performance tuning of Domino 7 in this environment. This IBM Redbook also provides information about moving Domino servers to the IBM System i platform and information about backup, recovery, and troubleshooting regarding Domino 7 servers running on i5/OS.

#### INTERNATIONAL TECHNICAL SUPPORT ORGANIZATION

#### BUILDING TECHNICAL INFORMATION BASED ON PRACTICAL EXPERIENCE

IBM Redbooks are developed by the IBM International Technical Support Organization. Experts from IBM, Customers and Partners from around the world create timely technical information based on realistic scenarios. Specific recommendations are provided to help you implement IT solutions more effectively in your environment.

For more information: ibm.com/redbooks

SG24-7311-00

ISBN 0748586132