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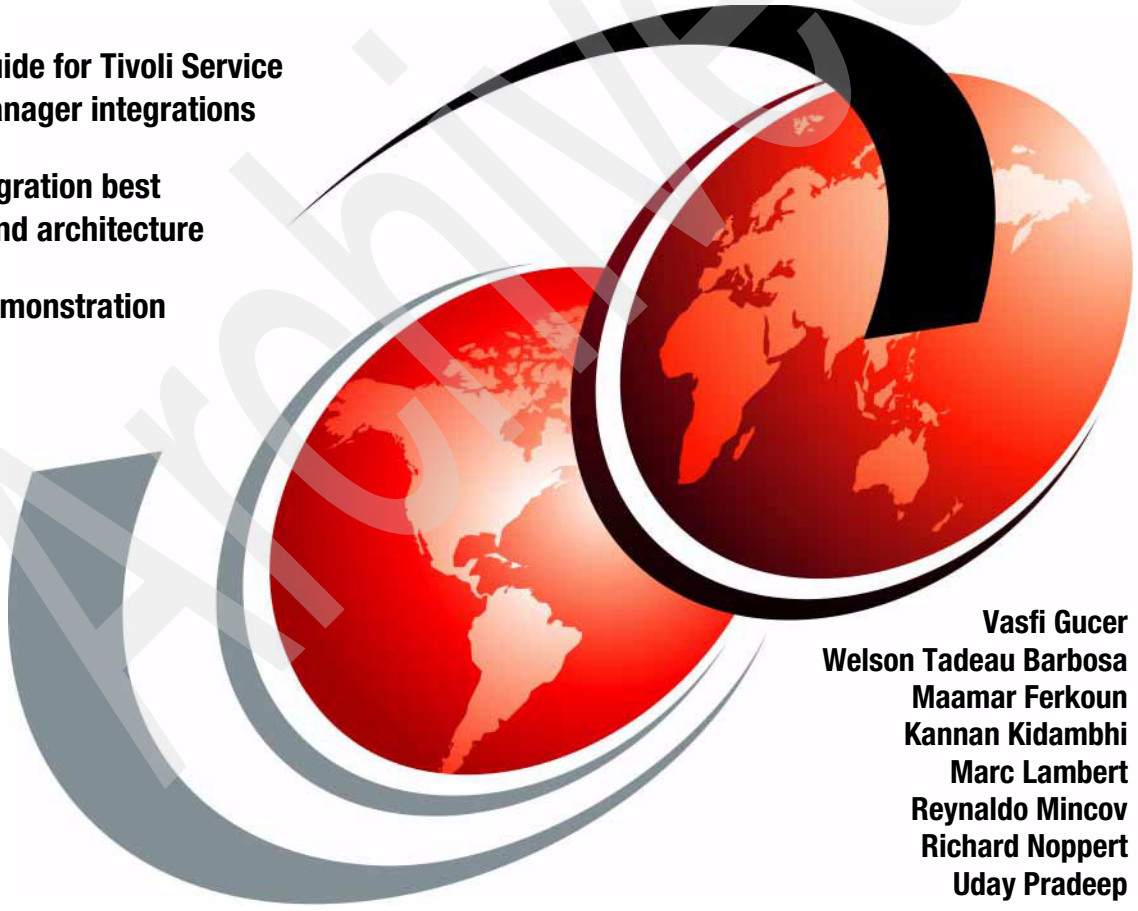
Integration Guide for IBM Tivoli Service Request Manager V7.1

- Insider's guide for Tivoli Service Request Manager integrations
- Covers integration best practices and architecture
- Includes demonstration scenarios



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Preface

IBM® Tivoli® Service Request Manager V7.1 provides a unified and integrated approach for handling all aspects of service requests to enable a *one-touch* IT service experience, backed up by an optimized delivery and support process. It is a powerful solution that closely aligns business and IT operations to improve IT service support and delivery performance.

This IBM Redbooks® publication presents an integration guide for IBM Tivoli Service Request Manager V7.1. We describe all major integration scenarios, such as:

- Event management
- IBM Lotus® Sametime® Connect
- Change and Configuration Management Database
- Third-party Service Desk programs, such as HP Service Center
- Computer Telephony Interface
- IBM Tivoli Identity Manager

This book helps you design and create a solution to integrate IBM Tivoli Service Request Manager V7.1 with other products to provide an Information Technology Infrastructure Library (ITIL®)-based integrated solution for your client environments.

The team that wrote this book

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

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1

Integration benefits

This chapter discusses the benefits of integration. We provide an overview of several possible (preconfigured and prepackaged) integrations. We do not cover all possible integrations. However, we include the best practices for the most common solutions in a service desk environment.

This chapter discusses the following topics:

- Integration requirements on page 2
- Process Management and Operation Management products integration on page 2
- Benefits of integration on page 5
- Integration scenarios on page 7

1.1 Integration requirements

In the world of IT, finding one solution that handles the business requirements of the whole company is virtually impossible. Integration is necessary for the following reasons:

- Specific functions of financial processes
- Complex financial processes
- IT processes and their alignment

Earlier versions of Tivoli Service Request Manager (SRM) use the Maximo Enterprise Adapter (MEA) to connect to third-party solutions. However, these versions require a lot of manual configurations, and using several IT specialists is not an easy task.

The Tivoli SRM V7.1 has an integration module, which is called the *integration toolkit*. The integration toolkit is part of the content that is being delivered to support the IBM Service Management (ISM) 7.1. It is an easy way to build a data level integration with any application hosted in Maximo by taking advantage of Tivoli Directory Integrator (TDI) capabilities. The toolkit extends standard MEA architecture by using ISM/Maximo object structures on one end and TDI connectors on the external end. Clients include Tivoli Enterprise Console® (TEC), Omnibus, and Tivoli Identity Manager (TIM).

1.2 Process Management and Operation Management products integration

There are two types of Tivoli SRM integration:

- Process Management products (PMPs)
- Operation Management products (OMPs)

To understand this better, refer to Figure 1-1 on page 3. It outlines a *logical component overview* for the Tivoli SRM solution and all related products.

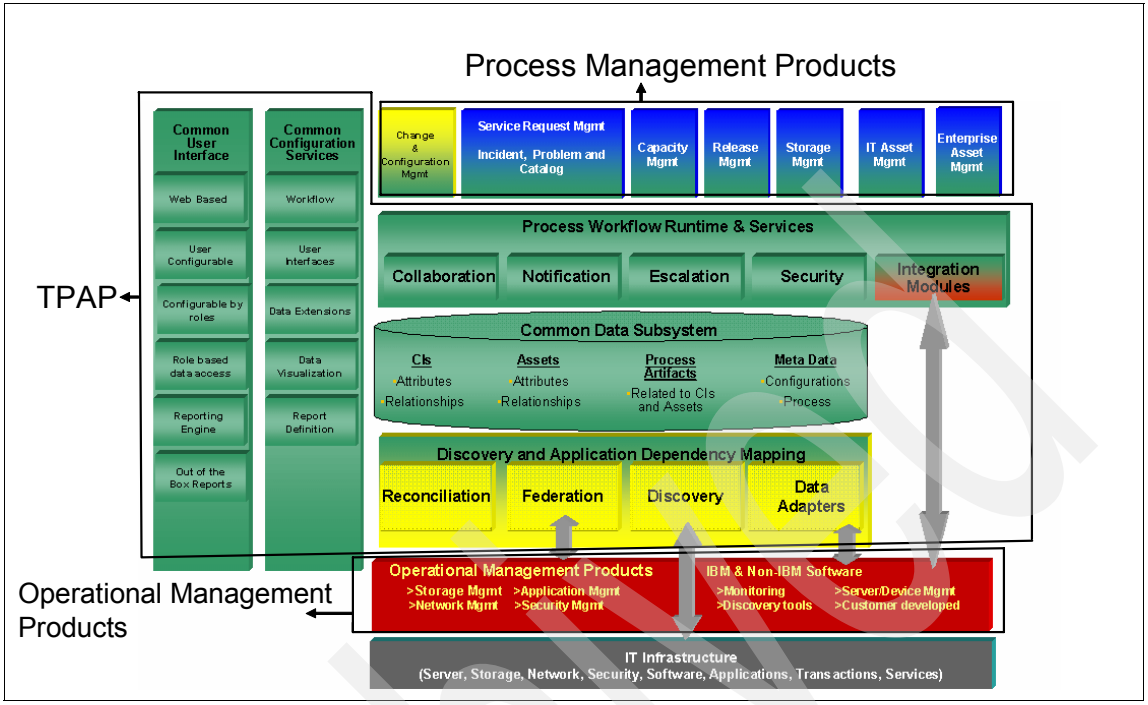


Figure 1-1 Logical component overview

Let us start with the bottom layer, OMP. OMPs automate tasks to address application or business service operational management challenges. These products help optimize performance, availability of business-critical applications, and IT infrastructure support. They also help ensure confidentiality and data integrity of information assets while protecting and maximizing the utility and availability of your e-business data.

OMPs can be implemented quickly to address immediate, specific IT challenges. As you implement a more comprehensive IT Service Management solution, these products can also integrate into the IT Service Management Platform and be utilized by IT PMPs.

Examples of OMPs are IBM TEC, IBM TIM, and HP Service Center. The majority of these integrations use the MEA and Tivoli TDI services. Refer to Chapter 2, “Integration components” on page 17 for an in-depth discussion of MEA and TDI.

A PMP (or application) is a system for managing process executions. Think of a process request as a ticket with a written note on it that is forwarded to various people (or entities) to perform various actions and, in the end, result in the objective of the process.

PMPs are applications that provide custom predefined implementations of best practice processes to help clients integrate and automate IT management processes across organizational silos, improving productivity and efficiency. Tivoli SRM and Tivoli Change and Configuration Management Database (CCMDB) are examples of PMPs.

PMPs focus on providing implementations of best practice processes as workflows with roles, tasks, user interfaces, and integration modules stored in the process database. In addition, they provide the ability to adapt the predefined implementation to match the client’s unique process and workflow requirements; allowing clients to capture and implement their current processes as workflows. Clients are also able to evolve to Information Technology Infrastructure Library (ITIL)-defined best practices over time. PMPs also provide the ability to monitor and report process status and execution; showing business owners process bottlenecks within an organization, and providing the opportunity to improve and enhance their processes. The IBM IT PMP bridge organizational silos, automate, and integrate IT management.

The TPAP provides the platform to run the applications (incident management, problem management, change management, and so on). The TPAP is the foundation layer of the ISM process. TPAP is also known as Base Services, which you might still find in certain menus after installation. TPAP provides rich tooling for configuring process flows, user interfaces, and process artifacts for the PMPs implemented on top of it. TPAP provides the integration platform for all PMPs. For an in-depth discussion about TPAP, refer to Chapter 2, “IBM Tivoli SRM architecture” of the IBM Redbooks publication, *Implementing IBM Tivoli Service Request Manager V7.1 Service Desk*, SG24-7579.

1.3 Benefits of integration

The advantages of integration with third-party solutions or other external solutions are:

- Having one primary location where data is stored and maintained, while you still have the option to exchange and use the data in other solutions.
- Exchanging data using automated integration requires less manual interaction and reduces costs.
- Exchanging data using automated integration requires less manual interaction and reduces the number of errors.
- Exchanging data using automated integration takes care of data synchronization, enforcing data integrity.

When implementing a synchronized solution, the result is an environment where shared data looks the same for all consuming applications. This is because changes are propagated throughout the synchronized network of systems, molded in transit to fit the needs of each consumer. Each data source is kept up-to-date, maintaining the illusion of a single, common repository. Each application accesses its data in an optimal manner, utilizing the repository to its full potential without creating problems for the other applications.

Synchronization strategies are increasingly chosen for deploying new IT systems. For identity management, this is usually a centralized, or *metadirectory* style synchronization, where a high speed store (such as a directory) is used to publish the enterprise view of its data. This approach has a number of advantages:

- Security requirements vary from system to system, and they can change over time. A good repository (such as a directory) provides fine-grained control over how each piece of data is secured. Certain repositories provide group management features as well. These tools enable you to sculpt the enterprise security profile.

- Each new IT deployment can be made on an optimal platform instead of shoe-horned between existing systems into an uninviting infrastructure. Applications live in individually suited environments bridged by *metadirectory* synchronization services.
- If the availability and performance requirements are not met by a system (past, existing, or new), it can be left in place and synchronize its contents to a new repository with the required profile, or multiple repositories to scale.
- A *metadirectory* uncouples the availability of your data from its underlying data sources. It cuts the cord, making it easier to maintain uptime on enterprise data.
- Disruption of IT operations and services must be managed and minimized. Fortunately, the *metadirectory* network of synchronized systems evolves over time in managed steps. Branches are added or pruned as required. TDI is designed for infrastructure gardening.

The introduction of the integration toolkit, TDI included, provides significant advantages in different areas. It not only makes configuration of an integration easier and more flexible, but reduces the need for specific code development.

Several advantages of the integration toolkit include:

- Connector communication can be set up from a simple configuration window:
  - Drag-n-Drop attribute mapping
  - Easily customizable mapping using simple mapping or Java™ Script
- Extends standard MEA architecture:
  - Uses ISM/Maximo object structures on one end
  - Uses TDI connectors on the external end
- Easy maximo connector configuration
- No need for creating SOAP clients to communicate with Maximo
- Eliminates the need to write communication code
- Many integrations can be built with only a small amount of Java Script
- Integration solutions built with TDI are easily extended to support changes in data model:
  - Most connectors support auto discover of the target data model
  - TDI includes an easy to use visual configuration editor for building and modifying data mappings
- Maximo connector can be used in unlimited assembly line configurations
- Supports reliability features to prevent the loss of incoming ticket data

- Maximo connector supports multiple Maximo servers
- More than two dozen predefined connectors for handling data I/O
- Logging support in all connectors and Java Script mapping
- TDI connectors exist for many common protocols and data sources, including:
  - Maximo
  - Web Service, Java Database Connectivity (JDBC™), Lightweight Directory Access Protocol (LDAP), Remedy, HTTP, Really Simple Syndication (RSS), International Development Markup Language (IDML), and many more
- It is reusable:
  - Custom TDI connectors that you build for your product adds to the value of your product:
    - TDI is the standard integration tool for field services
    - TDI is the strategic integration tool both for ISM and the data integration initiative
  - Utilized common integration architecture supported by ISM
  - Connectors are fairly interchangeable, so an integration can be cloned with a new connector to create an integration with a new target. For example, a connector to integrate OMNIbus with Maximo can be cloned to provide an integration between OMNIbus and Remedy.

1.4 Integration scenarios

The integration architecture of Tivoli SRM makes it possible to connect to any third-party solution. It is created based on several industry standards, as well as TDI. The architecture of Tivoli SRM provides a robust integration platform.

In the following chapters, we discuss a number of possible integration scenarios, such as:

- Event management products or *Event Generators*
- Third-party Service Desk tooling, such as HP Service Center
- TIM
- Computer telephony integration
- Sametime and instant messaging
- CCMDB

1.4.1 Integration with event management solutions

Any service, or incident request, can originate from different sources, for instance:

- A self-service user generates a new self-service request; no plausible solution is found in the knowledge base.
- A service desk agent is taking your call; the agent can register a request manually.
- An automated event generating the request, detected by your event management solution.

We are interested in automated events to synchronize with Tivoli SRM. Integrating Tivoli SRM with Event Management solutions is probably the most obvious integration we can think of. Out-of-the-box integrations exist for customers using:

- Tivoli Netview
- Tivoli Monitoring
- TEC
- Netcool® Omnibus

The integration allows service desk tickets (service requests) to open automatically based on predefined rules when an event arrives. The benefit is that the integration saves time by assisting in the automation of a common operator task.

During normal operation, the integration allows data to flow between the TDI and an Object Server in the form of Event Integration Facility (EIF) messages. The Tivoli EIF is a toolkit that expands event types and system information that you can monitor. Event adapters monitor managed resources and send events to the Event Management product or other applications. You can use the Tivoli EIF to develop your own adapters that are tailored to your network environment and your specific needs. Figure 1-2 shows the flow of data between an Object Server and Tivoli SRM through the various components of Event Management integration with Tivoli SRM.

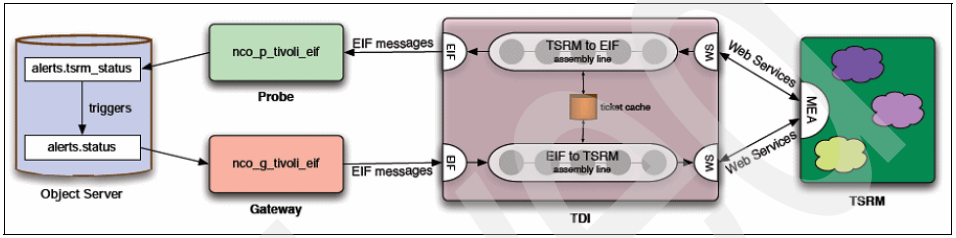


Figure 1-2 Event management integration data flow

For more details about how to install, configure, and manage Service Desk integrations, refer to Chapter 3, “Event management integration” on page 105.

1.4.2 Integration with other service desk solutions

Most clients already have a type of ISM solution in place. Typically, a new ISM product requires replacing the existing ISM product, or Tivoli ISM products coexisting and inter-operating with past ISM products. The Service Desk integration provides the necessary tools to support migration from past ISM products and the interoperability of Tivoli ISM solutions with past ISM products.

ISM Service Desk integration is a complex topic. There are a variety of Service Desk products being used today. Most Service Desks are customized by their users. Different clients focus on different areas of integration.

ISM provides a Service Desk integration toolkit that includes integration examples and documentation. Peregrine and Remedy examples are available and described in the following chapters. You can extend the examples to create new integration points.

To build a complete solution, the predefined code must be extended to:

- Handle any customization to either the third-party Service Desk or the IBM Service Desk data model for the objects addressed by the base solution.
- The predefined code must be cloned and modified to handle objects required by the base solution that are not covered by the base code.

Table 1-1 shows the benefits of ISM V7.1 Service Desk integration.

Table 1-1 Client value/benefits: ISM V7.1 Service Desk integration

Capability	Benefits
TDI connector for Maximo	► Integrates Maximo into the TDI family. Functions as an extension to the MEA bringing drag and drop data mapping and other TDI features to Maximo. ► Can be used with most MEAs/Business objects. ► Many uses beyond Service Desk integration. Can be used in conjunction with any standard TDI connector. Examples include EIF connector for event integration and XML for knowledge import.
TDI assembly lines	► Provides predefined integration for most common Service Desk and CMDB business objects. ► Near real-time, bi-directional symbolization of data. ► Can be easily customized to accommodate changes and extensions to the data model. ► Can be easily cloned to integrate other business objects.
Incident/problem application	► Provides ticket management applications for Tivoli SRM without requiring the third-party Service Desk. ► Operations personnel do not need to launch a third-party Service Desk for basic tasks. ► Supports creating, managing, and viewing relationships between tickets and other Tivoli SRM objects.

Capability	Benefits
Launch in context	► Provides launch based on external keys in synchronized data objects from the Tivoli SRM to an external Service Desk, and from an external Service Desk to Tivoli SRM.

For more details about how to install, configure, and manage Service Desk integrations, refer to Chapter 4, “Service Desk Tool integration” on page 135.

1.4.3 Integration with other solutions

You can probably think of several other integrations to learn, but to describe all possible scenarios is impossible. We selected and described a few of the existing and useful integrations in more detail.

Identity management

Several interpretations of identity management are developed in the IT industry. Computer scientists now associate the phrase, quite restrictively, with the management of user credentials and how users might log on to an online system. You can consider identity management as the management of information (as held in a directory) that represents items identified in real life (users, devices, services, and so forth).

The self-service password reset is defined as any process or technology that allows users who have either forgotten their password, or triggered an intruder lock-out, to authenticate with an alternate factor and repair their own problem without calling the help desk. It is a common feature in identity management software and often bundled in the same software package as a password synchronization capability.

Typically, users who have forgotten their password launch a self-service application from an extension to their workstation login prompt, using their own or another user’s Web browser, or through a telephone call. Users establish their identity without using their forgotten or disabled password by answering a series of personal questions, using a hardware authentication token, responding to a password notification e-mail, or less often, by providing a biometric sample. Users can then either specify a new unlocked password or ask that a randomly generated one be provided.

Self-service password reset expedites problem resolution for users *after the fact* and thus reduces help desk call volume. It can also be used to ensure that password problems are only resolved after adequate user authentication, eliminating an important weakness of many help desks: social engineering attacks, where an intruder calls the help desk, pretends to be the intended victim user, claims that the password is forgotten, and asks for a new password.

IBM TIM helps enterprises strengthen and automate internal controls governing user access rights. It provides a secure, automated, and policy-based solution that helps effectively manage user privileges across heterogeneous IT resources.

The integration of TIM and SRM is used to identity and manage password resets. Figure 1-3 shows the solution flow used.

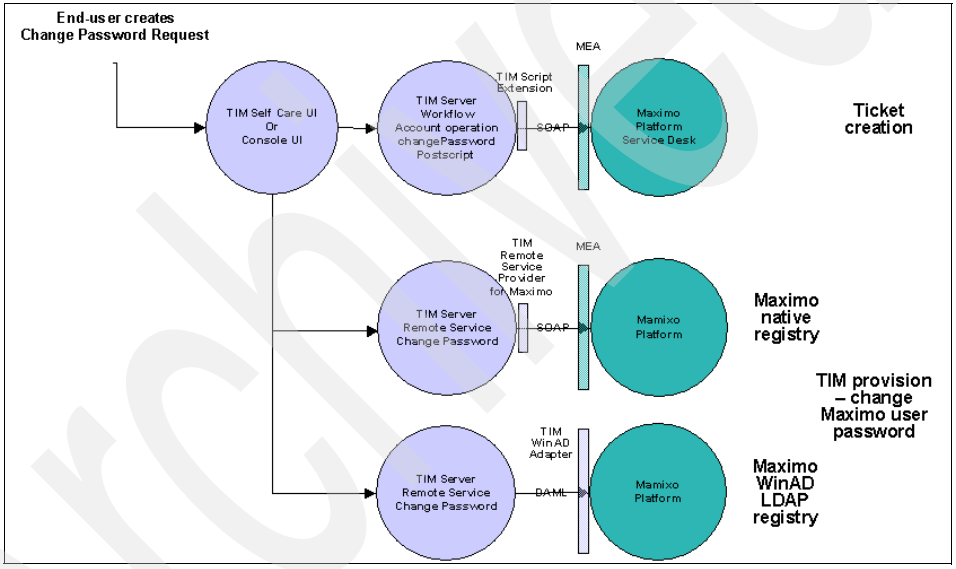


Figure 1-3 Password reset integration solution flow

TIM creates a Service Desk ticket every time a password reset (change) is performed by TIM. The ticket is created and closed if the password reset is successful. The ticket is created and left open if the password reset fails.

The integration uses the TIM Self Care UI (also referred to as Judith UI or End User UI) or TIM console UI to perform the password reset. Installing the integration makes sure the Maximo Logon page *Forgot Your Password* link is redirected to the TIM Self Care UI. TIM manages the Maximo native registry or WinAD LDAP registry.

For more details about how to install, configure, and manage identity management integrations, refer to Chapter 5, “IBM Tivoli Identity Manager integration” on page 167.

Computer telephony integration

Computer telephony integration (CTI) is the name given to the merger of traditional telecommunications (PBX) equipment with computers and computer applications. The use of Caller ID to automatically retrieve client information from a database is an example of a CTI application. It is also used to explain the connection between a computer and a telephone switch, which allows recording and using information obtained by telephone access. For example, CTI enables activities, such as dial-up registration, and fax-back.

CTI solutions are often used in call center environments, but can be used in a service desk environment. Integrating the CTI solution with your service desk solution reduces the number of manual steps for operators, but it increases the speed of handling for any operator even more, reducing the average call time.

CTI is new to Tivoli SRM. It has features that enables your telephony system to interact with Tivoli SRM. CTI allows you to populate Tivoli SRM records and fields with mapped information based on lookup information provided by the CTI system. Figure 1-4 on page 14 shows a simple process flow to open a ticket, based on information provided by the CTI system.

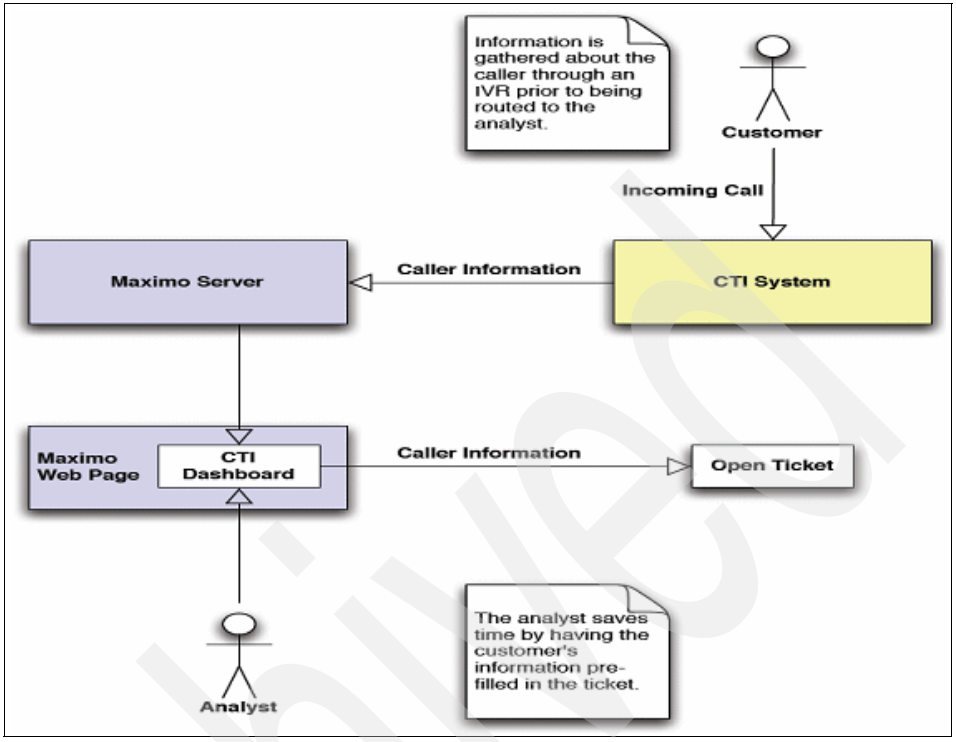


Figure 1-4 CTI process flow

You can also control your CTI solution from the Tivoli SRM user interface, creating a single application for all service desk-related activities.

For more details about how to install, configure, and use the existing CTI integrations, refer to Chapter 8, “Computer Telephony integration” on page 217.

Sametime and instant messaging

Communication has always been a keyword in many organizations. For a service desk analyst, communication is one of the most important aspects of the job. Several tools are available for an analyst to communicate with clients, such as the obvious e-mail and telephony. In recent years, many companies introduced other tools to support mostly internal communication, known as instant messaging.

Sametime is the IBM Lotus product for instant messaging, which now has a predefined integration with Tivoli SRM. It allows a service desk analyst, or IT specialist, to initiate contact with a Tivoli SRM user, based on the Sametime status (which can be found in the user information on the request) and chat functions provided by Sametime.

For more details about how to install, configure, and use the existing Instant Messaging integrations, refer to Chapter 7, “Lotus Sametime integration” on page 201.

CCMDB integration

It is not the most obvious integration, but you can call an installation of Tivoli SRM and CCMDB on the same base services an integration.

CCMDB provides information to help the Service Desk team isolate the source of the problem more quickly. Suppose a switch that is used for production goes down, and the affected users are calling the help desk. By looking at the applications and servers that are down (affected configuration items (CIs) in CCMDB terminology), a Service Desk person, or a Specialist, can understand that they are all related with a certain switch (through the CI relationship information provided by CCMDB). They can also see that this switch has caused problems before, and after a closer analysis, they can understand that the software or firmware on this switch is back-level. All this information is provided by the CCMDB. At this point, they can start a change request to upgrade the switch software or firmware. This change request is reviewed by the Change Manager or the change review board to analyze the impact of the change (again using the CCMDB, looking at the CIs affected), and after the change is authorized, it is implemented.

All these are ITIL processes, and by integrating your help desk processes with configuration and change management processes, you greatly increase the efficiently of these processes.

For more details about how to install and use CCMDB PMPs on top of Tivoli SRM, refer to Chapter 6, “CCMDB integration” on page 187.

Remote control

Remote control or Remote administration refers to any method of controlling a computer from a remote location. Software that allows remote administration is becoming increasingly common and is often used when it is difficult or impractical to be physically near a system to use it.

Any computer with an Internet connection, TCP/IP, or on a local area network can be remotely administered. For non-malicious administration, the user must install or enable server software on the host system in order to be viewed. Then, the user or client can access the host system from another computer using the installed software.

The IBM product delivered for this purpose is Tivoli Remote Control (TRC). Tivoli SRM is shipped with a light version of TRC, enabling a service desk agent to take over the user desktop from within Tivoli SRM and solve incidents as quickly

as possible. If a service desk agent can solve incidents quickly using remote control, there is no need to transfer requests to a second line. Remote control can also be used to gather more information about the request to open a second line so that an IT specialist can quickly solve an incident. The requester is not required to provide technical details. Using TRC can make your key performance indicators (KPIs) look better than ever.

2

Integration components

This chapter discusses integration components that are available in IBM Tivoli Service Request Manager (SRM) V7.1.

This chapter discusses the following topics:

- IBM Tivoli Directory Integrator on page 18
- TDI component on page 27
- Planning to deploy TDI on page 30
- Integration Framework or MEA on page 35

2.1 IBM Tivoli Directory Integrator

IBM Tivoli Directory Integrator (TDI) is a generic data integration tool that is used to address problems that require custom coding and more resources than traditional integration tools. It is designed to move, transform, harmonize, propagate, and synchronize data across otherwise incompatible systems.

TDI can be used in conjunction with the deployment of integration with the IBM Tivoli SRM product to provide a feed from multiple Service Desk Systems, such as HP Service Desk and Remedy Service Desk. TDI can also function as a custom adapter to integrate with network monitoring tools, such as Tivoli Enterprise Console (TEC) and Netcool Omnibus.

A TDI Connector provides access to anything else for which there is a TDI connector available. There is a large set of over 20 existing connectors. As shipped, it can synthesize data from many feeds at a time. TDI provides a visual drag and drop data mapping environment, and it provides JavaScript™ for data mapping and transforms. Figure 2-1 on page 19 shows additional types of integration that are made possible by using TDI, but they are not covered in this book.

Integrations are available as a TDI-unified adapter, and they can be used with minor adjustments.These scenarios are further expanded later in this book. Regardless of the scenario, it is essential to gain a full understanding of the environment. Understanding the environment allows you to document the solution. Typically, understanding the environment is accomplished by the development of a series of use cases that are designed to clarify the business needs and refine the solution through an iterative process that ultimately provides you with a complete list of documented customer business requirements.

Integration problems are all about communication and are typically broken down into three parts:

- The systems and devices that communicate
- The flow of data between these systems
- The trigger of events when the data flow occurs

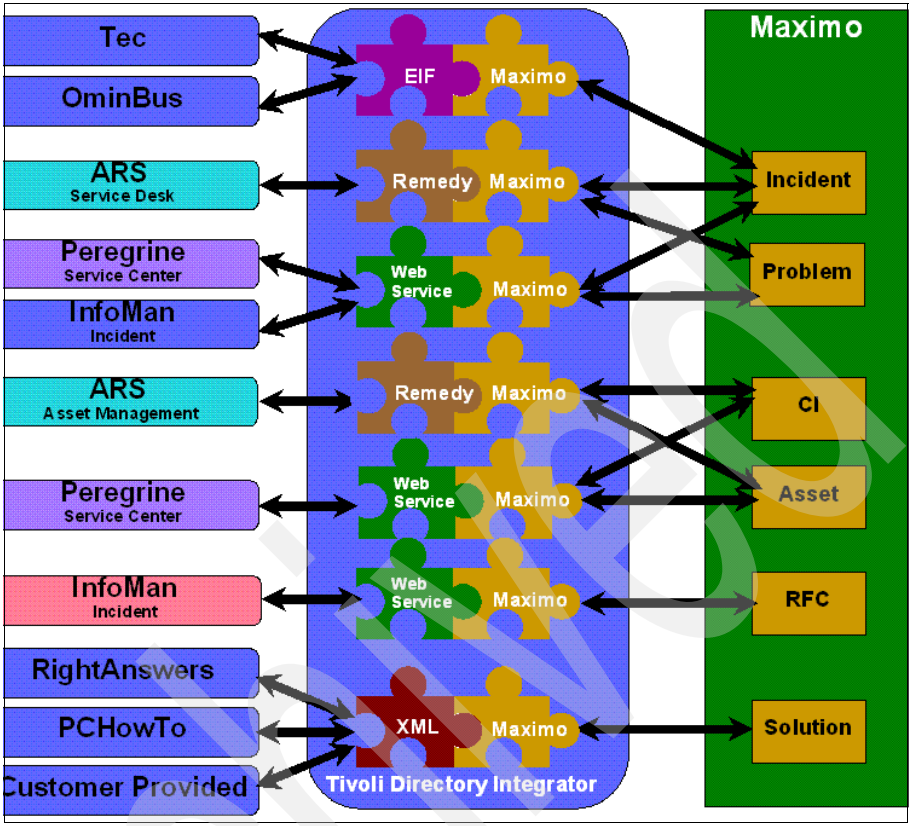


Figure 2-1 Integration possibilities using TDI

2.1.1 TDI architecture

TDI architecture consists of the elements of a communications scenario that can be described as data sources:

- Data repositories, systems, and devices that talk to each other. For example:
  - An enterprise directory that you are implementing or trying to maintain
  - Your customer relationship management (CRM) application
  - The office phone system
  - An access database with a list of company equipment and who owns the equipment

- Data sources represent a wide variety of systems and repositories. For example:
  - Databases:
    - IBM DB2®
    - Oracle®
  - SQL Server® directories:
    - iPlanet
    - IBM Directory Server
    - Domino®
    - eDirectory
    - ActiveDirectory
  - Directory services

    Exchange
  - Files:
    - Extensible Markup Language (XML)
    - Lightweight Directory Access Protocol (LDAP)
    - LDAP Directory Interchange Format (LDIF)
    - SOAP documents
    - Specially formatted e-mail

Data sources also represent any number of interfacing mechanisms that internal systems and external business partners use to communicate with your information assets and services: *data flows* and *events*.

Data flows are the threads of communication and their content. They are usually drawn as arrows that point in the direction of data movement. Each data flow represents a dialogue between two or more systems.

However, for a conversation to be meaningful to all participants, everyone involved must understand what is being communicated. You can probably count on the data sources representing their data content in multiple ways. One system might represent a telephone number as textual information, including the dashes and parentheses that are used to make the number easier to read. Another system might store them as numerical data. If these two systems are to communicate about this data, the information must be translated during the conversation. Furthermore, the information in one source might not be complete and might need to be augmented with attributes from other data sources. In addition, only parts of the data in the flow might be relevant to receiving systems.

A data flow must include the mapping, filtering, and transformation of information, shifting its context from input sources to that of the destination systems.

Events can be described as the circumstances dictate, when one set of data sources communicates with another set, for example, when an employee is added, updated, or deleted from the human resources (HR) system. Another example is when the access control system detects a keycard being used in a restricted area. You can base an event on a calendar or a clock-based timer; for example, start communications every 10 minutes or at 12:00 midnight on Sundays. An event can also be a manually initiated one-off event, such as populating a directory or *washing* the data in a system.

Events are usually tied to a data source and are related to data flows that are triggered when the specified set of circumstances arise. Each element is handled by TDI components:

- *Connectors*: Connectors are components that connect to and access data in a data source. For example, we use a Java Database Connectivity (JDBC) Connector to read and write to an SQL database, while an LDAP Connector allows us to access a directory. Certain types of data sources do not store data as structured objects (records, entries, and so on); they use bytestreams instead. Two examples are data over IP and flat files.
- *Parsers*: Parsers turn bytestreams into structured information or structured information into bytestreams. The data flows are implemented by clicking one or more Connectors together (associating Connectors with Parsers where necessary).
- *EventHandlers*: EventHandlers can be configured to pick up change notifications in connected systems (such as directories or Post Office Protocol Version 3 (POP3)/Internet Message Access Protocol (MAP) mailboxes) and then dispatch these events to the designated AssemblyLines.

The architecture of TDI is divided into two parts:

- The *core* system where most of the system functions are provided. The TDI core handles log files, error detection and dispatching, and data flow execution parameters. The core system is also where your customized configuration and business logic are maintained.
- The *components*, which serve to hide the complexity of the technical details of the data systems and formats with which you want to work. TDI provides you with three types of components: Connectors, Parsers, and EventHandlers. Because the components are wrapped by core functions that handle integration flow control and customization, the components themselves can remain small and lightweight. For example, if you want to implement your own Parser, you only have to provide two functions: one function for interpreting the structure of an incoming bytestream and one function for adding structure

to an outgoing bytestream. If you look in the jars subdirectory of TDI, you see how lightweight the standard components are, which makes them easy to create and extend.

This core/component design makes TDI easily extensible. It also means that you can rapidly build the framework of your solutions by selecting the relevant components and clicking them into place. Components are interchangeable and can be swapped out without affecting the customized logic and the configured behavior of your data flows. Therefore, you can build integration solutions that are quickly augmented and extended, while keeping them less vulnerable to changes in the underlying infrastructure.

2.1.2 AssemblyLines

The data flow arrows in the diagram (Figure 2-1 on page 19) represent AssemblyLines in TDI, which work in a similar fashion to real-world industrial assembly lines.

Real-world assembly lines are made up of a number of specialized machines that differ in both function and construction, but they have one significant attribute in common: They can be linked together to form a continuous path from the input sources to the output.

An assembly line generally has one or more input units that are designed to accept whatever raw materials are needed for production. These ingredients are processed and merged together. Sometimes, by-products are extracted from the line along the way. At the end of the production line, the finished goods are delivered to the waiting output units.

If a production crew receives an order to produce something else, they break the line down, keeping the machines that are still relevant to the new order. The new units are connected in the right places, the line is adjusted, and production starts again. The TDI AssemblyLines work in much the same way.

The TDI AssemblyLines receive information from various input units, perform operations on this input, and then, convey the finished product through output units. TDI AssemblyLines work on one item at a time, for example, one data record, directory entry, registry key, and so forth. Refer to Figure 2-2 on page 23.

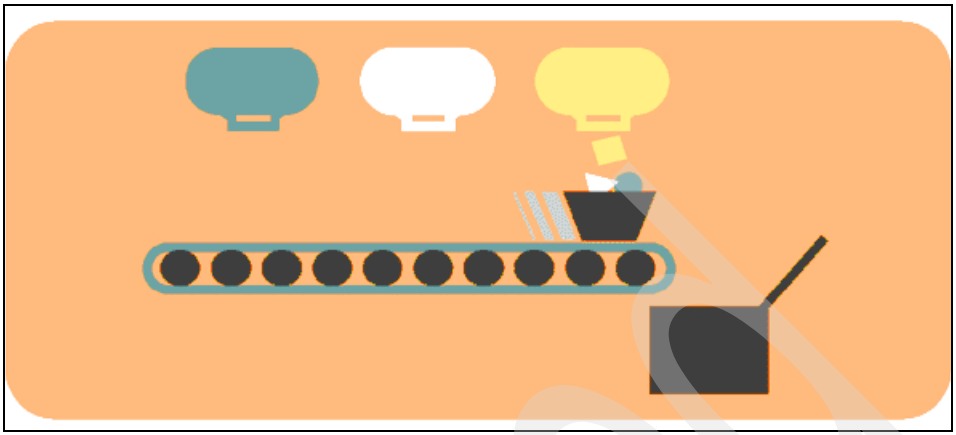


Figure 2-2 AssemblyLines

Data attributes from the connected input sources are accumulated in a Java bucket (called the *work* object). Scripts can be added to work with this information: verifying data content, computing new attributes and values, as well as changing existing attributes and values, until the data is ready for delivery from the line into one or more output data sources.

The input and output units of an TDI AssemblyLine are called Connectors, and each Connector is linked into a data store. Connectors tie the data flow to the outside world and are also where data transformation and aggregation take place. you can layer your business, security, and identity management logic through the Connectors.

2.1.3 Connectors

Connectors are similar to puzzle pieces that click together, while at the same time, they link to a specific data source, as shown in Figure 2-3 on page 24.

Each time that you select one of these puzzle pieces and add it to an AssemblyLine, you must:

1. Choose the Connector type.
2. Assign the Connector to its role in the data flow.

   This is called the Connector mode, and it tells the TDI how to use the Connector:

   – An input Connector iterates through or looks up information in its source.

   – An output Connector inserts, updates, or deletes data in the connected system or device.

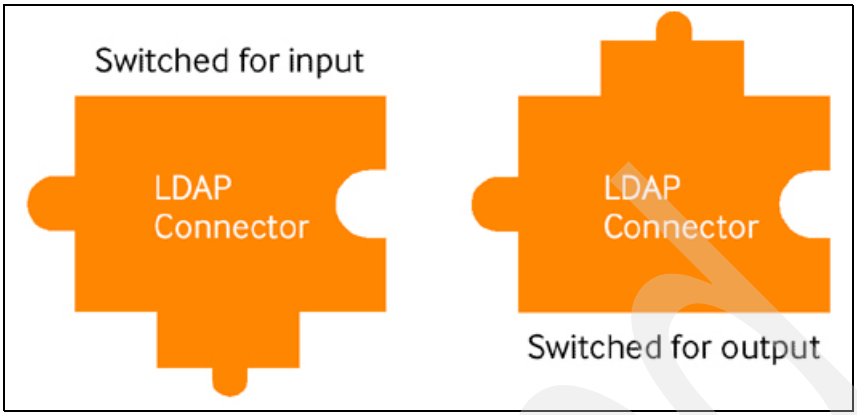


Figure 2-3 Connector puzzle pieces

Note: You might think that these puzzle pieces are rendered incorrectly and that data must flow from above, and then, flow down to the receiving data sources. But anyone who has ever tried to implement an integration solution knows that data does not tend to flow on its own. Data must be pulled out of input sources and then pushed into the output destinations, which is where Connectors excel.

You can change the type and the mode of a Connector to meet changes in your infrastructure or in the goals of your solution. If you plan for these changes, the rest of the AssemblyLine, including data transformations and filtering, is not impacted. Therefore, it is important to treat each Connector as a black box that either delivers data into the mix or extracts part of it to send to a data source. The more independent each Connector is, the easier it is to augment and maintain your solution.

By making your Connectors as autonomous as possible, you can also readily transfer them to your Connector Library and reuse them to create new solutions more quickly, even sharing them with other Connectors. Using the TDI library feature also makes maintaining and enhancing your Connectors easier, because you only have to update the Connector template in your library, and all of the AssemblyLines that are derived from this template inherit these enhancements. When you are ready to put your solution to serious work, you can reconfigure your library Connectors to connect to the production data sources instead of those data sources in your test environment, and you can move your solution from lab to live deployment in minutes.

To include new data into the flow, add the relevant Connector to the AssemblyLine. Refer to Figure 2-4 on page 25.

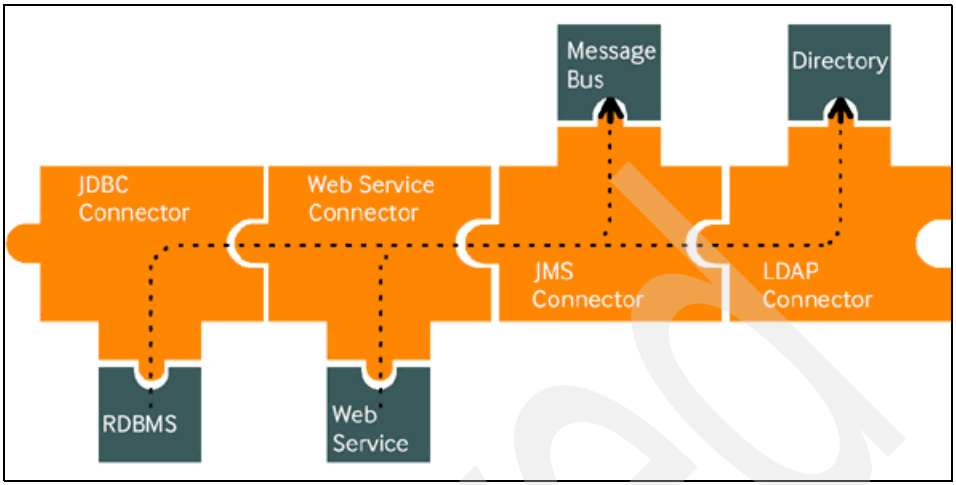


Figure 2-4 Add Connectors to the AssemblyLine

IBM TDI provides a library of Connectors from which to choose, such as LDAP, JDBC, Microsoft Windows® NT4 Domain, Lotus Notes®, and POP3/IMAP. And if you cannot find the Connector that you want, you can extend an existing Connector by overriding any or all of its functions by using one of the leading scripting languages, including JavaScript, VBScript, and PerlScript. You can also create your own Connector either with a scripting language inside of the Script Connector wrapper or by using Java or C/C++.

Furthermore, TDI supports most transport protocols and mechanisms, such as TCP/IP, FTP, HTTP, and Java Message Service (JMS)/message queuing (MQ), with or without Secure Sockets Layer (SSL) or other encryption mechanisms to secure the information flow.

For more information about scripting languages and about how to create your own scripting language, refer to the *IBM Directory Integrator 6.1.1: Reference Guide*, SC32-2566.

2.1.4 Parsers

TDI handles unstructured data, such as text files or bytestreams coming over an IP port, quickly and simply by passing the bytestream through one or more Parsers. Parsers are another type of TDI component, and the system ships with a variety of Parsers, including LDAP Directory Interchange Format (LDIF), Directory Services Markup Language (DSML), XML, comma-separated values (CSV), and fixed-length field. And, you can extend and modify Parsers in the same way that you can extend and modify Connectors, as well as create your own Parsers.

Continuing with the previous example, the next step is to identify the data sources. Because the input data source is a text file in comma-separated value format, you use the File System Connector paired with the CSV Parser. You use a File System Connector for output as well, but this time, choose the XML Parser to format the file as an XML document. First, we look at the AssemblyLine using the puzzle pieces, as shown in Figure 2-5.

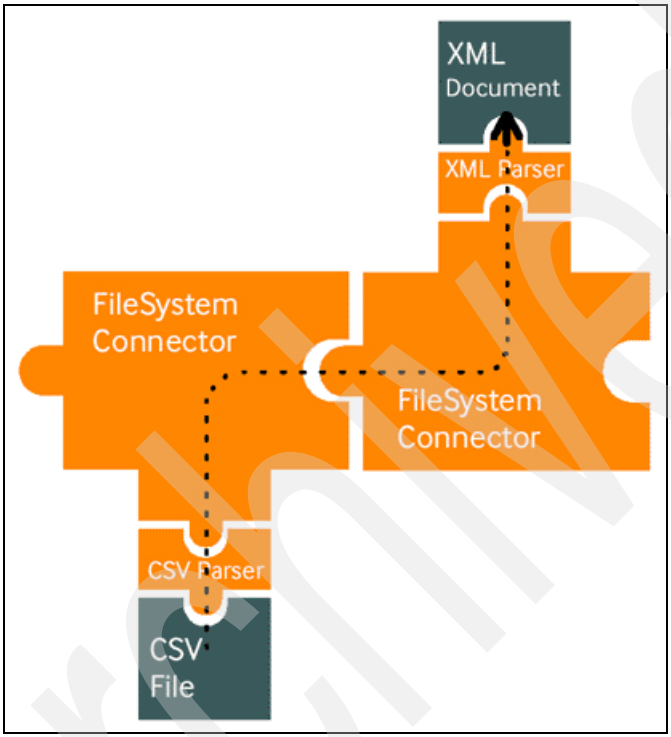


Figure 2-5 AssemblyLine puzzle pieces

Note: We created the examples in this book on a UNIX® platform and use the UNIX path name conventions. In order for your solution to be platform independent, use the forward slash (/) instead of the backward slash character (\) in your path names. For example, examples/Tutorial/Tutorial1.cfg works with both Windows and UNIX/Linux®.

2.1.5 EventHandlers

EventHandlers are the third and last type of TDI component and provide functions for building real-time integration solutions.

Like Connectors, EventHandlers can have data source intelligence that allows them to connect to a system or service and wait for an event notification. Examples are the Mailbox EventHandler, which can detect when new messages arrive in a POP3 or IMAP mailbox, and the LDAP EventHandler, which can catch changes made to a directory. When an event occurs, the EventHandler stores the specifics of the event, then performs logic, and starts the AssemblyLines according to the condition or action rules that you set up.

Sometimes you can also use Connectors to capture events, such as the JMS (MQ) Connector or the LDAP Changelog Connector. You can configure both of these Connectors to wait until new data appears and then retrieve it. However, because the EventHandler operates in its own thread, you can use EventHandlers to dispatch events to multiple AssemblyLines, which provides a cleaner and more straightforward method of filtering and handling multiple types of events from the same source (for example, SOAP or Web services calls). You can also configure EventHandlers for auto start, which means that if you start up a server with Config, these EventHandlers are immediately activated. Auto start saves you from having to specifically name the AssemblyLines to run in the command line parameters to the server.

2.2 TDI component

The connection between these components can be established either unidirectionally or bidirectionally to keep your system or record synchronized. Refer to Figure 2-6 on page 28. If the connector for an external application has not been developed by IBM, you have the ability to develop your own connector by using another type of language, such as JavaScript.

TDI is divided into three internal components:

- *Node*: This component is the heart of the system, which allows you to configure, communicate, and exchange data in various modes between two systems.
- *Interpreter*: This component is the function, which allows you to map various fields together. Also, you can write script in JavaScript to make your data exchange process more flexible.
- *Connector*: This component allows you to establish a connection to the third-party application to facilitate the data exchange between two components.

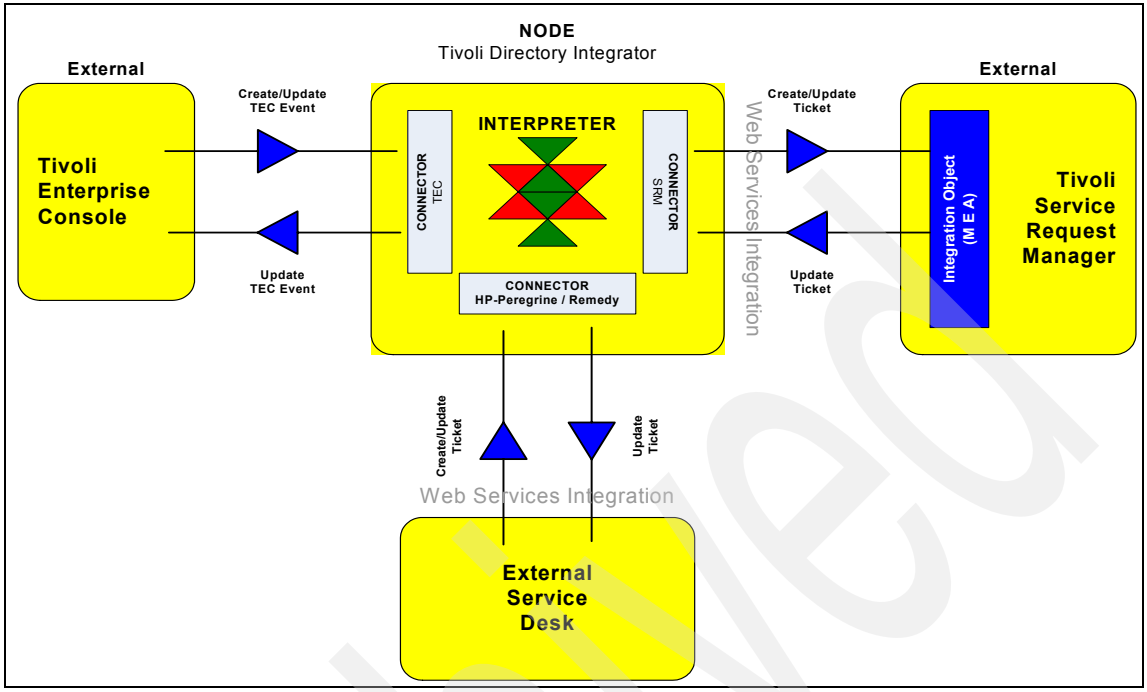


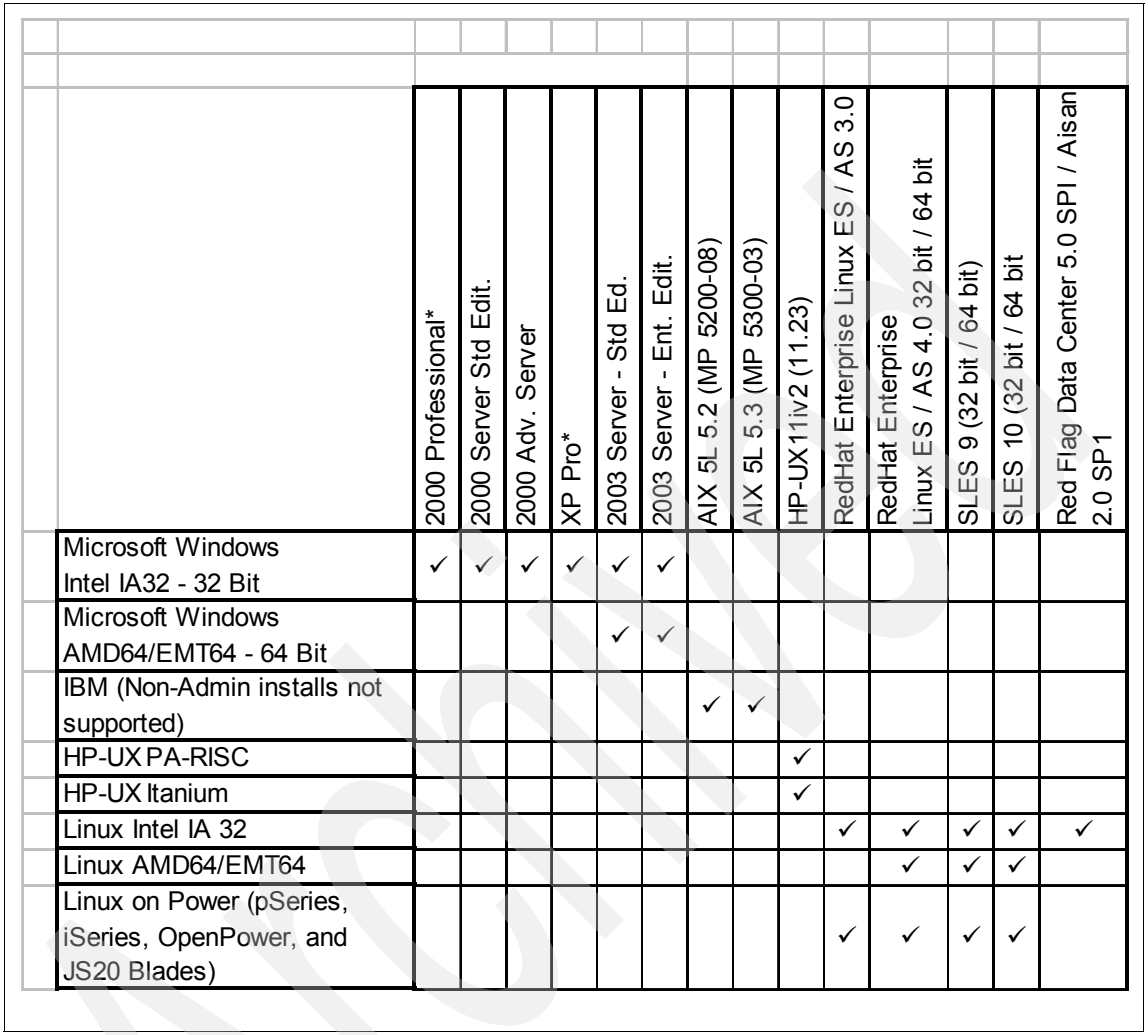
Figure 2-6 TDI components: the node, the interpreter, and the connector

Many ready-to-use connectors are available to provide the exchanged information between various products.

2.2.1 Supported platform and compatibility matrix

One of the most important points for this type of integration is the ability to define which platform and operating system are supported before proceeding to the installation. Refer to Figure 2-7 on page 29.

Note: Make sure that your actual infrastructure is within these components to ensure the continuity of your support contract.



	2000 Professional*	2000 Server Std Edit.	2000 Adv. Server	XP Pro*	2003 Server - Std Ed.	2003 Server - Ent. Edit.	AIX 5L 5.2 (MP 5200-08)	AIX 5L 5.3 (MP 5300-03)	HP-UX11iv2 (11.23)	RedHat Enterprise Linux ES / AS 3.0	RedHat Enterprise Linux ES / AS 4.0 32 bit / 64 bit	SLES 9 (32 bit / 64 bit)	SLES 10 (32 bit / 64 bit	Red Flag Data Center 5.0 SPI / Aisan 2.0 SP1
Microsoft Windows Intel IA32 - 32 Bit	✓	✓	✓	✓	✓	✓								
Microsoft Windows AMD64/EMT64 - 64 Bit					✓	✓								
IBM (Non-Admin installs not supported)							✓	✓						
HP-UX PA-RISC									✓					
HP-UX Itanium									✓					
Linux Intel IA 32										✓	✓	✓	✓	✓
Linux AMD64/EMT64											✓	✓	✓	
Linux on Power (pSeries, iSeries, OpenPower, and JS20 Blades)										✓	✓	✓	✓	

Figure 2-7 Compatibility matrix: Architecture and operating systems supported

2.2.2 Hardware and software prerequisites

This section provides TDI installation prerequisites.

Hardware prerequisites

The installation procedure requires 450 Mb disk space during the installation.

Disk space requirements by platform for a typical installation are:

- Windows (32-bit and 64-bit): 341 MB
- Linux (32-bit and 64-bit): 413 MB
- AIX®: 342 MB
- Solaris™: 453 MB
- HP-UX: 562 MB

Disk space requirements by platform for a custom installation in which all components are selected are:

- Windows (32-bit and 64-bit): 564 MB
- Solaris: 773 MB
- HP-UX: 858 MB

Software prerequisites

The administrative workstation is not used for daily operations, although it is an important SRM support component for administrative activities.

2.3 Planning to deploy TDI

Before installing TDI, you need to understand the interaction between the TDI component connectors and the third-party applications with which you expect to exchange data.

We have included various types of scenarios that you might encounter when implementing TDI.

2.3.1 Installation scenarios

The first scenario is integrating an event management product, such as Tivoli Enterprise Console (TEC). At any time, a server, network, or any other type of event can be generated and must be managed within this console.

Assume that this scenario uses the default value that is provided by TEC where a ticket in Tivoli SRM is created for each *Critical* event generated. When this ticket is closed, this information is updated in TEC to synchronize the open ticket and the open event. This type of integration is required to ensure the integrity of the generated data.

The second part of this integration in this scenario consists of keeping two Service Desk operations synchronized. The first part consists of the Tivoli SRM, and the second part consists of HP ServiceCenter V6.1.

Note: At this time, as shipped, only HP ServiceCenter V6.1 is supported. For any other version, you must modify the assembly line configuration within the connector configuration.

2.3.2 Installation procedure

In this section, we focus on the installation of the TDI application, which allows you to develop, configure, and define the mapping between two components. We do not discuss the integration scenarios here.

For event management integration scenarios, refer to Chapter 3, “Event management integration” on page 105. For third-party service desk integration, refer to Chapter 4, “Service Desk Tool integration” on page 135.

The latest version of TDI that is available at this time is V6.1.1. Prior to installing the application, make sure that:

- You copy the installation files from the IBM Tivoli SRM Integration Toolkit image to a temporary directory on the computer where you want to install TDI.
- You have enough disk space left, as shown in the prerequisites.
- You have Administrator’s rights on the Windows server or the Windows machine.

Important: Use the procedure (command line installation) that is described in this section rather than the TDI product documentation to install a TDI environment that supports the integration of Tivoli SRM with event management, third-party service desk integration, and so forth.

If you install TDI using the TDI V6.1.1 Launchpad (as described in the TDI manuals), several installation parameters that are necessary for Tivoli SRM integration are not available during the installation.

For general information about IBM TDI, refer to the product documentation at:

http://publib.boulder.ibm.com/tividd/td/IBMDirectoryIntegrator6.1.1.html

Complete the following steps to install TDI:

1. At a command prompt, change to the directory where the installation files are located.
2. Run the installation command that is appropriate for your platform:
   - Windows:

     ```
     installTDI.cmd -silent tdi_home tdi_working_dir "srm_host
     [srm_host2 srm_host3 ...]" tec_log_file_adapter_home Y | N
     ```

   - Linux or AIX:

     ```
     ./installTDI.sh -silent tdi_home tdi_working_dir \"srm_host
     [srm_host2 srm_host3 ...]\" tec_log_file_adapter_home Y | N
     ```

     The descriptions of the parameters are:

     `-silent:` Specifies to install the product in silent mode, where the installation is performed with no user interaction.

     `tdi_home:` Specifies the directory where you want to install the TDI binary files. Specify any directory. The directory that you specify is created for you if it does not exist.

     `tdi_working_dir:` Specifies the directory where you want to install the TDI files that are required by the products that are supported for integration with Tivoli SRM. Specify any directory.

     Note: Typically, the working directory is a subdirectory of the tdi_home directory. The directory that you specify is created for you if it does not exist.

     `srm_host` [*`srm_host2 srm_host3 ...`*]`:` Specifies the hostname or IP address of one or more servers that host Tivoli SRM. Specify the fully qualified host name with the HTTP listener port of the supporting application server. (Port number 9080 is typically used for a WebSphere® Application Server.) Be sure to enclose these arguments in double quotes ("), including the escape character (\) for UNIX, as shown in the command syntax.

Note: At the time of writing this book, there was a defect in the installTDI command. Although srm_host(s) is specified in the silent install, this parameter is not used during the execution of the command. You have to manually update the mxe.properties or TDI config file to specify the hostname or IP address of the servers that host Tivoli SRM. This is expected to be corrected in a later fixpack.

tec_log_file_adapter_home:
: Specifies the full directory path where you installed, or plan to install, the TEC non-TME logfile adapter on this computer. The non-TME logfile adapter supports the integration of Tivoli SRM with TEC.

Note: If you do not plan to integrate with TEC, or you do not know the location of the TEC logfile adapter, enter any valid character or character string for this parameter. For example, enter a dot (.) or any word (na). After installation, you can edit a properties file (mxe.properties) on the TDI server to specify the location of the TEC logfile adapter.

`Y | N :`
: Specifies whether you want to use a common queue in a multiple TDI server environment. The default is Y (yes).

3. Repeat the preceding steps on each computer where you want to install TDI.

Example 2-1 specifies that you want the TDI server to connect to two Tivoli SRM servers (`tsrm1` and `tsrm2`). No logfile adapter is specified (`na`).

Example 2-1 Windows example

```
installTDI.cmd -silent C:\TDI C:\TDI\work "tsrm1.itso.ibm.com:9080
tsrm2.itso.ibm.com:9080" na Y
```

The UNIX command in Example 2-2 specifies a single Tivoli SRM Server (`TSRM`) and the location of the logfile adapter on the TDI server.

Example 2-2 UNIX example

```
./installTDI.sh -silent /opt/TDI /opt/TDI/work
\"tsrm.itso.ibm.com:9080\" /opt/IBM/Tivoli/tec/nonTME Y
```

Post-installation verification

This section verifies that the installation is complete:

1. If the following component is in the All Programs folder, it confirms the success of the installation. Refer to Figure 2-8 on page 34.
2. Select **Start** → **All Programs** → **IBM TDI 6.1.1**:
   - Start Config Editor
   - Uninstall IBM TDI 6.1.1.

Figure 2-8 IBM TDI 6.1.1 menu

3. To complete the post-installation check, launch the TDI as shown in Figure 2-8 by selecting **Start Config Editor**, as shown in Figure 2-9.

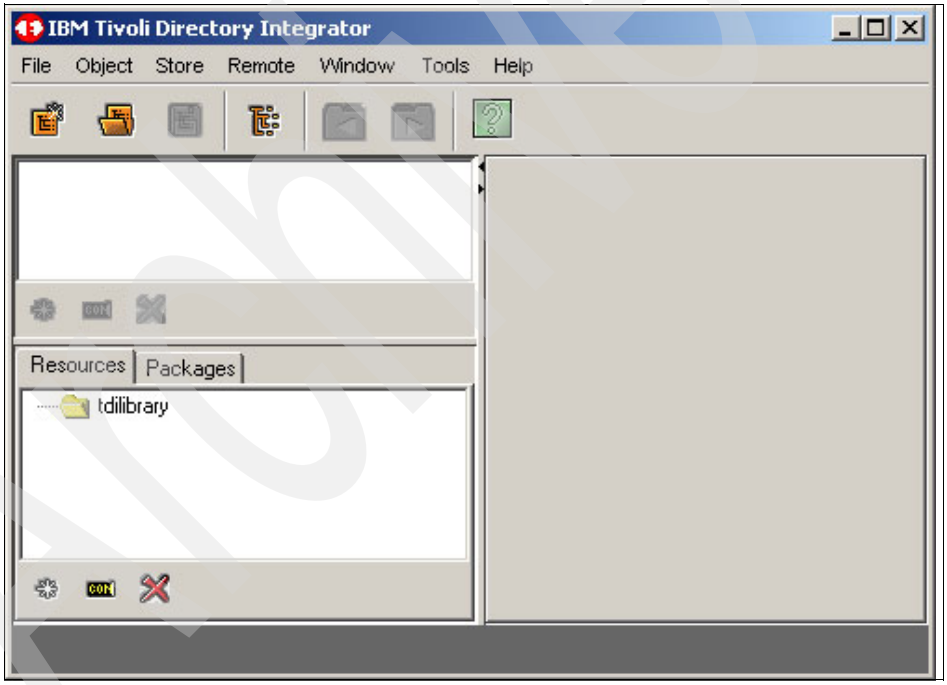


Figure 2-9 TDI user interface

2.4 Integration Framework or MEA

This section provides information about Integration Framework, which is one component of the Service Desk Integration Toolkit. In Maximo V6.*x,* the integration application is referred to as *MEA*. Now, in Tivoli SRM V7.1, MEA is referred to as the *Integration Framework*. In this section, we discuss:

- Overview of Integration Framework
- Architecture
- Integration Framework components
- Cluster configuration
- Integration enhancements and changes from Version 6.*x* to 7.1
- Sample scenario

2.4.1 Integration Framework overview

Integration Framework is a set of applications to help you integrate the system with your framework applications. You also can create business flows between the system and the other framework applications.

Integration Framework comes embedded with the Tivoli SRM installation. Figure 2-10 shows how to access the Integration application from the Web user interface.

To access the integration application, complete the follow steps:

1. Log on to an account with integration privileges.
2. Open the integration application by selecting **Go To** → **Integration**.

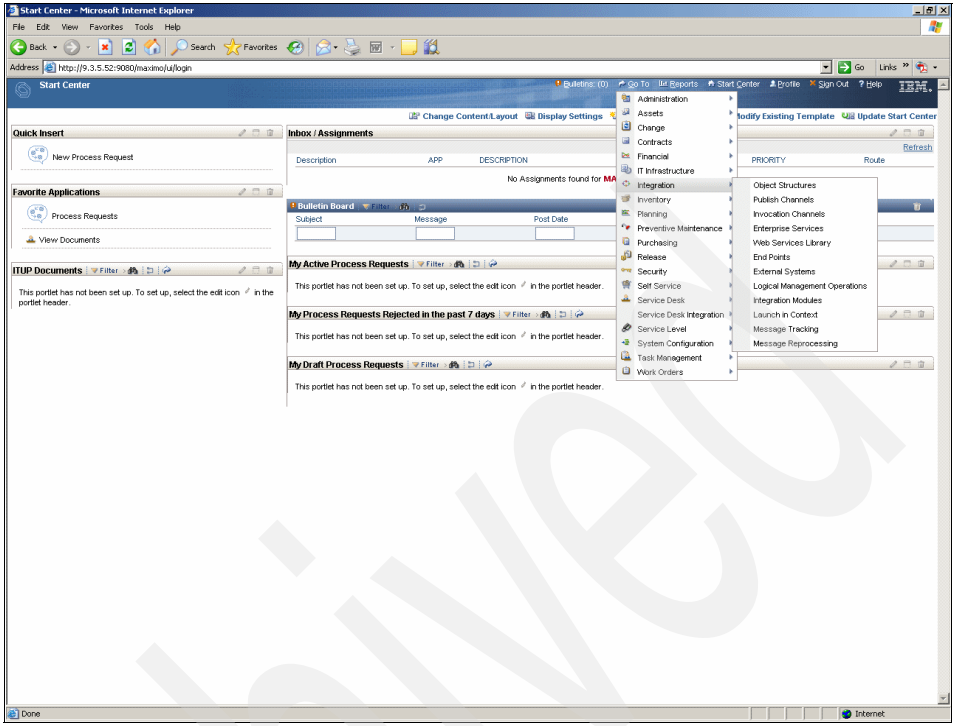


Figure 2-10 Integration Framework

Operational Management Products (OMPs) are individual external products that you can use to implement Logical Management Operations (LMOs). Tivoli Application Dependency Discovery Manager (TADDM), Tivoli Provisioning Manager (TPM), and Tivoli Configuration Manager (TCM) are examples of OMPs. You can bring OMPs into the system from the IBM Tivoli Application Dependency Discovery Manager (TADDM) using the Integration Composer. OMPs are artifacts within the system that can exist when there is no OMP.

The key features of the Integration Framework include:

- Predefined content to assist in implementing integration requirements in a timely manner. This content is a comprehensive set of outbound (Channels) and inbound (Services) integration interfaces that are available to use immediately.
- Applications to configure, predefine, and to create new integration definitions.
- Applications to facilitate the customization of predefined content using a processing rule engine, Java, and Extensible Stylesheet Language Transformations (XSLT).
- Support for multiple communication modes, including:

  - Web services
  - HTTP
  - JMS
  - Database interface tables
  - XML/flat files
- Event-based, batch, program-initiated, and user-initiated processing of outbound and inbound messages.
- Load and performance scalability using JMS queues.
- Support for clustered environments that reduce system downtime, increase system availability, and improve system performance.
- Support for user interface (UI)-based integration, including the context-based launching of external applications.
- Support for integration to OMPs.
- Support for bulk export of data using user-defined SQL query.
- Support for bulk importing of XML or flat files.
- Dynamic XML schema generation for all integration interfaces.

- Dynamic generation of Web services Interoperability (WS-I) compliant Web services, including Web Service Definition Language (WSDL).
- Provides the concept of an adapter that is used to group related integration artifacts. You can configure and deploy adapters for enterprise connectivity with various systems. Each adapter can have its own interface and delivery mode. Preconfigured adapters for Oracle and SAP® are available as add-ons.

2.4.2 Architecture

This section describes the architecture of Integration Framework processing. The Integration Framework facilitates bidirectional data exchange between the system and external applications in a real-time or batch mode. Through the Integration Framework, you can exchange data synchronously and asynchronously using a variety of communication protocols. Refer to Figure 2-11.

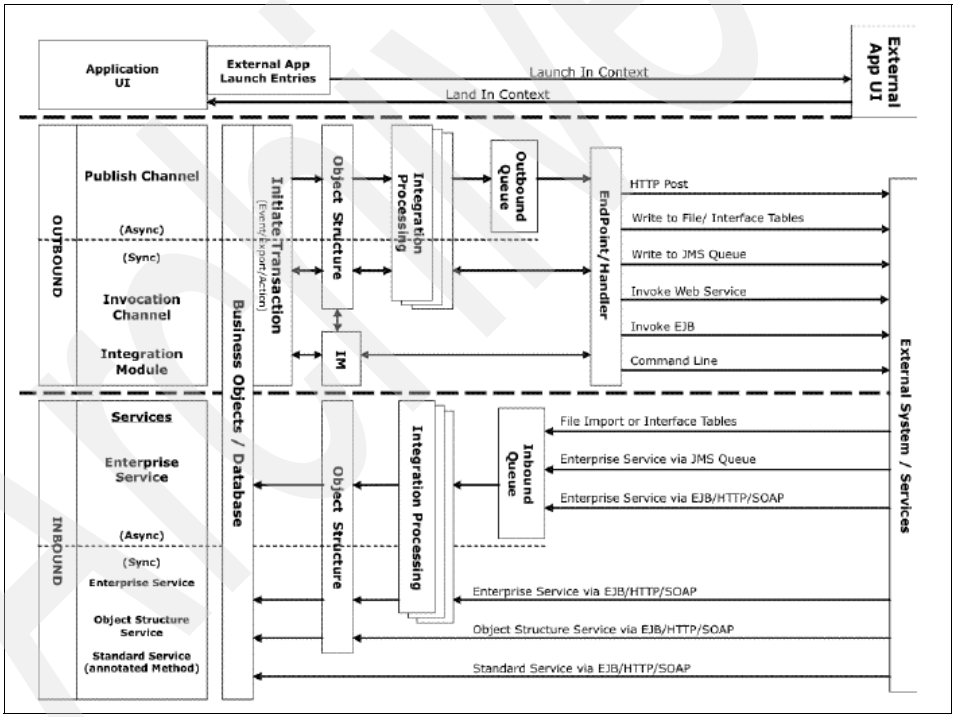


Figure 2-11 Integration Framework overview

You can implement the system within a cluster of application servers, and integration services can run across the cluster.

The Integration Framework also provides features that support integration with OMPs, such as Tivoli Provisioning Manager. You also can use a system application UI to launch an external application UI. The following sections describes:

- Integration Framework for data exchange
- Integration Framework for OMP integration
- Integration Framework for UI integration

Integration Framework for data exchange

Through the Integration Framework, you can send and receive XML messages between the system and external applications. The Integration Framework provides the following capabilities:

- Build, transform, and customize message content
- Send and receive messages using multiple protocols, including:
  - Web services
  - Hypertext Transfer Protocol (HTTP)
  - JMS
- Exchange data synchronously and asynchronously
- Exchange event-based messages
- Batch import and export messages

The Integration Framework components that support data integration are shown in Table 2-1 on page 40.

Table 2-1 Integration Framework for data exchange components

Component	Description
Object structures	Define message content
Services	Receive data into the system
Channels	Send data out of the system
External systems	Define external applications and services that integrate with the system
Communication	Modes you use to communicate with external applications. Modes include Web services, HTTP, Enterprise JavaBeans™ (EJB™), and flat files.
Events	The business object events that you use to initiate data exchange. Events include data import, data export, and record status changes, that is, work order approvals.
Web services	Query or send transactions to the Integration Framework.
Content	System-provided content that is configured to enable integration.

Figure 2-12 on page 41 illustrates the Integration Framework for data exchange.

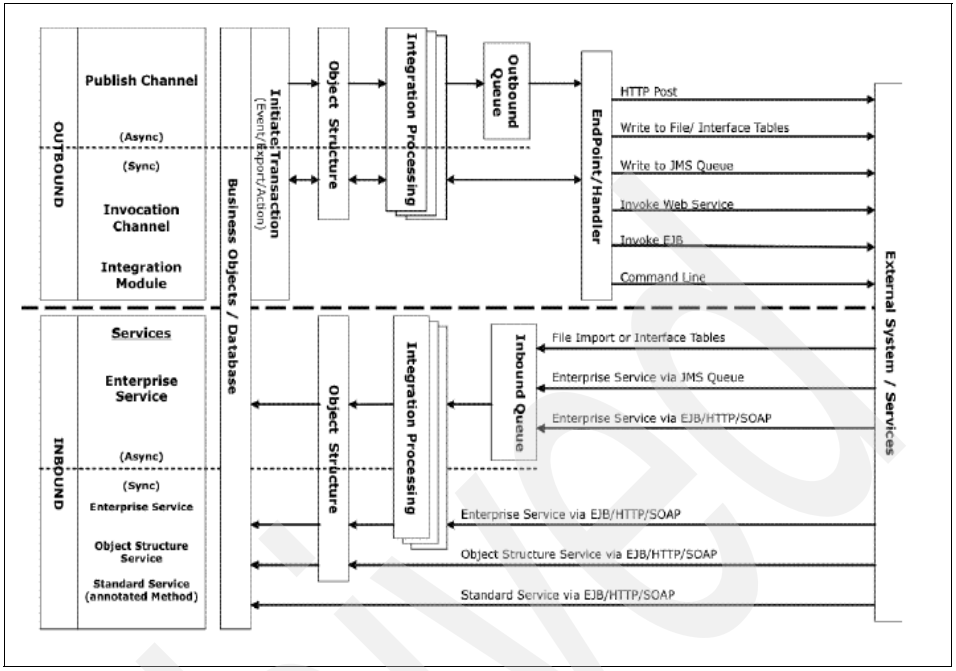


Figure 2-12 Integration Framework for data exchange

Integration Framework for OMP integration

OMPs are external products (to the system) that provide services for configuration items (CIs), such as a server that runs applications. PMPs are system applications and processes that use OMPs to automate IT-related services. Such services include software deployment on CIs.

OMP integration takes place through a series of system calls and invocations. A PMP calls an Integration Module (IM), which in turn communicates with the OMP to perform a Logical Management Operation (LMO). With this framework, actions, such as software deployment, can be automated where the PMP initiates the IM to invoke the OMP to perform such actions.

Through the Integration Framework, IMs are configured to support specific LMOs and OMPs. As part of the IM, an EndPoint/Handler is configured to identify the communication protocol (HTTP, Web service) that IM uses to invoke the OMP. The IM can map the service response so it is returned to the PMP. The service response then can be processed in multiple ways. The service can open a response in a UI application or save the response data to the application database.

OMPs can also choose to integrate in an assisted, (non-automated) approach by using the Integration Framework.

The Integration Framework components that the IMs and PMPs use for OMP integration are shown in Table 2-2.

Table 2-2 Integration Framework for OMP components

Component	Description
LMO	Define the actions that the IM supports for an OMP.
Integration modules (IMs)	Define the configurations and the relationships to LMOs and OMPs.
Actions	Use to implement an automated (no user interaction) or semi-automated (user initiates from a UI application) invocation of an IM/OMP by a PMP. You can initiate actions from UI Applications, Escalations, and Workflows.

Figure 2-13 illustrates the Integration Framework for OMP.

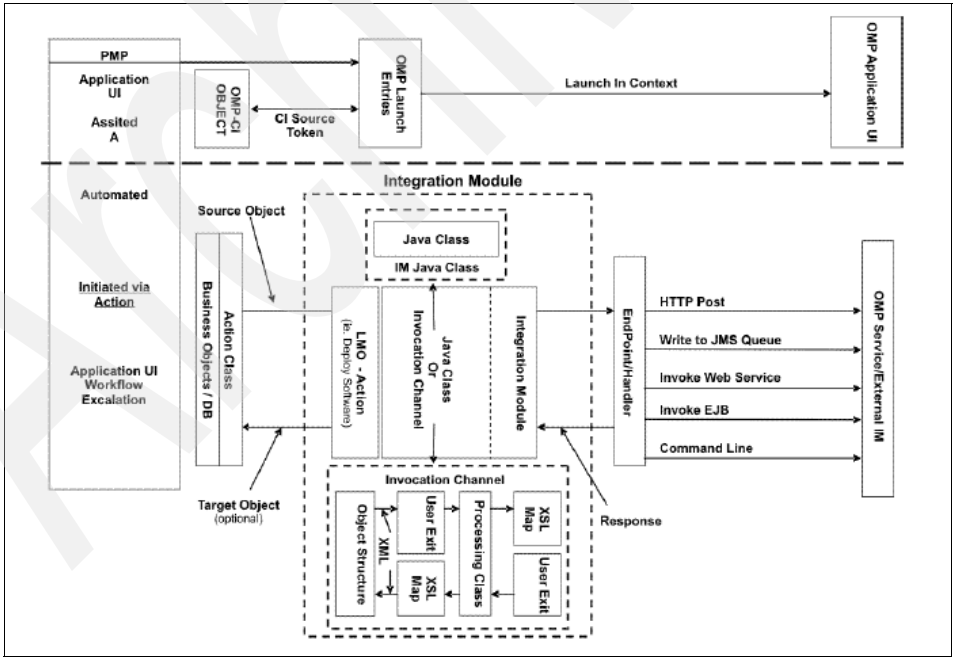


Figure 2-13 Integration Framework for OMP

Integration Framework for UI integration

The Integration Framework provides a mechanism for you to launch from a system application UI to an external application UI. You can define the context to facilitate the landing into your wanted external application interface. For example, you can configure in the system to launch and to display a specific part number in an external application. The Integration Framework supports URL substitutions of any values (part number) of any system business object.

You can use OMP-specific features when you launch to an OMP application UI. Features include retrieving the registered host name of the OMP and a CI Source token for the OMP. Refer to Figure 2-14.

You also can launch into a system UI from an external application (Land in Context).

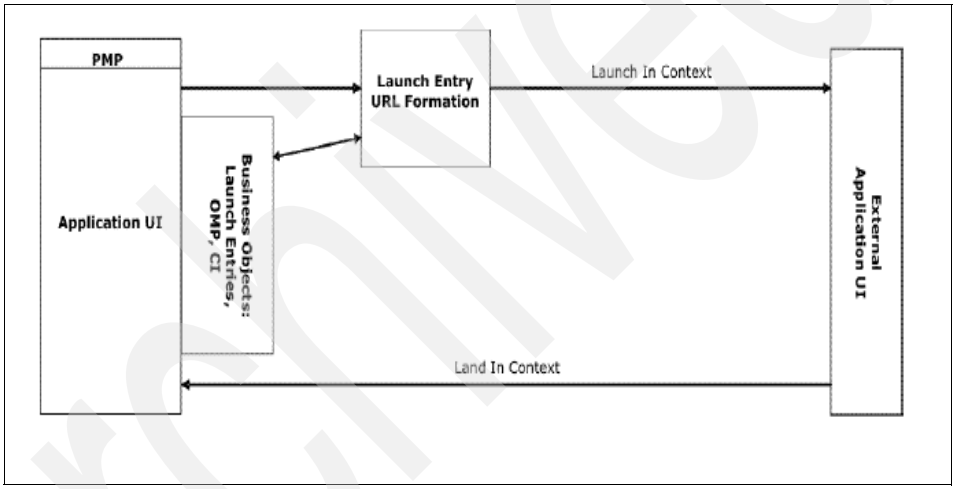


Figure 2-14 Integration Framework for UI

2.4.3 Integration Framework components

This section describes individual Integration Framework components and features. Familiarity with framework components is essential when using the Integration Framework application. The following components are described in this section:

- Object structures
- Publish Channels
- Invocation channels
- Enterprise Services
- Web services library

- Endpoints
- External systems
- LMO
- Integration modules
- Launch in context
- Message tracking
- Message reprocessing

Note: Several components are specific, depending on your integration type, such as Integration Framework for data exchange, OMPs (OPMs), and UI.

Object structures

An *object structure (OS)* is the common data layer that the Integration Framework uses for all outbound and inbound application data processing. An OS consists of one or more business objects that make up the content of an XML message. You can use the message content of a single OS to support bidirectional inbound and outbound messages.

An OS can have the same object more than one time in its definition. Objects must have a reference to a valid parent/child relationship within the system. The OS has a Definition Class (Java) that you can code to perform logic, such as filtering for outbound messages. For inbound messages, you can use an OS Processing Class (Java) to invoke specific business object logic. The logic is beyond the normal insert, update, and delete Integration Framework processing.

The OS is the building block of the Integration Framework that lets integration applications perform the following functions:

- Publish and query application data
- Add, update, and delete application data
- Import and export application data

In addition to being a building block, you can use the OS as a service to support inbound message processing. You can invoke the OS service as a Web service, as an EJB, or through HTTP. The object structure service supports system data updates, as well as data queries outside of the system. Refer to Figure 2-15 on page 45.

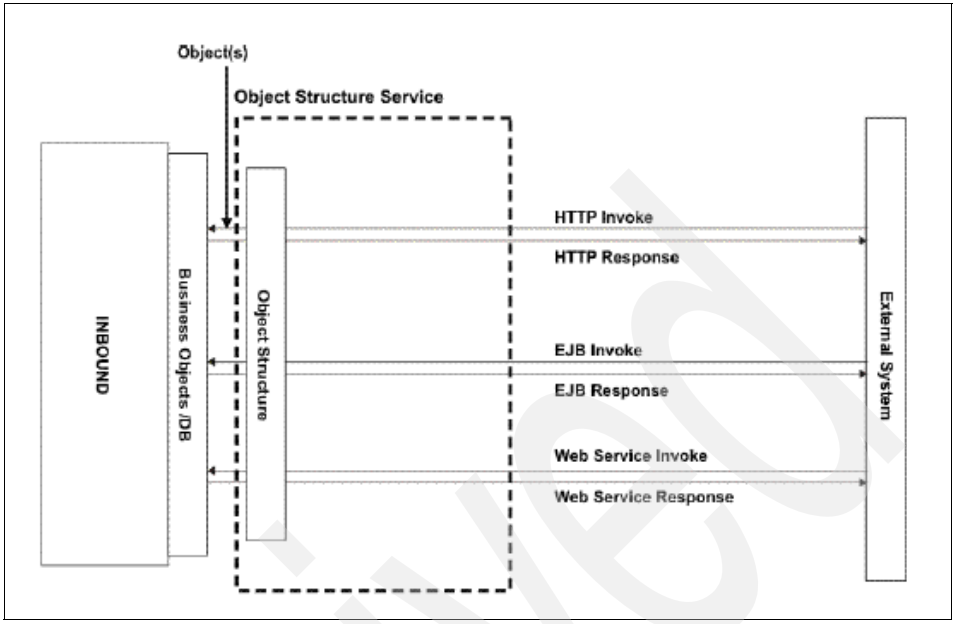


Figure 2-15 Object structure service

To access the OS application (Figure 2-16), select **Go** → **Integration** → **Object Structures**.

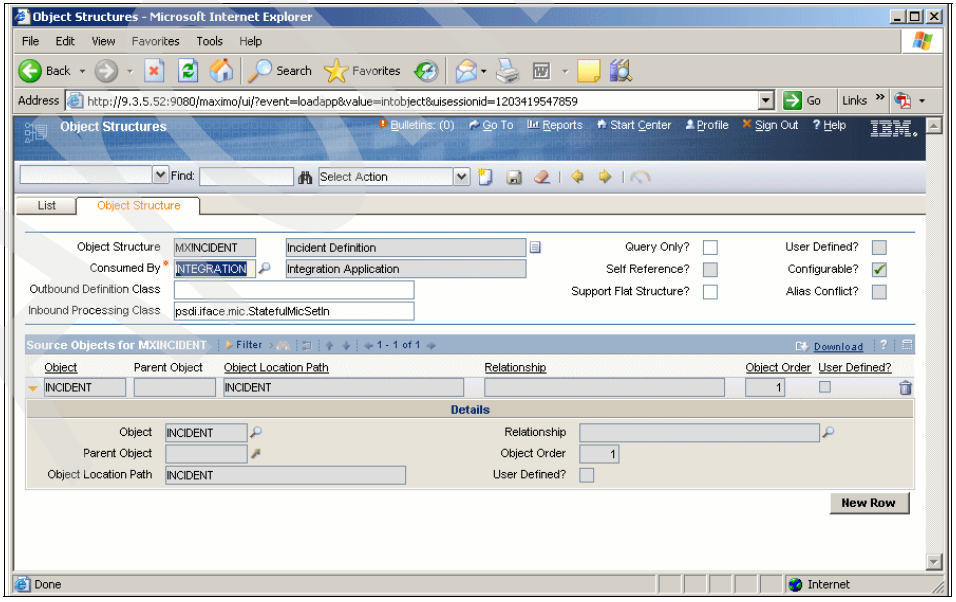


Figure 2-16 Object Structures interface

Publish channels

A *publish channel* is the pipeline for sending data asynchronously from the system to an external system. Refer to Figure 2-17.

The following events trigger publish channel processing:

- Object events (insert, update, and delete)
- Application-initiated calls
- Workflow calls
- Data export

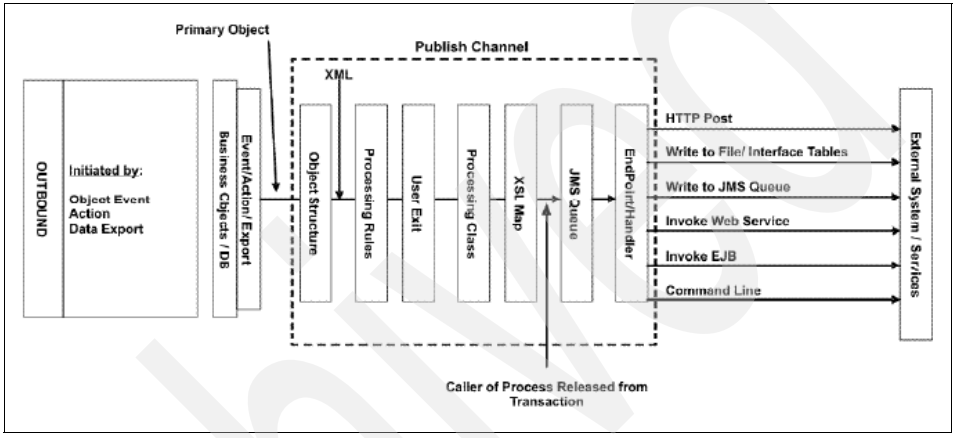


Figure 2-17 Publish channel

The content of a publish channel data structure is based on the associated object structure. When you trigger publish channel processing, the Integration Framework builds the XML message based on the object structure. The system then moves the message through multiple processing layers before dropping the message into a queue and releasing the initiator of the transaction.

Note: Each processing layer is optional.

The processing layers are:

Processing rules Use the Integration Framework rule engine to filter and transform XML messages. You can also implement rules through the publish channel application.

User exit Use to filter and transform data and implement business logic. You can use this class as part of an installation or customization process.

Processing class Is a Java class that is used to filter and transform data and implement business logic. Oracle and SAP Adapters provide processing classes to support product integration.

XSL map Is an XSLT style sheet that is used to transform data and map the XML message to another format.

When the system drops the message into the queue, a polling thread (system cron task) picks up the message and sends it to an external system through the endpoint. The endpoint identifies the protocol that the system uses to send data, such as HTTP or Web service. The endpoint also identifies the property values that are specific to that endpoint, such as the URL, user name, and password.

To access the Publish Channel application (Figure 2-18), select **Go** → **Integration** → **Publish Channel**.

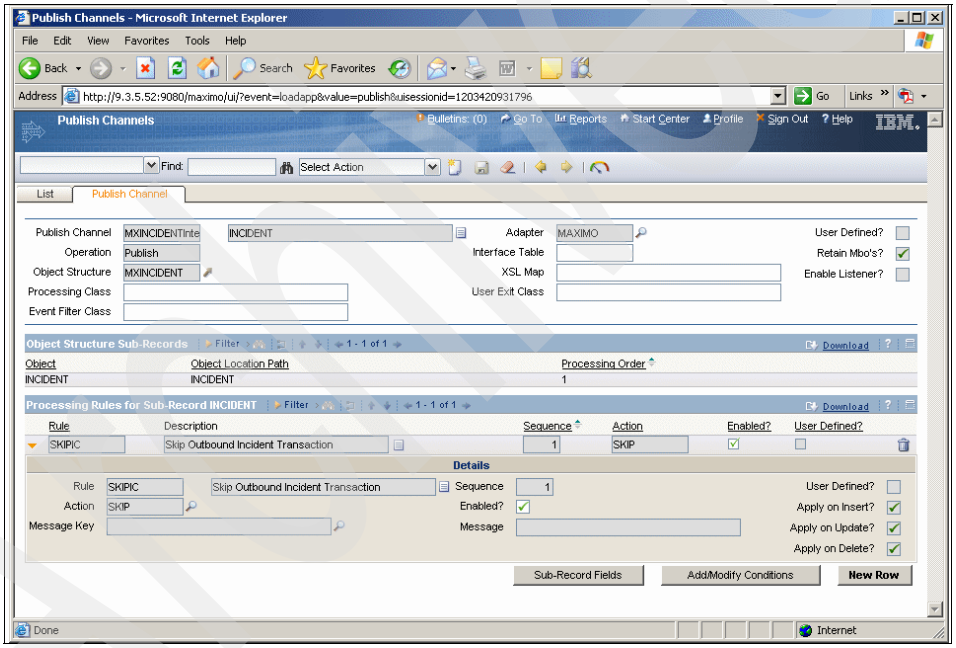


Figure 2-18 Publish channel interface

Invocation channels

A *service-oriented architecture (SOA) environment* enables the use of external services to process data from multiple sources. *Invocation channels* support this generic SOA capability by enabling the system to call an external service synchronously. The system also returns the response of the service back to the caller for subsequent processing.

For example, you can use an external system to calculate a tax amount for a product that you are purchasing. Configure an invocation channel to call the external tax service. The channel takes the returned tax amount and saves the value in the system database.

The initiation of an invocation channel is implemented through an action class that calls an invocation channel. Refer to Figure 2-19. You can implement an action through the following means:

- A user interface control (within an application)
- Workflow routing
- Escalation

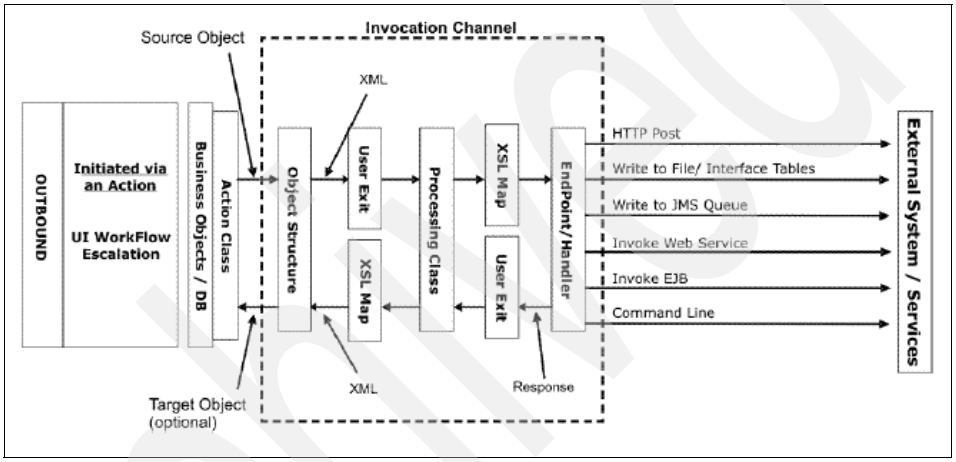


Figure 2-19 Invocation channel

You can only initiate an invocation channel through an action class. The system call is synchronous (no JMS queue), and a response can be returned from the service to the caller.

The content of an invocation channel data structure is based on the associated object structure. When you trigger invocation channel processing, the Integration Framework builds the XML message based on the object structure. The system then moves the message through multiple processing layers (optional) before calling the external service.

Note: Each processing layer is optional.

The processing layers are:

User exit Is used to filter and transform data and implement business logic. You can use this class as part of an installation or customization process.

Processing class Is a Java class used to filter and transform data and implement business logic. Oracle and SAP Adapters provide processing classes to support product integration.

XSL map Is an XSLT style sheet that is used to transform data and map the XML message to another format.

After the message goes through the processing layers, the Integration Framework uses the endpoint to call the external service. The endpoint identifies the protocol that the system uses to send data, such as HTTP or Web service. The endpoint also identifies the property values that are specific to that endpoint, such as the URL, user name, and password.

To access the Invocation Channel application (Figure 2-20), select **Go** → **Integration** → **Invocation Channel**.

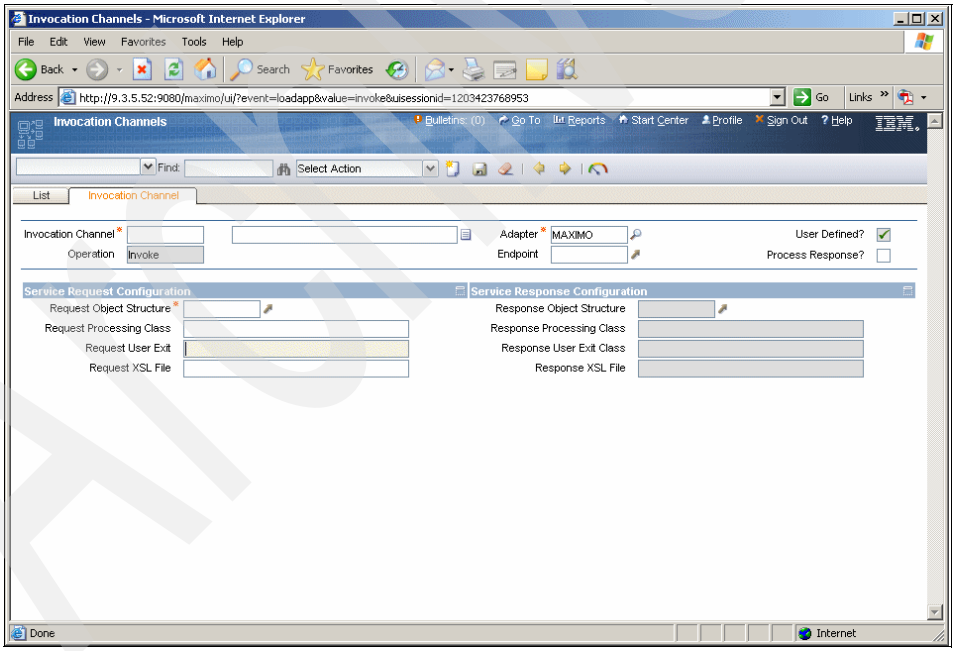


Figure 2-20 Invocation channel interface

Enterprise service

The *enterprise service* is a pipeline for querying system data and importing data into the system from an external system. You can configure the enterprise service to process data synchronously (no queue) or asynchronously (through a queue as shown in Figure 2-21). The enterprise service can use multiple protocols, such as Web services and HTTP.

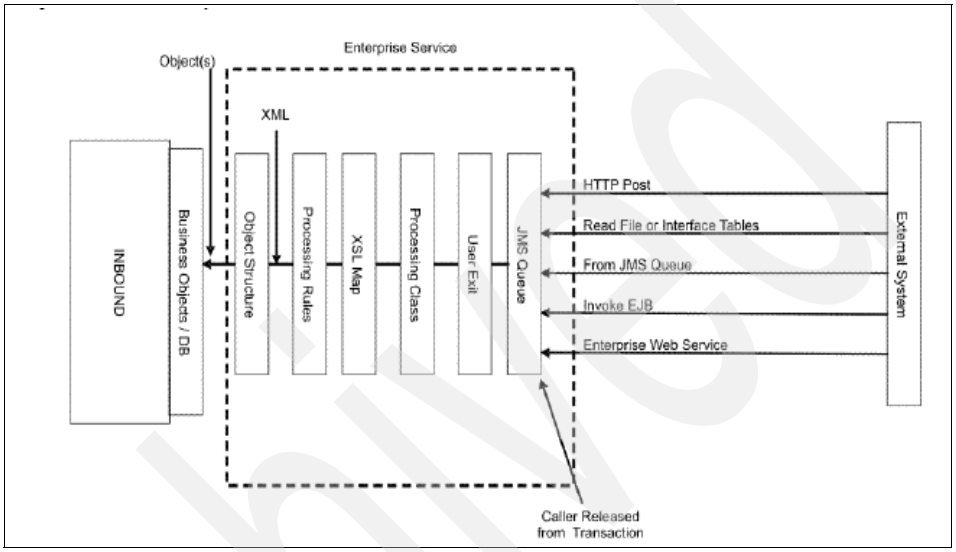


Figure 2-21 Asynchronous Enterprise Services

The synchronous enterprise service processes data without a queue, as shown in Figure 2-22 on page 51.

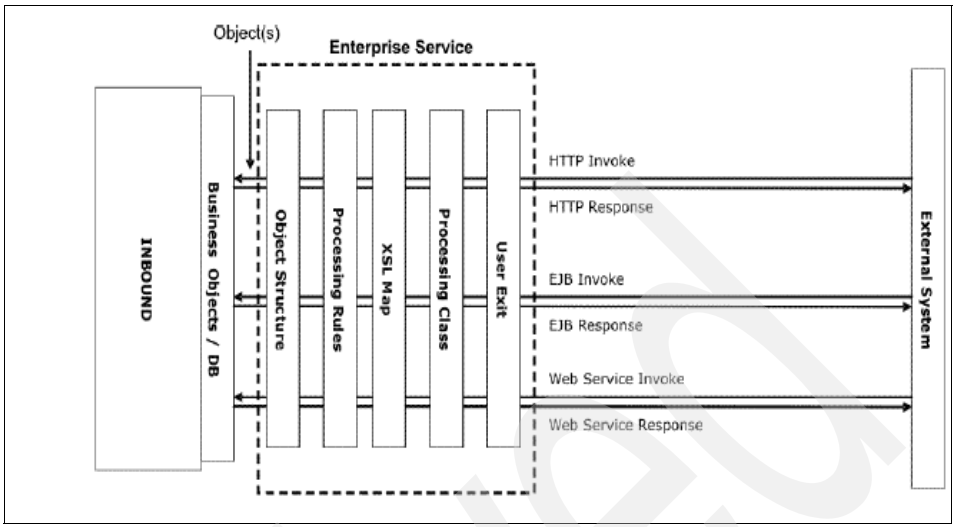


Figure 2-22 Synchronous Enterprise Services

The enterprise service has processing layers to transform data and to apply business processing rules before the data reaches the system objects. The Integration Framework builds the XML message based on the object structure. The XML message must be in the format of the object structure so the system can process it successfully.

Note: Each processing layer is optional.

The processing layers are:

Processing rules Use the Integration Framework rule engine to filter and transform XML messages.

User exit Use to filter and transform data and and implement business logic. You can use this class as part of an installation or customization process.

Processing class Is a Java class that is used to filter and transform data and implement business logic. Oracle and SAP Adapters provide processing classes to support product integration.

XSL map Is an XSLT style sheet that is used to transform data and map the XML message to another format.

To access the Enterprise Services application, (Figure 2-23 on page 52), select **Go** → **Integration** → **Enterprise Services**.

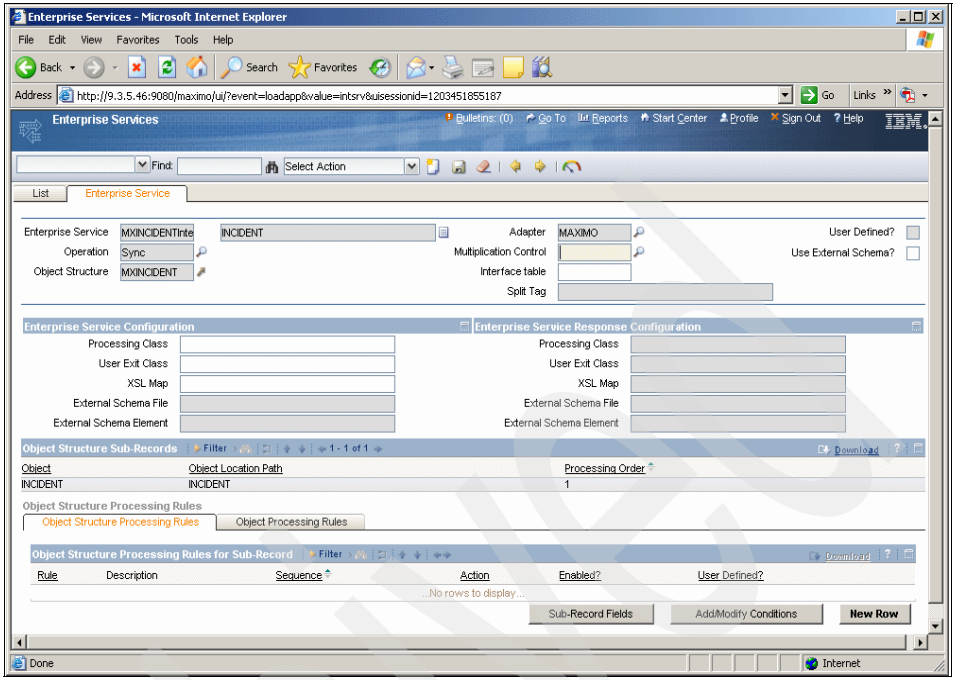


Figure 2-23 Enterprise Services interface

Web Services Library

External applications, Enterprise Service Bus (ESB), and Business Process Execution Language (BPEL) processes use Web services to query or send transactions to the Integration Framework. The Integration Framework provides three types of Web services:

- Object structure service
- Enterprise service
- Standard service

You can invoke these services as an EJB or HTTP.

When deploying Web services, the system generates a schema and Web services description language (WSDL) file that you can access through a URL. Optionally, a Universal Description, Discovery, and Integration (UDDI) registry is updated for each deployed service.

The Integration Framework supports the following Web services:

- Object Structure Web service: Created from an object structure. Object structure Web services do not provide a processing layer that is available to Enterprise Services. An object structure Web service supports five operations through its WSDL:
  - Create
  - Delete
  - Query
  - Sync
  - Update
- Enterprise Web service: Created from an enterprise service. Enterprise Services provide exit processing and optional JMS support. The Integration Framework creates individual enterprise Web services for the operation defined in an enterprise service (one operation per service). The operations supported in an object structure service are also supported in an enterprise Web service. You can deploy an enterprise Web service to use a JMS queue (asynchronous process) or to bypass the JMS queue (synchronous process).
- Standard Web service: Created from methods defined in application services. The methods must be annotated in the application service to be available for Web service implementation. The Integration Framework links the input and output parameters of the methods to the WSDL operations.

To access the Web services library application (Figure 2-24 on page 54), select **Go** → **Integration** → **Web Services Library**.

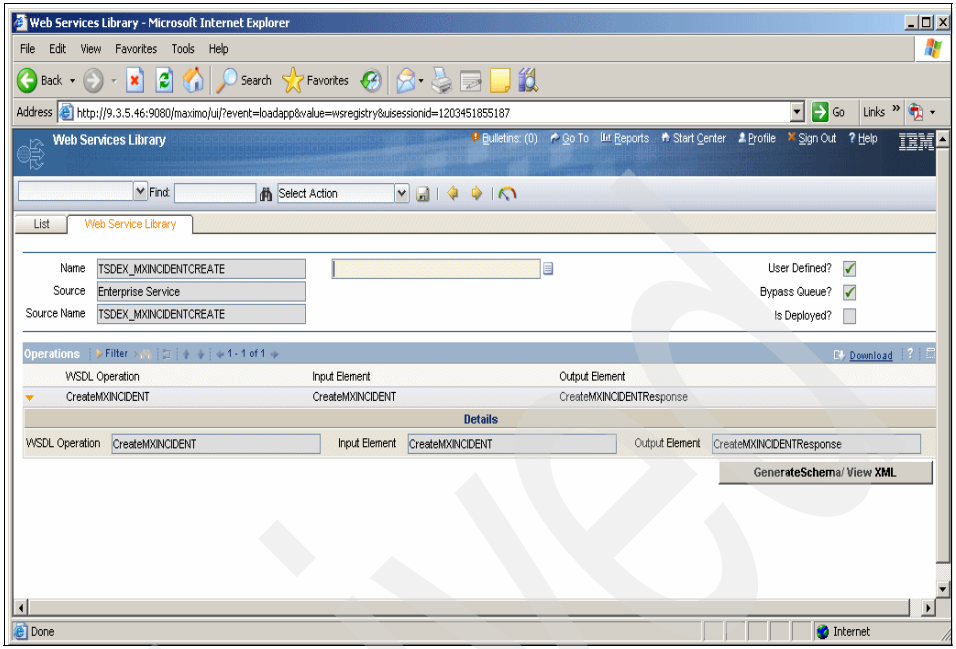


Figure 2-24 Web services library interface

Endpoints

Endpoints and their handlers facilitate the routing of outbound messages from the outbound JMS queue to its destination or from an invocation channel directly to its destination. The endpoint and handler combination contains the protocol client and the necessary data to identify the specifics of communicating with that destination, such as a URL.

The outbound queue cron task process or invocation channel invokes the handler and passes the message body and the metadata properties to it. The handler uses the metadata properties to determine the external system (for a publish channel message only) and override values for the configured endpoint properties. The handler then sends the data to the destination specified by the endpoint with which the handler is associated (Table 2-3 on page 55).

An endpoint represents an application component to which the system delivers outbound transactions. The system provides the following predefined endpoints.

Table 2-3 Predefined endpoints

Endpoint	Handler	Description
MXFLATFILE	FLATFILE	Writes flat files to a previously specified directory location
MXIFACETABLE	IFACETABLE	Writes outbound transactions to local interface tables
MXXMLFILE	XMLFILE	Writes XML files to a previously specified directory location
MXCMDLINE	CMDLINE	Implements the CMDL handler, takes a command and an endpoint as input, and uses the SSH protocol to securely invoke the command on the target system and return the results

The configuration of an endpoint involves the definition of the endpoint, the association of a handler to the endpoint, and setting the handler properties, if any, for that endpoint.

An endpoint is an instance of a handler with specific properties that the handler needs in order to connect and send outbound data.

You can use the predefined handlers or create new handlers that enable physical entities, such as File Transfer Protocol (FTP) servers, for which predefined handlers do not exist. You must define the handler before you define the endpoint. You configure endpoints and handlers in the Endpoints application.

To access the Endpoints application (Figure 2-25 on page 56), select **Go** → **Integration** → **EndPoint**.

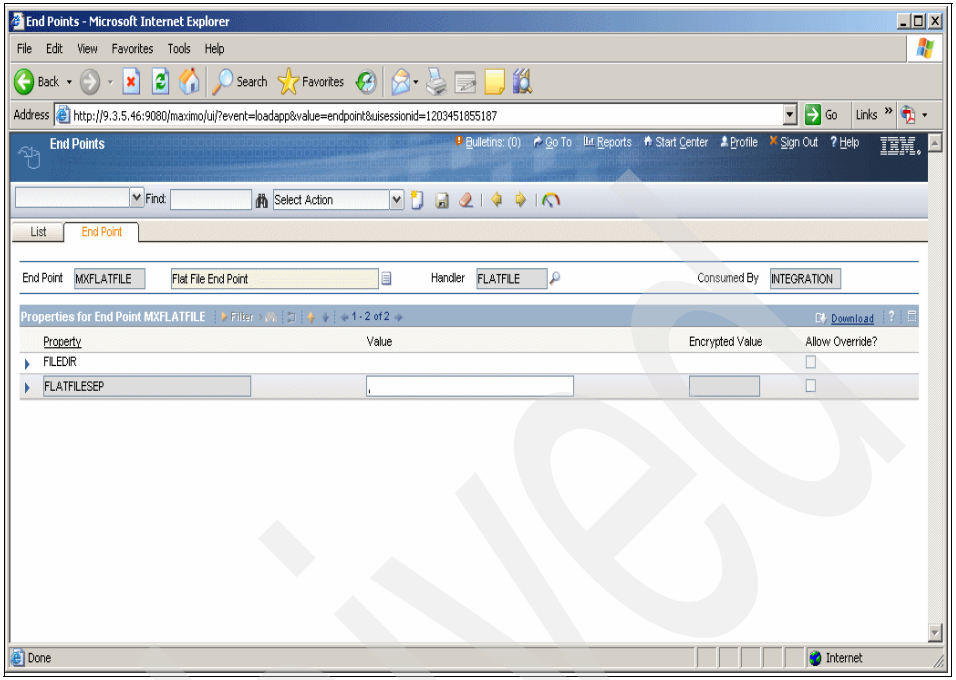


Figure 2-25 Endpoints interface

Handlers

In this section, we describe the predefined handlers and their required and optional properties. The system provides the following predefined handler types, which you can access through the Select Action menu in the Endpoints application:

- EJB
- FLATFILE
- HTTP
- IFACETABLE
- JMS
- WEBSERVICE
- XMLFILE
- CMDLINE

The *EJB handler* is a Java component that delivers system data (Table 2-4) to an EJB executing on the local application server or on a remote application server.

Note: If the EJB is on a remote application server, the remote and home classes of the EJB must be available on the local application server. For more information, refer to the documentation for your application server.

Table 2-4 shows the EJB handler's properties.

Table 2-4 EJB handler properties

Property	Description
CONTEXTFACTORY	This required property specifies a Java Two Platform, Enterprise Edition (J2EE™) context. Refer to the documentation for your application server for the name of the default context factory.
EJBEXIT Property	This optional property is used for customization. It specifies the fully qualified name of a custom Java class that implements the EJBExit interface. If you do not specify a value for this property, the system executes the default exit, DefaultEJBExit, which attempts to resolve the EJB's method signature and parameters.
JNDINAME	This required property specifies the name by which the EJB is registered in the application server Java Naming and Directory Interface (JNDI) tree.
METHODNAME	This required property specifies the public business method exposed by the EJB that is invoked through this handler.
PROVIDERURL	This required property specifies the URL that provides access to the EJB component.
USERNAME and PASSWORD	If access to the EJB requires a user name and password, these properties specify those values. The user name must match the value that was configured during the definition of Users and Groups in the application server.

The *FLATFILE handler* converts outbound data from the queue into a flat file and writes it to a directory whose location is configurable. Flat files contain ASCII data in the form of rows and columns. Each line of text constitutes one row, and a separator separates each column in the row.

The FLATFILE handler encodes outbound flat files in the standard UTF-8 format, and the Data Import mechanism assumes that inbound flat files are encoded in UTF-8 format.

Note: You can only use the FLATFILE handler with Publish Channels, not Invocation Channels.

The FLATFILE handler naming convention is:

- File names have the following format:

  *externalsystemname_publishchannelname_uniqueidentifier.*DAT

  where:

  – *externalsystemname* is the identifier of the system (the value of MAXVARS.MXSYSID).

  – *publishchannelname* is the name of the publish channel.

  – *uniqueidentifier* is a number based on the current system time.

The FLATFILE handler (Table 2-5) has the following properties.

Table 2-5 FLATFILE handler properties

Property	Description
FLATFILEDIR	This required property specifies the location of the flat file. The location must already exist on the local machine where the application server is executing or on a shared network drive.
FLATFILESEP	This required property specifies the character that separates the columns in each row.

The *HTTP handler* is a Java component that delivers data (Table 2-6) as an XML document to a URL using HTTP or HTTPS protocols and evaluates the response code received from the external system.

The HTTP handler has the following properties.

Table 2-6 HTTP handler properties

Property	Description
HTTPEXIT	This optional property is used for customization. It specifies the fully qualified name of a Java class that interprets the HTTP response. An external system might require additional code to interpret the HTTP response, and this exit lets users implement the necessary code. The Java class must be available in the classpath specified for the application server or the application enterprise archive (EAR) file.
URL	This optional property specifies a valid URL to which XML data can be posted. It is expected that a response is generated whenever an HTTP POST is performed upon this URL.
USERNAME and PASSWORD	If the URL requests basic authorization, these properties specify the required values. The system encodes both values and passes them to the URL. For more information about basic authorization for HTTP, refer to the documentation for your HTTP server.
CONNECTTIMEOUT	This optional property specifies the connection timeout value in milliseconds.
READTIMEOUT	This optional property specifies the read timeout value in milliseconds.
HTTPMETHOD	This optional property specifies the HTTP method to use. The allowed values are POST and GET, and the value defaults to POST if no value is specified.

The *IFACETABLE handler* writes data from an outbound queue to an interface table in a local or remote database. There are no Java exits (Table 2-7) for this handler. The IFACETABLE handler has the following properties.

Table 2-7 IFACETABLE handler properties

Property	Description
ISREMOTE	This required property specifies if interface tables are available in the local system database in the system schema or in a different schema. Its value can be 0 (zero) or 1. A value of 0 (false) indicates that the interface tables are available in the local system database in the system schema. You do not have to enter any other handler properties. For the predefined MAXIFACETABLE handler, the value of this property is 0. A value of 1 (true) indicates that the interface tables are in a remote database. If so, you must specify the values for all of the handler properties.
DRIVER	This property specifies the JDBC driver to be used to connect to a remote database containing the interface tables. This property applies only when the value of ISREMOTE is 1.
URL	This property specifies the JDBC URL that indicates the location, port number, and database name. This property applies only when the value of ISREMOTE is 1. For example: jdbc:db2://mea6:5000/MERLIN
USERNAME and PASSWORD	If access to the database instance requires a user name and password, these properties specify those values. These properties apply only when the value of ISREMOTE is 1.

The *JMS handler* is a Java component that delivers XML data into a messaging system that has been enabled through JMS. Depending on the messaging model that you implement, messages are placed in a virtual channel called a *queue* or *topic*.

In the point-to-point messaging model, messages are generated by a sender and placed in a queue. Only one receiver can obtain the message from the queue. In the publish-subscribe messaging model, messages are generated by a publisher and placed in a topic. Multiple subscribers can retrieve the message from the topic. The messaging system that is discussed in this section represents a queue or topic that is available in the local application server, a remote application server, or a remote dedicated queuing system, such as IBM MQSeries®. To use this handler, all of these messaging systems must be enabled through JMS (Table 2-8 on page 62).

For more information, refer to the documentation for the application server.

Note: The messaging system that is discussed in this section is distinct from the standard internal queues used by the system. The standard internal queues reside in the local application server where the system is executing.

The JMS handler has the following properties.

Table 2-8 JMS handler properties

Property	Description
CONFACTORYJNDINAME	This required property specifies a Java object that is used to manufacture connections to a Java Message Server provider. Before directly connecting to a queue or topic, the system must first obtain a reference to a queue or topic connection factory. Application servers usually provide a default connection factory. However, implementing your own connection factory lets you tune the resource attributes and properties to suit your implementation. In this case, use the following value for this property: jms/mro/int/qcf/intqcf
DESTINATIONTYPE	This required property specifies the JMS entity (queue or topic) to which the message is delivered.
DESTJNDINAME	This required property specifies the name by which the JMS queue or topic is registered in the application server's Java Naming and Directory Interface (JNDI) tree.
CONTEXTFACTORY	This required property specifies a J2EE context. Refer to the documentation for your application server for the name of the default context factory.
ISCOMPRESS	This required property specifies whether the message is compressed before being placed into a queue or topic. *Compression* is an optimization technique that delivers smaller messages to a queue or topic. Note: Compressed messages must be decompressed after receipt. Decompress the messages by creating the appropriate JMS receiver or subscriber component and placing Java decompression logic within the receiver or subscriber. Use the standard Java Inflater() class that is part of the java.util.zip package. The system-provided compression uses the standard Java Deflator() class.

Property	Description
JMSEXIT	This optional property is used for customization. It specifies the fully qualified name of a Java class that extends the JMSExit interface. The Java class must implement the getMessageProperties() method that is defined in the JMSExit interface. This option lets you change or add header information in the JMS message. If this property does not contain a value, the header attributes for the message are not changed when the message is delivered to the external queue or topic.
PROVIDERURL	This required property specifies a local or remote URL where the JMS component can be accessed. It can be local or remote.
PROVIDERPASSWORD	If the application server controls access to the JMS resource, these properties specify the user name and password that are needed to connect to the resource.
USERNAME and PASSWORD	If the application server controls access to the JMS resource, these properties specify the user name and password needed to connect to the resource. The user name must match the value configured during the definition of Users and Groups in the application server. For more information, refer to the documentation for your application server.

The *WEBSERVICE handler* is a Java component that invokes a specified Web service with system data as a SOAP request parameter. This handler is a Dynamic Invocation Interface (DII) using the JAX-RPC API. It supports a document-literal type Web service.

The Webservice handler has the properties that are listed in Table 2-9.

Table 2-9 WEBSERVICE handler properties

Property	Description
ENDPOINTURL	This required property specifies a valid Web service URL on which to invoke the document-literal style Web service. You can use the WSEXIT class to override the endpoint URL just before the Web service is invoked.
SERVICENAME	This optional property specifies the name of the Web service deployed in the URL. If you do not provide a value, the system uses the interface name in the XML. You can use the WSEXIT class to override the service name just before the Web service is invoked.
SOAPACTION	This optional property specifies the value of the SOAPAction HTTP header to be used while invoking the Web service. If you do not provide a value, the system uses the default value (an empty string). You can use the WSEXIT class to override the value that is specified in the user interface just before the Web service is invoked.
USERNAME and PASSWORD	If the specified Web service is secured (that is, if HTTP basic authentication is enabled), specify a user name and password. The system encodes the password.
WSEXIT	This optional property is used for customization. It specifies the fully qualified name of a custom Java class that implements the psdi.iface.router.WSExit interface.

Property	Description
HTTPCONNTIMEOUT	This optional property specifies the connection timeout value in milliseconds. If nothing is set, the default value is 60000 milliseconds.
HTTPREADTIMEOUT	This optional property specifies the read timeout value in milliseconds. If nothing is set, the default value is 60000 milliseconds.
CFGXMLPATH	This property specifies the path to the configuration XML file.
MEP	This optional property specifies the message exchange pattern for the Web service. Valid values are fireandforget, sendreceive, sendrobust, and null. If you do not provide a value, the system uses the default value sendreceive: ► sendreceive - Request/Response ► sendrobust - Request with void or fault response ► fireandforget - Request only. No response or fault.
HTTPVERSION	This optional property specifies the version of the HTTP protocol to be used for the Web service invocation. The valid values are "HTTP/1.0" and "HTTP/1.1". If no value is specified, it defaults to "HTTP/1.1".

The *XMLFILE handler* is a Java component that converts data in the outbound queue into an XML file format and then delivers it to the xmlfiles directory within the global directory. You define the global directory (Table 2-10) through the mxe.int.globaldir property in the System Configuration application.

Table 2-10 XMLFILE handler properties

Property	Description
PRETTYPRINT	This required property specifies whether the handler “pretty prints” the XML file. The valid values are 0 and 1. A value of 1 indicates for the handler to pretty print the xml file.
FILEDIR	This optional property specifies the folder location where the handler creates XML files. If no value is specified, the handler defaults this property to the value of <*mxe.int.globaldir*>/xmlfiles. You define the global directory through the mxe.int.globaldir property in the System Configuration application.

File names have the following format:

*externalsystemname_publishchannelname_uniqueidentifier.*xml (for publish channel)

*invocationchannelname_uniqueidentifier.*xml (for publish channel)

where:

- *externalsystemname* is the identifier of the system (the value of MAXVARS.MXSYSID).
- *publishchannelname* is the name of the publish channel.
- *invocationchannelname* is the name of the invocation channel.
- *uniqueidentifier* is a number based on the current system time.

The *CMDLINE handler* is a handler that takes a command and an endpoint as input. The CMDLINE uses the SSH protocol to securely invoke the command on the target system and return the results.

The metaData parameter passed during the invocation of the handler is a map that contains, among other things, the name of the endpoint that represents the target system. Passing the endpoint to the Command Handler allows the caller to

target any system at run time, using whatever configuration exists for that endpoint at the time of invocation.

Table 2-11 shows the CMDLINE handler properties.

Table 2-11 CMDLINE handler properties

Property	Description
CMDTIMEOUT	Timeout value for command execution
CONNTIMEOUT	Timeout value for connection
USERNAME	User name for connection
PASSWORD	Password for corresponding user name
HOST	Host name of target where command is to be executed
PORTNO	Port number of target where command is to be executed
IGNORESETUPERR	Boolean to ignore an error executing the **Setup** command
RETRYINTERVAL	Time to wait before retrying a command
MAXRETRY	Number of attempts to execute a command before returning an exception
SSHEXIT	A Java exit class that can be implemented to customize processing of the handler

The data parameter is a byte array representation of an XML document that contains tags corresponding to the **setup** command, the working directory, the command to invoke, and any substitution parameters.

Table 2-12 on page 68 shows the tags.

Table 2-12 Tags

Tag	Description
CLWORKINGDIR	A directory to which to change (**cd**) on the remote system before the command is invoked. If this tag is nonexistent or empty, no directory change is performed.
CLSSETUPCMD	A **setup** command is to be invoked prior to the main command. This tag is provided to allow for any environmental setup that must occur on the remote system before the main command is issued. If this tag is nonexistent or empty, no **setup** command is issued.
CLCMDPATTERN	A string that defines the pattern of the command to be invoked. The format of this pattern is similar to that used by the java.text.MessageFormat class. An example is “ls -l {0}”, where {0} represents a parameter that is substituted.
CLSUB0	The value that is to be substituted into positions marked by {0} in the CLCMDPATTERN.
CLSUB1	The value that is to be substituted into positions marked by {1} in the CLCMDPATTERN.
CLSUB*n*	The value that is to be substituted into positions marked by {*n*} in the CLCMDPATTERN. In general, there must be a CLSUB*n* corresponding to each substitution position in the CLCMDPATTERN.

The return byte array representation of an XML document contains the results of the command invocation. It contains tags corresponding to the return values: STDOUT and STDERR.

Table 2-13 on page 69 shows the return value tags.

Table 2-13 Return value tags

Tag	Description
CLRETURNCODE	The return code from the remote command
CLRESPONSEOUT	The data returned by the remote command in stdout
CLRESPONSEERR	The data returned by the remote command in stderr

External systems

Any business application that sends data to the system or receives data from the system is an *external system*. External systems let you synchronize external data through an endpoint (location) and internal data through an external source.

You can use the External Systems application to perform the following functions:

- Name the external applications or systems that exchange data with the Integration Framework
- Specify how the Integration Framework exchanges data with the defined systems
- Identify the specific Publish Channels and Enterprise Services process between the Integration Framework and each system
- Create interface tables

To create an external system, you specify an end point, queues, and integration control values in the external system record. You also can define the properties on the external system.

The endpoint identifies how and where the Integration Framework exchanges data with the system:

- The JMS queues that the system uses.
- Whether the external system is ready to begin integration processing.
- The Integration Framework can exchange data with one or more external systems.

To access the External Systems application (Figure 2-26 on page 70), select **Go** → **Integration** → **External Systems**.

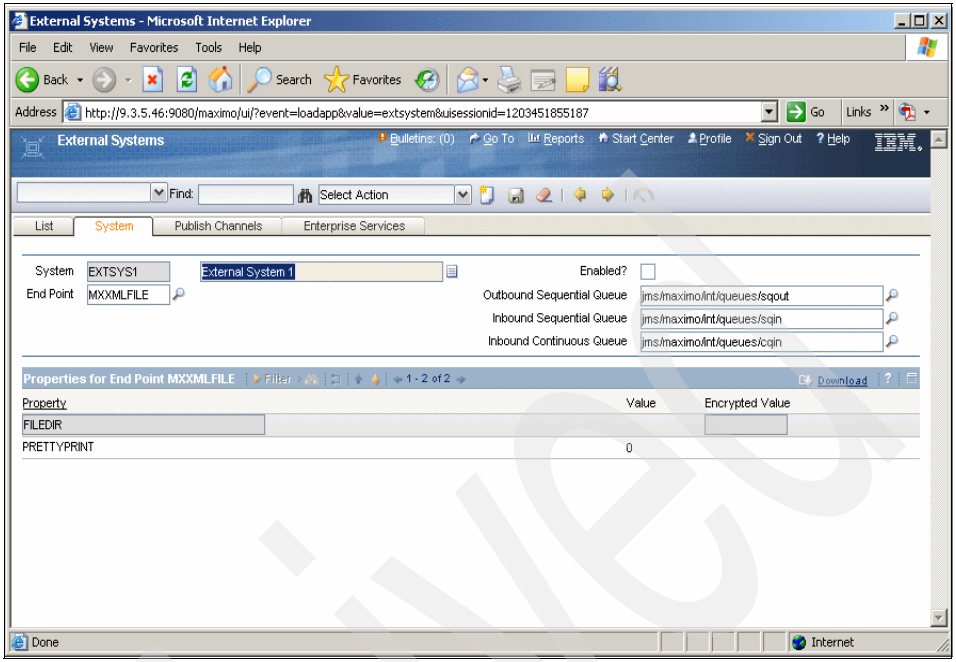


Figure 2-26 External systems interface

Logical Management Operations

Logical Management Operations (LMOs) define an action, such as Get Status or Deploy Software. LMOs identify actions that integration modules (IMs) support and for PMPs to request. The LMO acts as an interface between the PMP and IM; you can design and develop these entities to be independent of each other. The LMO defines the action and the data, which is required to support that action. You can install an LMO definition with the installation of an IM. You also can define an LMO definition using the LMO application. The LMO definition includes:

- Name: Name of the action
- Invocation Pattern

  There are four types of invocation patterns:

  - Synchronous: The PMP issues a request, and the IM returns the results of the operation.
  - Asynchronous one-way: The PMP issues a request, and there is no response.

- Asynchronous deferred response: The PMP issues a request, and the IM returns a token that the PMP can pass as input on another LMO. The PMP passes the token at a later time to obtain the status of the original action.
- Asynchronous call back: The PMP issues a request, and the IM returns an optional token that the target uses to report the results of the request. A call back by the OMP to the PMP, possibly using the IM, can insert or update a business object using the token.

- Source Business Object: Input object for the LMO
- Response Business Object: Output object for the LMO
- Business Object Attributes: Specific attributes of the objects that are needed either for input or output and their data types

To access the LMO application (Figure 2-27), select **Go** → **Integration** → **Logical Management Operations**.

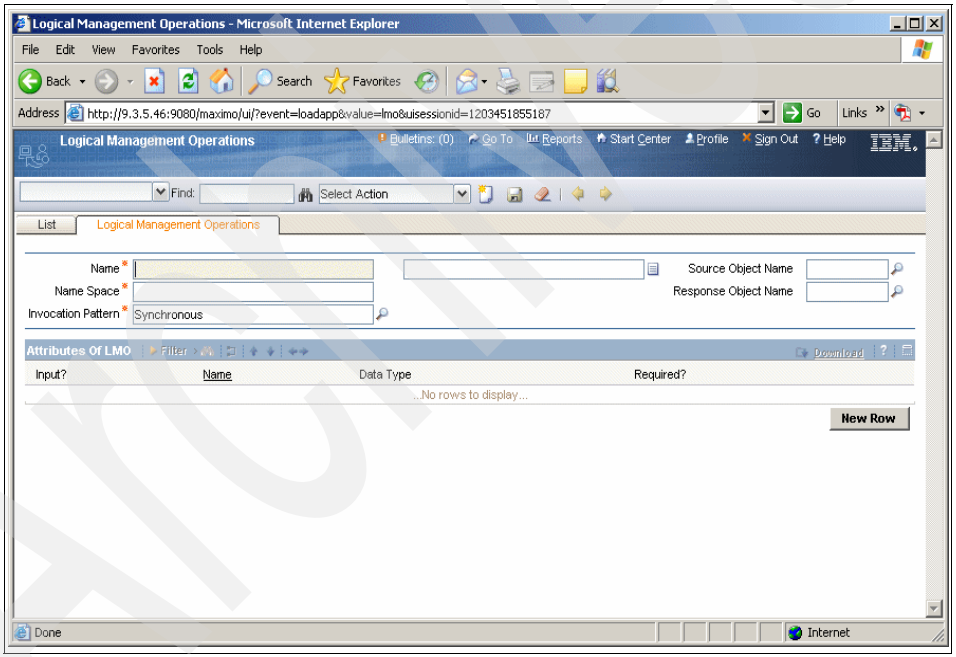


Figure 2-27 LMO interface

Integration modules

You can create *integration modules (IMs)* to assist PMP processes in automating actions. You implement actions, such as Deploy Software, using the Tivoli Provisioning Manager (TPM) OMP. An IM can support multiple LMOs for an

OMP. You can configure and view your installed IM definitions in the Integration Modules application.

IM processing is responsible for converting the LMO into the OMP-specific interface. If the system returns a response to the IM, it converts the response to an OMP response. The OMP response then returns data that is defined by the LMO.

Typically, there is a one-to-one correspondence between an LMO and an OMP function. However, your single LMO invocation can result in one or more IM functions being invoked on an OMP.

You can implement an IM through a Java class or an invocation channel. The underlying IM implementation (Java class or Invocation Channel) is transparent to the PMP.

The IM definition includes:

- The LMOs supported by the IM
- The OMP products that the IM supports, including specific LMOs supported for specific IMs
- Optional properties that you can configure as part of an implementation to control IM behavior
- IM implementation as either a Java class or an invocation channel

To access the Integration Modules application (Figure 2-28 on page 73), select **Go** → **Integration** → **Integration Modules**.

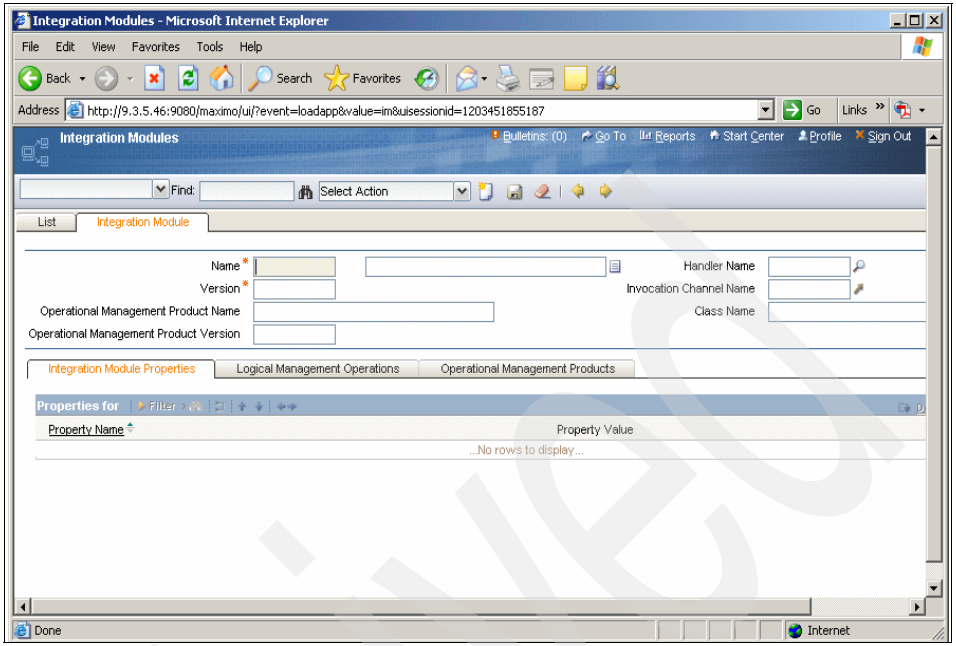


Figure 2-28 Integration modules interface

Launch in Context

In certain cases, your PMP integration to an OMP might not use an automated solution through an IM. Instead, your integration can use an assisted approach through a *Launch in Context (LIC)*. Using an assisted approach lets you navigate from a PMP application UI to an application UI of the OMP. The context represents the data that you pass from the PMP, such as the software identifier and the CI for which the software deployment applies.

Note: Although this discussion is specific to OMP launches, LIC capabilities can apply to any external application launch.

A LIC requires:

- Configuration of a PMP application to have a UI control that is tied to a registered launch entry (push button or Select Action menu items)
- A proper security assigned to it (limit users' and user groups' access to the control)
- Registered launch entries that are configured to the applicable OMP applications

Launch entry definitions include:

- The OMP product that the launch can support
- The URL of the OMP product application
- Whether the launch opens a new browser session or uses the existing window
- The business objects to which the launch entry is specific (optional)

  Note: A launch entry might support a single or multiple business objects.

- The classifications supported by the launch entry

  Note: For business objects that support classifications, this requirement can limit your URL access to the data that contains the same classification that you configured on the launch entry. For example, a launch entry that has a classification value of “Server” is available to you in the CI application if the CI that you view has a classification value of “Server.”

The LIC provides additional capabilities:

- The URL can contain substitution variables that use data from the business object that you view in the application. For example, you can substitute a CI number into the URL string. Your substitution can take place only if the OMP application URL supports your substitution value. You can use this feature when you launch into any application, not just OMPs.
- Specific to OMP integration, you can substitute a host name instance from the registered OMP data within the system.
- Specific to OMP integration for a CI, you can retrieve the source token of the CI for the specific OMP. The source token is the CI identifier that the OMP product understands. If managed by multiple OMPs, a CI might have multiple source tokens.

To access the Launch in Context application (Figure 2-29 on page 75), select **Go** → **Integration** → **Launch in Context**.

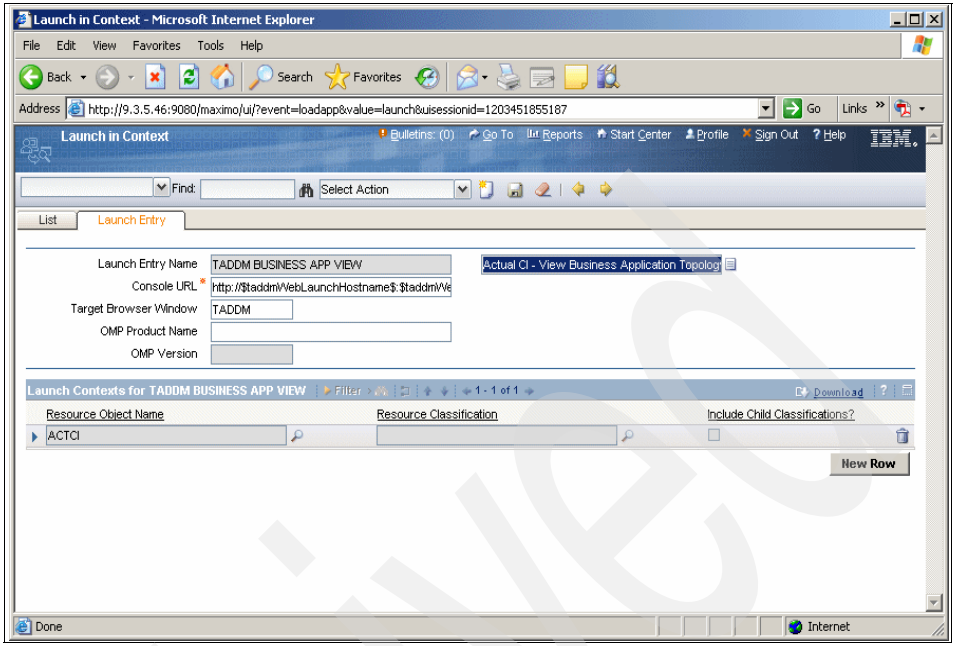


Figure 2-29 Launch in Context interface

Message tracking

In this section, we discuss how the Integration Framework tracks messages while processing publish channels (outbound messages) and enterprise services (inbound messages) and how system administrators work with the displayed messages. It contains the following subsections:

- Message details
- Message tracking configuration
- Message statuses
- Message events

Message details

The Message Tracking application tracks and displays the processing history of queue-based inbound (Enterprise Services) and queue-based outbound (Publish Channels) messages.

The Message Tracking application works with the Message Reprocessing application. Through the Message Tracking application, you can determine which messages are flagged with an error. You then can select a specific failed message and get redirected to the Message Reprocessing application to take appropriate action to correct erroneous data.

When you enable message tracking, the Integration Framework writes all processed messages to the MAXINTMSGTRK table. The system assigns a status to each message, which represents its current position in the Integration Framework queue-based processing cycle. The system also displays individual message events in the Message Details table window.

Table 2-14 shows the values that are assigned to the noted attributes based on the originating enterprise service or publish channel.

Table 2-14 Predefined attributes

Attribute	Description
Integration Mode	Name of the integration mode that is used in processing the message. For inbound messages, the system assigns a MXJMS default value. For outbound messages, the system assigns the name of the endpoint used in processing the message.
Operation	Operation value that determines the processing operation that the system applies to the message (publish).
System	External system value.
Integration Component	Name of enterprise service or publish channel.
Adapter	Adapter name.
Queue Name	Name of queue that is used by the Integration Framework to process the message.

Table 2-15 shows the values that are assigned to the noted attributes at the time that the transaction record is created.

Table 2-15 Assigned attributes

Attribute	Description
Received Datetime	The date and time that the message is received in the queue
External Message ID	Unique message identifier that is assigned by an external application
Search ID	Unique message identifier that the Integration Framework assigns

Table 2-16 shows the values that are assigned to the attributes that are dynamic and the changes based on the transaction events.

Table 2-16 Dynamic attributes

Attribute	Description
Current status	Most current processing status that is associated with the tracked message
Status	The status that is associated with the individual message event in the transaction history
Status date	The status date that is associated with the individual message event in the transaction history
Error	The error message that is associated with the individual error message event in the transaction history

Message tracking configuration

You can maintain a record of processing actions that are associated with publish channels or enterprise services. The Message Tracking action in the Publish Channels and Enterprise Services applications lets you track transactions and perform the following functions:

- Enable or disable transaction tracking
- Store transaction messages on the application file server
- Identify data that is used by the Message Tracking application search function
- Identify transactions by a unique ID value through an XPATH expression
- Identify XPATH expressions to let you search for a message

For the enable or disable transaction tracking function, you can maintain a record of processing actions that are associated with an enterprise service or a publish channel. To do so, select the Enable Message Tracking? check box in the Message Tracking dialog box. You access the Message Tracking dialog box from the Select Action menu in the Publish Channels and Enterprise Services applications.

In the Message Tracking application, you can use the External Message ID attribute to locate specific messages. In order to do so, an XPATH expression must be entered in the External Message ID field in the Message Tracking dialog box. You can set this value in the Publish Channels and Enterprise Services applications. The syntax that you use to identify the node values must be a fully qualified XPATH expression.

The Message Tracking action allows you to use an XPATH expression to specify the location of your message identifier in the inbound XML. The Integration Framework assigns an internal message identifier to guarantee uniqueness in the messages that are being tracked. The system stores the external message identifier as the EXTMSGIDFIELDDATA attribute in the MAXINTMSGTRK table.

In the event of receiving a multi-noun inbound message, the Integration Framework uses the enterprise service External Message ID XPATH as the identifier of the message. If the path expression points to an element included in each one of the nouns in the inbound message, the Integration Framework creates a multi-noun, comma-separated list of external identifiers.

Through the Advanced Search dialog box in the Message Tracking application, you can use the Search ID attribute to locate specific messages. In order to do so, an XPATH expression must be entered in the Search ID field in the Message Tracking dialog box. You can set this value in the Publish Channels and Enterprise Services applications. The syntax that you use to identify the node values must be a fully qualified XPATH expression.

The Message Tracking action allows you to use an XPATH expression to specify the location of an identifier in the inbound XML transaction. The XPATH expression enables you to perform efficient record searches. The system stores the search identifier in the SEARCHFIELDDATA field in the MAXINTMSGTRK table.

In the event of receiving a multi-noun inbound message, the Integration Framework uses the enterprise service Search ID XPATH as the search identifier of the message. If the path expression points to an element included in each one of the nouns in the inbound message, the Integration Framework creates a multi-noun, comma-separated list of search identifiers.

You can store the original message that you receive from an enterprise service or a publish channel definition. To store messages, select the Store Message? check box in the Message Tracking dialog box. You access the Message Tracking dialog box in the Select Action menu in the Publish Channels and Enterprise Services applications.

The system stores files in the msgdata folder in the system global directory. You define the global directory location in the mxe.int.globaldir system property, in the System Properties application.

The naming convention of the stored messages is: *ExternalSystemName_IntegrationComponent_UniqueId.*xml.

Message status

Every inbound and outbound queue-based message, which is registered in the Message Tracking application, has a status value that indicates its position in the transaction processing cycle (Table 2-17). The message tracking designated status indicates whether the message has been successfully received or processed. The message tracking designated status also indicates whether the message has been deleted or flagged with errors.

Table 2-17 Inbound message status

Status	Description
Error	Message processing failed due to validation issues.
Deleted	Message is deleted from the queue.
Processed	Message is successfully processed.
Received	Message is successfully written to the inbound queue.

Table 2-18 shows the outbound message status.

Table 2-18 Outbound message status

Status	Description
Error	Message processing failed due to validation issues.
Deleted	Message is deleted from the queue.
Processed	Message is successfully processed.
Received	Message is successfully written to the inbound queue.

Message events

The Message Tracking application tracks and displays inbound and outbound queue-based transaction processing events. Transaction processing events trigger the system to update the MAXINTMSGTRK table. The system updates the following message table attributes, according to event type:

- STATUS
- STATUDATETIME
- ERRORMSGR

Tracking inbound and outbound events

The following inbound and outbound events cause the system to update the MAXINTMSGTRK table:

- Message Written to Queue: The system creates a record in the message tracking table when the Integration Framework first writes the message to the queue. When the Integration Framework successfully writes the message to the queue, the system sets the message record status to RECEIVED.

  If the Integration Framework encounters an error when writing an inbound message to the queue, it replies to the process caller with a message detailing the cause of failure.

- Error in Message Processing: The system updates the existing record in the message tracking table in the event of a processing error. When the Integration Framework encounters a processing error, the system updates the message record status to ERROR. If you retry your message and a processing error is again identified, the system maintains the ERROR message status.

- End of Queue Processing: The following transaction processing events cause the system to update the existing record:

  - The system successfully completes the message processing and updates the message record status to PROCESSED. Because the processing cycle is complete, the system no longer applies further updates to the message tracking table.

  - If you delete the message from the queue, the system sets the message record status to DELETED. The system no longer applies further updates to the message tracking table.

To access the Message Tracking application (Figure 2-30 on page 81), select **Go** → **Integration** → **Message Tracking**.

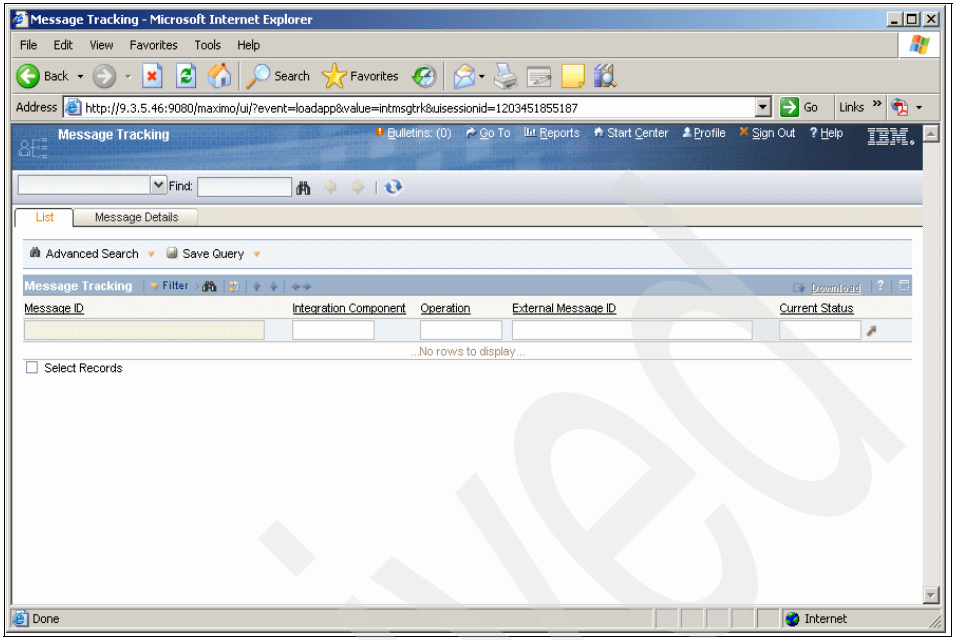


Figure 2-30 Message Tracking interface

Message Reprocessing

The Message Reprocessing application allows you to manage and view integration transaction messages that have been flagged with an error. Through the Message Reprocessing application, you can view the error Extensible Markup Language (XML) file without needing to gain access to the integration server error files.

The Message Reprocessing application works with the Message Tracking application and displays queue-based messages that failed any Integration Framework process validation. When you enable message tracking in either the Publish Channels or Enterprise Services applications, you can determine which messages are flagged with an error in the Message Tracking application. You then can take appropriate action to correct erroneous data in the Message Reprocessing application.

If you have not enabled message tracking, you can go directly to the Message Reprocessing application to check for transaction errors.

You can manage messages in the following ways:

- Change the message statuses to stop message processing or to reprocess a message

- Correct, process, save, or cancel the error XML file
- Delete the message from the database

To change the message status, you use the Change Status action in the Message Reprocessing application. The system designates a status to each message to indicate whether they are ready for processing.

Messages can have the following statuses (Table 2-19).

Table 2-19 Message statuses

Status	Description
Retry	Indicates that the message is ready to be reprocessed by the system
Hold	Indicates that the message is not ready to be reprocessed by the system

The RETRY status is the default status for messages that have been flagged with an error. Until you correct the processing problem, the system continues to reprocess and encounter errors with the applicable transaction.

You can halt message reprocessing by changing the message status to HOLD. Assigning a hold status prevents the system from automatically reprocessing the flagged message and from updating the system database tables.

For error correction, you use the Message Details dialog box in the Message Reprocessing application to view the message details and to manually change the contents of a message in error. You can choose to process or save your XML changes. You also can choose to cancel the error XML file changes.

Note: You only can edit a message if it is in a HOLD status. If the message has a RETRY status, the error data content is read-only.

For error details, when you select the Message Details icon for each listed error, the Message Details dialog box opens and displays the error XML file.

Example 2-3 on page 83 is an example of an error XML file that is displayed in the Message Details dialog box. It contains the following information:

- The error message in the ERRORMESSAGE element
- The message from the queue in the ER element
- The object structure XML in the IR element

The IR element is present only for inbound transactions, and only if enterprise service processing and user exit processing (Example 2-3) are successfully applied to the message. It represents the object structure that was created during enterprise service or user exit processing (or both).

Example 2-3 Example of an error xml file

```
<?xml version="1.0" encoding="UTF-8"?>
<ERROR>
   <ERRORMESSAGE>Error occurred while processing PO (Object
   Structure number 1). Error is:[system:unknownerror] An unknown
   error has occurred. Contact your system administrator for
   assistance. null</ERRORMESSAGE>
   <ER>
         <SyncMXPO xmlns="http://www.ibm.com/maximo"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         creationDateTime="2007-05-22T14:04:03-04:00"
         transLanguage="EN" baseLanguage="EN"
         messageID="11798570432187483" maximoVersion="7 1 Harrier 038a
         HARRIER-042" event="1" messageid="11798570432652428">
         <MXPOSet>
         <PO action="Update">
         .
         .
         .
         </PO>
         </MXPOSet>
         </SyncMXPO>
   </ER>
   <IR>
      <SyncMXPO xmlns="http://www.ibm.com/maximo"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      creationDateTime="2007-05-22T14:04:03-04:00"
      transLanguage="EN" baseLanguage="EN"
      messageID="11798570432187483" maximoVersion="7 1 Harrier 038a
      HARRIER-042" event="1" messageid="11798570432652428">
      <MXPOSet>
      <PO action="Update">
      .
      .
      .
      </PO>
      </MXPOSet>
      </SyncMXPO>
   </IR>
</ERROR>
```

Note: The ER element in an error file that was created for inbound messages from interface tables or flat files has a flat (non-hierarchical) structure.

Only the <ER> element can be edited; the <IR> element is provided for information only, and any change to the <IR> is ignored when the message is reprocessed.

To process a message, when you have completed your error XML changes in the Error Data window, you can choose to resubmit the message by selecting the Process option. The Message Details dialog box closes, and the application starts reprocessing the message.

If the system successfully processes the message, it performs the following actions:

- Deletes the error file
- Deletes the record in the MAXINTERRORMSG table
- Updates the DELETEFLAG, CHANGEBY, and CHANGEDATE attributes in the MAXINTERROR table

The application refreshes the result set and omits the successful message listing on the main tab of the Message Reprocessing application.

If the system does not successfully process the message, it performs the following actions:

- The MAXINTERRORMSG table is updated with the new error.
- Updates the CHANGEBY and CHANGEDATE attributes in the MAXINTERROR table.
- Opens an "`Error encountered in processing transaction`" error.

The application refreshes the result set and displays the new error for the unsuccessful message listing on the main tab of the Message Reprocessing application.

Save the message

When you have completed your error XML changes in the Error Data window, you can choose to save the message by selecting the Save option. The Message Details dialog box closes, and the application saves your XML changes.

The system saves the message and updates the CHANGEBY and CHANGEDATE attributes in the MAXINTERROR table.

Cancel the message

When you have edited your error XML file, you can choose not to proceed with the message changes by selecting the Cancel option. The Message Details dialog box closes, and the application cancels your XML changes.

When the system cancels the message, it does not perform any system database updates. The error XML file remains in its original state.

Message deletion

You use the Delete Message action in the Message Reprocessing application to delete a message from a queue, if necessary.

Important: After you delete a message, the system cannot reprocess it. When the system deletes the message, it deletes the record from the MAXINTERRORMSG and MAXINTERROR tables.

The application refreshes the result set and omits the deleted message listing on the main tab of the Message Reprocessing application.

Critical errors

Critical errors are transaction processing exceptions that the Integration Framework error correction process cannot retry. Transaction processing exceptions can occur when invalid data, such as a special character, is in the XML file. When the Integration Framework identifies a critical error, ER and IR sections in the corresponding (Figure 2-31 on page 86) error file are not present. To correct the critical error, remove the invalid data from the error XML. You can see invalid data associated with a critical error in the main tab of the Message Reprocessing application.

You can access the Message Reprocessing application by selecting **Go** → **Integration** → **Message Reprocessing**.

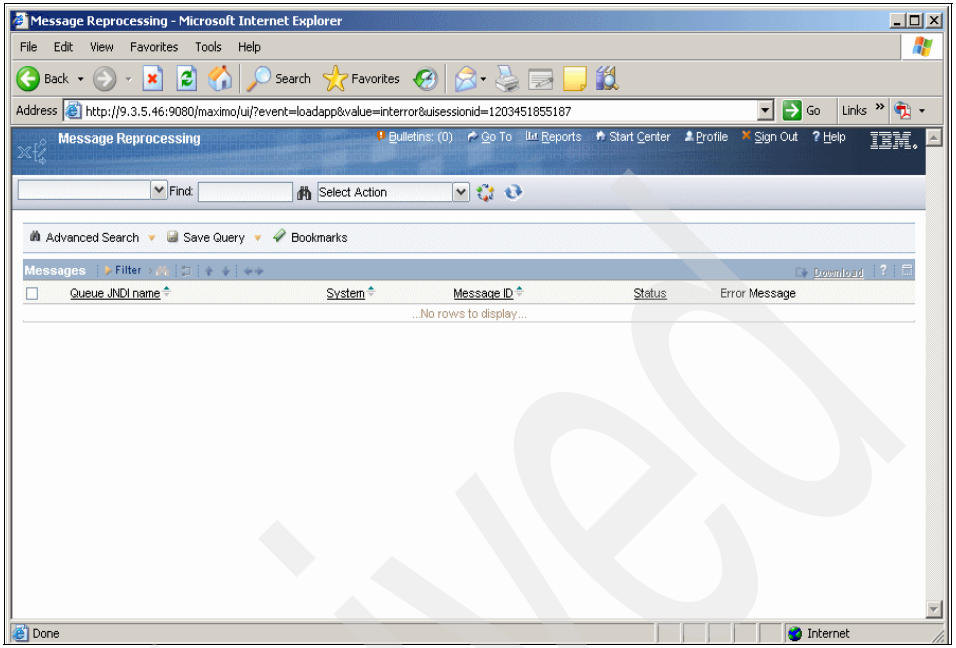


Figure 2-31 Message Reprocessing interface

2.4.4 Integration enhancements and changes from V6.*x* to V7.1

In this section, we provide information about enhancements and changes from MEA V6.*x* and Integration Framework MEA V7.1.

Changes to existing Version 6 MEA

The following changes have been made to the existing Version 6 MEA:

Integration Components	Integration components application changed to Object Structures
Integration Point	Integration Point is removed. Now, it is collapsed into the Object Structure.
Interfaces	The interfaces are split into outbound and inbound: The outbound interfaces are Publish Channels and the Inbound interfaces are Enterprise Services.

Integration Framework V7.1 (MEA) new features

Next, we list the new features of Integration Framework 7.1.

Invocation Channels

Integration Framework has been improved to support the synchronous invocation of an external service or application. The system also returns the response of the service back to the caller for subsequent processing (Figure 2-32). It can be initiated by the UI button, Escalation, or Work Flow.

Invocation channel provides the framework to:

- Transform Object Structure to service input.
- Associate an endpoint.
- Transform service response to Object Structure.

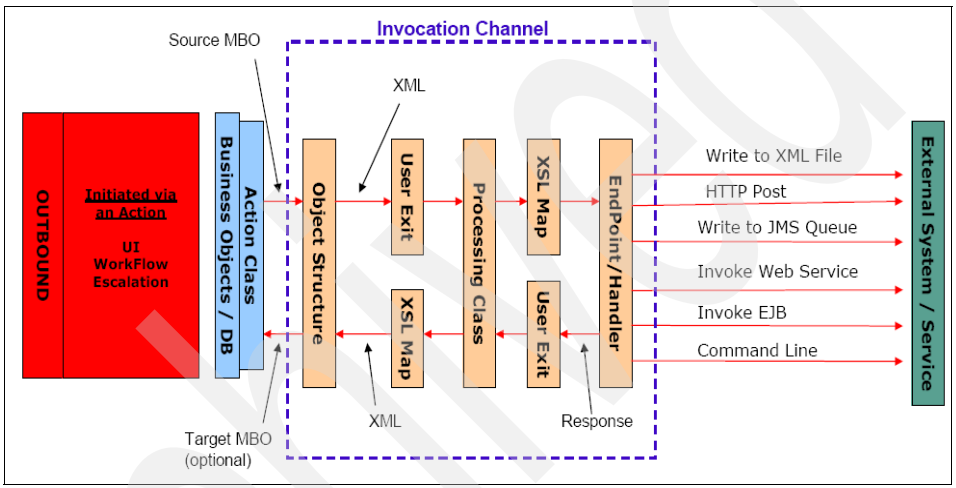


Figure 2-32 Invocation Channel

For detailed information about invocation channels, refer to Invocation channels on page 47.

Services

External applications can use Web services to query or to send transactions to the Integration Framework. The Integration Framework provides three types of services that you can choose to deploy as a Web service:

- Object Structure Service:
  - New feature in V7.1 (Figure 2-33 on page 88).
  - These services rely entirely on Object Structure definitions and do not utilize the exit processing available to Enterprise Services.
  - Requires less configuration because there is no Enterprise Service or External System required.

- Each Object Structure supports five operations (create, update, delete, sync, and query).
- The query operation provides object structure as the response content.
- The create operation provides the key of the top Maximo Business Object (MBO) of the object structure as the response content.

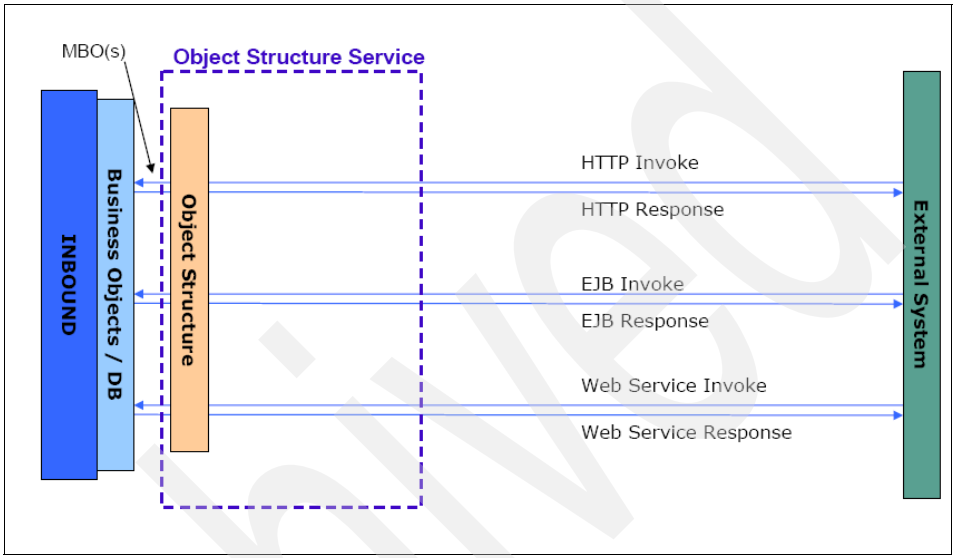


Figure 2-33 Object Structure Service

- Enterprise Service:
  - Replaces the 6.*x* inbound interfaces (Figure 2-34 on page 89).
  - Supports processing through the queue (async) or by bypassing the queue (sync).
  - The exit processing layer allows for mapping the external XML to the object structure XML for both the invocation and the response.
  - Enterprise Services are defined for a single operation.
  - The query operation provides object structure as the response content.
  - The create operation provides the key of the top MBO of the object structure as the response content.

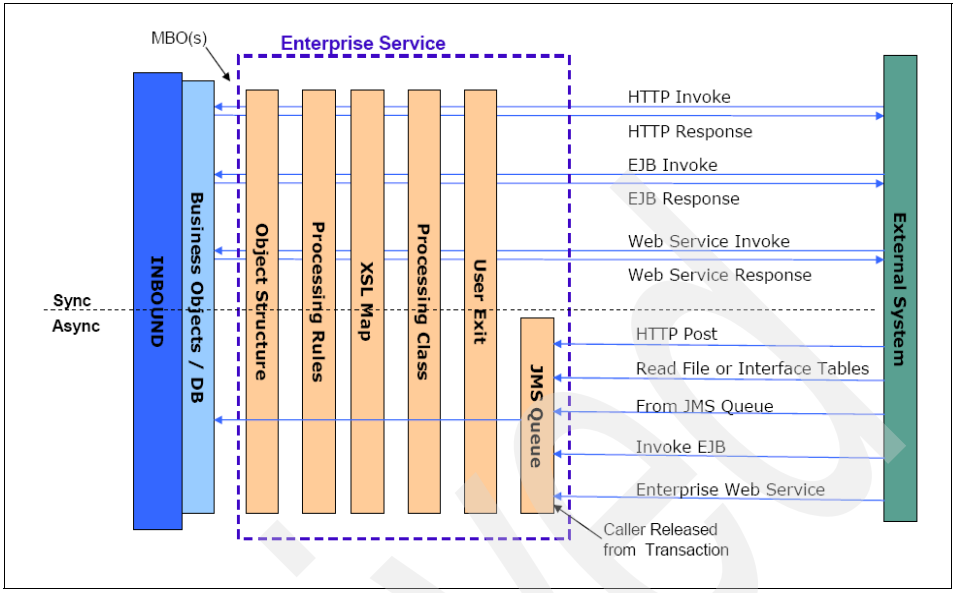


Figure 2-34 Enterprise Services

- Standard Service:
  - New in V7.1 (Figure 2-35 on page 90).
  - Created from annotated methods (such as changeStatus) in an MBO within an application service.
  - The inputs and outputs (if any) for these services are tied to the input and output parameters of the method.

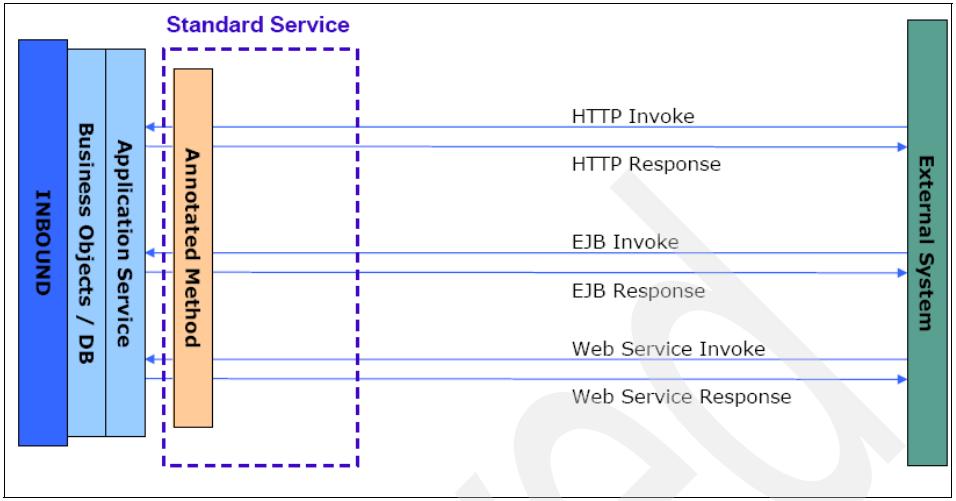


Figure 2-35 Standard Services

All services are accessible via HTTP, HTTPS, EJB, and Web Service (Figure 2-36).

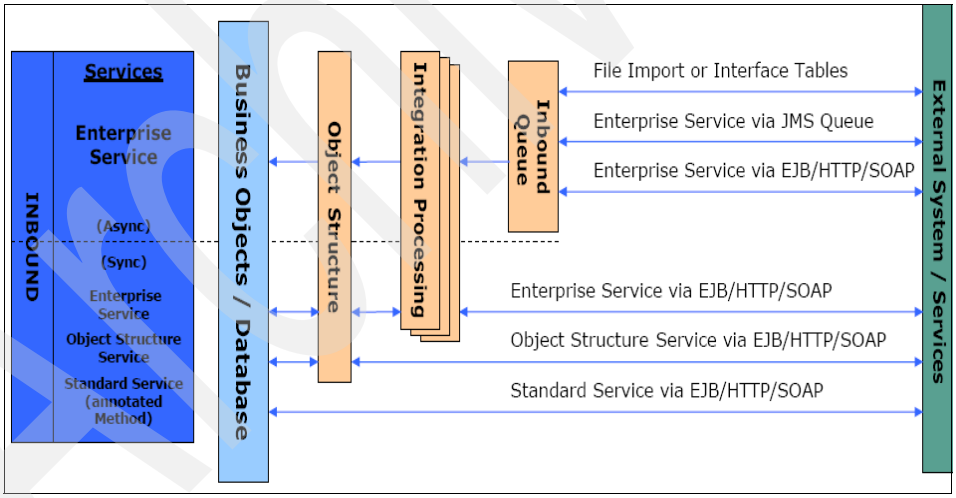


Figure 2-36 Services

For detailed information about services, refer to the Web Services Library on page 52.

Web Services Library

Web Services Library (Figure 2-37) is a new application in V7.1 to support the management and deployment of Web services for all three service classes.

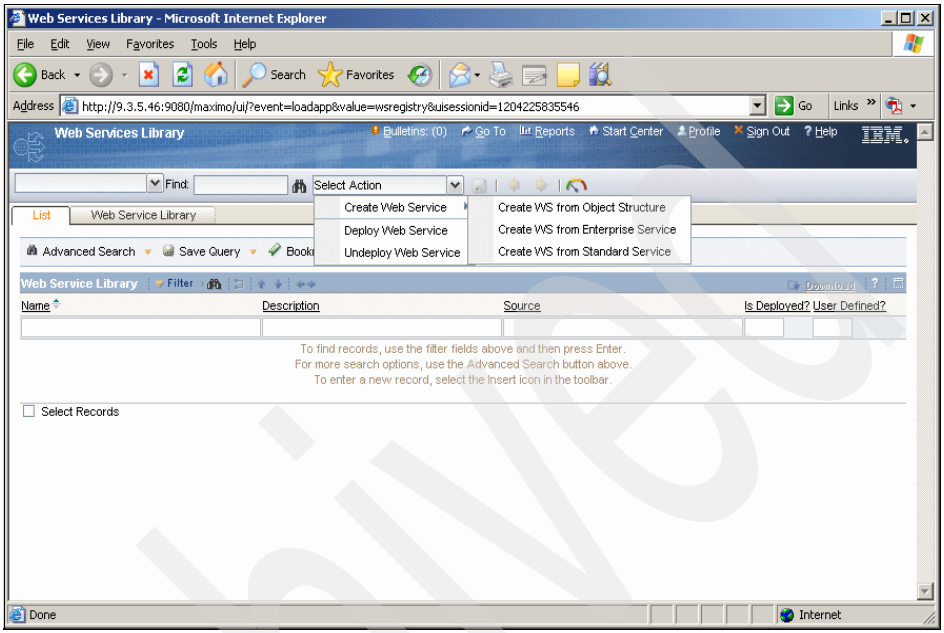


Figure 2-37 Web Services Library application

Figure 2-38 illustrates the Web Services Library architecture.

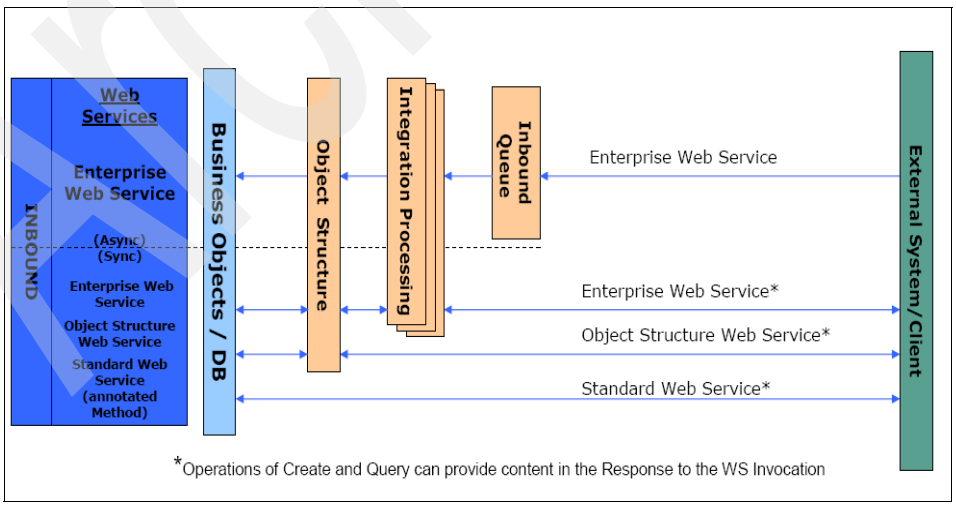


Figure 2-38 Web Services Library architecture

PMP and OMP integration

OMPs are external products (to the system) that provide services for CIs, such as a server that runs applications. PMPs are system applications and processes that use OMPs to automate IT-related services. These services include software deployment on CIs.

OMP integration supports:

- Assisted and automated approaches for PMPs, such as Change and Release, to integrate with OMPs, such as Tivoli Provisioning Manager (TPM).
- Maximo is fed updates of CIs, OMPs, and their relationships through the IMIC adapter from TADDM (discovery data).
- Integration Framework supports the installation and configuration of Integration Modules (IMs) and LMO.
- The PMP processes (UI, workflow, and escalations) invoke IMs to perform actions (LMOs) on CIs through OMPs. For example: Release PMPs invoke an IM to distribute software (LMO) on a server (CI) using TPM (OMP).
- The PMP application can also launch (UI) to an OMP application to support integration in an “assisted” model.

For detailed information about OPM integration, refer to Integration Framework for OMP integration on page 41.

Message tracking and reprocessing

Integration Framework provides two new applications to manage messages. The Message Tracking application tracks messages while processing publish channels (outbound messages) and enterprise services (inbound messages) and how system administrators work with the displayed messages. Message Reprocessing application allows you to manage and view integration transaction messages that have been flagged with an error. Through the Message Reprocessing application, you can view the error XML file without needing to gain access to the integration server error files.

For detailed information about the Message Tracking application, refer to Message tracking on page 75 and Message Reprocessing on page 81 for detailed information about the Message Reprocessing application.

Additional content

Addition content available in Integration Framework V7.1:

- The number of object structures that ship is increasing from approximately 40 (in Version 6.*x*) to over 55 (in Version 7.1).
- There is a new Command Line (SSH) handler.

- Predefined Launch Entries for TADDM from the CI applications ship.
- The Object Group annotates the changeStatus method across multiple MBOs and several additional methods.

2.4.5 Sample scenario

In this section, we introduce a sample scenario that shows how to expose a Web service in Tivoli SRM V7.1 to have incidents created into SRM. We describe in detail all of the necessary components.

Prerequisites

In order to create the Web service, you need the following prerequisites in your environment:

1. Tivoli SRM V7.1 must be installed.
2. JMS queues must be created and configured. The installation of Tivoli Process Automation Platform (TPAP) creates and configures all of the default JMS queues automatically for you.
3. SOAP test client. This client is required to interact with the Web service created in this section.

Configuring integration components

In order to set up your Web services, configure:

1. Enabling the cron task for the sequential queues
2. Object Structures
3. Enterprise Services
4. External system
5. Creating and exposing the Web Service
6. View WSDL
7. XML file

Enabling the cron task for the sequential queues

Activate the applicable instances of the cron task (SEQQIN and SEQQOUT) or the inbound and outbound messages remain unprocessed in the queues. You access the JMSQSEQCONSUMER cron task at the Cron Task Setup application. Click **Go To** → **System Configuration** → **Platform Configuration** → **Cron Task Setup**. Search for `JMSQSEQCONSUMER` and activate both SEQQIN and SEQQOUT as shown in Figure 2-39 on page 94.

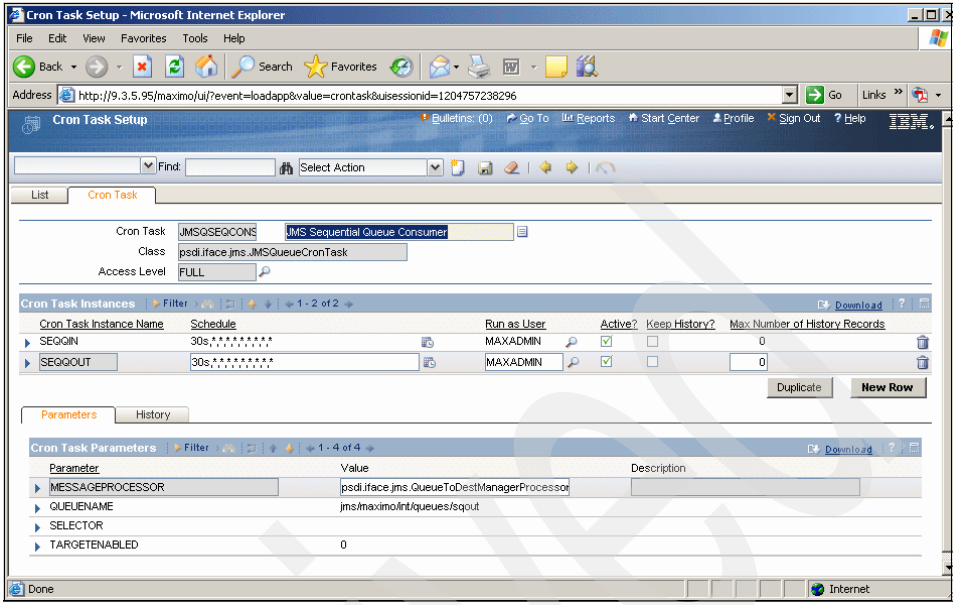


Figure 2-39 Enabling JMS queues

Object Structures

Create an object structure that consists of one business object that makes up the content of the XML message.

You can access the Object Structure application by selecting **Go** → **Integration** → **Object Structures**.

After launching the Object Structures application, follow these steps:

1. Click **New**. Figure 2-40 on page 95 appears.

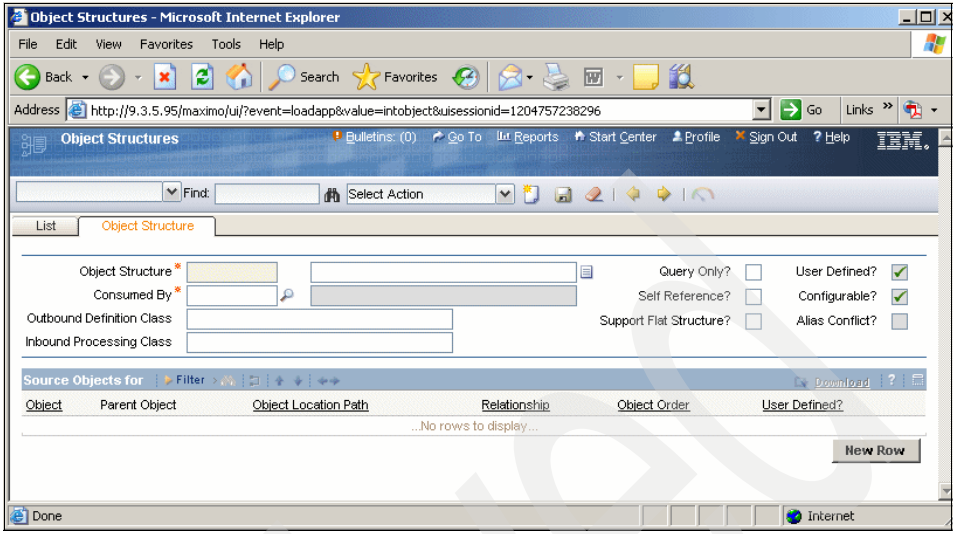


Figure 2-40 Object Structure application

2. In the object structure field, type `OBJSTR_SAMPLE`.
3. Select **INTEGRATION** from the component field.
4. Click **New Row** in the Source Objects subtab. Select **INCIDENT** in the Object field.
5. Accept all defaults and click **Save**.

Enterprise Services

After creating the object structure, create the enterprise service for querying system data and importing data into the system from an external system.

Access the Enterprise Services application by selecting **Go** → **Integration** → **Enterprise Services**.

After launching the Enterprise Services application, follow these steps:

1. Click **New**. Figure 2-41 on page 96 appears.

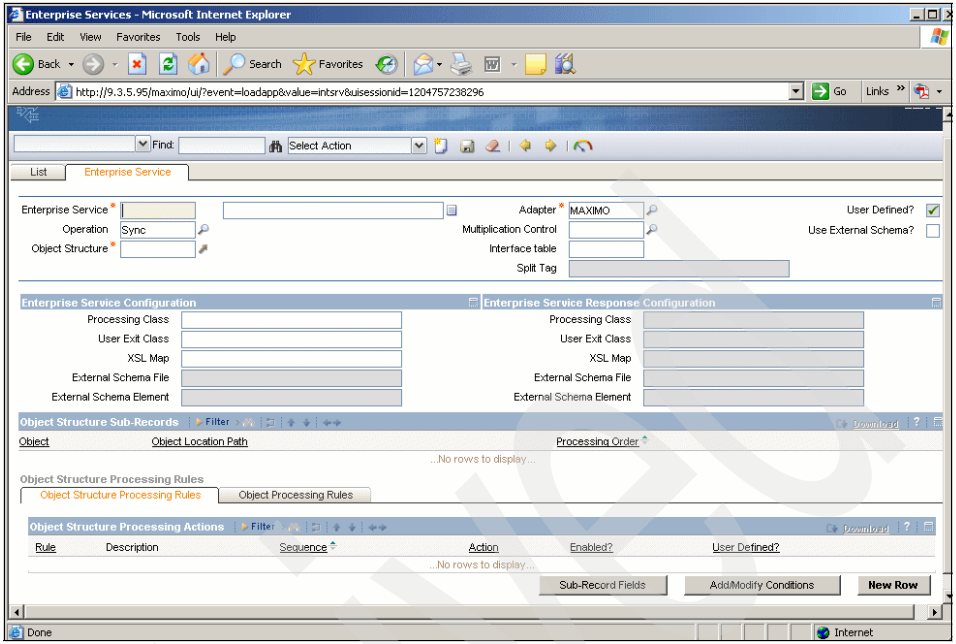


Figure 2-41 Creating a new Enterprise Services record

2. In the Enterprise Services field, type `ENTSER_SAMPLE`.
3. Select **Create** in the Operation field.
4. In the Object Structure field, select **OBJSTR_SAMPLE**. This is the object that you created before.
5. Accept all defaults and click **Save**.

External system

Create an external system to receive data from an external business application.

Access the External Systems application by selecting **Go** → **Integration** → **External Systems**.

After launching the External System application, follow these steps:

1. Click **New**.
2. Type `EXTSYS_SAMPLE` in the System field.
3. In the Enterprise Services tab, click **Select Service** and select the enterprise services that we created in the step before. Search for **ENTSER_SAMPLE** and select it.
4. Click **OK**.

5. Enable the enterprise services by clicking the **Enabled?** check box.
6. Enable the external system by clicking the **Enabled?** check box.

Creating and exposing a Web service

In this section, we create a Web service from an enterprise service and expose it. As soon as we expose the Web service, a external application can call this service, post an XML, and create a new incident.

You can access the Web Services Library application by selecting **Go** → **Integration** → **Web Services Library**. Follow these steps:

1. Create a new Web service by clicking **Select Action** → **Create Web Service** → **Create WS from Enterprise Service** as shown in Figure 2-42.

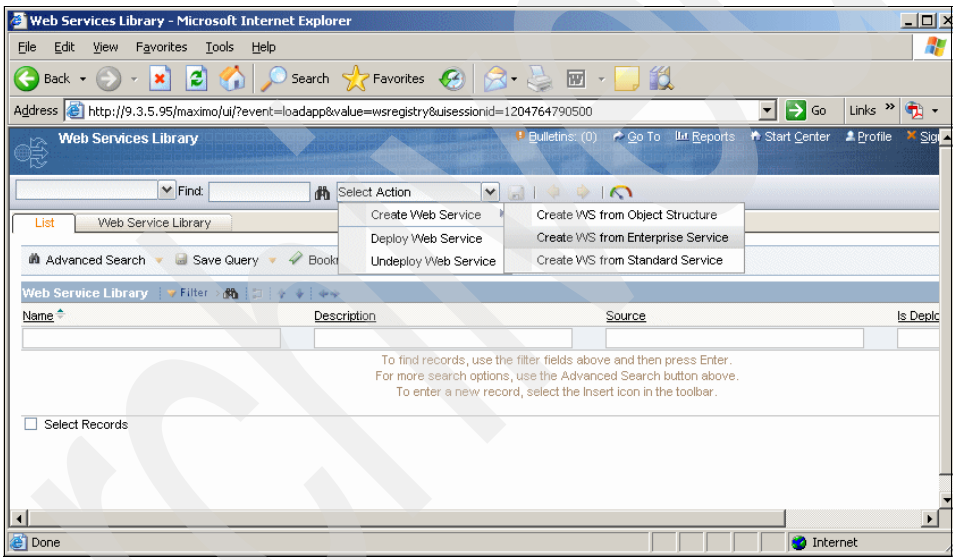


Figure 2-42 Creating a Web service

2. Select the enterprise service called **EXTSYS_SAMPLE_ENTSER_SAMPLE** and click **Create** as shown in Figure 2-43 on page 98.

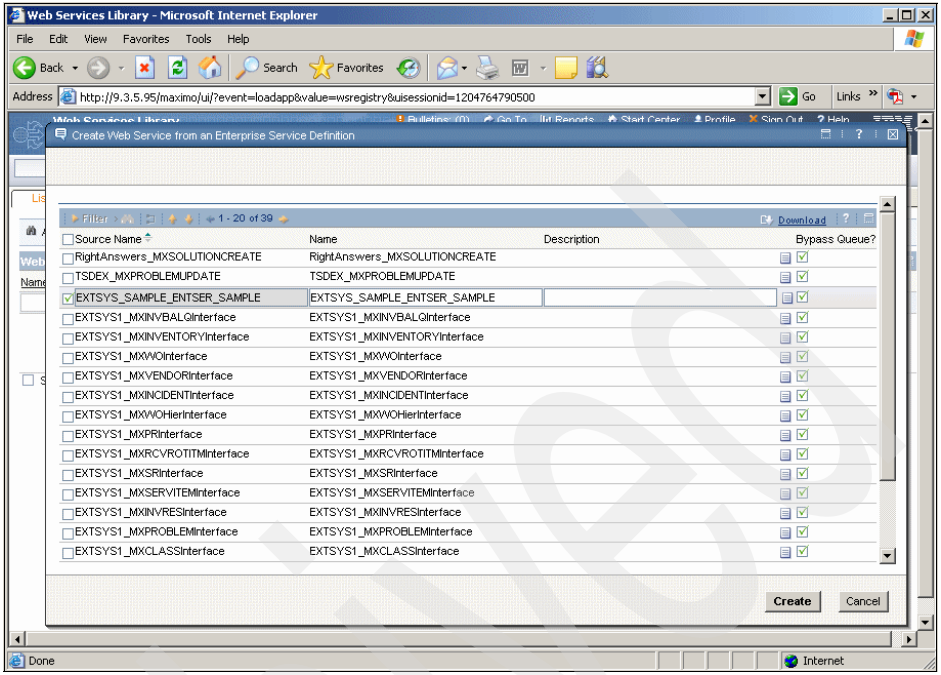


Figure 2-43 Selecting the enterprise service

3. The Web Service is now created. The next step is deploying the Web service by selecting the **EXTSYS_SAMPLE_ENTSER_SAMPLE** record.
4. Click **Select Action** → **Deploy Web Service**. A system message appears as shown in Figure 2-44 on page 99.

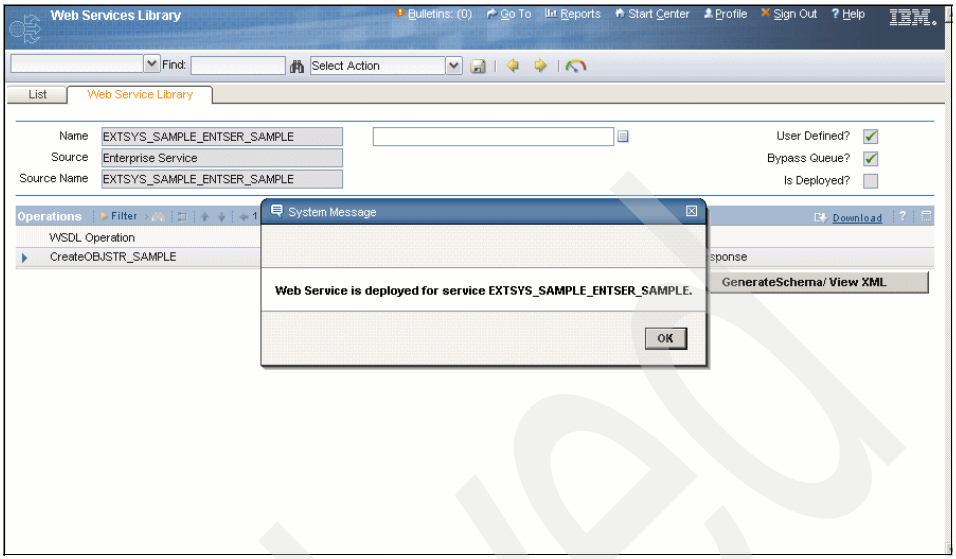


Figure 2-44 Web Service deployed

5. Click **OK**. The Web service EXTSYS_SAMPLE_ENTSER_SAMPLE is now created and deployed.

View WSDL

In order to view the wsdl file, open a browser and type the following URL:

`http://host/meaweb/wsdl/EXTSYS_SAMPLE_ENTSER_SAMPLE.wsdl`

Figure 2-45 on page 100 shows the wsdl definition.

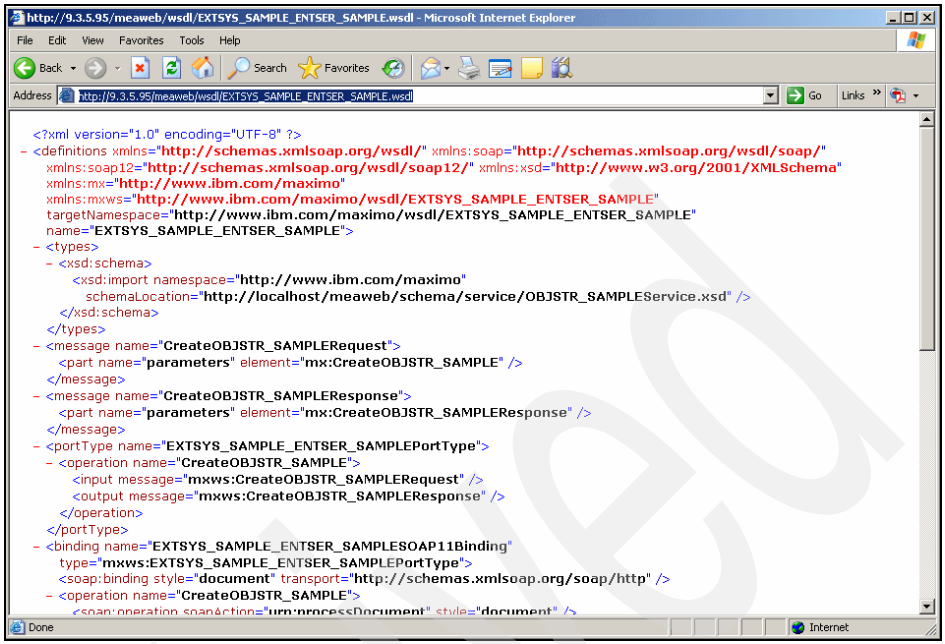


Figure 2-45 Wsdl definition

XML file

At this point, the Web service is created and deployed.

You can now test the Web service by using an external application to interact with the Web service and post an XML file.

Example 2-4 shows two XML files for test purposes. One file is for request and another file is for response.

Example 2-4 Request xml

```
<?xml version="1.0" encoding="UTF-8"?>
<CreateOBJSTR_SAMPLE xmlns="http://www.ibm.com/maximo"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
creationDateTime="2008-03-04T14:00:57-08:00" transLanguage="EN"
baseLanguage="EN" messageID="12046680576872200" maximoVersion="7 1 112
V7110-450" event="1">
  <OBJSTR_SAMPLE>
    <INCIDENT action="Add">
      <ACTLABCOST>0.0</ACTLABCOST>
      <ACTLABHRS>0.0</ACTLABHRS>
      <ACTUALCONTACTDATE xsi:nil="true" />
```

```
<ACTUALFINISH xsi:nil="true" />
<ACTUALSTART xsi:nil="true" />
<AFFECTEDDATE>2008-03-04T14:00:00-08:00</AFFECTEDDATE>
<AFFECTEDEMAIL />
<AFFECTEDPERSON>MAXADMIN</AFFECTEDPERSON>
<AFFECTEDPHONE />
<ASSETNUM />
<ASSETORGID />
<ASSETSITEID />
<CHANGEBY>MAXADMIN</CHANGEBY>
<CHANGEDATE>2008-03-04T14:00:37-08:00</CHANGEDATE>
<CINUM />
<CLASS maxvalue="INCIDENT">INCIDENT</CLASS>
<CLASSIFICATIONID />
<CLASSSTRUCTUREID />
<COMMODITY />
<COMMODITYGROUP />
<CREATEDBY>MAXADMIN</CREATEDBY>
<CREATEWOMULTI maxvalue="MULTI">MULTI</CREATEWOMULTI>
<CREATIONDATE>2008-03-04T14:00:38-08:00</CREATIONDATE>
<DESCRIPTION />
<DESCSRVID />
<EXTERNALRECID />
<EXTERNALSYSTEM />
<EXTERNALSYSTEM_TICKETID />
<FAILURECODE />
<FR1CODE />
<FR2CODE />
<GLACCOUNT />
<GLOBALTICKETCLASS />
<GLOBALTICKETID />
<HASACTIVITY>0</HASACTIVITY>
<HISTORYFLAG>0</HISTORYFLAG>
<IMPACT xsi:nil="true" />
<INDICATEDPRIORITY xsi:nil="true" />
<INHERITSTATUS>0</INHERITSTATUS>
<INTERNALPRIORITY xsi:nil="true" />
<ISGLOBAL>0</ISGLOBAL>
<ISKNOWNERROR>0</ISKNOWNERROR>
<ISKNOWNERRORDATE xsi:nil="true" />
<LOCATION />
<ORGID />
<ORIGRECORDCLASS />
<ORIGRECORDID />
<ORIGRECORGID />
```

```
      <ORIGRECSITEID />
      <OWNER />
      <OWNERGROUP />
      <PMCOMRESOLUTION />
      <PMCOMTYPE />
      <PROBLEMCODE />
      <RELATEDTOGLOBAL>0</RELATEDTOGLOBAL>
      <REPORTDATE>2008-03-04T14:00:37-08:00</REPORTDATE>
      <REPORTEDBY>MAXADMIN</REPORTEDBY>
      <REPORTEDEMAIL />
      <REPORTEDPHONE />
      <REPORTEDPRIORITY xsi:nil="true" />
      <SITEID />
      <SITEVISIT>0</SITEVISIT>
      <SOLUTION />
      <SOURCE />
      <STATUS maxvalue="NEW">NEW</STATUS>
      <STATUSDATE>2008-03-04T14:00:37-08:00</STATUSDATE>
      <SUPERVISOR />
      <TARGETCONTACTDATE xsi:nil="true" />
      <TARGETDESC />
      <TARGETFINISH xsi:nil="true" />
      <TARGETSTART xsi:nil="true" />
      <TEMPLATE>0</TEMPLATE>
      <TEMPLATEID />
      <TICKETID>1008</TICKETID>
      <TICKETUID>9</TICKETUID>
      <URGENCY xsi:nil="true" />
      <VENDOR />
    </INCIDENT>
  </OBJSTR_SAMPLE>
</CreateOBJSTR_SAMPLE>
```

Refer to Example 2-5 for the response XML file.

Example 2-5 Response xml

```
<?xml version="1.0" encoding="UTF-8"?>
<CreateOBJSTR_SAMPLEResponse xmlns="http://www.ibm.com/maximo"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
creationDateTime="2008-03-05T17:50:49-08:00" transLanguage="EN"
baseLanguage="EN" messageID="12047682499375535">
  <INCIDENTMboKeySet>
    <INCIDENT>
      <CLASS maxvalue="INCIDENT">INCIDENT</CLASS>
```

```
      <TICKETID>1008</TICKETID>
    </INCIDENT>
  </INCIDENTMboKeySet>
</CreateOBJSTR_SAMPLEResponse>
```

3

Event management integration

This chapter discusses event management integration products, such as Tivoli Enterprise Console (TEC) and Tivoli Netcool/Omnibus, which are available within the Tivoli portfolio.

This chapter discusses the following topics:

- Event management on page 106
- IBM TEC integration on page 106
- IBM Tivoli Netcool/Omnibus integration (preview) on page 130

3.1 Event management

The way that an organization handles an event is known as *event management*. It can include the organization's objectives for managing events, assigned roles and responsibilities, ownership of tools and processes, critical success factors, standards, and event-handling procedures. The link between the various departments within the organization that are required to handle events and the flow of this information among them is the focus of event management. Tools are mentioned in reference to how they fit into the flow of event information through the organization and to the standards that are applied to the flow.

Events are used to report problems, and event management is sometimes considered a sub-discipline of problem management. However, it can really be considered a discipline of its own, because it interfaces directly with several other systems management disciplines. For example, system upgrades and new installations can result in new event types that must be handled. Maintaining systems both through regularly scheduled and emergency maintenance can result in temporary outages that trigger events. There is clearly a relationship between event management and change management.

In small organizations, it is possible to handle events through informal means. However, as organizations' IT support staffs and the number of resources that they manage grow, it becomes crucial to have a formal documented event management process. Formalizing the process ensures consistent responses to events, eliminates duplication of effort, and simplifies the configuration and maintenance of tools that are used for event management.

Based on the business process, most of the events generated in the environment become an incident in the Information Technology Infrastructure Library (ITIL) process, which is maintained and supported by the Tivoli Service Request Manager (SRM) application.

3.2 IBM TEC integration

The Tivoli Enterprise Console (TEC) integration for Service Desk provides bidirectional communication between TEC and the Service Desk component of Tivoli SRM V7.1. TEC is an event management software system that collects, consolidates, and correlates events from a variety of event sources across the managed network. It initiates automated corrective action in order to reduce the number of events that require human intervention to a manageable size.

Events are consolidated or correlated by filtering redundant or low priority events, discarding duplicate events, discarding secondary events (events caused by other events) where appropriate, automatically closing a problem event when the related recovery event occurs, and other techniques. Rules define how events are processed.

TEC events are assigned a severity level that indicates the seriousness of the underlying problem. The default classifications, in order of increasing severity, are: UNKNOWN, HARMLESS, WARNING, MINOR, CRITICAL, and FATAL.

The Service Desk applications most directly related to TEC integration are the following ticket applications:

- Use the *Service Requests application* to create records of client calls or e-mail messages that request service.
- Use the *Incidents application* to create records of incidents that interrupt service or reduce the quality of a service.
- Use the *Problems application* to create records of the underlying problems that cause incidents and service requests.

Service Request, Incident, and Problem records are referred to as *ticket records* or *ticket types*. Ticket records can be created by a service desk agent and automatically use data from e-mail messages, system monitoring tools, or external software applications, such as IBM TEC. After a ticket record is created, a person or group can take ownership of the ticket and see the issue through to resolution.

After you install and configure TEC integration for Service Desk, TEC events that meet defined criteria are used as triggers to automatically open ticket records in the Service Desk ticket applications. For example, by default, FATAL events trigger the opening of an Incident ticket, and CRITICAL events trigger a Service Request ticket. You can change the event criteria for opening Service Desk tickets and the types of tickets that are opened in response to events.

After a ticket is opened in Service Desk, subsequent updates to the ticket automatically result in corresponding updates to the originating TEC event and all correlated events, provided that the events still exist in the TEC event cache. When the ticket is closed, all TEC events associated with the ticket are also closed.

The integration of TEC with Service Desk addresses an IT management need that Service Desk alone is not designed to meet. While a service desk agent might become aware of system outages and access failures reported by employees or customers, the Service Desk software is not intended as a solution for isolating and resolving performance and availability problems across computer networks. TEC, however, is specifically designed to help ensure the availability of IT resources. The integration of TEC with Service Desk enables service desk agents to become aware of problems that need attention. The automated opening of Service Desk tickets in response to events accelerates the resolution process, reducing mean time to repair, and in certain cases, solving a problem before it is reported by customers or becomes worse.

3.2.1 Prerequisites

The prerequisite software for TEC integration for Service Desk includes:

- Service Desk component of Tivoli SRM V7.1 on Windows

  Note: IBM WebSphere V6.0.2.17 is required for IBM Tivoli SRM and can be installed on Windows, Linux, or UNIX. However, Tivoli SRM must be installed on the Windows platform for this integration.

- TEC V3.9 or higher on Windows, Linux, or Unix

3.2.2 Architecture

When you install TEC integration for Service Desk software on a TEC server, the installer creates a rule base that defines the default event criteria for opening Service Desk tickets. You can change the default criteria by modifying the rule base.

Figure 3-1 on page 109 shows the components that take part in the integration.

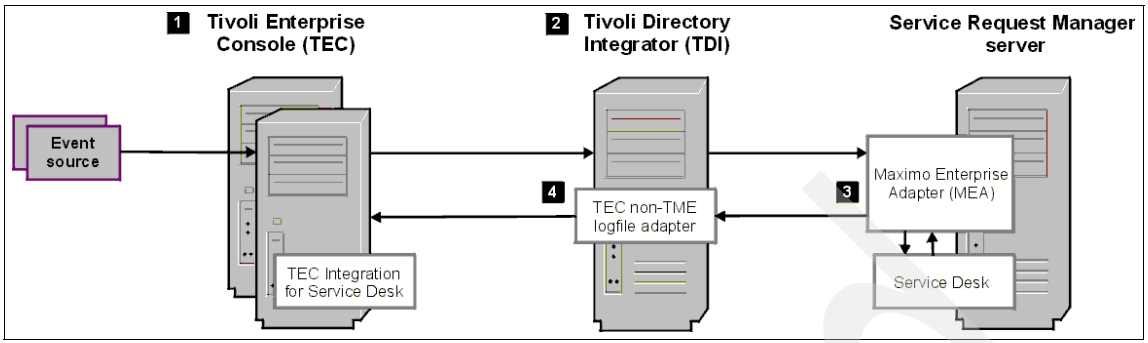


Figure 3-1 The components that take part in the integration

Moving from left to right in Figure 3-1:

1. After a TEC server receives an event from an event source, it evaluates the event according to the rule base. If the event meets the established criteria, the TEC server forwards the event information to the Tivoli Directory Integrator (TDI) server.
2. TDI serves as the interface between TEC and Service Desk. When the TDI server receives the event information, it evaluates the event to determine the type of Service Desk ticket to open and evaluates other ticket attributes based on default settings or based on mappings that you configure using the TDI Configuration Editor. This information is passed on to the SRM server, specifically to the MEA component.
3. The MEA provides the interface for communication between SRM and external applications, in this case, the TDI server.
4. When the ticket description is updated or the ticket is closed, the TEC event or events that are associated with the ticket are updated.
5. The updated ticket information is communicated through the MEA to the non-TME logfile adapter on the TDI server.

Note: TDI queries Maximo/MEA every minute (configurable timer) for updates. Maximo/MEA does not need to be aware of any TDI servers.

The non-TME logfile adapter is a TEC product component that you install on the TDI server. The logfile adapter is used to transmit information from Tivoli SRM back to the TEC event server.

Note: For incoming events from TEC (port 6767), a logfile adapter is unnecessary, because a TDI server connector listens for requests and forwards them to the Maximo connector, which sends the ticket Create/Update request to Tivoli SRM. Logfile adapter is only used to transmit information from Tivoli SRM back to the TEC.

Your TEC integration for the Service Desk environment can include multiple TEC servers, multiple TDI servers, and multiple Tivoli SRM servers. Although a single TDI server can accommodate the data flow from multiple TEC and Tivoli SRM servers, it is a best practice to install multiple TDI servers to maintain availability in case of server failure.

Event automation means that actions can be performed when processing events. For the purposes of this book, we refer to the process of taking action on system resources without human intervention in response to an event. The actual actions executed are referred to as *automated actions*. Automated actions in Service Desk generates an Incident in Tivoli SRM based on certain predefined rules.

Figure 3-2 on page 111 shows the communication between various components involved in TEC integration for Service Desk software.

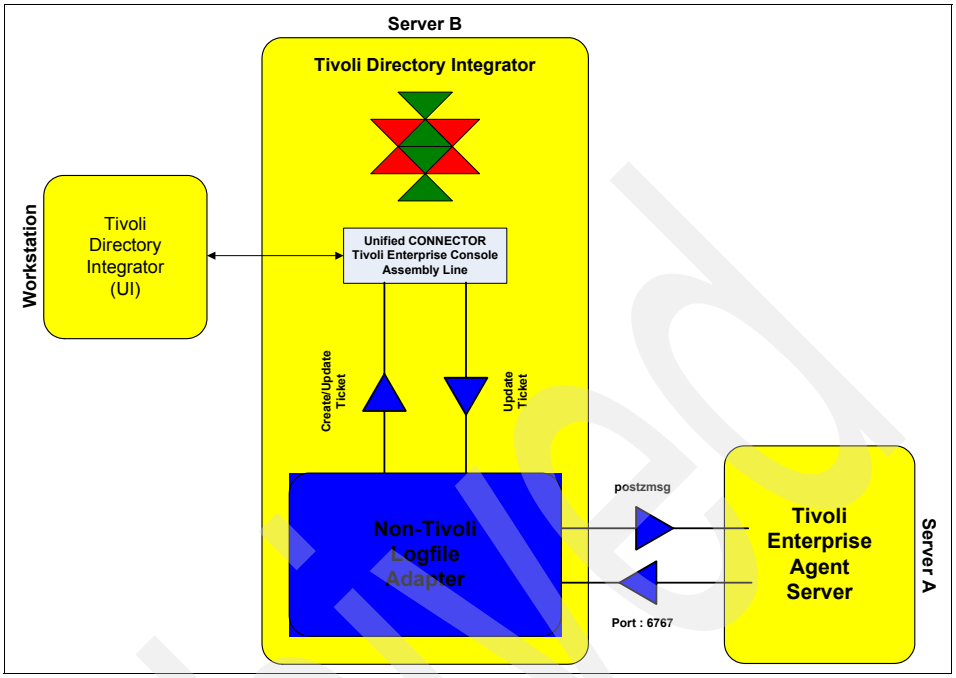


Figure 3-2 Communication methods

The AssemblyLine with the Unified Connector is configured to listen on port 6767, which is the default communication port for event server. When an event corresponds to the AssemblyLine condition, an Incident within Tivoli SRM is created automatically.

Figure 3-3 on page 112 demonstrates how the event generates an Incident record within Tivoli SRM and also how the event is generated within the TEC by calling the *postzmsg*.

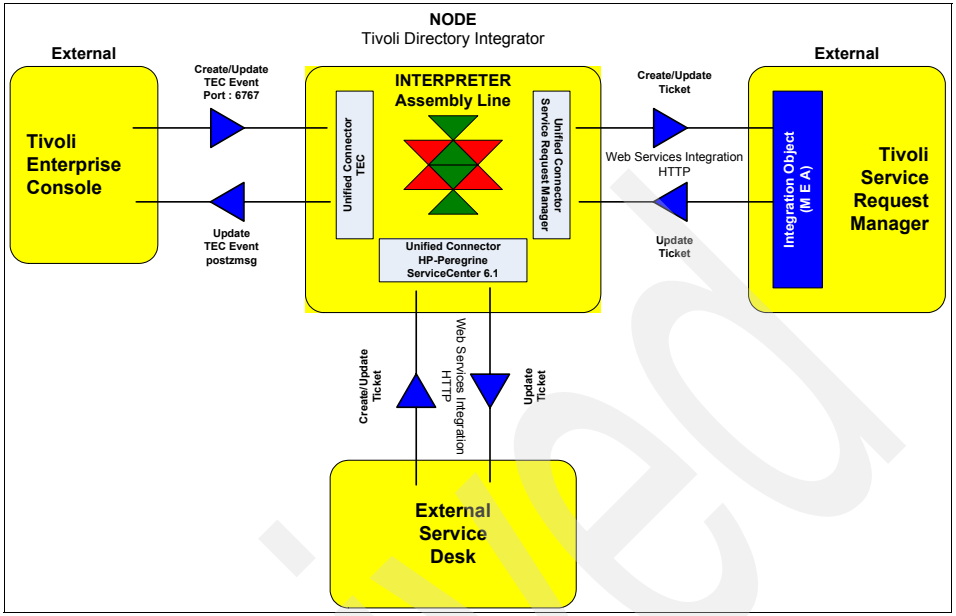


Figure 3-3 TDI architecture

The user is able to open an incident record within the TEC Console by using the Ticket Creation function.

3.2.3 Predefined scenarios

Table 3-1 lists the event status and corresponding actions for every event that is created or generated in TEC.

Table 3-1 Action performed for a particular event status

Event status	Action in Tivoli SRM
Fatal	An incident record is opened.
Critical or other status	A service request record is opened.

Note: You can change the event criteria for opening Service Desk tickets by editing the mro_troubleticket ruleset.

The mro_troubleticket ruleset file (mro_troubleticket.rls) is located in the following directory on the TEC server:
rbpath/TEC_Rules/mro_troubleticket.rls, where *rbpath* is the rulebase directory.

You can obtain the exact location by running the following command from within the Tivoli BASH Shell environment:

```
wrb –lsrb –path
```

TDI has a rule inside the assembly lines to guide the creation of various ticket types according to the event status sent by TEC (Example 3-1).

Example 3-1 TECInReadQueue assembly line

```
Open TECInReadQueue assembly line
Select ClassifyTECTicket script and take a look on the code.
   if ("FATAL".equals(severity)) {
         work.setAttribute("T_TICKET_TYPE", "INCIDENT");
         task.logmsg("Ticket class is INCIDENT or PROBLEM.");
   } else if (!"FATAL".equals(severity) && severity != null) {
         work.setAttribute("T_TICKET_TYPE", "SR");
         task.logmsg("Ticket class is SERVICE REQUEST.");
```

When the following actions (Table 3-2) are performed on the event, which opens a record in Tivoli SRM, the corresponding actions are automatically reflected in the service request or incident record.

Table 3-2 Action resolving the service request or the incident record

Event status	Action on the event	Action performed in Tivoli SRM
Fatal	Closed	Changes the incident status to resolved
Critical or other status	Closed	Changes the service request status to resolved

If the record created by an event is resolved or closed within the SRM Application, the event record is automatically closed (Table 3-3 on page 114).

Table 3-3 Action closing the event record

SRM record	SRM action	Action performed in TEC
Service request	Resolved	Close the event
Incident	Resolved	Close the event

3.2.4 Steps for implementing TEC integration

You must follow the instructions in this section to implement TEC integration.

Note: Our scenario assumes that you are using one TDI server. If for performance or high availability reasons you decide to use more than one TDI server, additional steps are required. Refer to “TDI considerations” on page 248 for more information.

The steps are:

1. Install non-TME logfile adapter.
2. Install TDI.
3. Edit the mxe.properties file (optional).
4. Install the new SRM ruleset.
5. Start TDI.
6. Configure the TEC connector.

3.2.5 Installing the non-TME logfile adapter

The non-TME logfile adapter is the adapter that provides the communication between the system where the logfile is installed and the TEC. The communication between these components is not secure and uses port 5529. The installation of this connector is required so that the system can post messages (using the postzmsg application) and communicate with TEC.

Depending on the operating system of the TDI server, install either the UNIX or Windows non-TME logfile adapter. The non-TME logfile adapter binary files are located on the TEC CD. Be sure to install the non-TME version of the logfile adapter. The TME® version is not supported.

Note: The Windows non-TME logfile adapter is also known as the Windows event log adapter.

Perform the following steps to install the Windows non-TME LogFile adapter:

1. The setup.exe file is located at *Non-TME LogFile adapter 3.9\W32-IX86\InstallWIN*.
2. Click **setup.exe** if you are using the file browser, or if you are using the command line, execute the **`setup.exe`**.
3. Click **Next** at the Welcome box.
4. Click **Next** to accept the destination directory, C:\tec\win.

Important: For Windows, do not change the default value for the path where you install the non-logfile adapter, because TDI uses this directory. For UNIX, there is no default location, so you can install at any location on UNIX.

5. Click **Next** to accept the destination directory.
6. Click **Next** to accept the type of adapter.

   The progress status bar shows the installation progress.
7. Click **Next** at the server configuration. The server configuration is done within the AssemblyLine.

   Note: You can use the default values. These values do not matter, because TDI provides the required values in real time to communicate with TEC.
8. Click **Next** at the port number configuration.
9. The configuration is completed automatically, and the following command line window appears (Figure 3-4 on page 116).

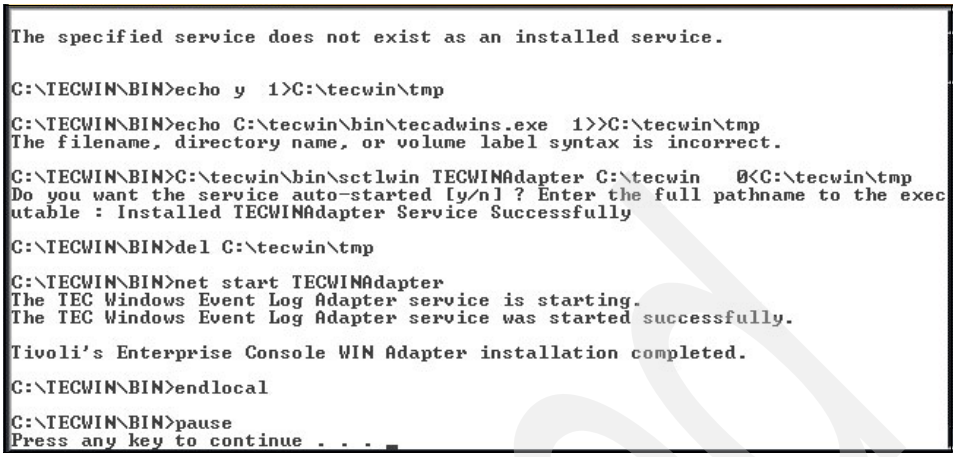


Figure 3-4 Automated logfile adapter configuration window

10. Click any key on your keyboard to complete the installation.
11. Click **OK** to complete the installation after answering the readme file question.
12. A reboot is required to activate the non-Logfile adapter.

3.2.6 Installing TDI

You can use the TDI installation program that is provided with Tivoli SRM to install a TDI environment that supports the integration of TEC (and other products) with Tivoli SRM Service Desk.

To install one or more TDI servers, use the procedure described in “Installation procedure” on page 31.

3.2.7 Editing the mxe.properties file (optional)

The TDI installation program prompts you for the location of the TEC non-TME logfile adapter. The value that you specify is entered into a properties file named mxe.properties. If you do not specify a location for the logfile adapter during installation, you can manually update the mxe.properties file after installation.

Edit the mxe.properties file on each computer that hosts a TDI server to specify the following values:

- The full directory path where the TEC non-TME logfile adapter is installed. If you specified the correct location of the logfile adapter when you installed TDI, the mxe.properties file already contains this value.

- A SRM user ID and password that the TDI server can use to log on to SRM. The SRM user that you specify must have the authority to create Service Desk tickets. You can specify either a Lightweight Directory Access Protocol (LDAP) or a non-LDAP user, depending on the type of authorization that is required by SRM.

Complete the following steps to edit the mxe.properties file on each computer where TDI is installed:

1. Change to the TDI work directory (solution directory). You specified a work directory when you installed TDI.
2. Open the mxe.properties file.
3. Use the tecLogAdapterFilePath property to specify or verify the location of the TEC non-TME logfile adapter:
   - For Windows: tecLogAdapterFilePath=c:\tecwin
   - For Linux or UNIX: tecLogAdapterFilePath=/opt/IBM/Tivoli/tec/nonTME

   To enable the TDI server to access SRM, specify values for the following properties:
   - `default.maximo.authentication.required=true`
   - `default.maximo.user=`*`user_ID`*
   - `default.maximo.url=http://172.27.34.45`
   - *`default.maximo.password=`*`{encr}`

   where *user ID* and *password* specify a user that is authorized to log on to SRM and who has the authority to create Service Desk tickets

Note: Typing `{protect}`- in front of a property name instructs TDI to encrypt the property value the next time that it reads the file. In this case, the encrypted password is shown if you open the mxe.properties file after the TDI server is started.

3.2.8 Installing the SRM rulebase

The prerequisites for installing the SRM rulebase are:

- Access to root on a UNIX box and access to Administrator or any other user on Windows with the Administrator privileges.
- Locate the following zip files containing the new ruleset for Tivoli SRM:
  - tec_integration_deployment.zip
  - integrate\install\tec\winstall_mro_tec
  - integrate\install\tec\mro_install\mro_troubleticket.baroc

- integrate\install\tec\mro_install\mro_troubleticket.sh
- integrate\install\tec\mro_install\mro_post.pl
- integrate\install\tec\mro_install\mro_troubleticket.rls

Installation procedure

The installation procedure is:

1. Unzip or untar the tec_integration_deployment.zip file. Example 3-2 is based on an Intel® architecture.

   Example 3-2 Files required to add the ruleset

   ```
   $bindir\tec\winstall_mro_tec
   $bindir\tec\mro_install\mro_troubleticket.baroc
   $bindir\tec\mro_install\mro_troubleticket.sh
   $bindir\tec\mro_install\mro_post.pl
   $bindir\tec\mro_install\mro_troubleticket.rls
   ```

2. Execute the Tivoli Environment variable, which is the **setup_env.sh** script file located in the /winnt/system32/drivers/etc/tivoli directory.

   Important: If you do not run this script, you will not be able to run Tivoli commands.

3. Start the bash shell script:
   a. Start a new Windows command line.
   b. Type `bash`.
   c. Press Enter.
   ```
   Bash$
   ```

4. Set the Tivoli variable environment for your Bash Shell environment:

   ```
   cd /winnt/system32/drivers/etc/tivoli
   setup_env.cmd
   bash
   .. ./setup_env.sh
   ```

5. Follow these steps for the ruleset configuration:
   a. Change the directory within the bash shell window to initiate the Perl script for the configuration:

      ```
      bash$ cd /appls/tivoli/bin/w32-ix86/tme/tec
      bash$ perl winstall_mro_tec
      ```

   b. Make your selection to the next question.

> **Note:** The following predefined rulebase might not show in your environment.

c. In your implementation, add this rulebase to an existing and active rulebase in your environment.

6. Choose a rulebase to modify:
   - ITM61rulebase
   - Omnibus
   - ITM71toTEC
   - Create new rulebase
7. Choose **Create New Rulebase**.

   You get the message "`You have chosen to create a new Rulebase.`"

   For "`Press Y to confirm, Q to quit, or any other key to reselect:`" enter `Y`.
8. The following question prompts you to provide a name for the new rulebase. We used the following name: `TECtoSRVv10`. The window shows:

```
Enter a valid Rulebase name.
Example: tsdrb or myrulebase: TECtoSRVv10
You entered: TECtoSRVv10.
```

   For "`Press Y to confirm, Q to quit, or any other key to reselect:`" enter `Y`.
9. The following question asks you to provide a path to store the new rulebase and all the related files.

> **Important**: In the Windows environment, it is important not to confuse the backslash (\) with the forward slash (/). If the forward slash is appended, you receive an error from the script.
>
> For this example, we use the fully qualified path:
>
> `c:\appls\tivoli\bin\w32-ix86\tme\tec\SRM_RBase`

   The window shows:

```
Enter a valid path for new Rulebase "TECtoSRVv10".
Example: "c:\TEC\tsdrb" or "/data/Tivoli/TEC/myrulebase":
c:\appls\tivoli\bin\w32-ix86\tme\tec\SRM_RBase
You entered "c:\appls\tivoli\bin\w32-ix86\tme\tec\SRM_RBase".
```

For “Press Y to confirm, Q to quit, or any other key to reselect:” enter Y.

The following question asks on which rulebase the new rulebase is based.

Note: The following predefined rulebase might not show in your environment. Substitute the name of a predefined rulebase from your environment.

10. Choose which Rulebase to inherit your functions:

    a. Default
    b. ITM61rulebase
    c. Omnibus
    d. ITM71toTEC

    Choose **ITM71toTEC**.

    ```
    You have chosen Rulebase Default.
    ```

    For “Press Y to confirm, Q to quit, or any other key to reselect:” enter Y.

11. For the next question, select the EventServer by entering 1. The window shows:

    ```
    Choose the Rulebase target(usually "EventServer"):
    EventServer
    Choice: 1
    You have chosen Rulebase target "EventServer"
    ```

    For “Press Y to confirm, Q to quit, or any other key to reselect:” enter Y.

12. The next question is about the TDI Server, where you have to identify it by its host name or by its IP address:

    ```
    Enter the hostname or IP address of your TDI Server: 9.3.5.56
    You have chosen TDI Server "9.3.5.56"
    ```

    For “Press Y to confirm, Q to quit, or any other key to reselect:” enter Y.

13. The next question is about the HTTP port and TDI communication:

    ```
    Enter the HTTP Port for your TDI Server (usually "6767"): 6767
    You have chosen TDI Server Port "6767"
    ```

    For “Press Y to confirm, Q to quit, or any other key to reselect:” enter Y.

14. For high availability reasons, you can specify another TDI server. Refer to Chapter 9, “High availability best practices” on page 245 for more discussion about this topic.

    ```
    Do you want to specify an additional TDI Server? (Y/N): N
    ```

15. You can add the host name or the IP address related to the TEC server:

    ```
    Enter the fully qualified hostname or IP address of your TEC Server.
    Note: This is the fully qualified hostname of *THIS* machine:
    9.3.4.139
    You have chosen TEC Server "9.3.4.139"
    ```

    For “`Press Y to confirm, Q to quit, or any other key to reselect:`” enter `Y`.

16. The next question is about activating the rulebase after the script is run successfully. Answer `Y` (Yes) to this question.

    Tip: We highly recommend that you stop and start the TEC at the end of this process to make sure that the rulebase is activated.

    Do you wish to load and activate the new ruleset? [Y/N]:

    ```
    This requires an EventServer restart: Y
    You have chosen to load and activate the new ruleset.
    ```

    For “`Press Y to confirm, Q to quit, or any other key to reselect:`” enter `Y`.

17. This question is about UTF-8, which makes reference to the new standard for the multi-language system. Confirm it by pressing the Enter key:

    ```
    Enter the character set you wish to use. Enter "list" for choices.
    Simply press Enter for the default choice of UTF-8.
    You have chosen character set "UTF-8"
    ```

    For “`Press Y to confirm, Q to quit, or any other key to reselect:`” enter `Y`.

Example 3-3 lists a summary of the options that you chose.

Example 3-3 Summary

```
**********************************
                Summary
**********************************
     Rulebase Name:            TECtoSRVv10*
     Rulebase Directory:
c:\appls\tivoli\bin\w32-ix86\tme\tec\SRM_RBase*
     Rulebase Target:          EventServer
```

```
     Rulebase Parent:          ITM61rulebase
     TDI Server:               9.3.5.56
     TDI Server HTTP Port:     6767
     TEC Server Hostname:      9.3.4.139
     TEC Server Port:          5529
     Load and Active Rulebase  Yes
     Character Set:            UTF-8
     **********************************
     *-is created
Press "Y" to continue, or "Q" to quit: y
Checking dependencies.
Creating new Rulebase "ITMtoTEC".
New Rulebase successfully created.
Inheriting functions from "Default"...this might take a
minute.
Successfully inherited functions.
Generating TDI properties file.
Successfully installed "tdi_server.props" file.
Successfully installed "mro_troubleticket.rls" file.
Successfully installed "mro_troubleticket.baroc" file.
Successfully installed "mro_Troubleticket.sh" file.
Successfully installed "mro_post.pl" file.
Importing mro_troubleticket.baroc into the "ITMtoTEC"
Rulebase.
Class import is successful.
Importing mro_troubleticket ruleset into the "ITMtoTEC"
Rulebase.
Ruleset import is successful.
Importing mro_troubleticket ruleset into the "EventServer"
Rulebase target.
Ruleset import to Rulebase target is successful.
Compiling the Rulebase "ITMtoTEC".
Ruleset compile operation is successful.
Loading and activating the modified Rulebase "ITMtoTEC".
Ruleset successfully loaded.
Restarting the EventServer.
EventServer restart operation is successful.
bash$
```

After the Assembly Line is configured, an incident record is generated within Tivoli SRM for every event with status equal to “FATAL”.

Perform the following steps to make sure that the new rule base is properly created and activated:

1. Start the Tivoli Desktop.
2. Authenticate with the Administrator ID or root if you use UNIX.
3. Open the EventServer icon, as shown in Figure 3-5 on page 123. The new rule base appears.

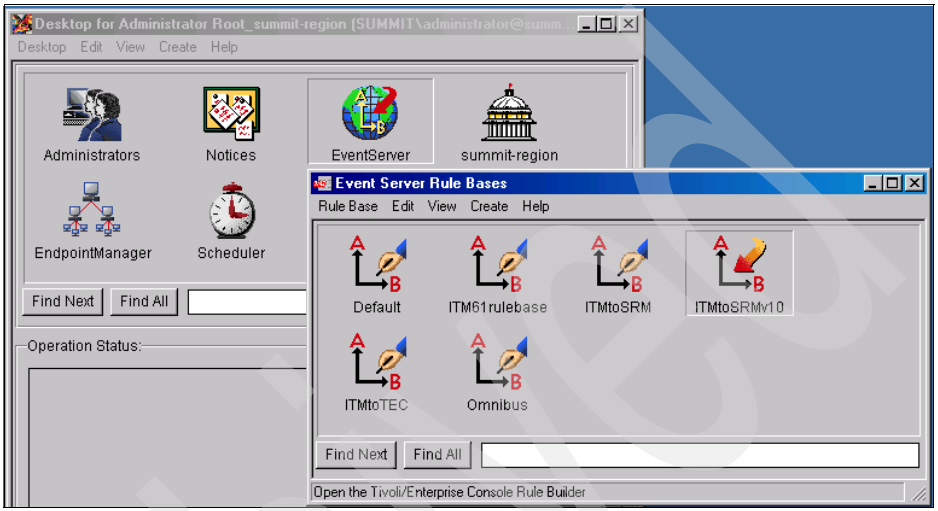


Figure 3-5 New rule set created and activate

3.2.9 Starting the TDI server

Complete the following steps to start the TDI server. Do not start the server if you have not completed configuration of the SRM server:

1. Change to the TDI working directory.

   Note: You specified the TDI working directory when you installed TDI.

2. Run the following command:
   - On Windows:

     ```
     mxetdi.cmd
     ```

   - On Linux or UNIX:

     ```
     mxetdi.sh
     ```

3.2.10 Ticket synchronization

Based on the rules defined in “Predefined scenarios” on page 112, the following AssemblyLine allows you to create an incident record within Tivoli SRM with minimum configuration:

1. To establish communication between TDI and Tivoli SRM, the following configuration in the TDI (described in Figure 3-6 on page 125 and Figure 3-7 on page 126) is required.

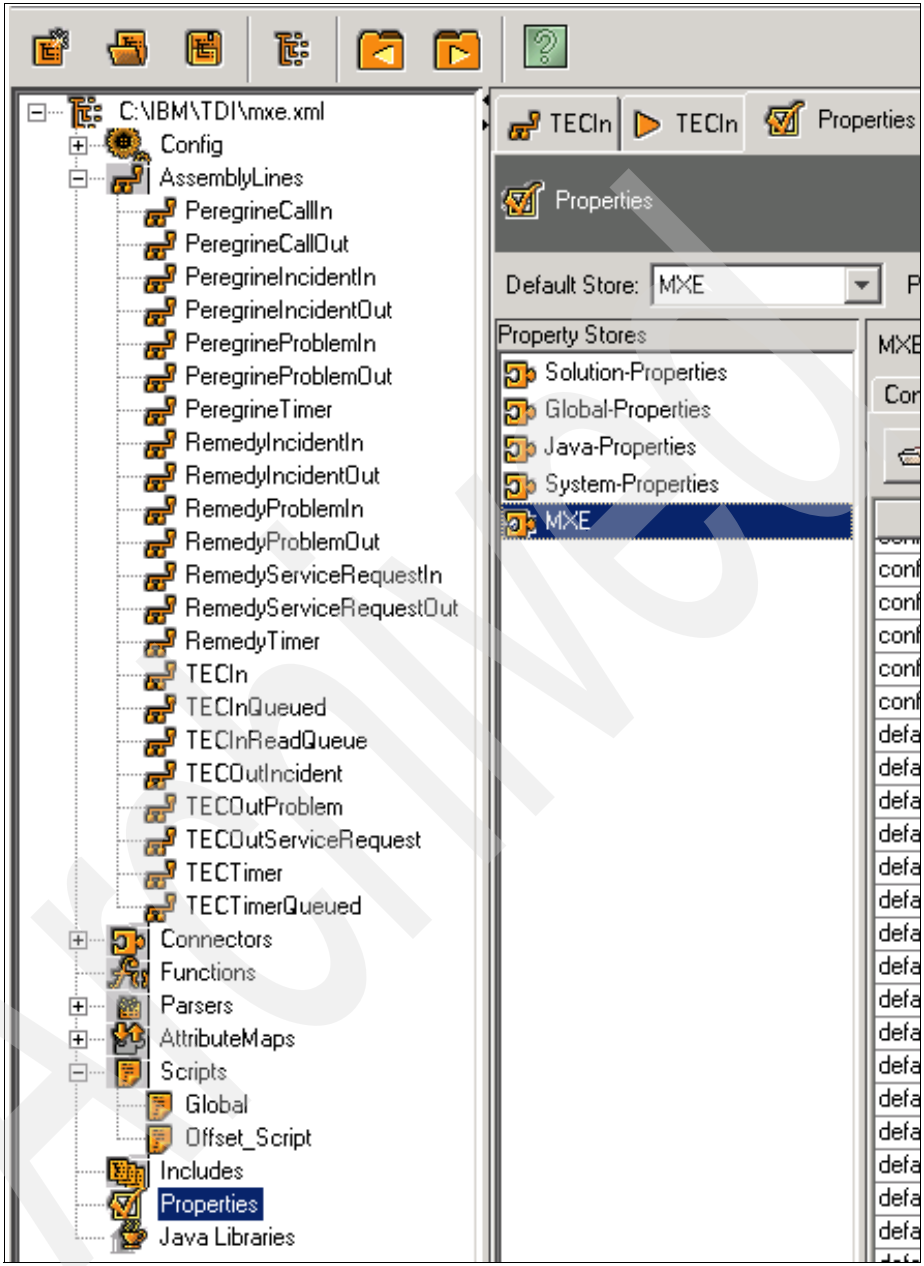


Figure 3-6 Configuration required to establish the communication (1 of 2)

default.maximo.url	☐	http://9.3.5.46:9080
default.maximo.user	☐	maxadmin
default.maximo.xml.character.validation	☐	true
default.peregrine.assignment.group	☐	DEFAULT
default.peregrine.category	☐	other
default.peregrine.contact	☐	FALCON, JENNIFER
default.peregrine.incident.assignment.group	☐	DEFAULT
default.peregrine.incident.category	☐	other
default.peregrine.incident.closure.code	☐	Advice & Guidance
default.peregrine.incident.contact	☐	FALCON, JENNIFER
default.peregrine.incident.problem.type	☐	none
default.peregrine.incident.product.type	☐	none
default.peregrine.incident.resolution.fix.type	☐	permanent
default.peregrine.incident.severity	☐	5 - Very Low
default.peregrine.incident.site.category	☐	Remote
default.peregrine.incident.subcategory	☐	client dependent
default.peregrine.owner	☐	BOB.HELPDESK
default.peregrine.problem.category	☐	other
default.peregrine.problem.initial.impact	☐	low
default.peregrine.problem.problem.type	☐	none
default.peregrine.problem.product.type	☐	none
default.peregrine.problem.subcategory	☐	client dependent
default.peregrine.problem.type	☐	none
default.peregrine.problem.urgency	☐	4 - Low
default.peregrine.severity	☐	5 - Very Low
default.peregrine.site.category	☐	Remote
default.peregrine.subcategory	☐	client dependent
default.problem.urgency	☐	4 - Low
default.remedy.systemId	☐	RMD
default.tec.systemId	☐	TEC
delete.last.execution.date.Maximo_ESD	☐	no
maximumQueueSendAttempts	☐	10
queueStoreINIFile	☐	pwstore_server.ini
tecListenPort	☐	6767

Figure 3-7 Configuration required to establish the communication (2 of 2)

2. To test the scenario manually, generate an event with the severity “FATAL”, using the following command:

   ```
   wpostemsg -r FATAL -m "This Event is generated to create an Incident
   within SRM v7.x" fqhostname="SRV_Server_404"  TEC_Error Events
   ```

3. Log on to TEC, and validate the creation of the event specified in the previous step, as shown in Figure 3-8 on page 127.

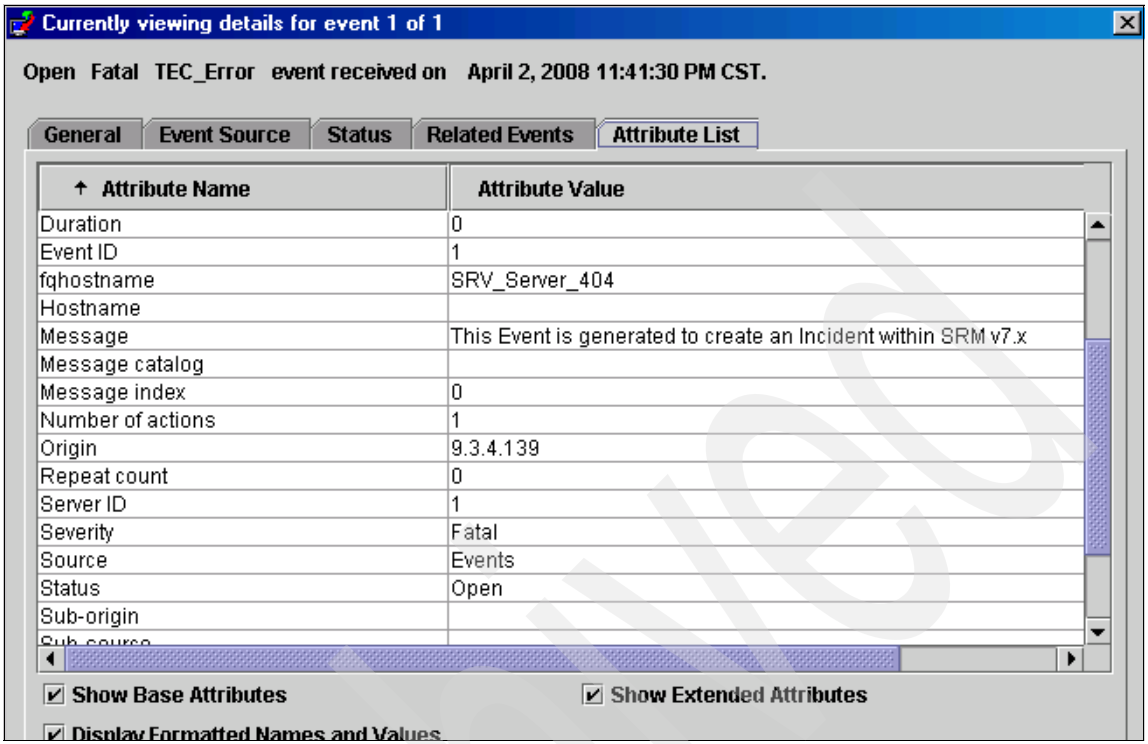


Figure 3-8 Event with severity "Fatal"

4. Right-click and select **RUN** to run TEC in AssemblyLine, as shown in Figure 3-9.

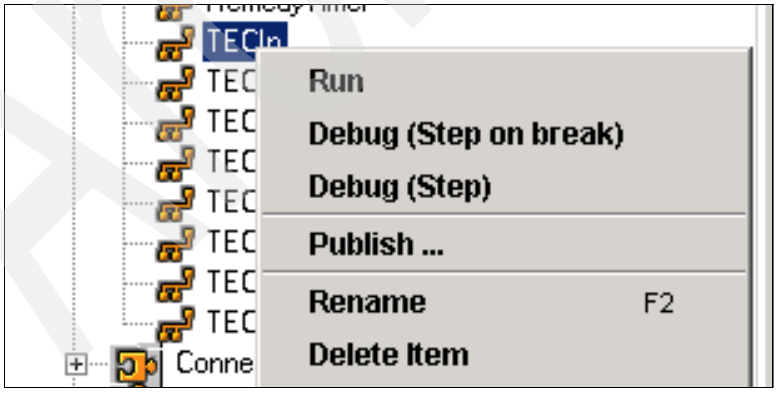


Figure 3-9 Run AssemblyLine

Output similar to Example 3-4 on page 128 appears.

Example 3-4 Output of the Run command

```
is.close();
os.close();
23:11:16  [TECListen] CTGDIS504I *Result of attribute mapping*
23:11:16  [TECListen] CTGDIS505I The 'conn' object
23:11:16  [TECListen] CTGDIS003I *** Start dumping Entry
23:11:16  Operation: generic
23:11:16  Entry attributes:
23:11:16  TECADAPTERHOST (replace):''
23:11:16  TECDURATION (replace):'--'
23:11:16  http.From (replace):'tecadmin@us.ibm.com'
23:11:16  TECLONGMSG (replace):'A trouble ticket has been opened on
reception of this event from host SRV_Server_407'
23:11:16  TECADMINISTRATOR (replace):''
23:11:16  TECMSGINDEX (replace):'--'
23:11:16  TECMSG (replace):'This Event is generated to create an
Incident within SRM v7.x'
23:11:16  http.qs.TECOPERATION (replace):
'OPEN_TT;TECTTID=tt111207203074;TECLONGMSG=A trouble ticket has been
opened on reception of this event from host SRV_Server_407;TECMSG='This
Event is generated to create an Incident within SRM
v7.x';TECSEVERITY=FATAL;TECFQHOSTNAME=SRV_Server_407;TECCLASS=TEC_Error
;TECSERVER_HANDLE=1;TECEVENT_HANDLE=1;TECDATE_RECEPTION=1207203074;TEC_
SERVER=9.3.4.139;TECHOSTPORT=5529;TECACL='[admin]';TECADAPTERHOST='';TE
CADMINISTRATOR='';TECCAUSEDATEEVENT=--;TECCREDIBILITY=1;TECDATEEVENT=--
;TECDURATION=--;TECHOSTNAME='';TECLASTMODIFIEDTIME=--;TECMSGCATALOG='';
TECMSGINDEX=--;TECNUMACTIONS=1;TECORIGIN=origin;TECREPEATCOUNT=--;TECSE
RVERPATH='[]';TECSOURCE=Events;TECSTATUS=OPEN;TECSUBORIGIN='';TECSUBSOU
RCE='';'
23:11:16  TECDATEEVENT (replace):'--'
23:11:16  TECCAUSEDATEEVENT (replace):'--'
23:11:16  TECMSGCATALOG (replace):''
23:11:16  TECHOSTPORT (replace):'5529'
23:11:16  http.base (replace):'/TME/TEC/mro_post.pl'
23:11:16  TECOPERATION (replace):'OPEN_TT'
23:11:16  http.body (replace):
'TECOPERATION=OPEN_TT;TECTTID=tt111207203074;TECLONGMSG=A trouble
ticket has been opened on reception of this event from host
SRV_Server_407;TECMSG='This Event is generated to create an Incident
within SRM
v7.x';TECSEVERITY=FATAL;TECFQHOSTNAME=SRV_Server_407;TECCLASS=TEC_Error
;TECSERVER_HANDLE=1;TECEVENT_HANDLE=1;TECDATE_RECEPTION=1207203074;TEC_
SERVER=9.3.4.139;TECHOSTPORT=5529;TECACL='[admin]';TECADAPTERHOST='';TE
CADMINISTRATOR='';TECCAUSEDATEEVENT=--;TECCREDIBILITY=1;TECDATEEVENT=--
```

```
;TECDURATION=--;TECHOSTNAME='';TECLASTMODIFIEDTIME=--;TECMSGCATALOG='';
TECMSGINDEX=--;TECNUMACTIONS=1;TECORIGIN=origin;TECREPEATCOUNT=--;TECSE
RVERPATH='[]';TECSOURCE=Events;TECSTATUS=OPEN;TECSUBORIGIN='';TECSUBSOU
RCE='';'
23:11:16  TECSOURCE (replace):'Events'
23:11:16  TECCREDIBILITY (replace):'1'
23:11:16  TECDATE_RECEPTION (replace):'1207203074'
23:11:16  TECSUBSOURCE (replace):''
23:11:16  http.Content-Length (replace):'709'
23:11:16  TECSTATUS (replace):'OPEN'
23:11:16  TECSEVERITY (replace):'FATAL'
23:11:16  TEC_SERVER (replace):'9.3.4.139'
23:11:16  TECFQHOSTNAME (replace):'SRV_Server_407'
23:11:16  TECCLASS (replace):'TEC_Error'
23:11:16  TECTTID (replace):'tt1112072030 74'
23:11:16  http.User-Agent (replace):'HTTPTool/1.0'
23:11:16  http.method (replace):'POST'
23:11:16  TECLASTMODIFIEDTIME (replace):'--'
23:11:16  TECEVENT_HANDLE (replace):'1'
23:11:16  TECREPEATCOUNT (replace):'--'
23:11:16  http.Content-Type (replace):
'application/x-www-form-urlencoded'
23:11:16  TECACL (replace):'[admin]'
```

5. Log on to Tivoli SRM to validate the creation of the incident record (Figure 3-10 on page 130).

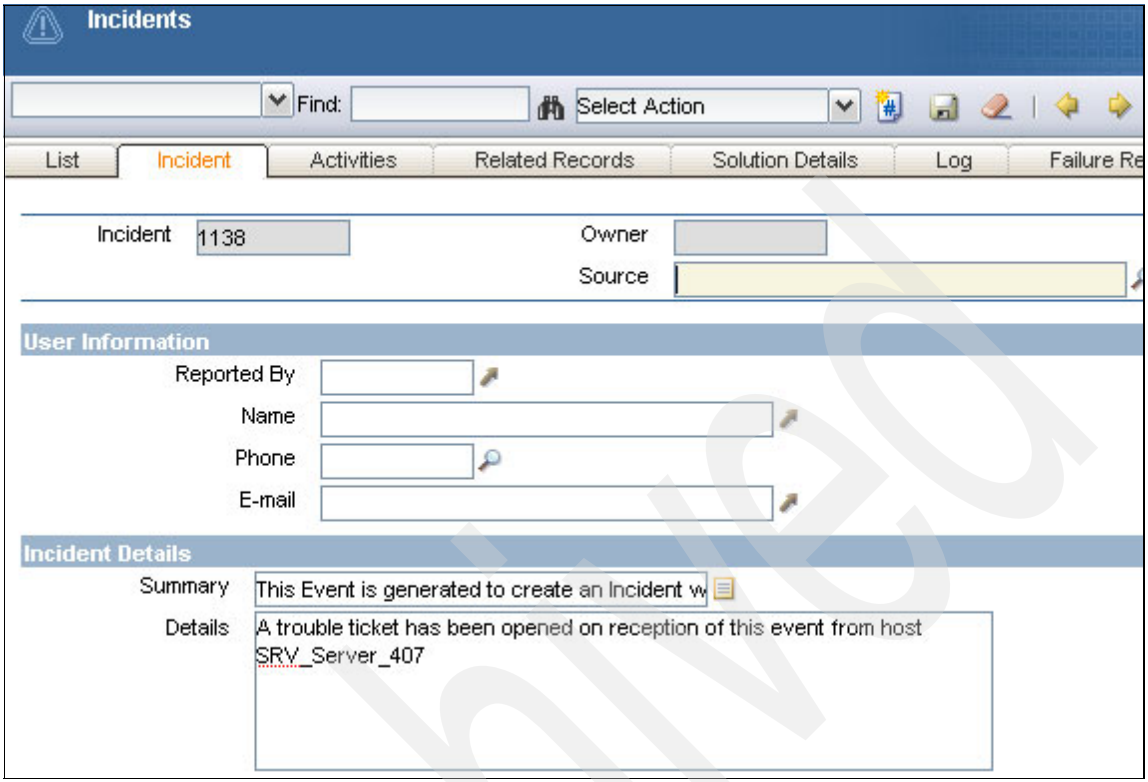


Figure 3-10 The incident is generated within Tivoli SRM

3.3 IBM Tivoli Netcool/Omnibus integration (preview)

Tivoli Netcool/Omnibus functions are similar to TEC in terms of event management. Tivoli Netcool/Omnibus delivers real-time, centralized monitoring of complex networks and IT domains.

At the time of writing this book, Tivoli Netcool/Omnibus integration with Tivoli SRM V7.1 is not available. *Tivoli SRM V6.2 (or Maximo V6.2) integration* is available and documented at:

http://publib.boulder.ibm.com/infocenter/tivihelp/v8r1/topic/com.ibm.netcool_OMNIbus.doc/gateways/tsrm_integration/concept/tsrm_introduction.html

The bidirectional integration of Tivoli Netcool/Omnibus with Tivoli SRM helps create the new Incident ticket within Tivoli SRM, keeping the incident synchronized with the event in Netcool/Omnibus. Similar to the TEC, Tivoli Netcool/Omnibus integration uses TDI. The Netcool/Omnibus Probe and Gateway are also required to manage the event management workflow.

Note: The Gateway for Tivoli Event Integration Facility (EIF) forwards events from IBM Tivoli Netcool/OMNIbus™ to applications that accept events in EIF format. The gateway consists of a reader/writer and a writer. The reader/writer extracts alerts from a source ObjectServer, and the writer forwards the alert data to applications.

A range of Tivoli products generates EIF messages. The Netcool/OMNIbus Probe for Tivoli EIF receives EIF events sent from the Tivoli devices and sends them to the ObjectServer.

We provide a high level overview of the Tivoli SRM V6.2 integration, which is similar to the Tivoli SRM V7.1 integration, when available.

3.3.1 Event workflow (outbound)

Figure 3-11 shows the event workflow to make the outbound integration possible.

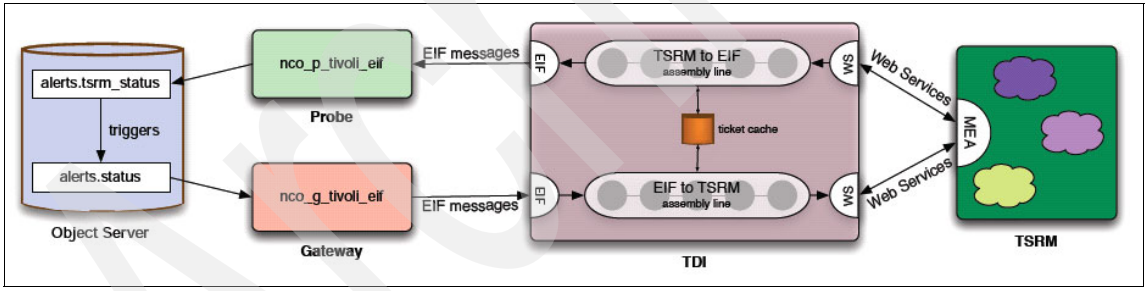


Figure 3-11 Outbound event

The event workflow is:

1. The activity in alerts.status is picked up by the Tivoli EIF gateway.
2. The gateway sends EIF messages to TDI.
3. The contents of the EIF messages are passed through the EIF to the SRM assembly line, being modified (for example, severity mapping) along the way.
4. The data is passed to the Tivoli SRM MEA interface using Web services.

3.3.2 Event workflow (inbound)

Figure 3-12 shows the event workflow for inbound integration (the incoming event from the service desk tools).

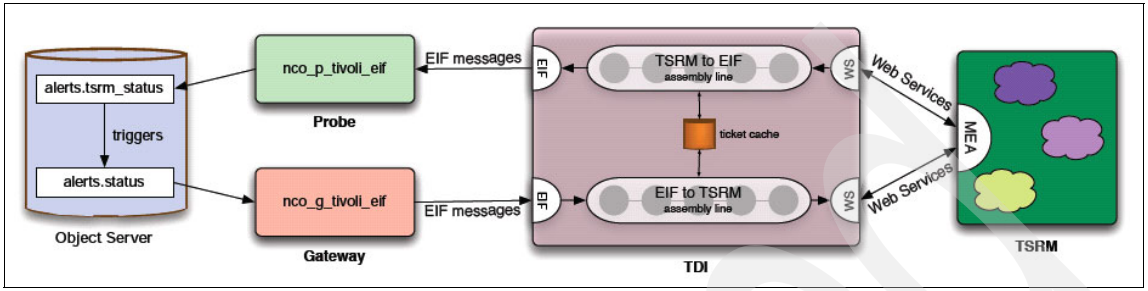


Figure 3-12 Inbound event

The event workflow is:

1. TDI polls Tivoli SRM by using Web services every 60 seconds.
2. Updates are passed through the *TSRM to EIF* assembly line again with modifications.
3. The data is sent as EIF messages to the EIF probe.
4. The probe puts the data in *alerts.tsrm_status*.
5. Pre-insert triggers on this table match records with the original records in *alerts.status* and perform the appropriate updates.
6. Other triggers clear out the *tsrm_status* table.

Figure 3-13 shows an event within Netcool/Omnibus.

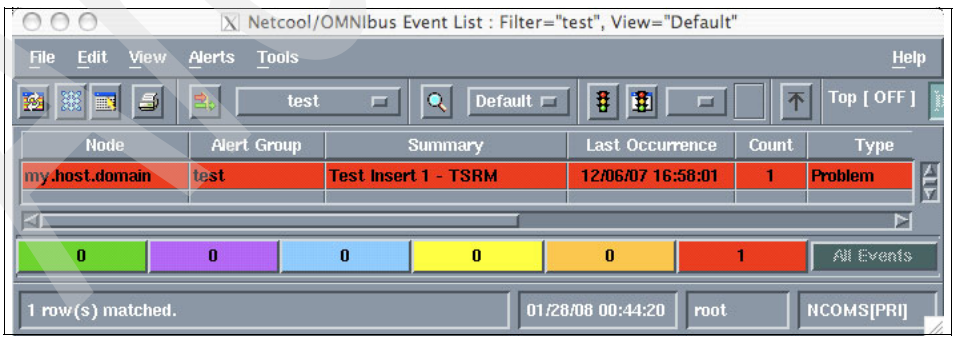


Figure 3-13 Netcool/Omnibus event

Figure 3-14 shows the event generated through TDI as an incident within Tivoli SRM.

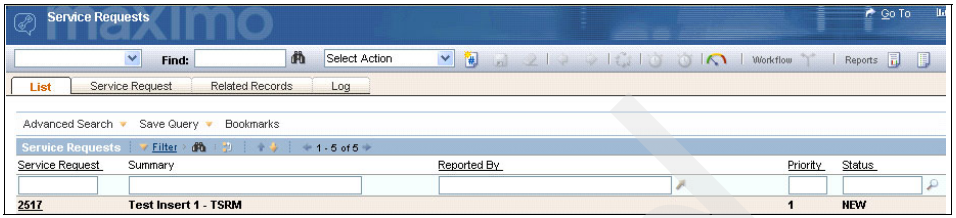


Figure 3-14 Incident created by automation in Tivoli SRM

4

Service Desk Tool integration

This chapter describes the Hewlett-Packard (HP) Service Desk and Tivoli Service Request Manager (SRM) V7.1, various business aspects of the need for integration, and in-depth technical configurations for approaching the integration.

This chapter contains the following sections:

- Introduction to integration landscape on page 136
- Integration scenario on page 137
- Service Desk integration planning and installation on page 139
- Scenario window flow on page 156

4.1 Introduction to integration landscape

Service Desk applications are responsible for streamlining IT operations and improving operational efficiency in an organization. These tools can work in tandem for monitoring service availability within an organization and identifying and resolving any interruptions of service that might occur. Many large enterprises depend on Service Desk to deliver timely customer service.

Most clients already have a type of Service Management solution in place. In many cases, clients use multiple Service Desk tools for various operations within the same organization. Many times, these constellations of Help desk tools are a result of company acquisitions and mergers.

In an IT environment that has multiple Help desks, operating in silos for multiple operations (such as networking, application support, and so forth) is the most common cause of delay in responding to service disruption. In most cases, the multiple Help desks use these tools, and these tools, working in silos, do not share operational data and do not support carrying forward or sharing the transaction with other tools. In this scenario, it is essential to have a single repository for all the Service Desk operations about critical configuration items (CIs) in order to make the Service Desk operation proactive and responsive to a customer's critical business. This repository can carry forward transactions from the existing Help desk tools, which allows seamless transaction data sharing that enables the central Help desk to make responsive decisions.

Tivoli SRM is equipped with integration technology that is designed to coexist with other Help desk tools in the environment. Typically, a new Service Management product requires replacing the existing or legacy Help desk product, which might be a costly proposition. Implementing Tivoli SRM saves the cost of re-implementing the existing Help desk processes in the new tool. At the same time, this coexisting integration model helps build a central Service Desk system, which operates in the full view and awareness of all the operations performed at various Help desk tools on the particular Service Ticket.

The Service Desk Integration Offering for Tivoli SRM provides the necessary tooling to support migration from existing Help desk products and the interpretability of Tivoli SRM solutions with other Service Desk products.

The collection of integration scenarios is essentially a software development kit for the integration of Tivoli SRM V7.1 with HP ServiceCenter and BMC Remedy-AR IT Service Management suites. In this chapter, we focus on HP ServiceCenter integration, but BMC Remedy Service Desk is similar and uses the same tools and concepts.

HP ServiceCenter is a comprehensive software product that automates service management processes based on the Information Technology Infrastructure Library (ITIL) framework. HP ServiceCenter is used by many clients to manage Helpdesk IT operations. The Tivoli SRM V7.1 integration with HP ServiceCenter scenarios collaborates directly with the Web service, which allows Tivoli SRM V7.1 to interface directly with HP ServiceCenter data.

4.2 Integration scenario

Service Desk personnel are required to make numerous decisions based upon a limited set of data delivered through Service Desk applications. The evaluation process involves answering a series of questions and making judgements. Which group is assigned to manage an event? What priority is the event assigned? How does this event impact the business? The amount of data and its accessibility during an event assessment directly impact the quality, efficiency, and cost-effectiveness of the event resolution. Integrating Service Desk applications with the rich data, analytics, workflows, policies, and relationships provided in the Tivoli SRM enables them to provide all the information necessary to make rapid and well-informed decisions for IT management processes. This consolidation of resources also:

- Lowers the cost of resolving incidents and deploying changes by reducing the amount of time that is required to execute these processes by making information readily available and ensuring it is accurate and consistent.
- Automates process steps whenever possible.
- Assigns work to the appropriate personnel.
- Performs tasks in a sequence that maximizes their effectiveness while minimizing financial impact.

Figure 4-1 on page 138 shows well-defined categories available for integration between external Service Desk applications and Tivoli SRM V7.1.

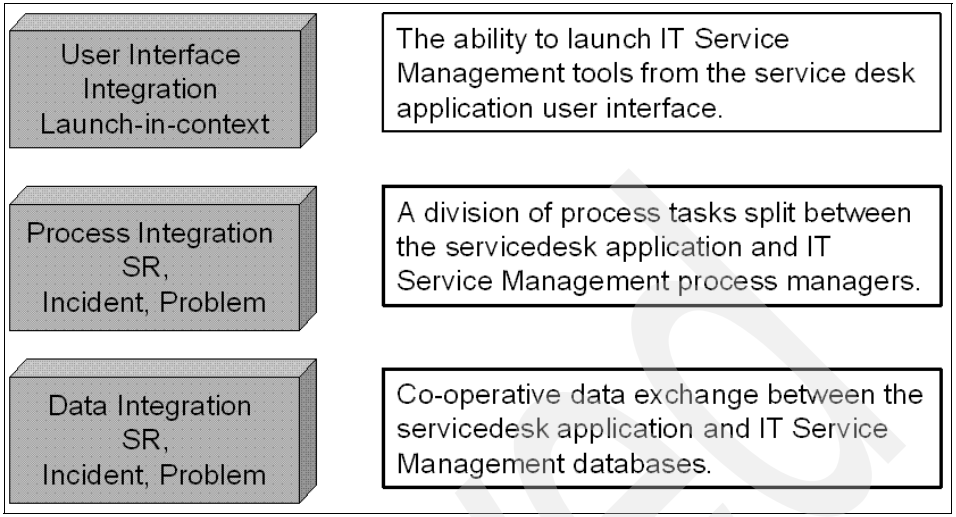


Figure 4-1 Integration types

Data integration

Setting up an integration environment enables data to be exchanged between the HP ServiceCenter application and Tivoli SRM. This data includes Calls, Incidents, and Problems information as of now.

Process integration

Tivoli SRM can be integrated with HP ServiceCenter at the process level. The tasks that comprise the Service Request, Incident Management, and Problem management processes can be divided between the HP ServiceCenter application and Tivoli SRM transactions. A management process typically begins in the HP ServiceCenter application and, at an appropriate point in the process, a corresponding process begins on Tivoli SRM. The two applications work together where only one application executes a process at a given time with appropriate notifications that keep the overall process working.

The following process integration scenarios are provided for the HP ServiceCenter and Tivoli SRM:

- Incident creation and updates originating in the HP ServiceCenter invoke Incident ticket creation and updates in Tivoli SRM.
- Incident creation and updates originating in Tivoli SRM invoke Incident creation, updates in the Service Desk application, which, in practice, take Incidents created in the Service Desk application, and closure.

User interface integration

Service Desk applications can be integrated with Tivoli SRM at a user interface level in order to obtain the information necessary to complete a task in the Service Desk application. Tivoli SRM can be launched in context with the current HP ServiceDesk application task. For example, during an incident evaluation, you can launch the Tivoli SRM Incident Management window view from the HP Service Desk, which provides a detailed view of incident Ticket details from Maximo.

4.3 Service Desk integration planning and installation

Prior to the installation and configuration of the HP ServiceCenter connector, prerequisites must be met prior to starting the installation and configuration.

Predefined scenario

The predefined scenario that we provide with the product is simple. Every incident record in the HP ServiceCenter with a data that is greater than the particular date specified in the AssemblyLine is created in Tivoli SRM.

Service Desk integration component availability

Service Desk application integration scenarios are available by default along with the TDI installation from the Tivoli SRM installation launchpad.

Note: Service Desk application integration scenarios are also available as a single zip file archive (.zip) from the IBM Tivoli Open Process Automation Library (OPAL) Web site at:

`http://catalog.lotus.com/wps/portal/topal`

Visit this Web site prior to deploying Service Desk integration scenarios to ensure that you have the latest version. The zip is not available on the Web site at this time.

Prerequisites for installation and configuration

The integration and installation have prerequisite environmental requirements as shown in Figure 4-2 on page 140.

The prerequisites are:

- An HP ServiceCenter server V6.1 installed and running in your environment.
- An HP ServiceCenter Web Services installed and configured properly, using the same version as the HP ServiceCenter server V6.1.

- An HP ServiceCenter V6.1 Thick Client installed to connect to the server. Perform the configuration and other changes to the system.

Figure 4-2 shows the integration environment and components.

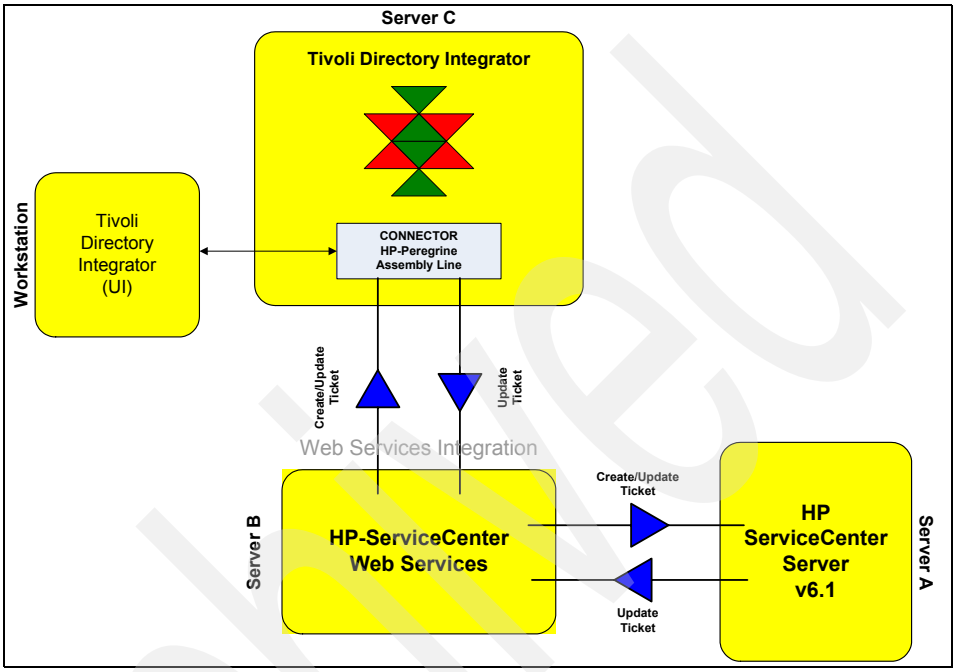


Figure 4-2 Tivoli SRM V7.1 and HP ServiceCenter integration environment

Table 4-1 lists the applications that are supported by the Service Desk integration scenarios.

Table 4-1 Supported versions

Application	Supported version
Tivoli SRM	7.1
HP Service Desk	6.1
TDI	6.1.1

4.3.1 Installation instructions for the HP ServiceCenter connector

The following steps install the HP ServiceCenter connector in the TDI environment:

1. Rename the MaximoConnector.jar file to <*tdi home*>/jars/connectors to MaximoConnector.jar_.
2. Obtain the file tdi_integration_deployment.zip from the TDI build directory.
3. Unzip the file, and copy all jars from integrate/install/tdi/jars/connectors to <*tdi home*>/jars/connectors directory. Example 4-1 shows an example of the jar files.

Example 4-1 Jar files required for the HP ServiceCenter connector

```
C:\IBM\TDI\jars\connectors>dir
 Volume in drive C has no label.
 Volume Serial Number is 6806-ABBD

 Directory of C:\IBM\TDI\jars\connectors

02/28/2008  05:58 PM    <DIR>          .
02/28/2008  05:58 PM    <DIR>          ..
02/12/2008  04:20 PM             6,991 build_stubs.xml
02/12/2008  04:20 PM            13,285 IBMSRMPeregrineBaseConnector.jar
02/12/2008  04:20 PM         1,219,526 IBMSRMPeregrineBaseStubs.jar
02/12/2008  04:20 PM             5,420 IBMSRMPeregrineChangeConnector.jar
02/12/2008  04:20 PM             5,090 IBMSRMPeregrineComputerConnector.jar
02/12/2008  04:20 PM               704 IBMSRMPeregrineConnectors-docs.zip
02/12/2008  04:20 PM             5,426 IBMSRMPeregrineIncidentConnector.jar
02/12/2008  04:20 PM             3,644 IBMSRMPeregrineOperatorConnector.jar
02/12/2008  04:20 PM             5,704 IBMSRMPeregrineProblemConnector.jar
02/12/2008  04:20 PM             4,501 IBMSRMPeregrineRelationshipConnector.jar
02/12/2008  04:20 PM             4,928 IBMSRMPeregrineSoftwareConnector.jar
02/05/2008  04:42 PM            16,882 MaximoConnector.jar_
```

4. Copy the mxe.xml file from \tdi path in tdi_integration_deployment.zip to <*tdi working dir*>.
5. Modify the <*tdi working dir*>/mxe.properties file (Example 4-2 on page 142), and add the following lines:

```
peregrinePassword<peregrine password>  (default is blank)
peregrineCMTOffset=<CMT offset> (timezone offset from CMT, -5 is Central)
peregrineHost=<your peregrine host URL> (ex. http://localhost)
peregrinePort=<peregrine port> (ex. 12670)
peregrineUser=<peregine userid>  (ex. falcon)
```

Example 4-2 mxe.properties file

```
peregrinePassword={encr}
peregrineCMTOffset=-5
peregrineHost=http://localhost
peregrinePort=12670
peregrineUser=falcon
```

6. Edit <*tdi working dir*>/mxetdi.cmd (or.sh for Linux/UNIX), and modify the values (Example 4-3) for the `-r` option.

Example 4-3 mxetdi.cmd file

```
"<tdi home>\ibmdisrv" -s . -c mxe.xml -r TECIn TECTimer PeregrineTimer
```

7. By default, AssemblyLine queries the HP ServiceCenter database (Figure 4-3).

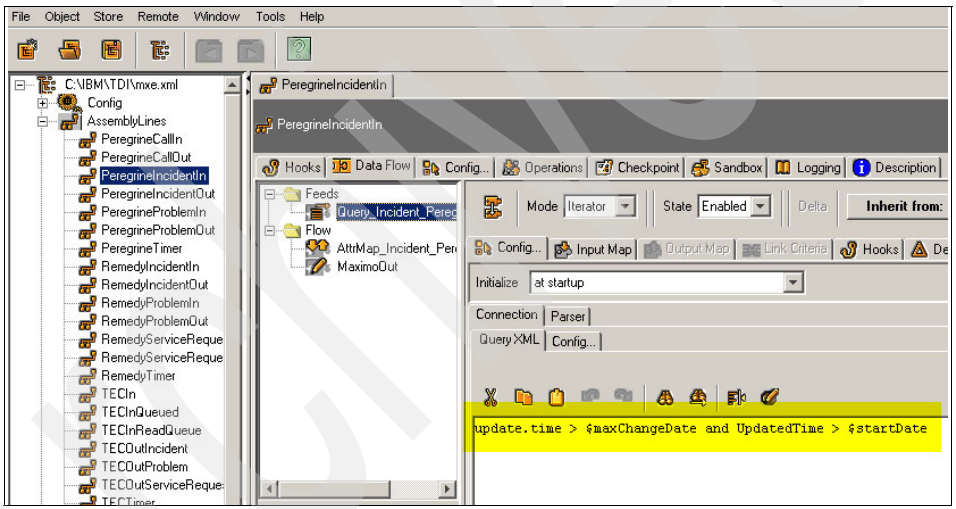


Figure 4-3 AssemblyLine configuration: Querying HP ServiceCenter database

8. To bypass this feature, you must disable the *MaximoOut Flow connector* temporarily in the following assemblies: *PeregrineIncidentIn*, *PeregrineProblemIn*, and *PeregrineCallIn*:
   a. Start **TDI config editor**, and open the mxe.xml file.
   b. Select **PeregrineIncidentIn** assembly from the upper left panel.
   c. Right-click the *MaximoOut connector* in the Flow section, and choose the *Enable* option to toggle it to disabled as shown Figure 4-4 on page 143.

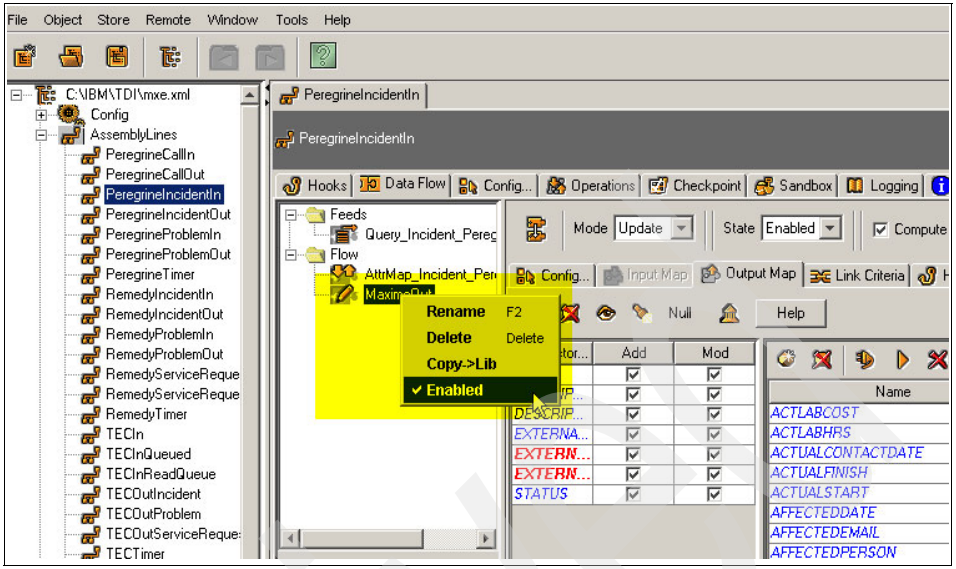


Figure 4-4 AssemblyLine configuration: Disabling the SRM ticket generation

4.3.2 HP Service Desk configuration

To make the integration possible and to prevent duplicates of the same record being created in HP ServiceCenter or Tivoli SRM, there must be a field in both ServiceCenter and Tivoli SRM to hold the external ID value of the ticket in the SRM application. In Tivoli SRM, this field is created when the Process Solution installation is running. In HP ServiceCenter, we manually create them.

Setting up the Web services server

Complete the following steps:

1. Open the file sc.cfg located in <*PEREGRINE_INSTALL_HOME*>\ ServiceCenter Server\RUN and open it.
2. Add the following line in the file:
   `scenter -apiserver:<` *PEREGRINE_WEBSERVICES_PORT*`> -log:../logs/ws.log`
   and substitute <*PEREGRINE_WEBSERVICES_PORT*> for a port number to use as the Web services listener. The default port in the Assembly Line is 12700.
3. Restart the HP ServiceCenter console.

Creating new fields

To create new fields, complete the following steps:

1. Open the **Peregrine ServiceCenter client** and connect to the server.
2. Navigate to **System Definition** → **Tables** → **probsummary**.
3. Go to the **Field and Keys** tab.
4. In the Field section, click **New Field** → **type name external.id**
5. Click **OK**.
6. With **Field** selected, in General Properties, select type **Text** → **caption ExternalID.**
7. In Peregrine Web Services API Properties, select **Include in API**.
8. Type `ExternalID` in the Field Name in the API field.
9. In the Field section, click **New Field** → **type name external.uid**
10. Click **OK**.
11. With **Field** selected, in General Properties, select type **Text** → **caption ExternalUID.**
12. In Peregrine Web Services API Properties, select **Include in API**.
13. Type `ExternalUID` in the Field Name in the API field.
14. Click **Save**.
15. Navigate to **System Definition** → **Tables** → **rootcause**.
16. Go to the tab **Field and Keys**.
17. In the Field section, click **New Field** → **type name external.id**
18. Click **OK**.
19. With field selected, in General Properties, select type **Text** → **caption ExternalID.**
20. In Peregrine Web Services API Properties, select **Include in API**.
21. Leave the Field Name in API field blank.
22. In the Field section, click **New Field** → **type name external.uid**
23. Click **OK.**
24. Select **Field** in General Properties, select **Text** → **caption ExternalUID.**
25. In Peregrine Web Services API Properties, select **Include in API**.
26. Leave the Field Name in API field blank.
27. Click **Save**.
28. Navigate to **System Definition** → **Tables** → **cm3r**.

29. Go to the tab **Field and Keys.**
30. In the Field section, click **New Field** → **type name external.id**
31. Click **OK**.
32. With **field** selected, in General Properties, select **Text** → **caption ExternalUID.**
33. In Peregrine Web Services API Properties, select **Include in API**.
34. Type `ExternalID` in the Field Name in the API field.
35. In the Field section, click **New Field**, and type name **external.uid**
36. Click **OK**.
37. With Field selected, in General Properties, select **Text** → **caption ExternalUID**.
38. In Peregrine Web Services API Properties, select **Include in API**.
39. Type `ExternalUID` in the Field Name in API field.
40. Click **Save**.

Adding Web Services API database attributes

The HP OpenView ServiceCenter Web services API does not include all required database attributes by default. The Service Desk integration AssemblyLines are dependent upon attributes that are not included. These attributes can be included as described next (when the column Field Data Type in API is empty, leave it empty in the Administration Client also, so that the application defaults to StringType).

For Peregrine to publish the tables and fields that are going to be queried or updated by the AssemblyLines, it has to be configured:

1. Open **Peregrine ServiceCenter Client** and connect to the server.
2. Go to **System Definition** → **Tables** → **probsummary**.
3. Go to the tab **Fields and Keys** and locate them as shown in Table 4-2 on page 146.

Table 4-2 Adding the API database attributes to fields

Field name	Field name in API	Field data type in API
contact.email	ContactEmail	N/A
contact.phone	ContactPhone	N/A
contact.time	ContactTime	DateTimeType
extension	ContactPhoneExtension	N/A
user.priority	UserPriority	N/A

Note: For each of these fields, click the **Include in API** check box, **Field Name in API**, and **Field Data Type in API**.

4. Go to **System Definition** → **Tables** → **cm3r**.
5. Go to the **Fields and Keys** tab and locate the fields shown in Table 4-3.

Table 4-3 Adding the API database attribute fields

Field name	Field name in API	Field data type in API
header, orig.date.entered	DateOpened	DataTimeType
header,request.phone	RequestorPhone	N/A
sysmodtime	SysModTime	DataTimeType

6. Go to **System Definition** → **Tables** → **rootcause**.
7. Click the **Include in API** check box for all fields:
   a. Leave the Field Name in API blank.
   b. For each field type: Date/Time in the General Properties section, choose **StringType.**
8. Go to **System Definition** → **Tables** → **operator**.
9. Go to the Fields and Keys tab, and locate the following fields in Table 4-4 on page 147.

Table 4-4 Adding the API database attributes to fields

Field name	Field name in API	Field data type in API
email	email	N/A
name	name	N/A
phone	phone	N/A

10. Go to **System Definition** → **Tables** → **scrélation**.
11. Click the **Include in API** check box for all fields:
    a. Leave the Field Name in API blank.
    b. For each field that is Date/Time Type (look in the General Properties section), choose **DateTimeType** in the Field Data Type in API field.
    c. For each field that is Boolean Type, choose **Type Boolean** in the Field Data Type in API field.
12. Go to **System Definition** → **Tables** → **Device**.
13. Go to the **Fields and Keys** tab and locate the fields that are shown in Table 4-5.

Table 4-5 Adding the API database attributes to fields

Field name	Field name in API	Field data type in API
sysmodtime	SysmodTime	DateTimeType

Note: For each of these fields, click the **Include in API** check box, and fill in the Field Name in API and the Field Data Type in API.

14. Go to **System Definition** → **Tables** → **Computer**.
15. Go to the **Fields and Keys** tab and locate the fields that are shown in Table 4-6.

Table 4-6 Adding the API database attributes to fields

Field name	Field name in API	Field data type in API
machine.name	MachineName	N/A
sysmodtime	SysModTime	DateTymeType

Note: For each of the fields, click the **Include in API** check box, and fill in the Field Name in API and the Field Data Type in API.

16. Go to **System Definition** → **Tables** → **pcsoftware**.
17. Go to the **Fields and Keys** tab and locate the fields that are shown in Table 4-7.

Table 4-7 Adding the API database attributes to fields

Field name	Field name in API	Field data type in API
sysmodtime	SysmodTime	DateTimeType

Note: For each field, click the **Include in API** check box, and fill in the Field name in API and the Field data type in API.

18. Go to **Menu Navigation** → **Toolkit** → **DatabaseManager** → **Table: extaccess**.
19. Select **Search**.
20. Add a new service with the following parameters:
    a. Service Name: `OperatorManagement`
    b. Name: `Operator`
    c. Object: `Operator`
21. Select **Add.**
22. Select **OK.**
23. Add a new service with the following parameters:
    a. Service Name: `RelationshipManagement`
    b. Name: `screlation`
    c. Object: `Relationship`
    d. Go the **Allowed Actions** tab, add the following lines:
       i. `Save/Update`
       ii. `Delete/Delete`
       iii. `Add/Create`
24. Select **Add.**
25. Exit the Database Manager application.

Implementing launch in context

The first time that a *launch in context* is established from an HP ServiceCenter server application, log in to the Change and Configuration Management Database (CCMDB) environment. After that, you do not have to log in to the CCMDB environment unless the session expires, you choose the Sign out option, or you close the window. To customize the HP ServiceCenter to launch the CCMDB in context, complete the following steps:

1. Identify the HP ServiceCenter form. The first step to launching CCMDB from the HP OpenView ServiceCenter interface is to identify the HP OpenView ServiceCenter form where the launch button is placed:
   a. Select the **Services** tab in the HP ServiceCenter panel.
   b. Click **Incident Management**, and then, click **Search IM Tickets**.
   c. Press Enter with the window open without entering any values. A new window appears with a list at the top and a form at the bottom.
   d. Click or position the focus on the form. Check the name of the form in the bottom right corner (for example, `IM.template.open.g`).
   e. Write down the name of the form.
2. Associate an action to the button. After you have successfully added the new button to the form, you must associate an action with its use. Complete the following steps to associate an action with the new button:
   a. Select the **Utilities** tab from the HP ServiceCenter window.
   b. Select **Tools** from the Utilities panel.
   c. Click **Display Options**.
   d. In the display application option definition, fill the following fields with these values:
      i. Window ID: `scm.advanced`
      ii. Default Label: `By Owner`
      iii. Balloon Help: `Calls by Owner`
   e. Select **Search**.
   f. Modify the following fields:
      i. Window ID: `apm.edit.problem`
      ii. Action: `do nothing`
      iii. Unique ID: `lic.incident.CCMDB` (as an example)
      iv. GUI option: `6000`
      v. Balloon Help: `This is a text field not mandatory.`
      This text appears when you move the mouse pointer on the button.

vi. Default Label: `This is a text field not mandatory.`
Type a default label for the application.

Condition: **"**`not null(external.uid in $L.filed)`**"** Setting Condition to that value forces the launch button to be enabled only for integrated records. If you want the launch button to be conditionally enabled, consult the HP ServiceCenter documentation.

g. Select the **RAD** tab.

h. Select the **Pre Rad® Expressions** tab in the sub-tab and fill the expression with the following value:
`$lo.command="http://<hostname or IP address>:<portnumber>/maximo/ui/?event=loadapp&value=incident&uissessionid="+external.uid in $L.filed`

The link that was added within the HP ServiceCenter record is shown in Example 4-4.

Example 4-4 Link added within the HP ServiceCenter record

```
"http://9.3.5.46:9080/maximo/ui/?event=loadapp&value=incident&uisessionid="+external.uid
```

i. Select the **Rad** tab in the sub-tab, and fill the fields as described:

i. RAD Application: `us.launch.external`

ii. Separate Thread: `false`

iii. Name: `$lo.command`

j. Click **Add**.

k. Click **OK**.

3. Now that the form is identified, you can add a button.

a. Select the **Toolkit** tab from the HP ServiceCenter window.

b. Select **Forms Designer** from the Toolkit panel.

c. Type `IM.template.update.g` in the Form field of the Forms Designer window.

d. Click the Search icon.

e. Highlight the **IM.template.update.g** form listed in the search results list.

f. Click **Design**.

4. Create a New button on the form by first selecting the button icon from the tools bar.

5. Move the button anywhere on the form.

6. Change the properties when the button is created on the form:
   a. Select **New**.
   b. Change the following Properties from within the Properties window:
      i. Change the Caption value: Provide the appropriate identification.
      ii. Change the Button ID: `6000`.

      This value is defined in the Button definition “as Display Option”.

Viewing data in context

After you have completed the steps for implementing launch in context for the incident modules, it must be synchronized through the AssemblyLines. To view the data in context, complete the following steps:

1. Launch **HP OpenView ServiceCenter** and log in.
2. View any of the Open tickets that are incident types.
3. Click **Launch CCMDB**.

After you complete the steps, the CCMDB Product Console is launched in context.

Verifying the creation and publication of new fields

Use this topic to verify that new fields are created in HP ServiceCenter and the correct fields are published.

Verify that the new fields are created and published by completing the following steps:

1. Open the **Peregrine ServiceCenter Client** and connect to the server.
2. Go to **Menu Navigation** → **Toolkit** → **DatabaseManager**.
3. Click **File.**
4. Type `extaccess`.
5. Press Enter.
6. For the following services, click the **Data policy** tab and make sure that the external.id and external.uid fields are created and that all the correct fields are published:
   a. IncidentManagement.wsdl
   b. ProblemMangemente.wsdl
   c. ChangeManagement.wsdl
7. For the following services, click the **Data policy** tab and make sure that the correct fields are published:
   a. ConfigurationManagement.wsdl

b. RelationshipManagement.wsdl
c. OperatorManagement.wsdl

4.3.3 TDI properties configuration

The TDI Properties file contains the parameters that you need for the AssemblyLines to work. The values must be defined for the properties according to your system's configuration. Using the values that you entered in the worksheet, complete the following steps to install Service Desk integration scenarios:

1. Start the **TDI**.
2. Open the TDI AssemblyLine:
   a. Select **File** → **Open**.
   a. Choose the <*TDI solution directory*>\peregrine\mxe.xml file.
   a. Click **OK**.
3. Set the properties for your environment by completing the following steps:
   a. In the navigation menu, click **Properties**.
   a. Select **MXE** from the Property Stores list.
   b. Edit the **MXE** properties by double-clicking the Value field for each of the properties that is listed in Table 4-8 on page 153.

Table 4-8 MXE properties store in TDI

Property	Default value	Properties per integration environment	Record your values
config.peregrine.password	N/A	Provide HP Service Desk user password for authentication	
config.peregrine.server.port	12700	Provide HP Service Desk port number	
config.peregrine.server.url	http://<*server IP*>	Provide Peregrine URL, for example: http://9.3.5.56	
config.peregrine.user, value	falcon	Provide HP Service Desk user name for authentication	
default.last.execution.date.Maximo_ESD	2008-01-01T06:00:00+00:00	Auto-populated	
default.maximo.authentication.required	TRUE	DEFAULT	
default.maximo.callSystemId, value	PCALL	DEFAULT	
default.maximo.error.excedent.size	FALSE	DEFAULT	
default.maximo.incidentSystemId	PINC	Provide value Maximo Incident System ID	
default.maximo.owner	EXT_SD	Provide value of Owner ID which is a valid ID in Tivoli SRM person records	
default.maximo.owner.group	G_EXT_SD	Provide value of Owner Group ID, which is a valid ID in Tivoli SRM Person Group records	
default.maximo.password	N/A	Provide Tivoli SRM user password for authentication	
default.maximo.problemSystemId	PPRO	DEFAULT	

Property	Default value	Properties per integration environment	Record your values
default.maximo.siteid	BEDFORD	Provide Tivoli SRM Site ID for the tickets	
default.maximo.url	http://<*Server name* or *ID*>:<*port number*>	Provide Tivoli SRM application URL with port number. For example: http://9.3.5.46:9080	
default.maximo.user	maxadmin	Use maxadmin as default or provide an integration user that is used for the activity	
default.maximo.xml.character.validation	TRUE	DEFAULT	
default.peregrine.assignment.group	DEFAULT	DEFAULT	
default.peregrine.category	other	DEFAULT	
default.peregrine.contact	FALCON, JENNIFER	Provide Peregrine user for the contact	
default.peregrine.incident.assignment.group	DEFAULT	Provide Peregrine Incident assignment group	
default.peregrine.incident.category	other	DEFAULT	
default.peregrine.incident.closure.code	Advice & Guidance	Provide Peregrine Incident closure code	
default.peregrine.incident.contact	FALCON, JENNIFER	Provide Peregrine Incident contact name	
default.peregrine.incident.problem.type	none	DEFAULT	
default.peregrine.incident.product.type	none	DEFAULT	
default.peregrine.incident.resolution.fix.type	permanent	DEFAULT	

Property	Default value	Properties per integration environment	Record your values
default.peregrine.incident.severity	5 - Very Low	Provide Peregrine Incident severity	
default.peregrine.incident.site.category	Remote	Provide Peregrine Incident category	
default.peregrine.incident.subcategory	client dependent	Provide Peregrine Incident subcategory	
default.peregrine.owner	BOB.HELPDESK	Provide Peregrine process owner, which is a valid Peregrine user	
default.peregrine.problem.category	other	Provide Peregrine Problem category	
default.peregrine.problem.initial.impact	low	Provide Peregrine Problem initial impact	
default.peregrine.problem.problem.type	none	Provide Peregrine Problem type	
default.peregrine.problem.product.type	none	Provide Peregrine Problem Product type	
default.peregrine.problem.subcategory	client dependent	Provide Peregrine problem subcategory	
default.peregrine.problem.type	none	Provide Peregrine Problem type	
default.peregrine.problem.urgency	4 - Low	Provide Peregrine Problem Urgency	
default.peregrine.severity	5 - Very Low	Provide Peregrine Problem Severity	
default.peregrine.site.category	Remote	Provide Peregrine Problem Site category	
default.peregrine.subcategory	client dependent	Provide Peregrine Problem subcategory	
default.problem.urgency	4 - Low	Provide Peregrine Problem Severity	

Property	Default value	Properties per integration environment	Record your values
delete.last.execution.date.Maximo_ESD	no	DEFAULT	
maximumQueueSendAttempts	10	DEFAULT	
queueStoreINIFile	pwstore_server.ini	DEFAULT	

4.4 Scenario window flow

In this section, we demonstrate how Tivoli SRM and HP ServiceCenter integration is accomplished in a real-life scenario:

1. Open HP ServiceCenter and navigate to the **Incident Management** module.
2. Select the **Open New incident** window and fill all the required fields to create a new incident record.
3. Click **Submit**.
4. Open the **TDI** scenario:
   a. Start the **TDI** application.
   b. Open the **mxe.xml** (the configuration file for the scenarios). Refer to Figure 4-5 on page 157.

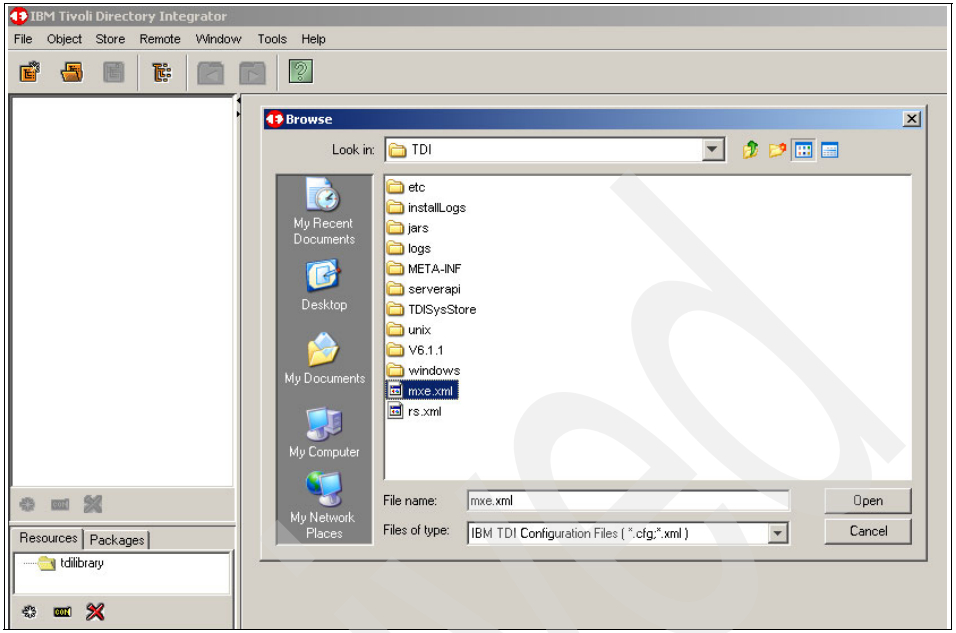


Figure 4-5 Opening of the integration scenarios, known as an AssemblyLine

Note: By default, TDI has a timer scheduling mechanism, which runs all AssemblyLine transactions periodically. You can alter the timing schedule by setting the TDI Timer. You can also execute the AssemblyLines manually from TDI.

5. Run **PeregrineIncident** in the AssemblyLine to perform integration (Figure 4-6 on page 158).

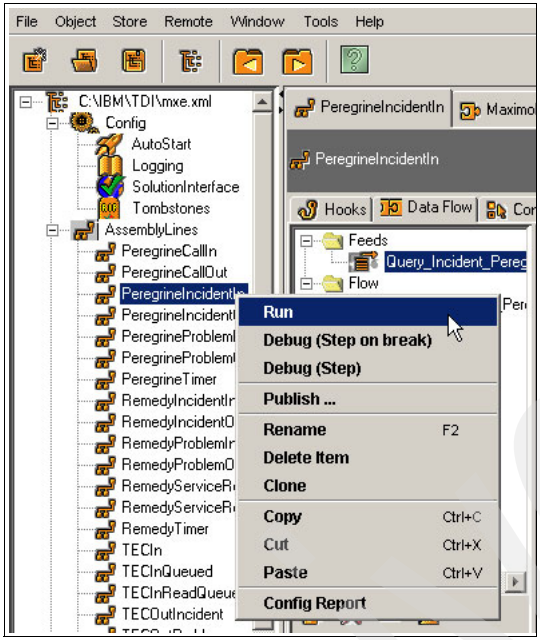


Figure 4-6 Running AssemblyLine manually

6. After PeregrineIncident in AssemblyLine runs successfully, the following output appears on the right pane, which shows the messages. We identify the important messages (Example 4-5) in this output in **bold**.

Example 4-5 PeregrineIncident in AssemblyLine output

```
Command Line Parameters:
 [javaw.exe, -classpath, C:\IBM\TDI\V6.1.1\IDILoader.jar,
-Dlog4j.configuration=file:///C:\IBM\TDI\V6.1.1/etc/executetask.properties, -Dos.name=Windows
Server 2003,
-Djava.library.path=C:\IBM\TDI\V6.1.1\jvm\jre\bin;.;C:\IBM\TDI\V6.1.1\jvm\jre\bin;C:\IBM\TDI\V6
.1.1\libs;C:\cygwin\bin;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\Wbem;C:\Program
Files\IBM\WebSphere\AppServer\java\bin;C:\Program Files\IBM\Java50\jre\bin;C:\Apache Software
Foundation\Tomcat 4.1, -jar, C:\IBM\TDI\V6.1.1\IDILoader.jar, com.ibm.di.server.RS,
-rAssemblyLines/PeregrineIncidentIn, -SC:\IBM\TDI\mxe.xml,
-Ycom.ibm.di.config.xml.MetamergeConfigXML, -D, -R]

16:16:49  CTGDIS232I Server is running in standard mode.
16:16:50  CTGDIS236I The stash file has been successfully read.
16:16:50  CTGDIS237I The key password is not in the stash file. The keystore password is used.
16:16:50  CTGDIS238I Server security has been successfully initialized.
16:16:50  CTGDKD445I Custom method invocation is set to false.
16:16:51  CTGDKD460I Generated configuration id 'C__IBM_TDI_mxe.xml' for a configuration
instance loaded from file 'C:\IBM\TDI\mxe.xml'.
```

```
16:16:51  CTGDIS229I Register server: C:\IBM\TDI\mxe.xml.
16:16:51  Version : 6.1.1 - 2007-02-07
16:16:51  OS Name : Windows Server 2003
16:16:51  Java Runtime : IBM Corporation, 2.3
16:16:51  Java Library : C:\IBM\TDI\V6.1.1\jvm\jre\bin
16:16:51  Java Extensions : C:\IBM\TDI\V6.1.1\jvm\jre\lib\ext
16:16:51  Working directory : C:\IBM\TDI\V6.1.1
16:16:51  Configuration File: <stdin>
16:16:51  CTGDIS785I ---
16:16:51  CTGDIS040I Loading configuration from stdin.
16:16:52  CTGDIS028I Starting AssemblyLine AssemblyLines/PeregrineIncidentIn.
16:16:52  CTGDIS255I AssemblyLine AssemblyLines/PeregrineIncidentIn is started.
16:16:52  CTGDIS669I [ScriptEngine] RegEx library: java regex library.
16:16:52  CTGDIS670I [ScriptEngine] Engine last modified date: Tue Jan 23 13:08:12 CST 2007
(C:\IBM\TDI\V6.1.1\jars\3rdparty\IBM\ibmjs.jar).
16:16:53  CTGDIR101I The properties file 'C:\IBM\TDI\V6.1.1\solution.properties' does not exist
and is ignored.
16:16:54  CTGDIS087I Iterating.
16:16:56  extToHash: PINC IM10006=PINC-1680533229
16:16:56  [MaximoOut] Executing search...
16:17:12  [MaximoOut] Search has been executed.
16:17:12  [MaximoOut] Creating entry...
16:17:12  [MaximoOut] Entry has been created.
16:17:12  extToHash: PINC IM10007=PINC-1680533228
16:17:12  [MaximoOut] Executing search...
16:17:12  [MaximoOut] Search has been executed.
16:17:12  [MaximoOut] Creating entry...
16:17:12  [MaximoOut] Entry has been created.
16:17:12  CTGDIS088I Finished iterating.
16:17:12  CTGDIS100I Printing the Connector statistics.
16:17:12   [Query_Incident_Peregrine] Get:2
16:17:12   [AttrMap_Incident_Peregrine_Maximo] CTGDIS103I No statistics.
16:17:12   [MaximoOut] Lookup:2, Add:2
16:17:12  CTGDIS104I Total: Get:2, Lookup:2, Add:2.
16:17:12  CTGDIS101I Finished printing the Connector statistics.
16:17:12  CTGDIS080I Terminated successfully (0 errors).
16:17:12  CTGDIS079I AssemblyLine AssemblyLines/PeregrineIncidentIn terminated successfully.
16:17:14  CTGDIS241I All threads have been stopped.
16:17:14  CTGDIS174I Config Instance C:\IBM\TDI\mxe.xml exited with status 0.
16:17:14  CTGDIS228I Unregister server: C:\IBM\TDI\mxe.xml.
16:17:14  CTGDIS627I TDI Shutdown.
16:17:14  CTGDIS376I Shutting down database: TDISysStore.
************************

Process exit code = 0
```

7. Open **Incident Management** from the Start Center, as shown in Figure 4-7.

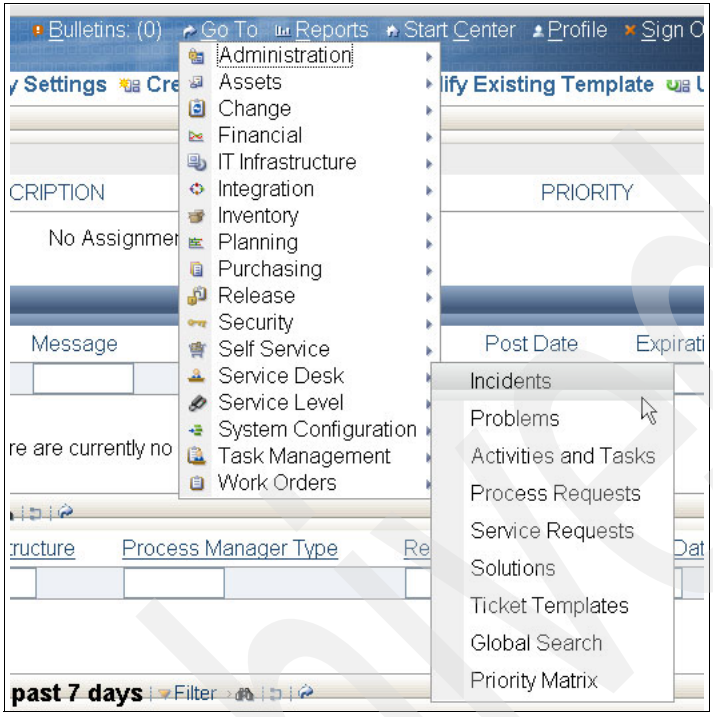


Figure 4-7 Opening the incident application within SRM

8. Verify the Incident ticket that was created by HP ServiceCenter. Take action on the ticket and save the Incident ticket. You can move this ticket into the workflow and take an action by using the Tivoli SRM features.
9. Update the Incident that was created in Tivoli SRM by changing the Contact Name or any other field that exists in HP ServiceCenter. Refer to Figure 4-8 on page 161.

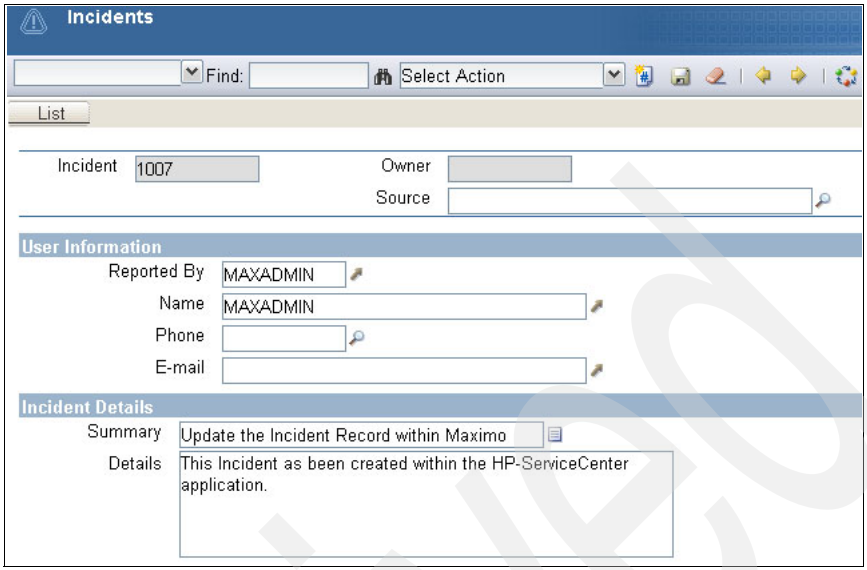


Figure 4-8 Opening the incident created from HP ServiceCenter

10. Run AssemblyLine manually as shown in Step 5., “Run PeregrineIncident in the AssemblyLine to perform integration (Figure 4-6 on page 158).” Example 4-6 on page 162 shows the output.

Example 4-6 Peregrine IncidentOUT AssemblyLine output

```
Command Line Parameters:
 [javaw.exe, -classpath, C:\IBM\TDI\V6.1.1\IDILoader.jar,
-Dlog4j.configuration=file:///C:\IBM\TDI\V6.1.1/etc/executetask.properties, -Dos.name=Windows
Server 2003,
-Djava.library.path=C:\IBM\TDI\V6.1.1\jvm\jre\bin;.;C:\IBM\TDI\V6.1.1\jvm\jre\bin;C:\IBM\TDI\V6
.1.1\libs;C:\cygwin\bin;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\Wbem;C:\Program
Files\IBM\WebSphere\AppServer\java\bin;C:\Program Files\IBM\Java50\jre\bin;C:\Apache Software
Foundation\Tomcat 4.1, -jar, C:\IBM\TDI\V6.1.1\IDILoader.jar, com.ibm.di.server.RS,
-rAssemblyLines/PeregrineIncidentOut, -SC:\IBM\TDI\mxe.xml,
-Ycom.ibm.di.config.xml.MetamergeConfigXML, -D, -R]

16:24:28  CTGDIS232I Server is running in standard mode.
16:24:29  CTGDIS236I The stash file has been successfully read.
16:24:29  CTGDIS237I The key password is not in the stash file. The keystore password is used.
16:24:29  CTGDIS238I Server security has been successfully initialized.
16:24:29  CTGDKD445I Custom method invocation is set to false.
16:24:30  CTGDKD460I Generated configuration id 'C__IBM_TDI_mxe.xml' for a configuration
instance loaded from file 'C:\IBM\TDI\mxe.xml'.
16:24:30  CTGDIS229I Register server: C:\IBM\TDI\mxe.xml.
16:24:30  Version : 6.1.1 - 2007-02-07
16:24:30  OS Name : Windows Server 2003
16:24:30  Java Runtime : IBM Corporation, 2.3
16:24:30  Java Library : C:\IBM\TDI\V6.1.1\jvm\jre\bin
16:24:30  Java Extensions : C:\IBM\TDI\V6.1.1\jvm\jre\lib\ext
16:24:30  Working directory : C:\IBM\TDI\V6.1.1
16:24:30  Configuration File: <stdin>
16:24:30  CTGDIS785I ---
16:24:30  CTGDIS040I Loading configuration from stdin.
16:24:31  CTGDIS028I Starting AssemblyLine AssemblyLines/PeregrineIncidentOut.
16:24:31  CTGDIS255I AssemblyLine AssemblyLines/PeregrineIncidentOut is started.
16:24:31  CTGDIS669I [ScriptEngine] RegEx library: java regex library.
16:24:31  CTGDIS670I [ScriptEngine] Engine last modified date: Tue Jan 23 13:08:12 CST 2007
(C:\IBM\TDI\V6.1.1\jars\3rdparty\IBM\ibmjs.jar).
16:24:31  [MaximoIn] CTGDIS058I Connector com.ibm.di.maximo.core.GenericMaximoConnector
inherits from [parent].
16:24:31  [MaximoIn] CTGDIS187I Loaded com.ibm.di.maximo.core.GenericMaximoConnector, 1.0.0
[2008-03-03 00:31:09].
16:24:31  [MaximoIn] CTGDIS064I Loading Attribute Map.
16:24:31  [MaximoIn] CTGDIS065I Load Hooks.
16:24:31  [Update_Incident_Peregrine] CTGDIS058I Connector
com.tivoli.di.peregrine.incident.PeregrineIncidentConnector inherits from [parent].
16:24:31  [Update_Incident_Peregrine] CTGDIS187I Loaded
com.tivoli.di.peregrine.incident.PeregrineIncidentConnector, 1.0.
16:24:31  [Update_Incident_Peregrine] CTGDIS064I Loading Attribute Map.
16:24:31  [Update_Incident_Peregrine] CTGDIS065I Load Hooks.
16:24:31  [MaximoIn] CTGDIS350I Trigger before_initialize [1]
```

```
com.ibm.di.maximo.util.AbstractConfigurationParameters{enterpriseServiceDelete=MXIncidentDelete
; enterpriseServiceUpdate=MXIncidentUpdate; password=(password not shown);
externalSystem=EXTSYSTDI; mbo=INCIDENT; authenticationRequired=true;
maximoBaseURL=http://9.3.5.46:9080; enterpriseServiceQuery=MXIncidentQuery;
objectStructure=MXOSINCIDENT; maximoVersion=7 1 Harrier 072 7100-001; pageSize=100;
enterpriseServiceCreate=MXIncidentCreate; xmlCharacterValidation=true; queryCriteria=<INCIDENT>
   <CHANGEDATE operator="&gt;">2008-03-05T18:25:56-06:00</CHANGEDATE>
   <EXTERNALRECID>PINC</EXTERNALRECID>
</INCIDENT>; userId=maxadmin; errorOnExcedentSize=false; maxobjObjectStructure=MXOBJECTCFG;
maxobjEnterpriseService=MXMaxObjectQuery; }
16:24:49  [Update_Incident_Peregrine] CTGDIS484I Connector
com.tivoli.di.peregrine.incident.PeregrineIncidentConnector: 1.0.
16:24:49  [Update_Incident_Peregrine] CTGDIS046I Initialization finished.
16:24:49  CTGDIS087I Iterating.
16:24:49  [MaximoIn] CTGDIS504I *Result of attribute mapping*
16:24:49  [MaximoIn] CTGDIS505I The 'conn' object
16:24:49  [MaximoIn] CTGDIS003I *** Start dumping Entry
16:24:50  [Update_Incident_Peregrine] CTGDIS004I *** Finished dumping Entry
16:24:50  [Update_Incident_Peregrine] CTGDIS506I The 'work' object
16:24:52  [MaximoIn] CTGDIS504I *Result of attribute mapping*
16:24:52  [MaximoIn] CTGDIS505I The 'conn' object
16:24:52  [MaximoIn] CTGDIS003I *** Start dumping Entry
16:24:52  Operation: generic
16:24:52  Entry attributes:
16:24:52  REPORTEDPHONE (replace):''
16:24:52  STATUS#maxvalue (replace):'NEW'
16:24:52  VENDOR (replace):''
16:24:52  COMMODITY (replace):''
16:24:52  ACTLABHRS (replace):'0.0'
16:24:52  ISGLOBAL (replace):'false'
16:24:52  SOLUTION (replace):''
16:24:52  PMCOMRESOLUTION (replace):''
16:24:52  RELATEDTOGLOBAL (replace):'false'
16:24:52  ACTUALFINISH (replace):''
16:24:52  AFFECTEDPERSON (replace):''
16:24:52  CREATEWOMULTI#maxvalue (replace):'MULTI'
16:24:52  CREATEDBY (replace):'MAXADMIN'
16:24:52  ACTUALSTART (replace):''
16:24:52  INHERITSTATUS (replace):'false'
16:24:52  FR2CODE_LONGDESCRIPTION (replace):''
16:24:52  TARGETDESC (replace):''
16:24:52  LOCATION (replace):''
16:24:52  FAILURECODE (replace):''
16:24:52  EXTERNALSYSTEM (replace):''
16:24:52  ISKNOWNERROR (replace):'false'
16:24:52  HASACTIVITY (replace):'false'
```

```
16:24:52  COMMODITYGROUP (replace):''
16:24:52  OWNER (replace):''
16:24:52  GLOBALTICKETID (replace):''
16:24:52  CHANGEBY (replace):'MAXADMIN'
16:24:52  PROBLEMCODE_LONGDESCRIPTION (replace):''
16:24:52  ORIGRECSITEID (replace):''
16:24:52  REPORTEDBY (replace):''
16:24:53  ISKNOWNERRORDATE (replace):''
16:24:53  GLOBALTICKETCLASS (replace):''
16:24:53  DESCRIPTION_LONGDESCRIPTION (replace):'Blue Window appeared on Win 2000 Server
hosting my Data

Description Updated as per discussion with ticket creator'
16:24:53  EXTERNALRECID (replace):'PINC-1680533229'
16:24:53  DESCSRVID (replace):''
16:24:53  CHANGEDATE (replace):'2008-03-20T16:06:25-07:00'
16:24:53  SUPERVISOR (replace):''
16:24:53  ACTUALCONTACTDATE (replace):''
16:24:53  PMCOMTYPE (replace):''
16:24:53  CLASS (replace):'INCIDENT'
16:24:53  PROBLEMCODE (replace):''
16:24:53  AFFECTEDEMAIL (replace):''
16:24:53  ORIGRECORGID (replace):''
16:24:53  REPORTEDEMAIL (replace):''
16:24:53  SOURCE (replace):''
16:24:53  TICKETID (replace):'1102'
16:24:53  ACTLABCOST (replace):'0.0'
16:24:53  TICKETUID (replace):'115'
16:24:53  FR1CODE_LONGDESCRIPTION (replace):''
16:24:53  ORIGRECORDCLASS (replace):''
16:24:53  ORIGRECORDID (replace):''
16:24:53  OWNERGROUP (replace):''
16:24:53  SITEVISIT (replace):'false'
16:24:53  CLASSSTRUCTUREID (replace):''
16:24:53  HISTORYFLAG (replace):'false'
16:24:53  AFFECTEDDATE (replace):''
16:24:53  ASSETORGID (replace):''
16:24:53  REPORTDATE (replace):'2008-03-20T16:02:31-07:00'
16:24:53  TARGETSTART (replace):''
16:24:53  CREATEWOMULTI (replace):'MULTI'
16:24:53  CINUM (replace):''
16:24:53  TARGETFINISH (replace):''
16:24:53  ASSETSITEID (replace):''
16:24:53  EXTERNALSYSTEM_TICKETID (replace):''
16:24:53  FR2CODE (replace):''
16:24:53  CLASSIFICATIONID (replace):''
```

```
16:24:53  TEMPLATE (replace):'false'
16:24:53  ORGID (replace):''
16:24:53  TARGETCONTACTDATE (replace):''
16:24:53  DESCRIPTION (replace):'Blue Window appeared on Win 2000 Server hosting my Data'
16:24:53  CLASS#maxvalue (replace):'INCIDENT'
16:24:53  REMARKDESC_LONGDESCRIPTION (replace):''
16:24:53  FR1CODE (replace):''
16:24:53  TEMPLATEID (replace):''
16:24:53  STATUS (replace):'NEW'
16:24:53  CREATIONDATE (replace):'2008-03-20T16:02:31-07:00'
16:24:53  STATUSDATE (replace):'2008-03-20T16:02:31-07:00'
16:24:53  SITEID (replace):''
16:24:53  ASSETNUM (replace):''
16:24:53  AFFECTEDPHONE (replace):''
16:24:53  [MaximoIn] CTGDIS004I *** Finished dumping Entry
16:24:53  [MaximoIn] CTGDIS506I The 'work' object
16:24:53  [MaximoIn] CTGDIS003I *** Start dumping Entry
16:24:53  Operation: generic
16:24:53  Entry attributes:
16:24:53  STATUS (replace):'NEW'
16:24:53  DESCRIPTION (replace):'Blue Window appeared on Win 2000 Server hosting my Data'
16:24:53  CHANGEDATE (replace):'2008-03-20T16:06:25-07:00'
16:24:53  EXTERNALRECID (replace):'PINC-1680533229'
16:24:53  TICKETID (replace):'1102'
16:24:53  DESCRIPTION_LONGDESCRIPTION (replace):'Blue Window appeared on Win 2000 Server
hosting my Data

Description Updated as per discussion with ticket creator'
16:24:53  TICKETUID (replace):'115'
16:24:53  SOLUTION (replace):''
16:24:53  [MaximoIn] CTGDIS004I *** Finished dumping Entry
16:24:53  [MaximoIn] CTGDIS350I Trigger get_ok [3]
16:24:53  hashToExt: PINC-1680533229=IM10006
16:24:53  [Update_Incident_Peregrine] findEntry(SearchCriteria):
SearchCriteria=com.ibm.di.server.SearchCriteria@10da10da
16:24:53  [Update_Incident_Peregrine] findEntry(SearchCriteria):
search.getFirstCriteriaMatch()=61
16:24:53  [Update_Incident_Peregrine] findEntry(SearchCriteria):
search.getFirstCriteriaName()=number
16:24:53  [Update_Incident_Peregrine] findEntry(SearchCriteria):
search.getFirstCriteriaValue()=IM10006
16:24:53  [Update_Incident_Peregrine] findEntry(SearchCriteria): criteria xml=number ="IM10006"
16:24:53  [Update_Incident_Peregrine] resp keys is
com.peregrine.webservice.incident.IncidentKeysType@300f6546
16:24:53  [Update_Incident_Peregrine] resp key is IM10006
16:24:53  [Update_Incident_Peregrine] status = SUCCESS
```

```
16:24:53  contactPhone (replace):'(619) 455-7645'
16:24:53  [Update_Incident_Peregrine] CTGDIS004I *** Finished dumping Entry
16:24:53  [Update_Incident_Peregrine] CTGDIS350I Trigger before_modify [3]
16:24:54  CTGDIS088I Finished iterating.
16:24:54  [MaximoIn] CTGDIS350I Trigger before_close [1]
16:24:54  [MaximoIn] CTGDIS353I Script is: //Try to store the last execution date
storeNewLastExecutionDate( maxDate, "LASTEXECUTION_INCIDENT_MAXIMO_PEREGRINE", "", "",
"Maximo_ESD" );
16:24:54  SAVING  THE LAST EXECUTION DATE = 2008-03-20T17:06:25-06:00
16:24:54  [Update_Incident_Peregrine] terminate()
16:24:54  CTGDIS100I Printing the Connector statistics.
16:24:54   [MaximoIn] Get:4
16:24:54   [AttrMap_Incident_Maximo_Peregrine] CTGDIS103I No statistics.
16:24:54   [Update_Incident_Peregrine] Lookup:4, Modify:4
16:24:54  CTGDIS104I Total: Get:4, Lookup:4, Modify:4.
16:24:54  CTGDIS101I Finished printing the Connector statistics.
16:24:54  CTGDIS080I Terminated successfully (0 errors).
16:24:54  CTGDIS079I AssemblyLine AssemblyLines/PeregrineIncidentOut terminated successfully.
16:24:55  CTGDIS241I All threads have been stopped.
16:24:55  CTGDIS174I Config Instance C:\IBM\TDI\mxe.xml exited with status 0.
16:24:55  CTGDIS228I Unregister server: C:\IBM\TDI\mxe.xml.
16:24:55  CTGDIS627I TDI Shutdown.
16:24:55  CTGDIS376I Shutting down database: TDISysStore.
************************

Process exit code = 0
```

11. Log back in to HP ServiceCenter to verify the synchronization.

5

IBM Tivoli Identity Manager integration

In this chapter, we provide step-by-step procedures for integrating Tivoli Service Request Manager (SRM) V7.1 with TIM V5.0. Using this integration, you can manage Tivoli SRM application users through Tivoli Identity Manager (TIM).

This chapter has the following sections:

- TIM introduction on page 168
- Installation and configuration procedure on page 170

5.1 TIM introduction

The purpose of this integration is to manage Tivoli SRM application users through TIM 5.0. The integration provides the ability to automatically generate Service Request tickets to be generated in Tivoli SRM for any password that is changed in TIM. In any industry, the majority of Service Request tickets are often password changes. Automating this activity or task allows users to change their password in real time, which results in a dramatic reduction of tickets being raised formally through the Service Desk agents and lowers overall operational cost. The integration between TIM and Tivoli SRM allows for increased flexibility between the products, and it speeds up the process of user management in SRM.

Tivoli Identity Manager

Identity management is a comprehensive, process-oriented, and policy-driven security approach that helps organizations consolidate identity data and automate enterprise deployment.

TIM provides a secure, automated, and policy-based user management solution that helps manage user identities across both existing and e-business environments throughout their life cycle. TIM provides centralized user access to disparate resources in organizations by using policies and features that streamline operations associated with user resource access. As a result, your organization realizes numerous benefits, including:

- Web self-service
- Password reset
- Synchronization

Users can self-administer their passwords using the rules of a password management policy that controls access to multiple applications. *Password synchronization* enables a user to use one password for all accounts that TIM manages. Other advantages are:

- Quick response to audits and regulatory mandates
- Automation of business processes related to changes in user identities by using life cycle management
- Centralized control and local autonomy
- Enhanced integration with the use of extensive APIs
- Choice to manage target systems with an agent or agent-less approach
- Reduced help desk costs
- Increased access security through the reduction of orphaned accounts

- Reduced administrative costs through user provisioning and software automation
- Reduced costs and delays associated with approving resource access to new and changed users

Tivoli SRM

Tivoli SRM is a core component of IBM Service Management (ISM) offerings that are built on open standards-based technologies. It is a highly flexible service-desk solution that allows you to support Information Technology Infrastructure Library (ITIL) processes that benefit your overall business objectives. The solution allows you to move from incident management, to Problem management, to Change management, and to Release management all on a single platform.

The Service Desk module includes applications to manage customer requests for:

- Help
- Information
- Service

The principal user of the Service Desk module is a service desk agent. The *agent* uses the software to record requests from internal or external customers and takes steps to resolve the issue. The resolution of an issue often requires a workflow of activities involving several people. Users can record solutions in a knowledge base so that the solution can be retrieved and applied to other issues of a similar nature.

The Tivoli SRM applications directly related to the TIM integration are the *ticket* applications:

- Service Request application

  The *Service Requests* application is used to create records of customer calls or e-mail messages that request service.

- Incidents application

  The *Incidents* application is used to create records of incidents that result in an interruption to or reduction in the quality of a service.

- Problems application

  The *Problems* application is used to create records of the underlying problems that cause incidents and service requests.

Service Request, Incident, and Problem records are referred to as *ticket records* or *ticket types*. Ticket records can be created by a service desk agent or automatically by using data from e-mail messages, system monitoring tools, or external software applications, such as TIM. After a ticket record is created, a person or group can take ownership of the ticket and see the issue through to resolution.

The TIM integration for Tivoli SRM has the ability to create Service Request type tickets for all *changePassword* operations that occur. The Service Request is given the status of either *Closed* or *New*, depending on whether the *changePassword* operation is successful in TIM.

5.2 Installation and configuration procedure

In this section, we discuss installation and customization procedures.

5.2.1 Software prerequisites

In this section, we describe the prerequisite software products that are required for the TIM Integration with Tivoli SRM.

Before you install the TIM Integration for SRM, the following products must be installed and running on one of the specified operating systems:

- TIM V5.0 on Windows, AIX, Hewlett-Packard UNIX (HP-UX), or Solaris
- Tivoli SRM V7.1 on Windows, AIX, or Linux

The IBM SRM requires a Web application server, such as IBM WebSphere Application Server or BEA Weblogic, and a database server, such as IBM DB2, Oracle, or Microsoft SQL Server. The supported database servers vary according to which application server is used and the operating system of the application server.

For information about software and hardware prerequisites and the detailed installation procedure for IBM SRM V7.1, refer to *IBM Tivoli SRM V7.1 Service Desk*, SG24-7579.

For TIM V5.0, refer to the following Web site:

`http://publib.boulder.ibm.com/infocenter/tivihelp/v2r1/index.jsp?topic=/com.ibm.itim.doc/welcome.htm`

5.2.2 Installation and configuration procedure for integration

In this section, we provide an overview of the tasks that are required to set up communication between TIM and Tivoli SRM.

After installing the prerequisite software, perform the following steps to integrate SRM V7.1 and IBM TIM V5.0:

1. You can locate the TIM Integration for Tivoli SRM 7.1 installation package on the IBM Tivoli Open Process Automation Library Web site:

   `http://catalog.lotus.com/wps/portal/topal`

Note: The package is posted at the general availability of Tivoli SRM V7.1. It is not posted at the time of writing this book.

2. Download the tim_sd_integration.zip file to your administrator machine for Tivoli Process Automation Platform (TPAP), which is also known as *Maximo Base Services*. Extract the file onto your TPAP installation directory.
3. Table 5-1 lists the subdirectories and files that exist in your TPAP installation directory. *Maximo_Install* refers to the TPAP installation directory, for example, C:\IBM\Maximo or C:\Maximo.

Table 5-1 Installation and configuration procedure for integration

Top level directory	Files	Description
Maximo_Install\doc	tim_integration.pdf	The doc subdirectory contains the TIM Integration Installation Instructions.
Maximo_Install\tim_50	maximo.jar maximoserviceprofile.jar	The files in the tim_50 subdirectory are used to configure TIM 5.0 to support integration with Tivoli SRM.

Steps to perform on Tivoli SRM

Table 5-2 shows you the top level activities for integrating TIM with Tivoli SRM.

Table 5-2 Steps to perform on Tivoli SRM

Steps	Tasks	Description
1	Download and expand the IBM TIM Integration as described in 5.2.2, “Installation and configuration procedure for integration” on page 171.	After you expand the package, the *Maximo_Install*\optional subdirectory contains the MaxUser class, which is an optional component of the TIM Integration.
2	Ensure that your *maximo.properties* file is configured correctly and that it is pointing to the correct database server.	The maximo.properties file is located in the following folder: *Maximo_Install*\applications\maximo\properties. Verify that the jdbc connection string specifies the correct location of the database server that supports this Tivoli SRM installation.
3	Configure the Maximo Enterprise Adapter (MEA). Follow the instructions in Configuring MEA on page 172.	The MEA is the framework for integrating external applications with Tivoli SRM. When you configure the MEA, you install and activate the Tivoli SRM interfaces that are required to establish communication between Tivoli SRM and TIM.
4	Rebuild and deploy the maximo.ear file to IBM WebSphere. Follow the instructions for Configuring WebSphere on page 181.	When you install Tivoli SRM, a maximo.ear file is built and installed on the Tivoli SRM server and then deployed to WebSphere, which supports your Tivoli SRM installation. (The Web application server might reside on the same or a different host computer as Tivoli SRM.) For the TIM Integration with Tivoli SRM to function properly, you must rebuild the maximo.ear file on the Tivoli SRM server. After rebuilding, the maximo.ear file must be redeployed on WebSphere.

Configuring MEA

In this section, we describe how to configure the MEA to support TIM.

The procedure for configuring the MEA consists of two parts:

- Run the **`updatedb.bat`** script that is provided with Tivoli SRM. This script automatically installs the Tivoli SRM integration interfaces that are required for communication between the Tivoli SRM application server and the IBM TDI server.
- Complete the MEA configuration by activating the integration interfaces from within the integration module of Tivoli SRM.

Running updatedb.bat

Perform the following procedure to obtain and run the **updatedb.bat** script.

In these instructions, *Maximo_Install* refers to the directory where TPAP or Maximo Base Services V7.1 is installed on the Administrator Machine. The steps are:

1. Open a Windows command prompt.
2. Change to the *Maximo_Install*\tools\maximo directory.
3. Run the **updatedb.bat** script.

After the script finishes processing, complete the procedure to activate the Tivoli SRM interfaces.

Activating the Tivoli SRM interfaces

Complete the following procedure to deploy Web services that activate the interfaces that are required for communication between Tivoli SRM and TIM. The steps are:

1. Log on to the Tivoli SRM Server with Administrative permission.
2. In the Start Center window, click **Go To** → **System Configuration** → **Platform Configuration** → **System Properties**, as shown in Figure 5-1 on page 174.

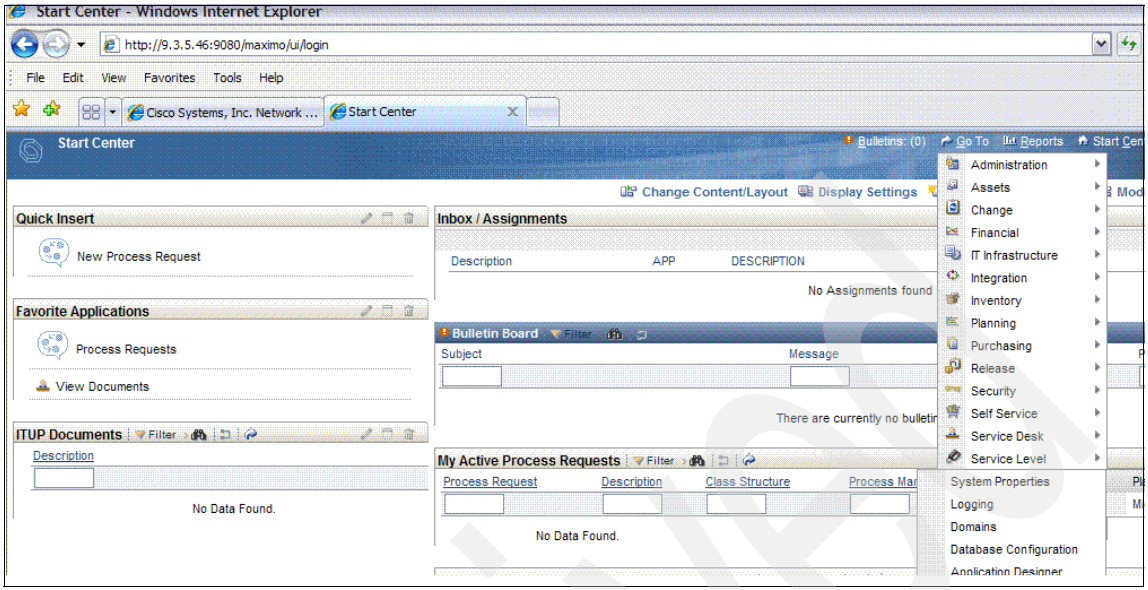


Figure 5-1 Start center window

3. Configure the Web Application URL to match the address of your Tivoli SRM application server. Refer to Figure 5-2 on page 175. The steps are:
   a. In the Property Name filter box, type `webappurl`.
   b. Press Enter.
   c. Expand **mxe.int.webappurl**.
   d. In the Global Value field, type the address of the Tivoli SRM server. For example:

      `http://maximoserver.ibm.com:9080/meaweb`

   e. Select the value by checking the box next to mxe.int.webappurl.
   f. Save the property.
4. Click **Go To** → **Integration** → **Web Services Library**. The steps are:
   a. In the Source field, type `Object Structure Service`.
   b. Press Enter.

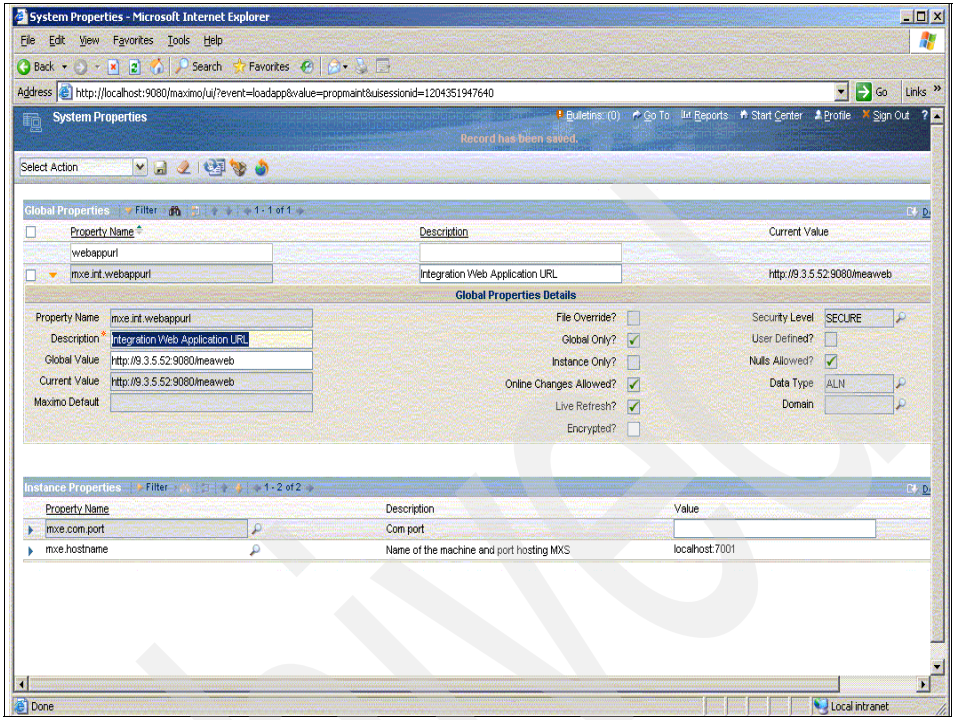


Figure 5-2 System properties window

5. Activate the GRPASSIGN interface:
   a. Click **GRPASSIGN**.
   b. Select **Deploy Web Service** from the Select Action menu.
   c. Click **OK** on the confirmation window.
   d. Click **List** to go back to the list of services.
6. Activate the MAXATTRIBUTE interface:
   a. Click **MAXATTRIBUTE**.
   b. Select **Deploy Web Service** from the Select Action menu.
   c. Click **OK** on the confirmation window.
   d. Click **List** to go back to the list of services.

7. Activate the PERSON interface:
   a. Click **PERSON**.
   b. Select **Deploy Web Service** from the Select Action menu.
   c. Click **OK** on the confirmation window.
   d. Click **List** to go back to the list of services.
8. Activate the SITE interface:
   a. Click **SITE**.
   b. Select **Deploy Web Service** from the Select Action menu.
   c. Click **OK** on the confirmation window.
   d. Click **List** to go back to the list of services.
9. Activate the Service Request (SR) interface:
   a. Click **SR**.
   b. Select **Deploy Web Service** from the Select Action menu.
   c. Click **OK** on the confirmation window.
   d. Click **List** to go back to the list of services.
10. Activate the SYNONYMDOMAIN interface:
   a. Click **SYNONYMDOMAIN**.
   b. Select **Deploy Web Service** from the Select Action menu.
   c. Click **OK** on the confirmation window.
   d. Click **List** to go back to the list of services.
11. Activate the USER interface:
   a. Click **USER**.
   b. Select **Deploy Web Service** from the Select Action menu.
   c. Click **OK** on the confirmation window.
   d. Click **List** to go back to the list of services.
12. Activate the USERQ interface:
   a. Click **USERQ**.
   b. Select **Deploy Web Service** from the Select Action menu.
   c. Click **OK** on the confirmation window.
   d. Click **List** to go back to the list of services.
13. Click **Sign Out**.

Configuration changes on WebSphere

For TIM integration to function properly, several classes that are provided with the TIM Integration must be built into the maximo.ear file. If your Tivoli SRM installation is supported by an IBM WebSphere Application Server, complete the following procedure to build the MaxUserProcess.class and the MaxUser.class (optional) files into the maximo.ear file on the Tivoli SRM server. Then, deploy the maximo.ear file on your WebSphere server.

Note: When the tim_sd_integration.zip file is unzipped into the Maximo_Install directory, it automatically adds the MaxUserProcess.class to the correct directory. No further configuration for this class is needed.

Activating user deletion in Tivoli SRM

Tivoli SRM does not allow users to be deleted when the *LOGINTRACKING* variable is enabled. If you want to delete Tivoli SRM users, this variable must be disabled. You can disable this variable by performing the following steps:

1. Log on to the Tivoli SRM server with administrative permissions.
2. Click **Go To** → **Security** → **Users** → **System Properties**.
3. From the action drop-down menu, select **Security Controls**.
4. Remove the check from **Enable Login Tracking?** if it is checked.

Note: If *LOGINTRACKING* is not checked, select the **Maximo User Deletion Enabled?** check box on the Tivoli SRM service form. This check box in TIM is required in order to delete Tivoli SRM users.

Building the Tivoli SRM main component

In this section, we discuss building the Tivoli SRM main component. The steps are:

1. Open a Windows command prompt on the machine where the TPAP is installed.

   Note: You can install the TPAP on the same or a different computer from the WebSphere server.

2. Change to the following directory: *Maximo_Install*\deployment.

3. Enter the following command to rebuild the maximo.ear file:

   ```
   buildmaximoear.cmd
   ```

   The **buildmaximoear.cmd** rebuilds the maximo.ear file while automatically pulling in the modified class files to replace the class files that were originally included in the maximo.ear file.

   Allow this process to complete.

4. Copy the new maximo.ear file from the TPAP machine to any location on the WebSphere server.
5. The new maximo.ear file is located in the *Maximo_Install*\deployment\default directory on the Tivoli SRM server.

Deploying on WebSphere Application Server

Perform the following steps to deploy the maximo.ear file on the WebSphere Application Server:

1. Log on to the WebSphere Administrative Console.
2. Click **Applications** in the navigation pane.
3. Select **Enterprise Applications**.
4. The Enterprise Applications window is displayed. Refer to Figure 5-3 on page 179.

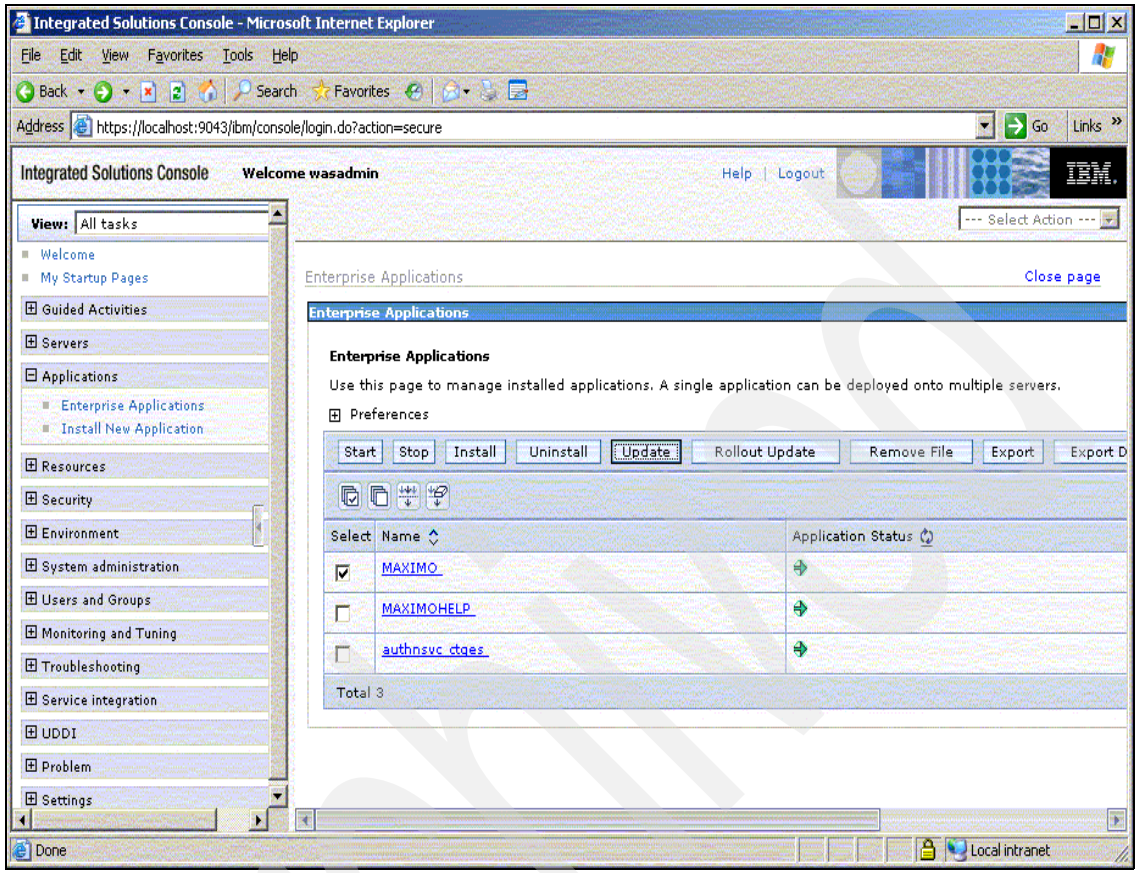


Figure 5-3 Enterprise Applications window

5. Select the check box next to **MAXIMO**.
6. Click **Update**.
7. Click **Replace the entire application**.
8. Click **Remote File System**.
9. Click **Browse**.
10. Select the node of your WebSphere server.
11. Browse to the location of the maximo.ear file that you copied.
12. Select the file.
13. Click **OK**.
14. Click **Next**.

15. Click **Next** on the Select installation options window.
16. Click **Next** on the Map modules to servers window.

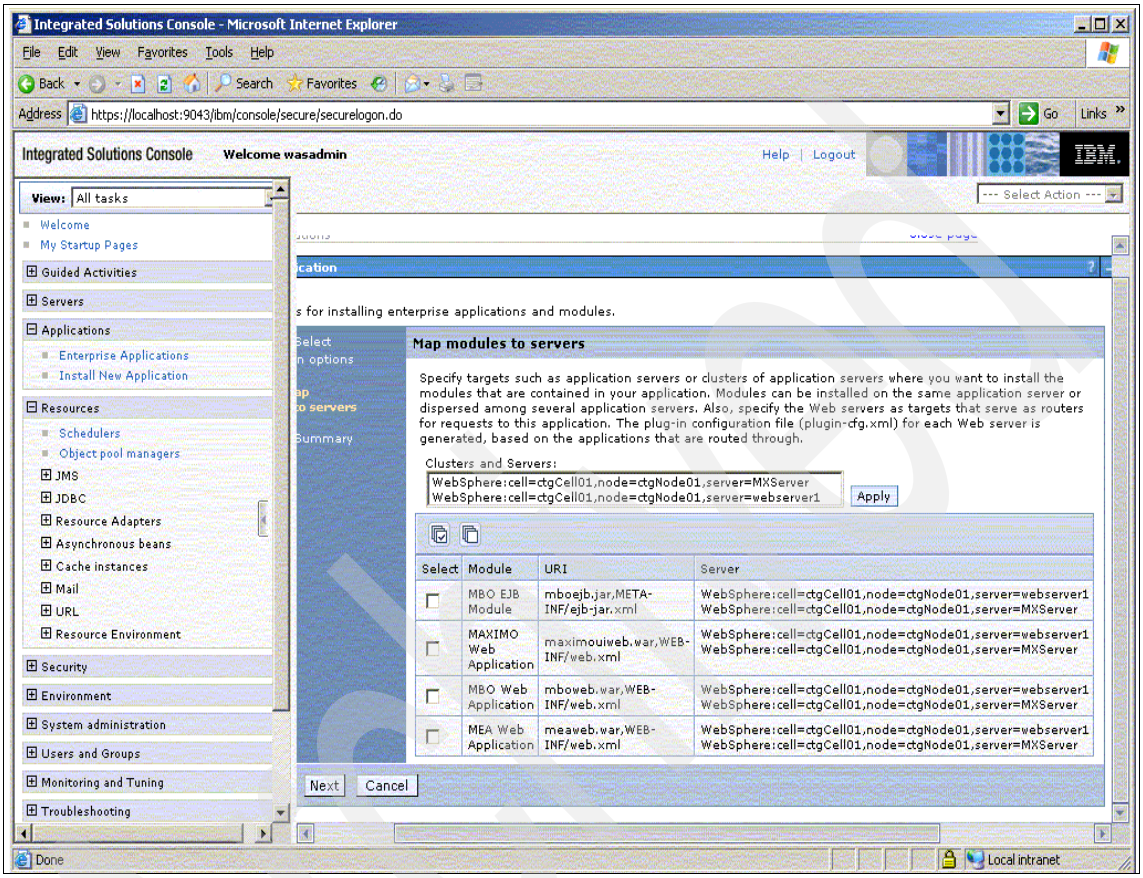


Figure 5-4 Map modules to servers window

17. Click **Finish** on the Summary page. The maximo.ear file is redeployed. This process can take several minutes.
18. Click **Save to Master Configuration**.
19. Click **Applications** in the navigation pane.
20. Select **Enterprise Applications**.
21. Select the check box next to **MAXIMO**.
22. Click **Start**. Allow this process to complete.
23. Log off of the WebSphere Administrative Console.

Configuring TIM

Table 5-3 shows the steps for configuring TIM.

Note: In the following sections, *ITIM_HOME* refers to the directory where IBM TIM is installed.

Table 5-3 Configuring TIM

Steps	Tasks	Description
1	Add maximo.jar to the TIM lib directory	The maximo.jar archive contains the code that drives the integration between TIM andTivoli SRM.
2	Add maximo.jar to the WebSphere Application Server Shared Library Entries	TIM needs to know about maximo.jar in order to use it.
3	Modify enRole.properties	The Tivoli SRM connection information for the password extension needs to be set in the properties file.
	Modify scriptframework.properties	The changePassword extension is a script extension, and the properties file needs to be modified to reflect this script extension.
	Restart WebSphere Application Server	The Application Server needs to be restarted for the changes to take effect.
	Configure Workflow Extension	The changePassword extension needs to be set up in the TIM configuration.
4	Configure Maximo Service Profile	The service profile must be configured in order to manage Tivoli SRM users.

Configuring WebSphere

You must perform the following steps in order for the integration between TIM and Tivoli SRM to work properly:

1. Navigate to the *Maximo_Install*\tim_50 directory
2. Copy the maximo.jar file.
3. Navigate to ITIM_HOME\lib\.
4. Paste the maximo.jar file to the lib directory.
5. Log in to the WebSphere Administrative Console for the ITIM install.
6. Click **Environment** → **Shared Libraries** → **ITIM_LIB**.
7. Modify the *Classpath* by adding: `${ITIM_HOME}/lib/maximo.jar`.

   Figure 5-5 on page 182 shows an example of the *Classpath* entry.

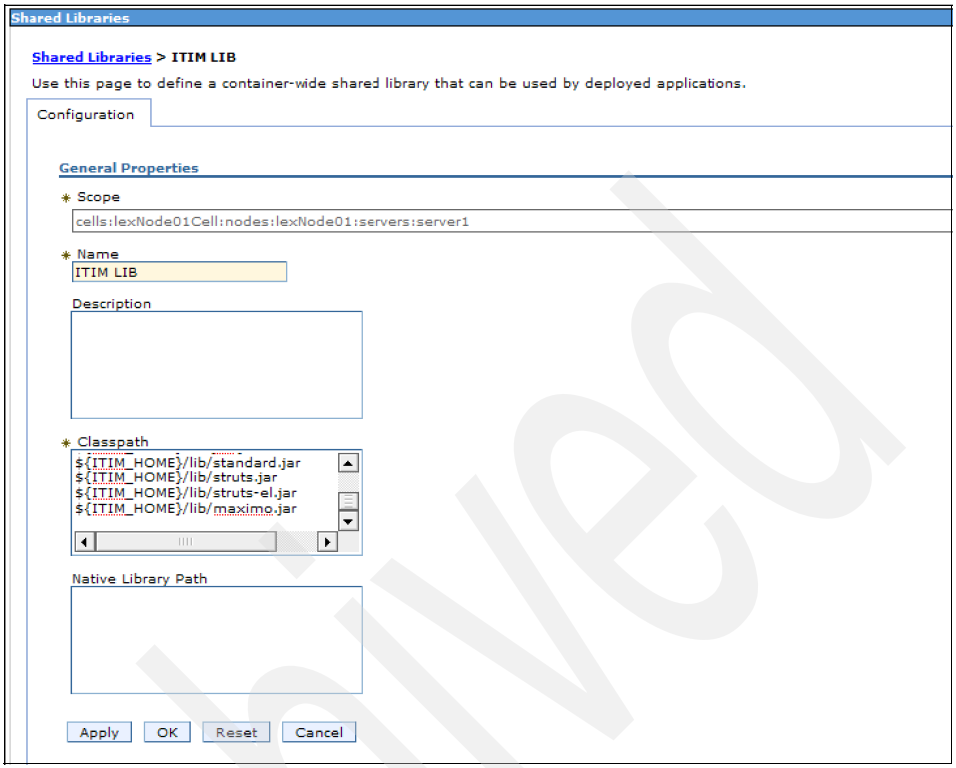


Figure 5-5 Classpath entry

Configuring TIM 5.0

You must perform the following steps in order for the integration between TIM and Tivoli SRM to work properly.

Modify enRole.properties

The steps to modify the enRole.properties are:

1. Navigate to the *ITIM_HOME*\data directory.
2. Open the enRole.properties, add the text that is shown in Example 5-1 on page 183, and replace *hostname* and *port* with the values that correspond with the Tivoli SRM environment. Also, set the maximo.security value to `true` or `false`, depending on whether the Application Server Security is enabled. If the value is set to `true`, the maximo.user and maximo.password fields are required, which enables the Service Request creation for Maximo when the Application Server Security is enabled.

Example 5-1 Maximo Workflow Extension Properties

```
####################################
## Maximo Workflow Extension Properties
####################################
maximo.url=http://hostname:port
maximo.security=true
maximo.user=maxadmin
maximo.password=maxadmin
```

3. Save and close **enRole.properties**.

Modify scriptframework.properties

The steps to modify scriptframework.properties are:

1. Navigate to the *ITIM_HOME*\data directory.
2. Open scriptframework.properties and add the command line that is shown in Example 5-2.

Example 5-2 Scriptframework.properties: Add a line

```
ITIM.extension.Workflow.Maximo=com.ibm.itim.maximo.MaximoExtension
```

3. Save and close scriptframework.properties.
4. Restart the WebSphere Application Server.

Configure changePassword workflow extension

The following steps are required for the changePassword extension to function properly (Example 5-3):

1. Log in to TIM as an administrator.
2. Click **Configure System** → **Manage Operations**.
3. Select **Entity type level**.
4. Click **changePassword**.
5. Double-click the **CHANGEPASSWORD** extension box. Add this text.

Example 5-3 Text to be added

```
Maximo.addTicket(Entity.get(), activity);
```

6. Click **OK.**
7. Click **Apply.**
8. Click **OK** to verify the changes. Refer to Figure 5-6 on page 184.

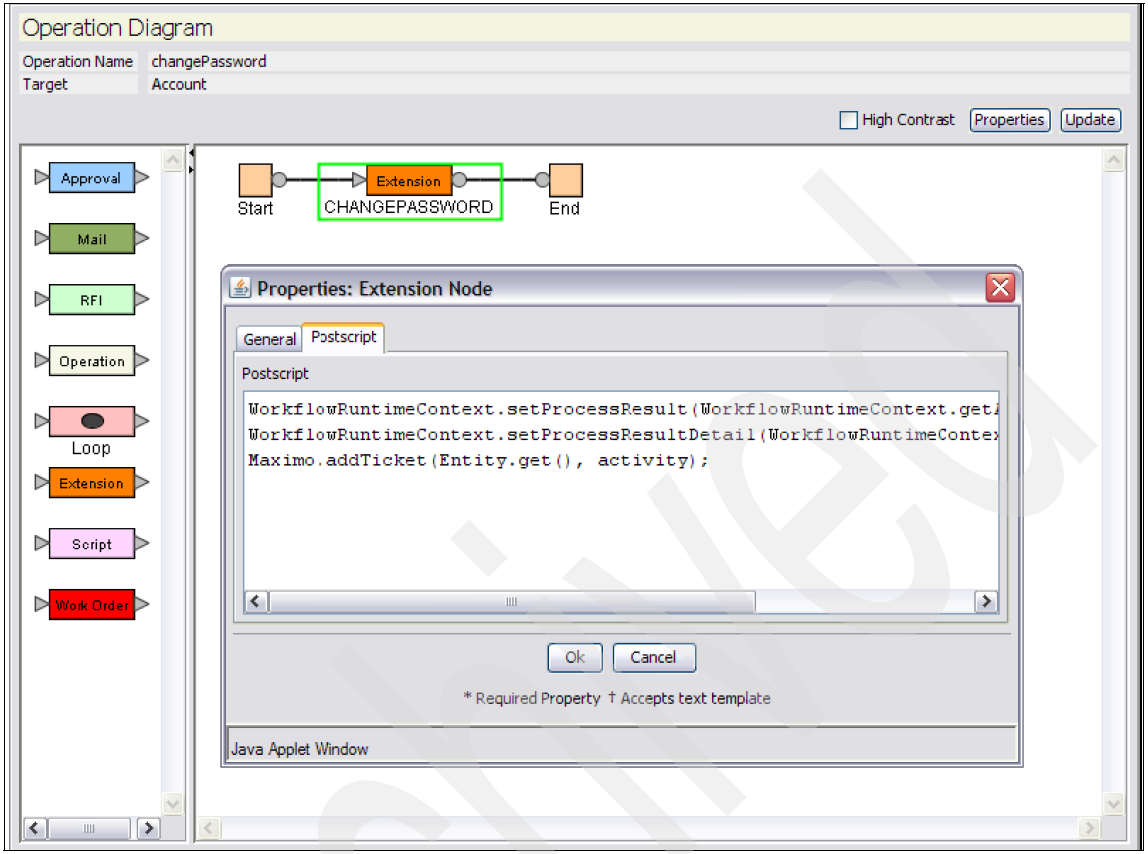


Figure 5-6 ChangePassword Workflow Extension modified to create Maximo tickets

Configure the Tivoli SRM Service Provider

The following steps are required to enable support for Tivoli SRM user management:

1. Log in to TIM.
2. Click **Manage Service Types**.
3. Click **Import.**
4. Click **Browse** and navigate to *Maximo_Install*\tim_50.
5. Select **maximoserviceprofile.jar**.
6. Click **OK** and allow a few minutes for the operation to complete.
7. Click **Manage Services**.
8. Click **Create**.

9. Select **Maximo Service** from the radio menu.
10. Click **Next**.
11. Type a unique service name, and provide the maximo URL:

    `http://`*`hostname`*`:`*`port`*

12. Select **Maximo User Deletion Enabled?** if LOGINTRACKING is false and if you want Tivoli SRM users deleted.
13. Click **Test Connection** and verify that the test is successful.
14. Click **Finish**.

Note: It might be necessary to modify the default provisioning policy that is created when new service is created in order to make sure that all necessary attributes are set.

The TIM configuration is complete.

6

CCMDB integration

In this chapter, we describe the integration of Tivoli Service Release Manager (SRM) V7.1 with Change and Configuration Management Database (CCMDB) V7.1.

In this chapter, we discuss the value of integrating CCMDB with a Tivoli SRM implementation and leveraging this integration to achieve services level management.

- CCMDB overview on page 188
- Change Management integration on page 190
- Working with SRM and CCMDB on page 197

6.1 CCMDB overview

The CCMDB is the foundation for the IBM Service Management (ISM) strategy. It is the foundation for core Information Technology Infrastructure Library (ITIL) process solution deliverables, such as Configuration, Change, or Release Management. These process solutions provide the best practices implementations of core ITIL processes.

The CCMDB provides a shared infrastructure, as well as a set of foundation services that are used by ISM process solutions, such as Configuration, Change, or Release Management, and includes the Configuration and Change Management processes that provide the core management capabilities that are needed in an IT environment.

In addition, the CCMDB incorporates a consistent data model and data layer implementation and includes a framework for the discovery of resources and its relationships.

A Configuration Management Database (CMDB) according to ITIL is a database that is used to manage Configuration Records throughout their life cycle. The CMDB records the attributes of each CI (Configuration Item) and its relationships with other CIs and provides the underpinnings for IT Service Management processes.

A CI has several characteristics, a classification or type, attributes that describe the CI depending on its classification, and relationships that describe how a CI is related to other CIs.

In ITIL, a CI is defined as "*Any component that needs to be managed in order to deliver an IT Service*." Information about each CI is recorded in a Configuration Record within the CMDB and is maintained throughout its life cycle by Configuration Management. CIs are under change control by Change Management.

The IBM CCMDB solution provides an ITIL-aligned implementation of a Configuration Management Database. For more information about CCMDB, refer to *Deployment Guide Series: IBM Tivoli CCMDB Overview and Deployment Planning*, SG24-7565.

Before we get into the specifics of the IBM CCMDB product and related solutions, we provide an overview of the ISM strategy, ITIL, and the IBM Tivoli Unified Process that provides a linkage between the ISM strategy and ITIL.

6.1.1 Tivoli SRM and CCMDB integration

The first question that come up when installing both products is, “Why do I need both products?” Tivoli SRM has a database in which asset and CI information can be stored. CCMDB collects and manages CIs and their relationships.

Installing the CCMDB adds functions to Tivoli SRM, such as:

- Impact analysis
- CI lifecycle management
- Configuration process
- Change implementation schedule
- Ability to promote process requests to change management and configuration management requests

Let us consider an example to demonstrate the benefits of introducing CCMDB to an existing Tivoli SRM environment. CCMDB provides information to help the Service Desk team isolate the source of the problem quickly. Suppose that a switch that is used for production goes down and affected users are calling the help desk. By looking at the applications and servers that are down (affected CIs in CCMDB terminology), a Service Desk person or a Specialist can determine that the applications and servers that are down are all related to a certain switch (through the CI relationship information that is provided by CCMDB). A Service Desk person or a Specialist can also see that this switch has caused problems before, and after a closer analysis, the support person can understand that the firmware software on this switch is back level. All this information is provided by CCMDB. At this point, the support person can start a change request to upgrade the switch firmware software. This change request is reviewed by the Change Manager or the change review board to analyze the impact of the change (again using the CCMDB, looking at the affected CIs), and when the change is authorized, it gets implemented.

Similarly, using CCMDB alone allows you to manage CIs and view CCMDB change history. For instance, if a memory card is added to a server, you notice that this is a change in CCMDB, but you do not know why this change has occurred, or what incidents or problems are associated with this change. This information is usually contained in Tivoli SRM.

This integration is possible when Tivoli SRM V7.1 is present. Every problem or incident is related to the affected CI.

6.2 Change Management integration

To integrate Tivoli SRM with CCMDB, you must upgrade your CCMDB Tivoli Process Automation Platform (TPAP), which used to be known as Base Services, to the appropriate level. *You must upgrade your CCMDB TPAP before installing Tivoli SRM on the same infrastructure.*

Also, remember that CCMDB requires that a Tivoli Application Dependency Discovery Manager (TADDM) server is installed in your environment. The TADDM server does not need to be installed in the same physical server as CCMDB or Tivoli SRM.

6.2.1 Installing CCMDB on top of SRM scenario

In this scenario, we describe the installation of CCMDB in the same server where Tivoli SRM V7.1.1 is deployed, which is a valid scenario if you are deploying both solutions at the same time.

Important: Tivoli SRM and CCMDB integration requires both products to be at the V7.1.1 level. At the time of writing this book, CCMDB V7.1.1 is not available, so we use an early version of CCMDB V7.1.1.

When installing CCMDB, it is mandatory to install TADDM, which is the technology that is used to discover CIs and CCMDB relationships. We do not describe CCMDB or TADDM installation in detail, only the necessary steps to install CCMDB integrated with Tivoli SRM. Refer to the TADDM or CCMDB documentation, such as *Deployment Guide Series: IBM Tivoli CCMDB Overview and Deployment Planning*, SG24-7565, for more information about how to install and configure TADDM.

We provide the installation steps that you need to install CCMDB on top of an existing Tivoli SRM V7.1.1 installation:

1. The installation procedure starts from the launchpad, similar to the Tivoli SRM launchpad, as shown in Figure 6-1 on page 191.

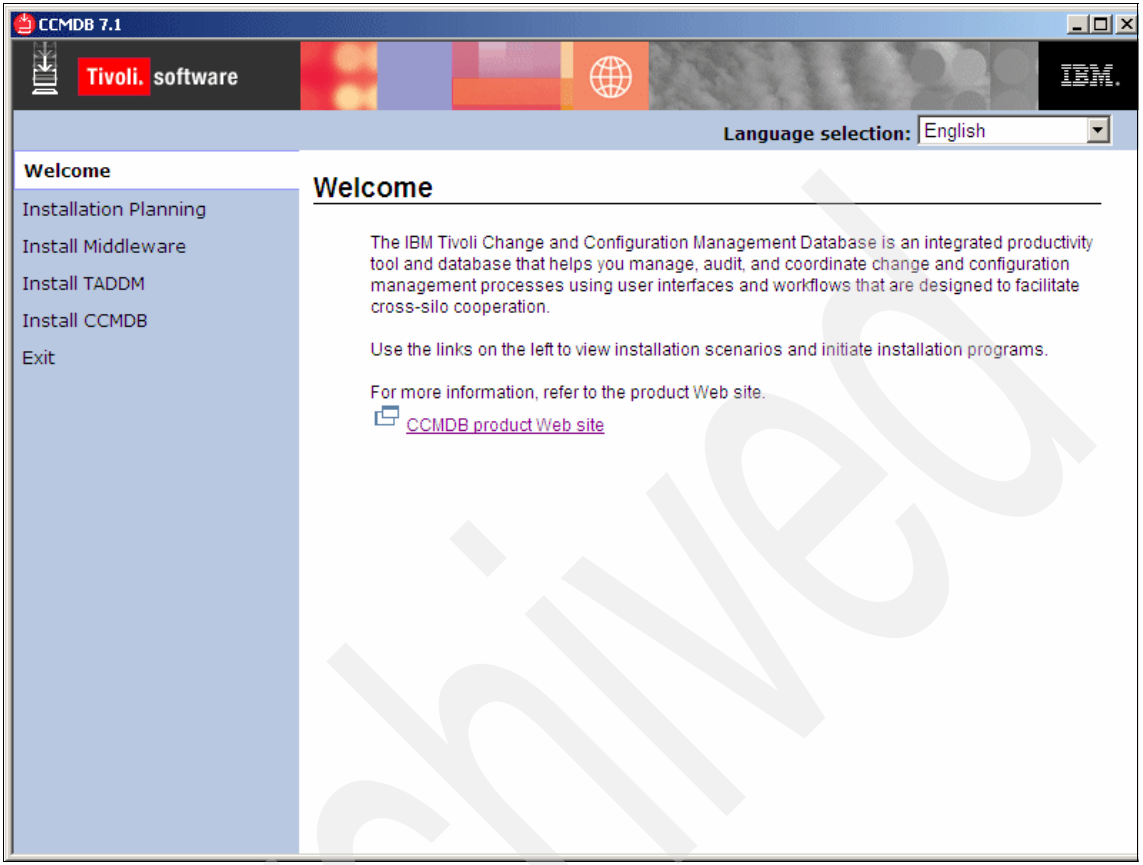


Figure 6-1 CCMDB Welcome window

The language selection window, Figure 6-2 on page 192, appears.

Figure 6-2 Language selection

2. Click **OK**.
3. In the next window, click **Next** to view the license agreement.
4. After accepting the license agreement, the upgrade window appears. This window appears when the installation detects that the TPAP is already installed on this server. Refer to Figure 6-3 on page 193.

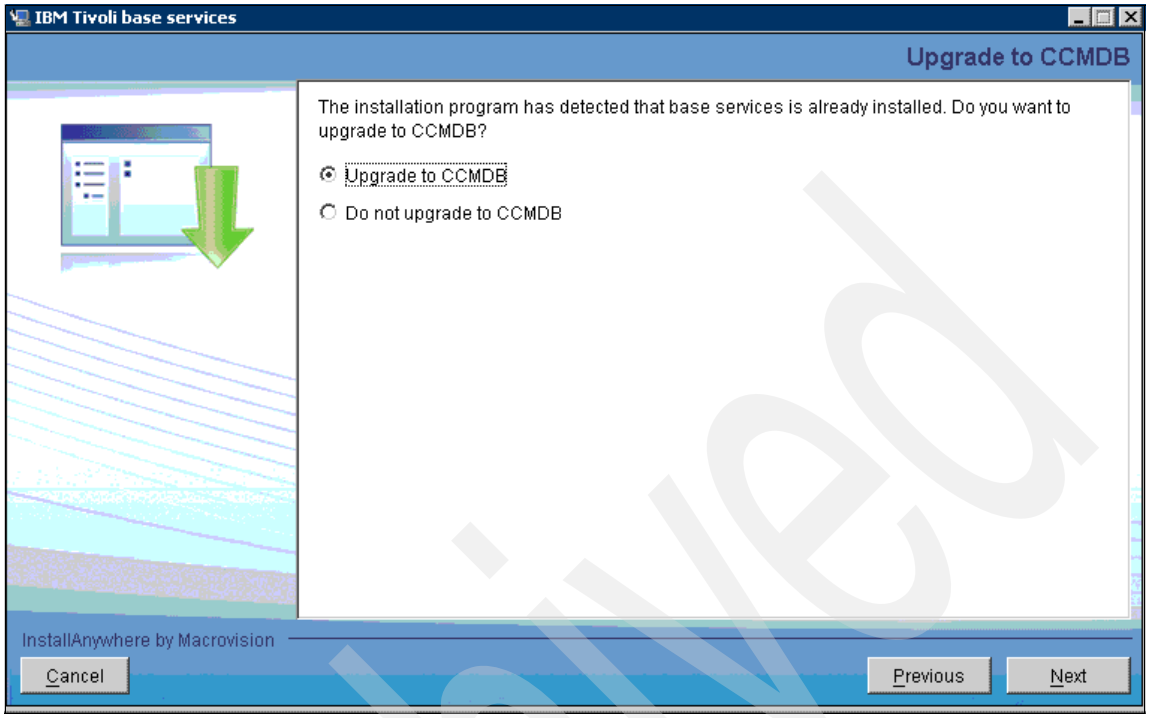


Figure 6-3 Upgrade window

5. To implement CCMDB along with Tivoli SRM, it is mandatory that you upgrade the base services, because the base services must be at the same level for both applications.
6. Click **Next**.
7. As part of CCMDB implementation, TADDM server information is requested. You can point to a local TADDM server if you deployed one locally, or point to your current TADDM server. Refer to Figure 6-4 on page 194.

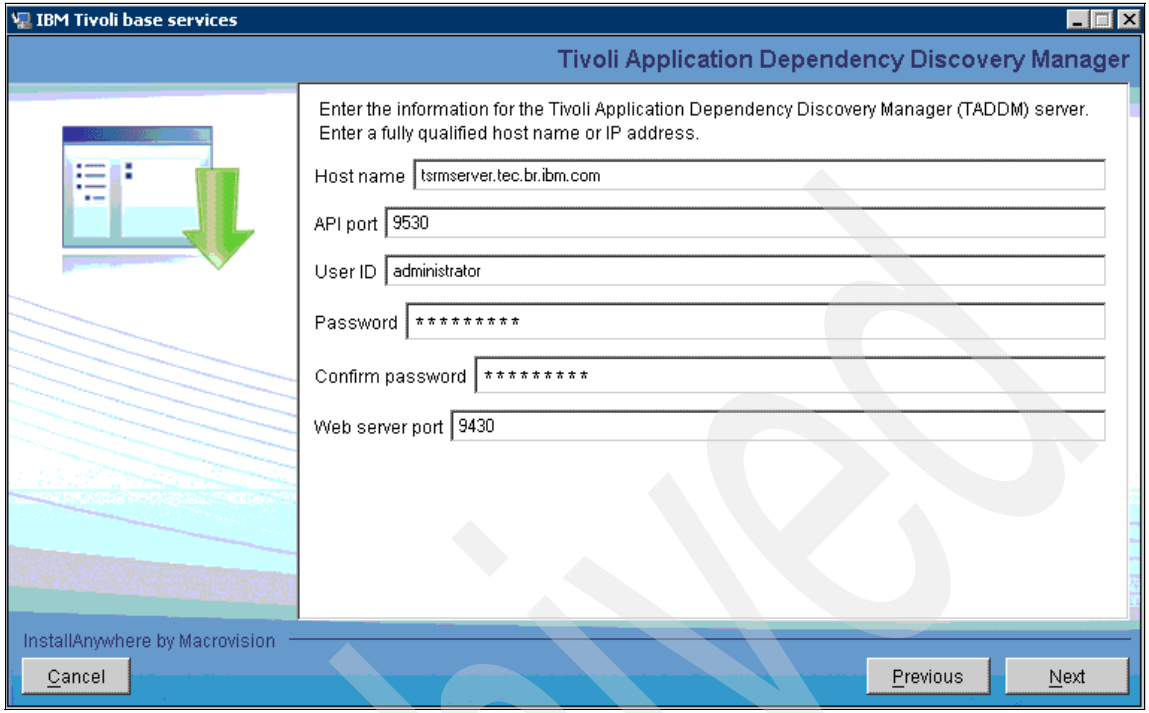


Figure 6-4 TADDM

8. Provide the information specific to your environment for the following fields:
   - **Host name**: This is the host name for the TADDM Server; it might be the same server where Tivoli SRM and CCMDB are installed.
   - **API port**: Default port number for TADDM Server. Change this number only if you have changed the port number during the TADDM Server installation.
   - **User ID**: TADDM administrator. Default is `administrator`, if it is not changed by the TADDM administrator.
   - **Password**: Default password is `collation`.
   - **Web server port:** Default is `9430`.
9. After entering the information in these fields, click **Next** to view the run configuration step window. Refer to Figure 6-5 on page 195.

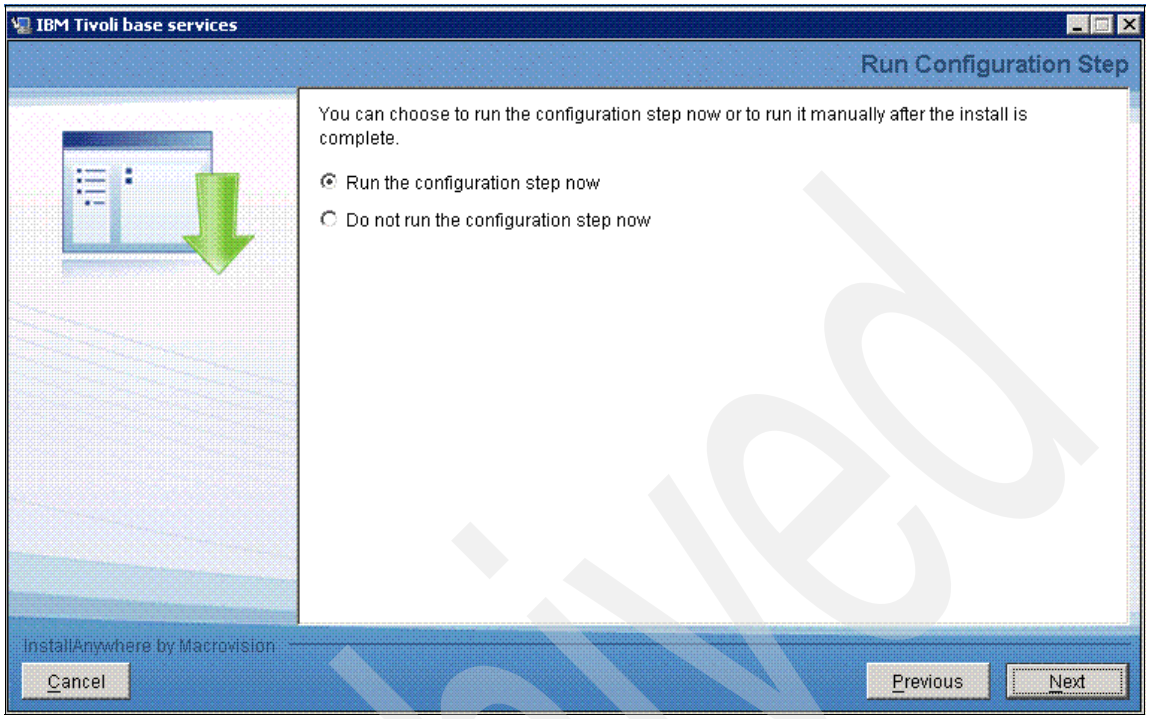


Figure 6-5 Run Configuration Step window

10. In this step, you can let the installation run the appropriate steps, or you can defer this step to be executed manually after the installation is finished. We recommend that you run this step during the installation process.
11. Click **Next**.
12. Figure 6-6 on page 196 shows you the information that was entered during the previous steps. Review the information and click **Next**.

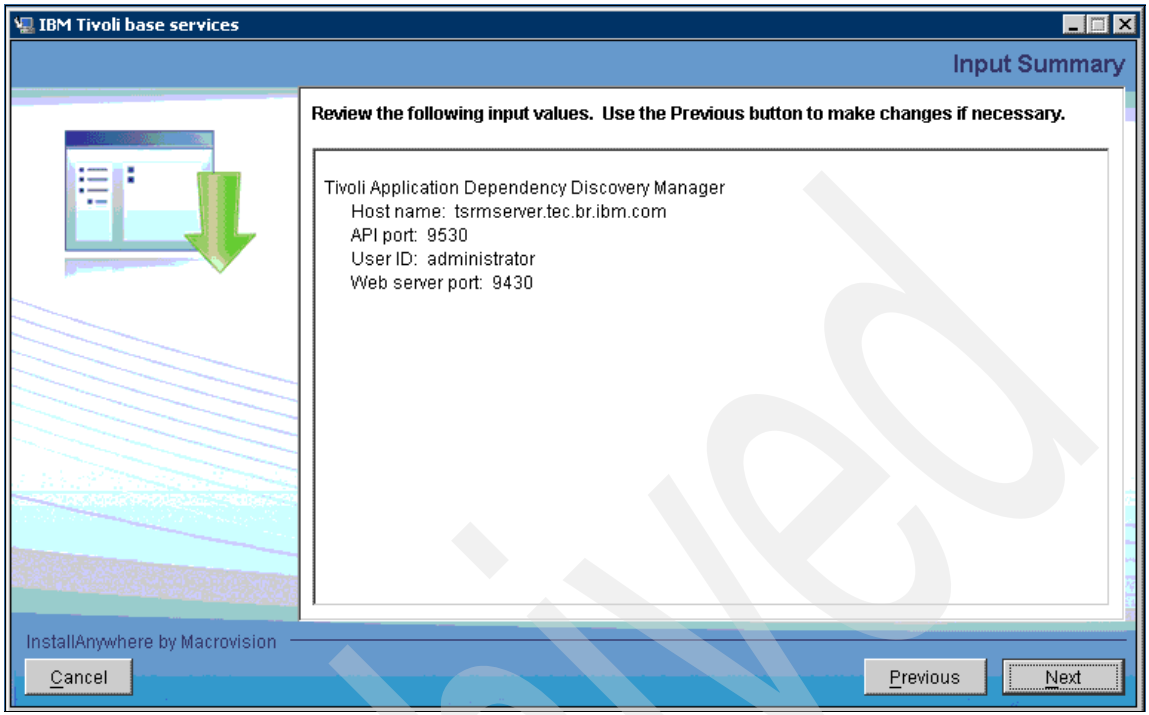


Figure 6-6 Summary window

13. The Pre-Installation Summary is an information window. Click **Install** and wait until the installation is finished. Refer to Figure 6-7 on page 197.

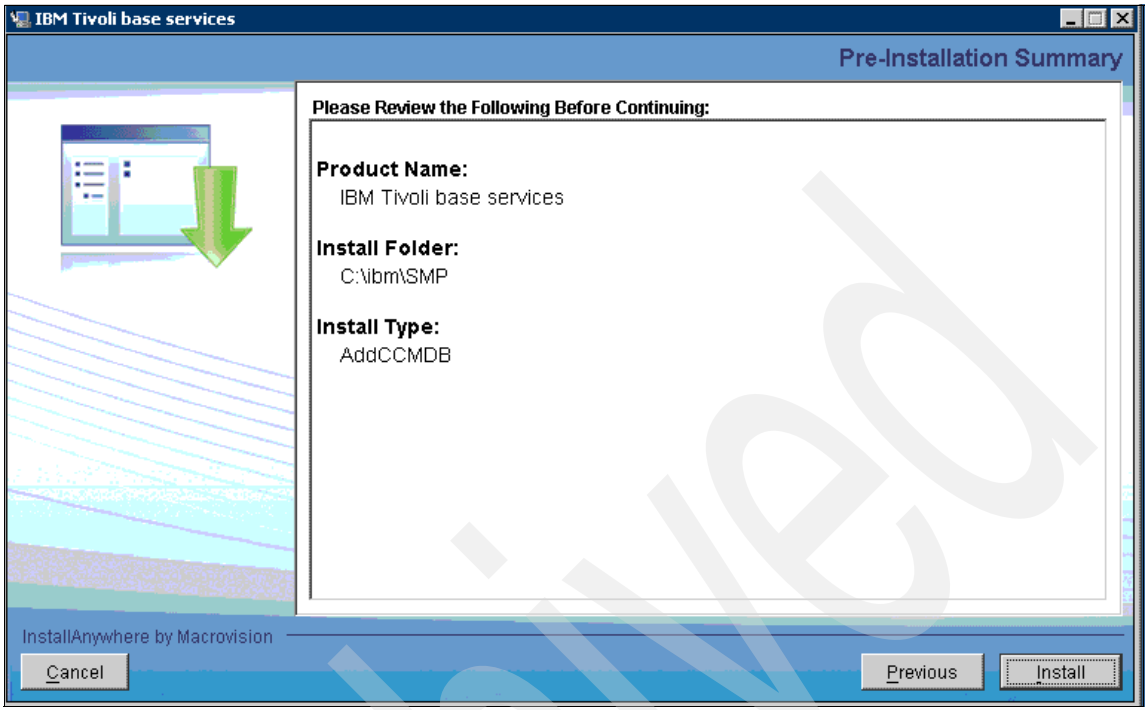


Figure 6-7 Pre-Installation Summary

6.3 Working with SRM and CCMDB

After integrating CCMDB and Tivoli SRM, you are able to associate CIs to incidents and problems.

Follow these required steps to associate a CI to a problem or a incident:

1. Open an Incident or Problem. Refer to Figure 6-8.

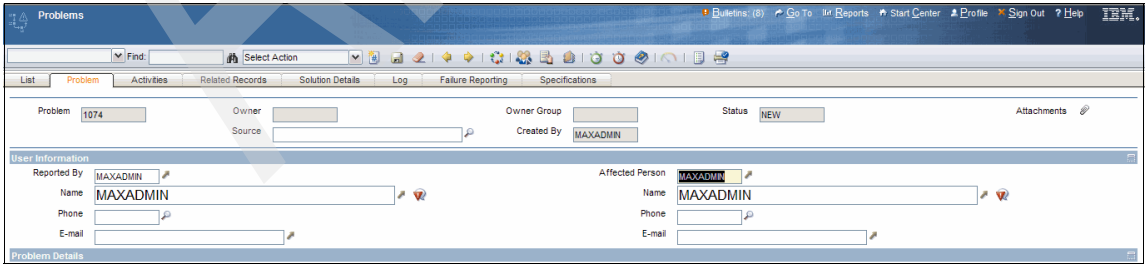


Figure 6-8 Problem window

2. Type the information in the fields based on your process.
3. If a change is required to fix the problem, you can open a change from the Select Action menu, as shown in Figure 6-9.

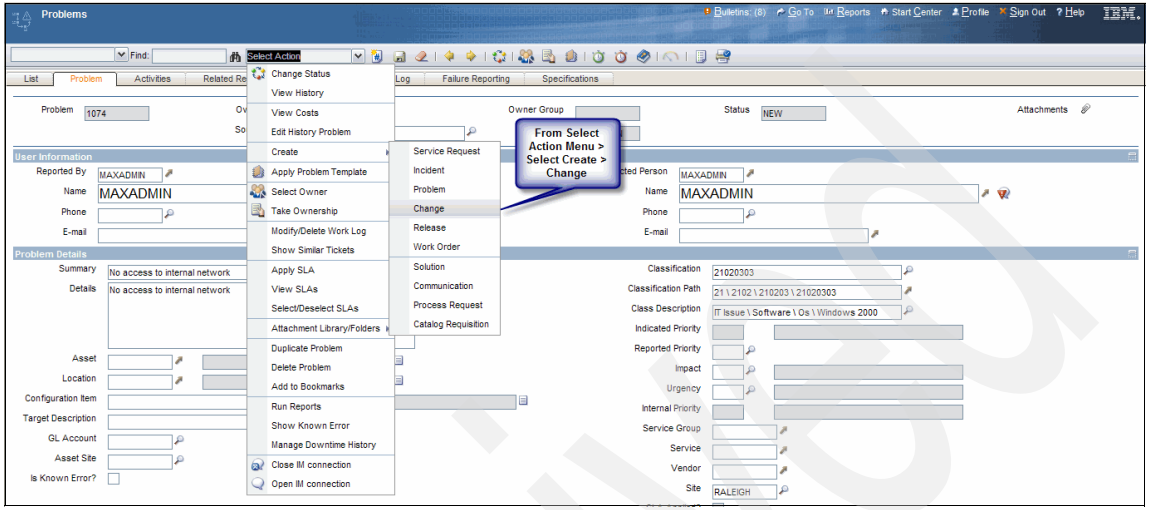


Figure 6-9 Open change option

4. After selecting this option, a message appears in the top menu bar with the change ticket number that was created for this problem. Refer to Figure 6-10.

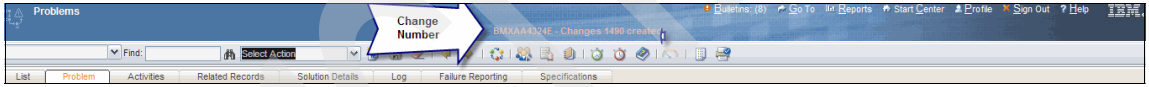


Figure 6-10 Change ticket number

5. From this point forward, the Change Manager takes over the ticket.

   Navigating through the change window, go to the **Related Records** tab. You are able to see all related tickets, which are the tickets that originated from or are related to this change, as shown in Figure 6-11 on page 199. Relating incidents with change records provides significant value for both the Incident Management and Change Management disciplines.

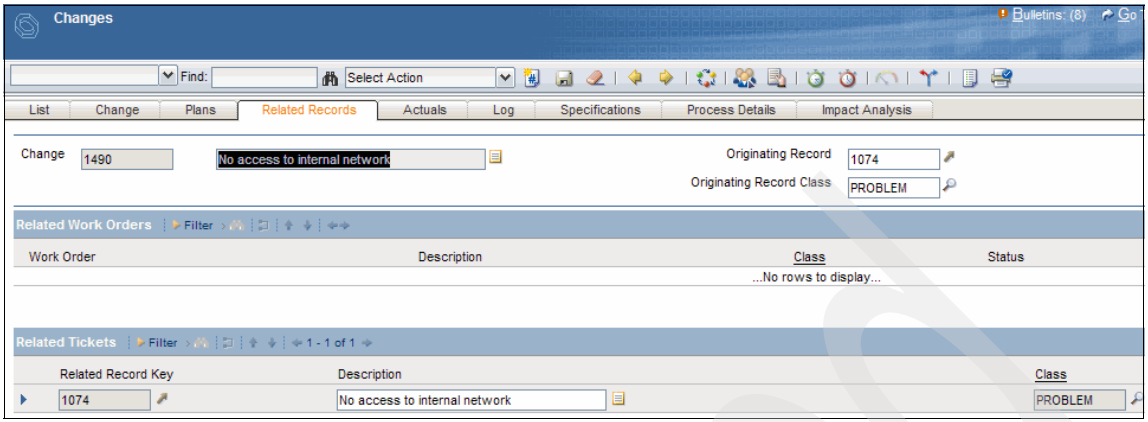


Figure 6-11 Related Tickets panel

6. After the change is completed, the problem management team checks whether the solution that was applied solved the problem. If the solution is successfully implemented, they record the solution as a valid solution in the database for further use.

> **Note:** According to ITIL, any change to the environment flows through the Change Management process, so service desk personnel or technicians do *not* send updates directly to the CMDB as they resolve incidents. Even if work is already done (in the case of urgent or high priority incidents), the CMDB is still updated by the Change Management process (not Incident Management).

Tivoli SRM helps you to implement or improve services management. When implemented with CCMDB, the solution is even more powerful. In this chapter, we have provided examples of these benefits.

7

Lotus Sametime integration

In this chapter, we provide general information about Sametime Connect instant messenger, and we focus on integrating the instant messaging application with IBM Tivoli Service Request Manager (SRM) 7.1.

We discuss the features, installation, and integration of the application in the following sections:

- Sametime overview on page 202
- Sametime in the context of Tivoli SRM on page 202
- Sametime installation and configuration on page 202
- Service desk scenario on page 210

7.1 Sametime overview

Lotus Sametime software offers integrated, enterprise instant messaging, point-to-point video, and integration with desktop productivity applications, such as Microsoft Office, file transfer, integrated chat histories, and optional integration with supported audio, video, and telephony systems.

In the context of this book, we focus on the integration of Sametime instant messaging with the Tivoli SRM V7.1.

7.2 Sametime in the context of Tivoli SRM

Tivoli SRM instant messaging offers the following functions:

- Allows the service desk analyst to begin a conversation session in real time with any person related to a ticket
- Allows the person who requested the service request to talk to a service desk analyst in real time by using an instant messenger application

7.3 Sametime installation and configuration

You need to ensure that the application has been installed in order to use the instant messaging functions.

7.3.1 Installation

Note: Refer to the Chapter 2, “Integration components” on page 17 of this book for detailed information about the SRM installation.

To perform the Tivoli SRM V7.1 integration installation with the Sametime server, follow these steps:

1. Start the launchpad utility by clicking on the launchpad icon located on your Tivoli SRM V7.1 installation CD.
2. Select **Product integration software**.
3. Select **Service Desk-Sametime Connect Integration** (Figure 7-1 on page 203).

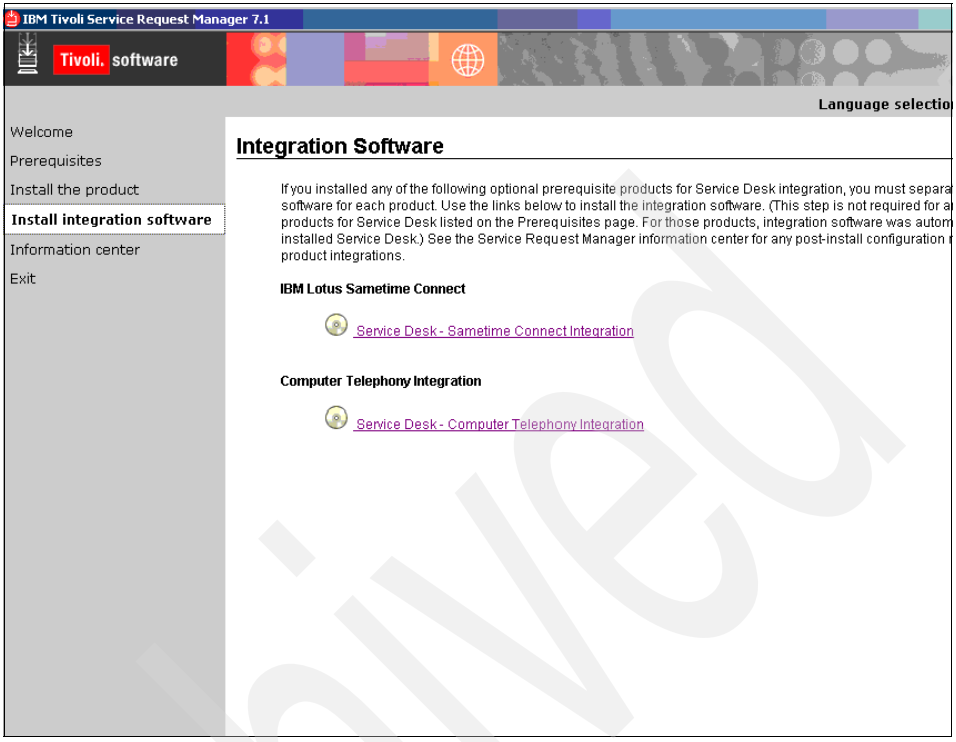


Figure 7-1 Installing Sametime integration

4. Installation starts as shown in Figure 7-2 on page 204.

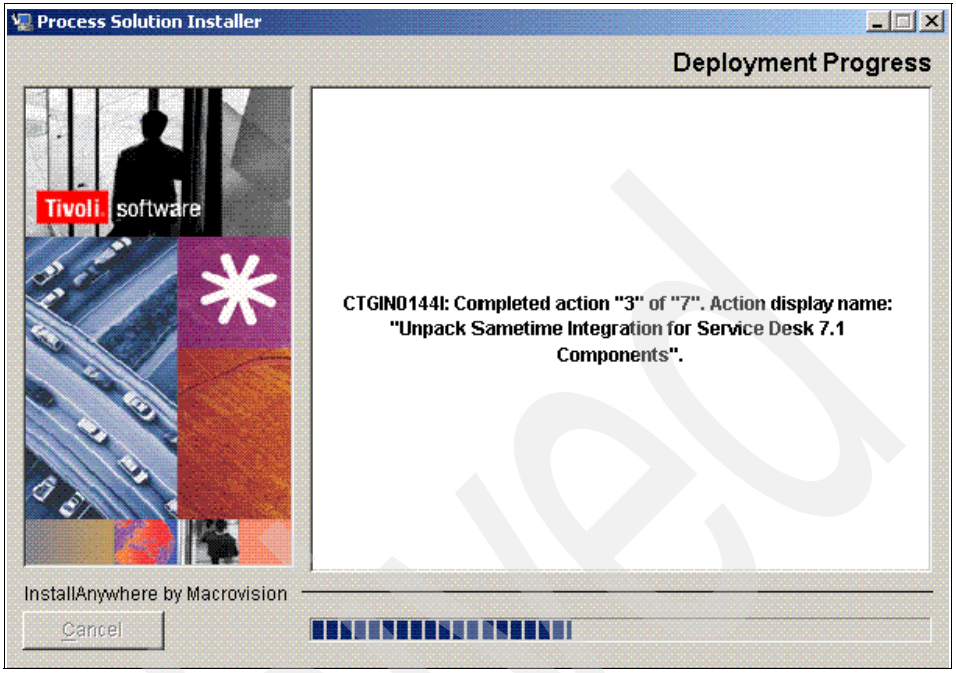


Figure 7-2 Installing Sametime integration

5. A request from the installer for the Sametime Connect server IP address appears.
6. Type the IP address of your Lotus Sametime Connect server (Figure 7-3).

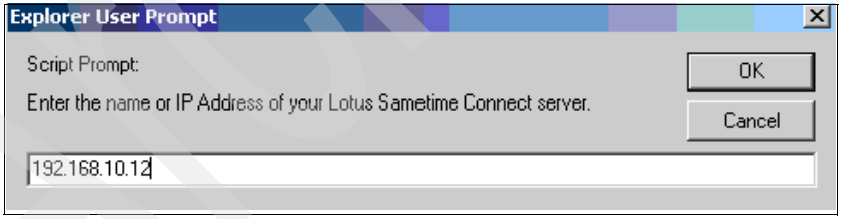


Figure 7-3 Installing Sametime integration

7. After the installation successful completes, click **Done**.

You are now ready to interact with your Sametime Connect application from within the Tivoli SRM interface.

7.3.2 SRM configuration

The following two properties are created by default; however, you provide values, such as the Sametime instant messaging server and time-out values, manually:

- mxe.im.connectiontimeout

  This option defines how many milliseconds the instant messaging application tries to connect to the instant messaging server. If this timeout expires, the analysts receives a notification stating that it is not possible to connect to the instant messaging server.

- mxe.im.sametimeserver

  This is the instant messaging server host name.

Tip: While the mxe.im.sametimeserver property is mandatory, the mxe.im.connectiontimeout property is optional.

From the SRM interface:

1. Select **Go To** → **System Configuration** → **Platform Configuration** → **System Properties**, as shown in Figure 7-4 on page 206.

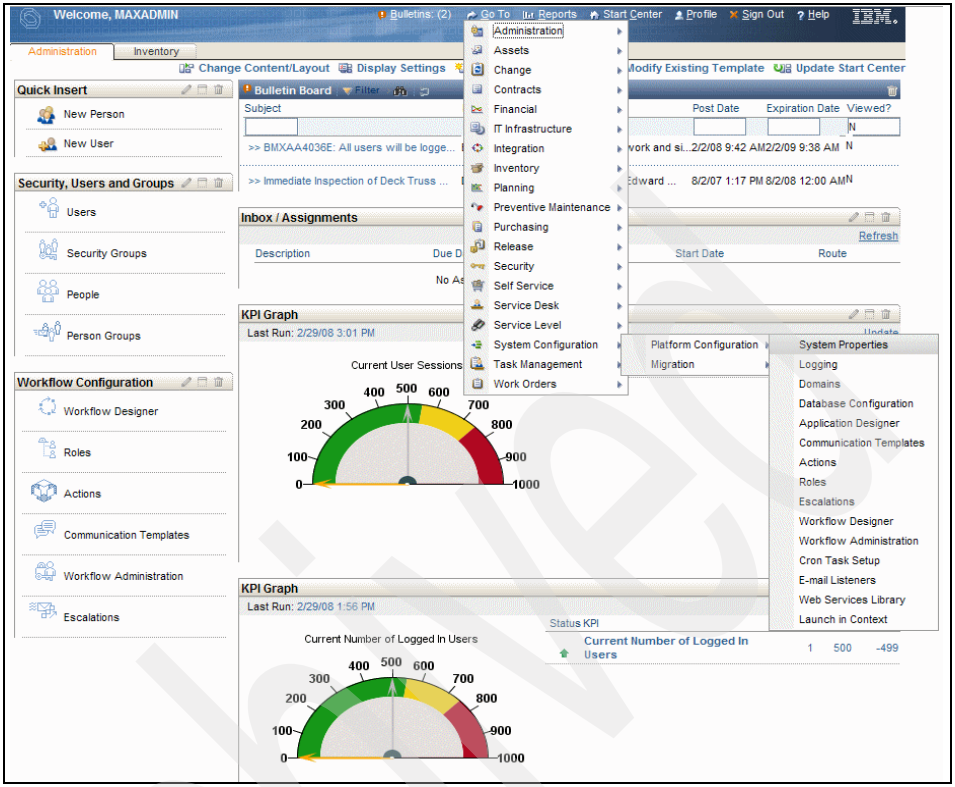


Figure 7-4 Properties configuration

2. To view the mxe.im.sametimeserver and mxe.im.connectiontimeout properties, use the filter to find the property. Type `mxe.im` and press Enter, which brings up the two instant messaging properties. Refer to Figure 7-5 on page 207.

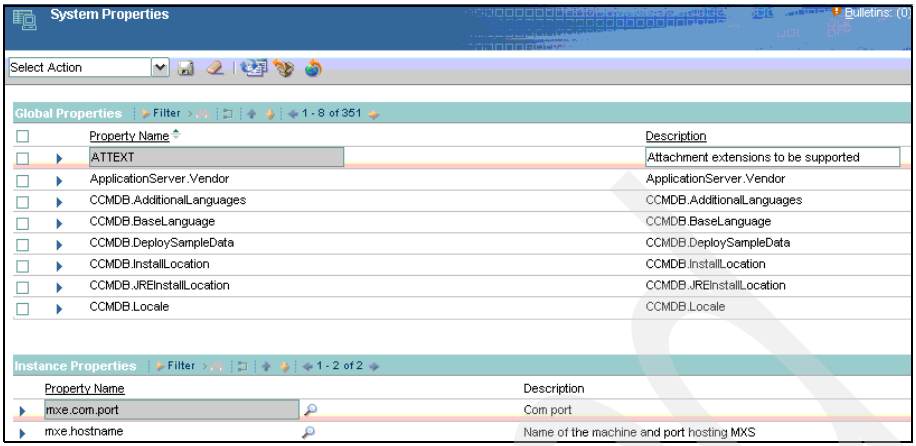


Figure 7-5 System Properties (1 of 3)

Refer to Figure 7-6.

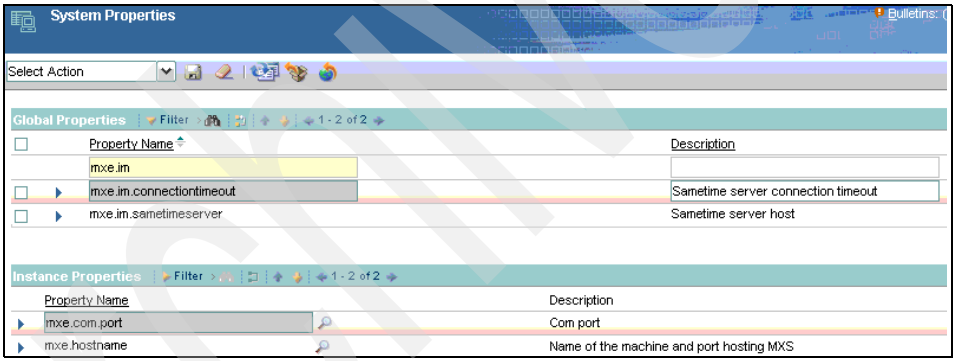


Figure 7-6 System Properties (2 of 3)

Refer to Figure 7-7 on page 208.

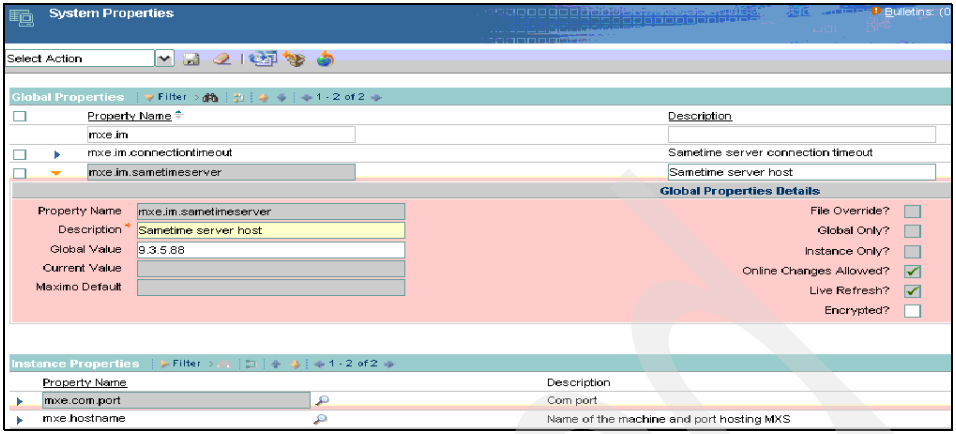


Figure 7-7 System Properties (3 of 3)

3. In order to finish the integration, you need to restart the server, which sets the Current Value to the same value as the Global Value.

Tip: You can refresh the Current Value without restarting the server by following these steps:

1. Save the changes.
2. Select the check box next to the mxe.im.sametimeserver property.
3. Click **Live Refresh**.
4. Click **OK**.

7.3.3 Sametime server configuration

On the Sametime server, ensure that users have their profiles properly configured with the Internet password (refer to Figure 7-8 on page 209).

For more details regarding how to administer users on the Sametime server, refer to the Sametime server documentation at:

`http://www.ibm.com/developerworks/lotus/documentation/sametime/`

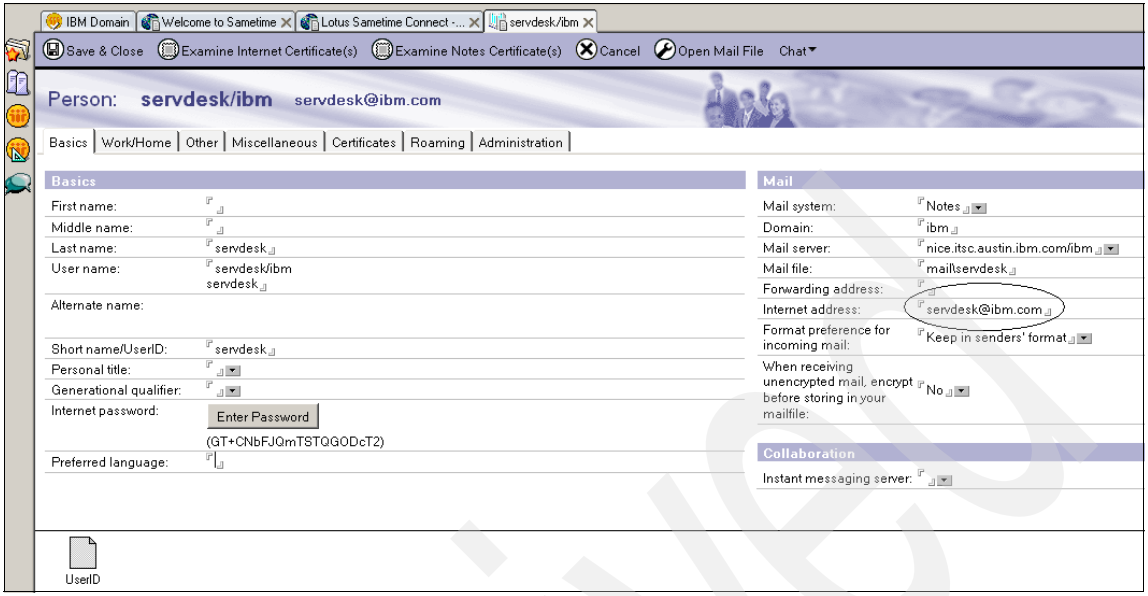


Figure 7-8 Sametime server

7.3.4 Sametime instant messaging with Tivoli SRM

You can use the instant messaging function in the following scenarios.

Conversation started by the service desk analyst

The instant messenger integration allows the service desk analyst to begin a conversation session with the affected user or a person acting on behalf of the affected user (reported by a person in service desk terminology).

Note: The service desk analyst cannot chat with the configuration item (CI) owner.

Using this feature, the analyst can quickly verify details with users who are related to the ticket and interact dynamically with these users for classifications, descriptions, and similar purposes.

The conversation can be started from the Tivoli SRM application, such as service request, incident, and problem. You can initiate a conversation any time while the other user is active in the Sametime instant messaging application.

There is an icon beneath a user's information that indicates the person's state, such as:

- Available
- Offline
- Away
- Do not disturb
- In meeting
- Unknown

When the conversation ends, the analyst can make an assessment about the ticket status. The transcript of the conversation is saved in the *communication* log under the Log application tab. This transcript is accessed when required.

7.4 Service desk scenario

In this section, we describe a situation where the service desk analyst interacts with a user by using Sametime instant messaging.

In our scenario, the user has raised an incident. The incident number is `1001`.

The service desk analyst opens the incident to check the status and tries to initiate a conversation with the user (refer to Figure 7-9 on page 211).

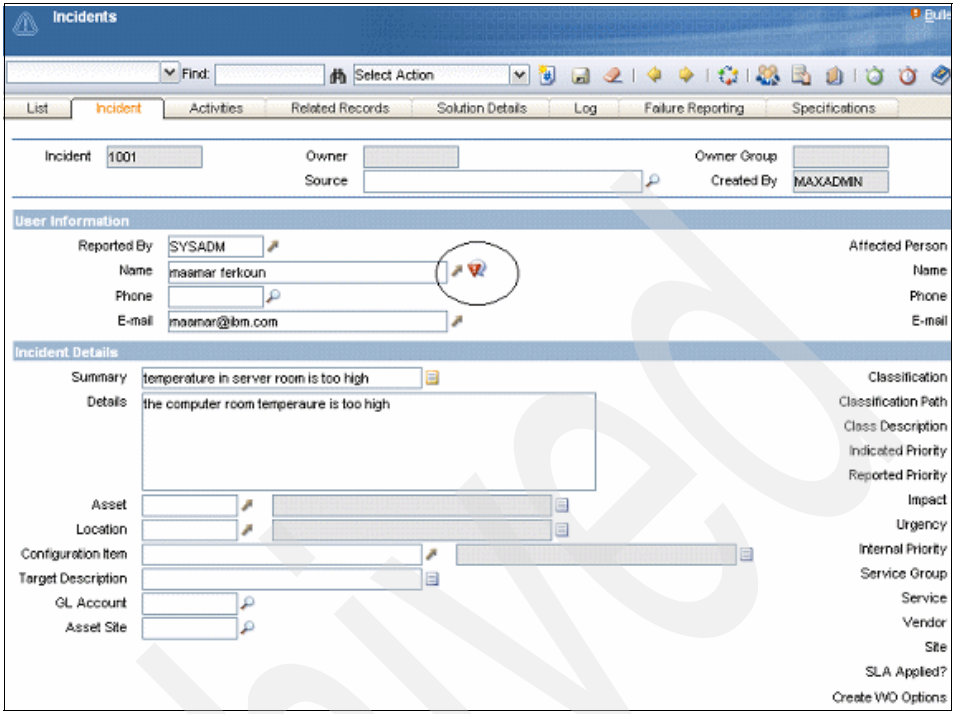


Figure 7-9 Incident raised

Note: In Figure 7-9 on page 211, the circled icon displays that an instant messaging connection is not open.

To initiate an instant messaging session, perform the following steps:

1. Select the **Action** pull-down menu.
2. Select **Open IM connection** (refer to Figure 7-10 on page 212).

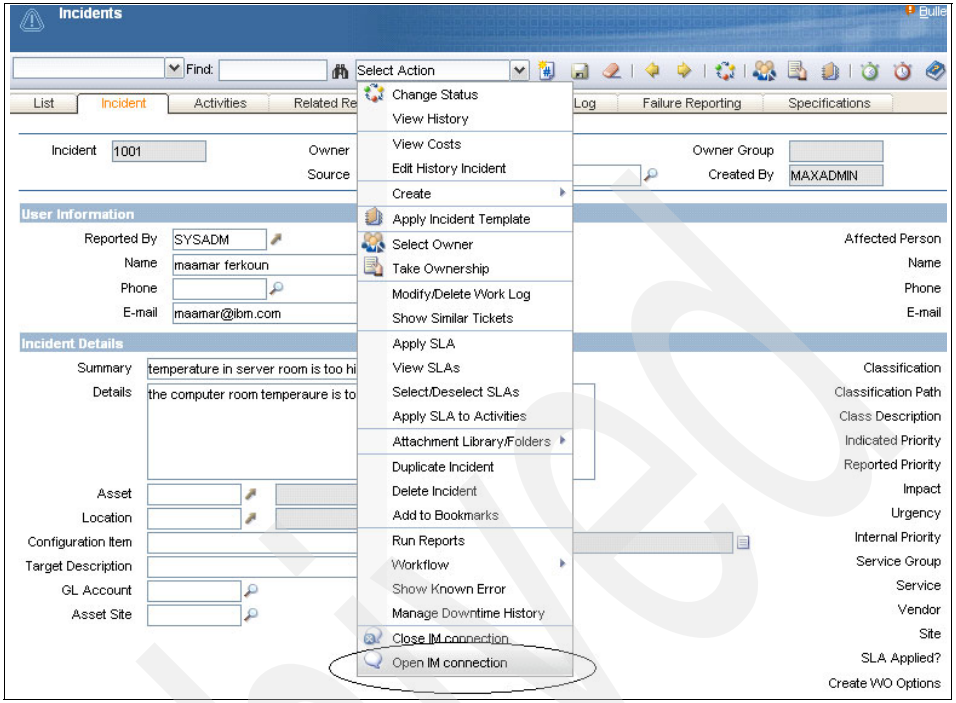


Figure 7-10 Open IM connection

3. Enter the password for the IM application, as shown in Figure 7-11.

Figure 7-11 Enter the password for the IM application

4. You now have an open session with the Sametime application, as shown in Figure 7-12 on page 213.

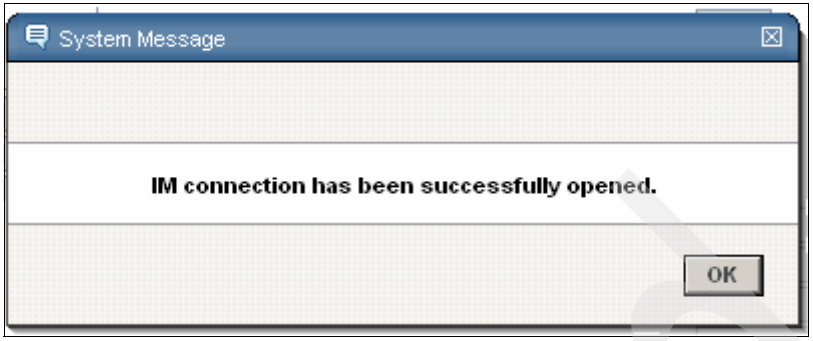


Figure 7-12 IM connection

5. The user status display shows as being away (Figure 7-13).

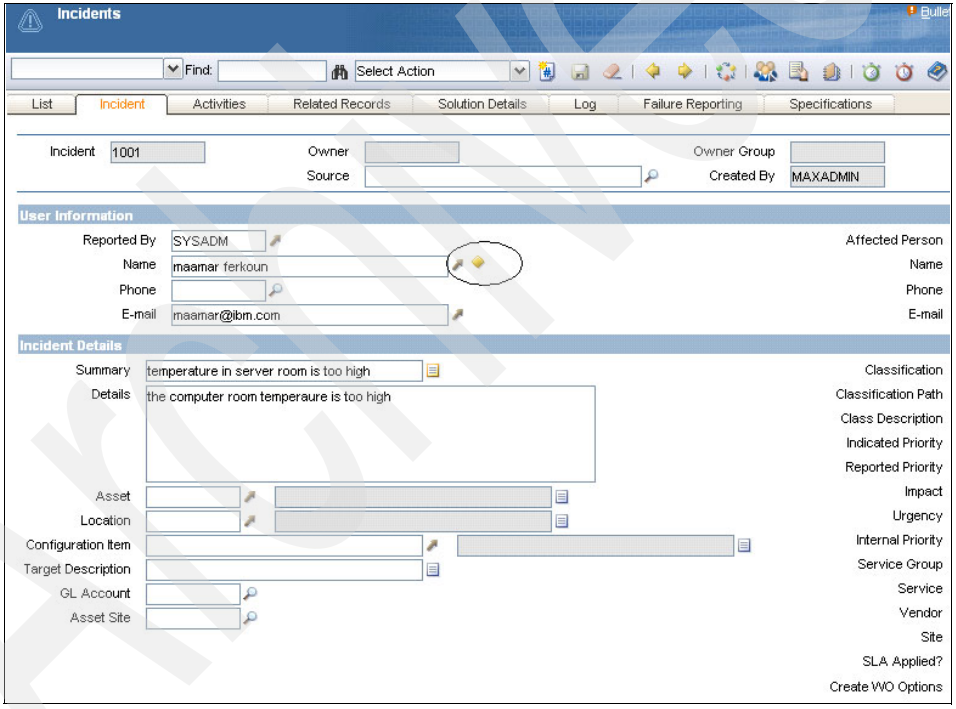


Figure 7-13 Away status

6. Click the icon to start a Sametime conversation with the user (refer to Figure 7-14 on page 214).

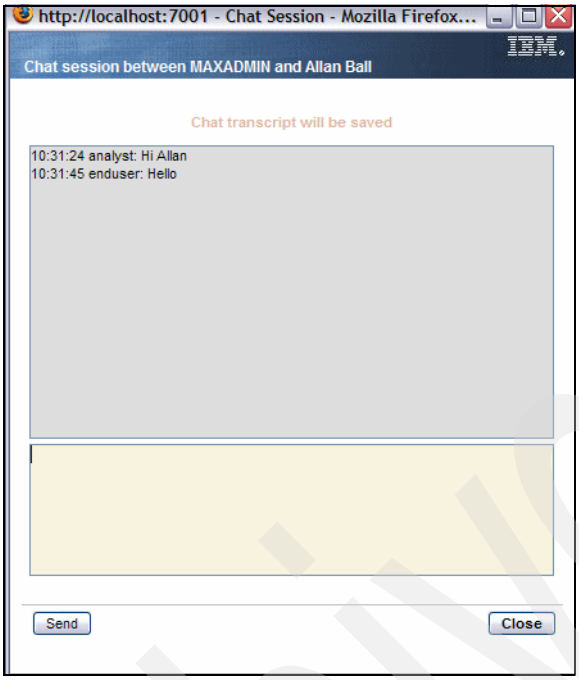


Figure 7-14 Chat window

7. Figure 7-15 displays the user Sametime connect session.

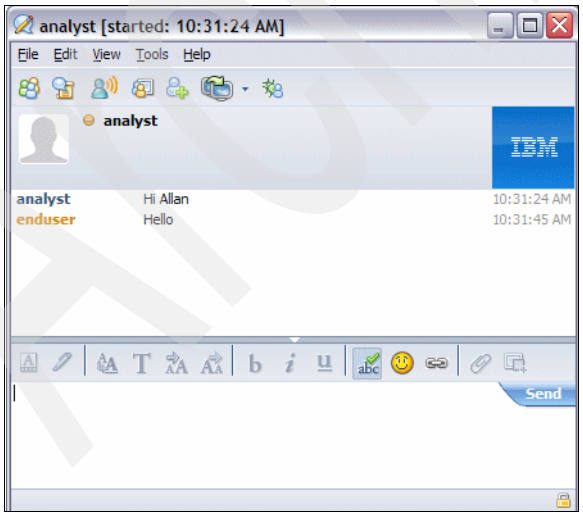


Figure 7-15 Sametime session

8. To close the session, select **Close** (refer to Figure 7-16).

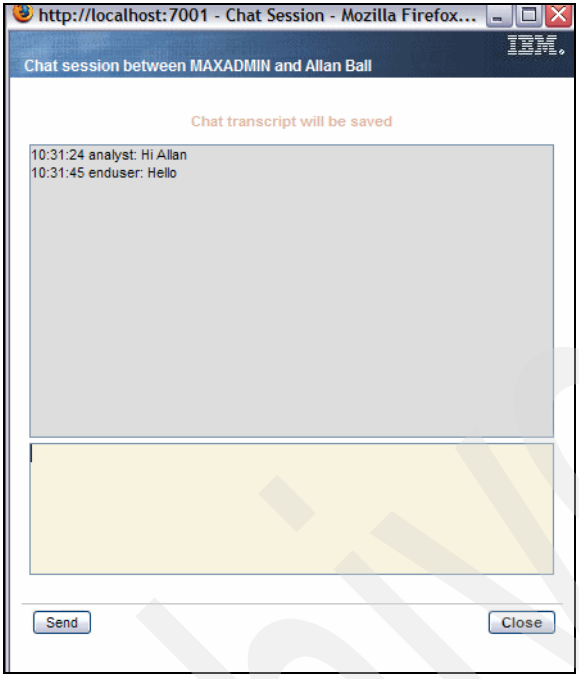


Figure 7-16 Close connection

9. Figure 7-17 shows the closed connection.

Figure 7-17 Connection closed

8

Computer Telephony integration

In this chapter, we describe the available Computer Telephony integrations (CTIs) for Tivoli Service Request Manager (SRM) V7.1. We describe how to install and configure the integrating software, as well as an example of how CTI functions, and basic troubleshooting.

In this chapter, we discuss:

- CTI functions on page 218
- CTI installation on page 219
- CTI configuration on page 231
- Using your CTI implementation on page 234
- Troubleshooting on page 241

8.1 CTI functions

CTI is a new Tivoli SRM integration that provides features that allow your telephony system to interact with Tivoli SRM. CTI solutions are often used in call center environments, but they can also be used in a Service Desk environment. Integrating the CTI solution with your service desk solution reduces the number of manual steps for operators and increases the handling speed, which reduces the average call time.

CTI allows you to populate Tivoli SRM records and fields with mapped information based on lookup information that is provided by the CTI system. You can also control your CTI solution from the Tivoli SRM user interface, creating a single application for all service desk-related work.

Using CTI, you can implement the following functions:

- Call information display (caller number (ANI), number dialed (DNIS), and screen population on answer (without using calling line data)
- Automatic and computer-controlled dialing (fast dial, preview, and predictive dial)
- Phone control (answer, hang up, hold, conference, and so forth)
- Coordinated phone and data transfers between two parties (for example, pass on the screen pop with the call)
- Call center phone control (logging on after-call work notification)
- Advanced functions, such as call routing, reporting functions, automation of desktop activities, and multi-channel blending of phone, e-mail, and Web requests
- Agent state control (for example, after-call work for a set duration, then automatic change to the ready state)
- Call control for Quality Monitoring and call recording software

A typical CTI application manages an event flow that is generated by a telephony switch during the life cycle of a call. The following list is the sequence of events in the event flow:

1. Set up
2. Deliver (ringing)
3. Establish (answer)
4. Clear (hang up)
5. End

Other events that can be handled by a typical CTI solution include:

- Hold
- Retrieve from hold
- Conference
- Transfer
- Forward

CTI applications handle events that are related to automated call distribution (ACD), such as:

- Agent logged in
- Agent available
- Agent not available
- Agent ready
- Agent not ready

On general availability of Tivoli SRM V7.1, Genesis is the only integration supported. Future integrations with other CTI systems are planned, such as Avaya, CISCO, Siemens, and Envox.

8.2 CTI installation

Follow these steps, and you will find your Tivoli Service Request Manager environment equipped with an additional Java Applet and CTI functionality:

1. Download the CTI Installation package from:

   http://catalog.lotus.com/wps/portal/topal/details?catalog.label=1TW10SR01

2. Launch the process solution installation program by navigating to the <*CCMDB_HOME*>\bin directory of your CCMDB installation and executing solutionInstallerGUI.bat.
3. From the Choose PSI Package panel, click **Choose** and navigate to the CTI package that you have downloaded.
4. Proceed with the prompts. The dialog box shown in Figure 8-1 on page 220 appears.

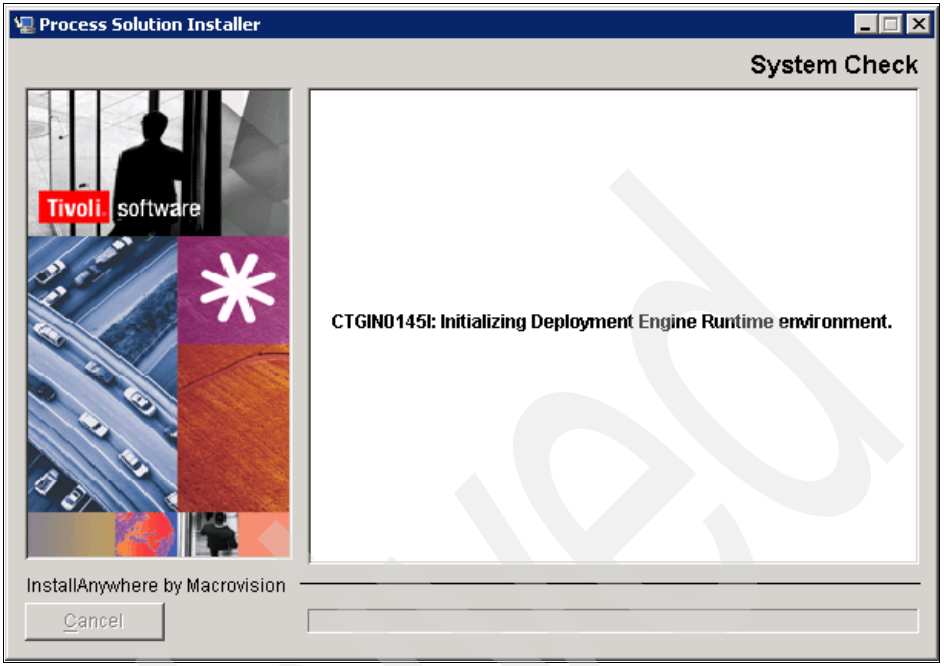


Figure 8-1 Deployment engine system check

5. The installation package is validated (Figure 8-2 on page 221).

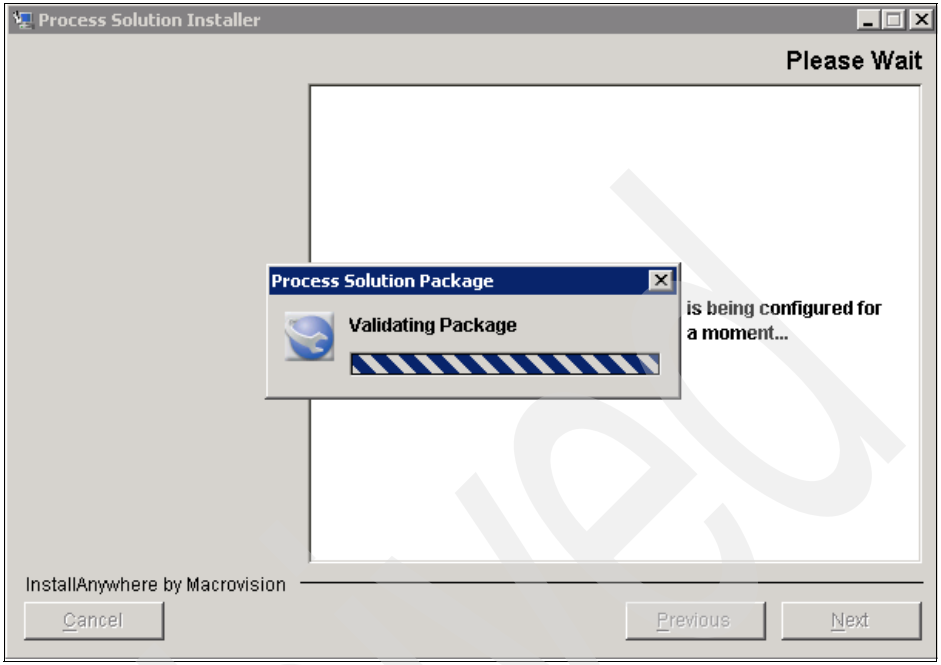


Figure 8-2 Package validation

6. The result appears in the Package Validation Results dialog box and provides information about the installation. If the package is already installed, you cannot continue (refer to Figure 8-3 on page 222).

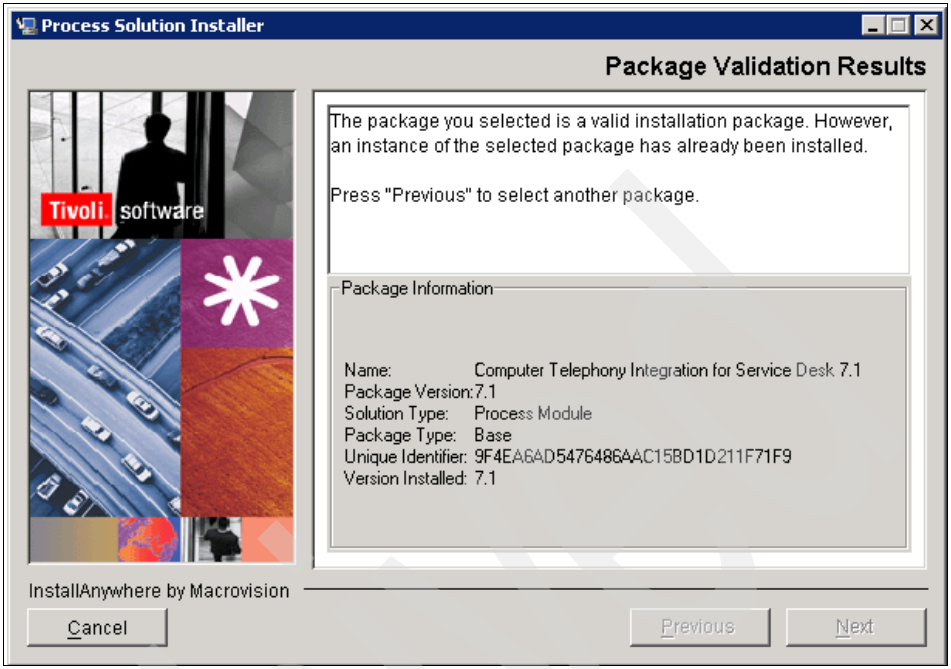


Figure 8-3 Package validation results when already installed

7. Uninstall the package using the appropriate Windows tools before you can install the package again.
8. If the package has not been previously installed and successfully validated, Figure 8-4 on page 223 appears.

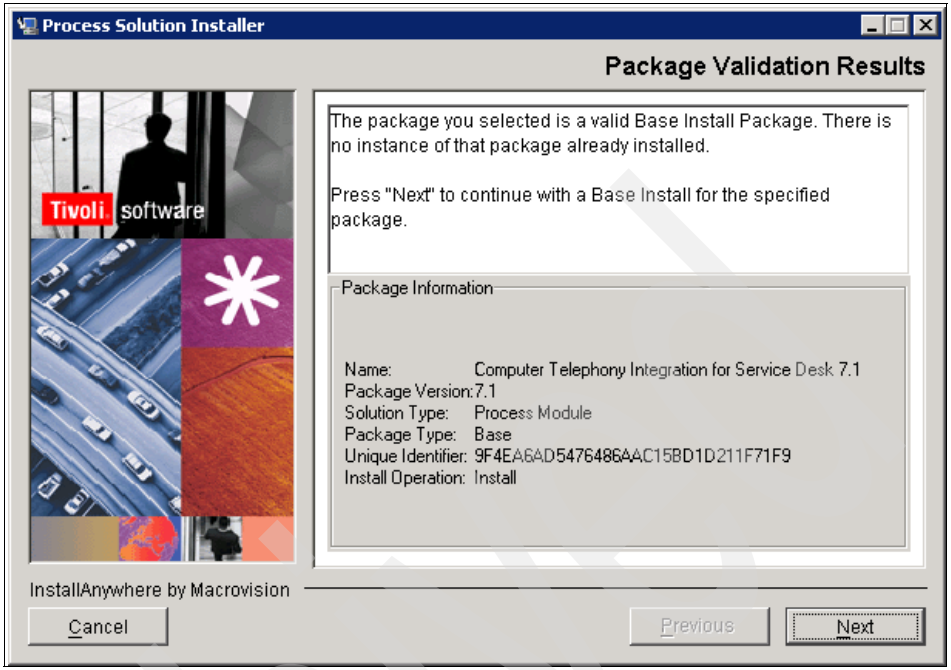


Figure 8-4 Package validation results when not installed yet

9. Press **Next** to continue.
10. A dialog box appears to obtain the license. When the license is obtained successfully, a dialog box as shown in Figure 8-5 on page 224 appears.

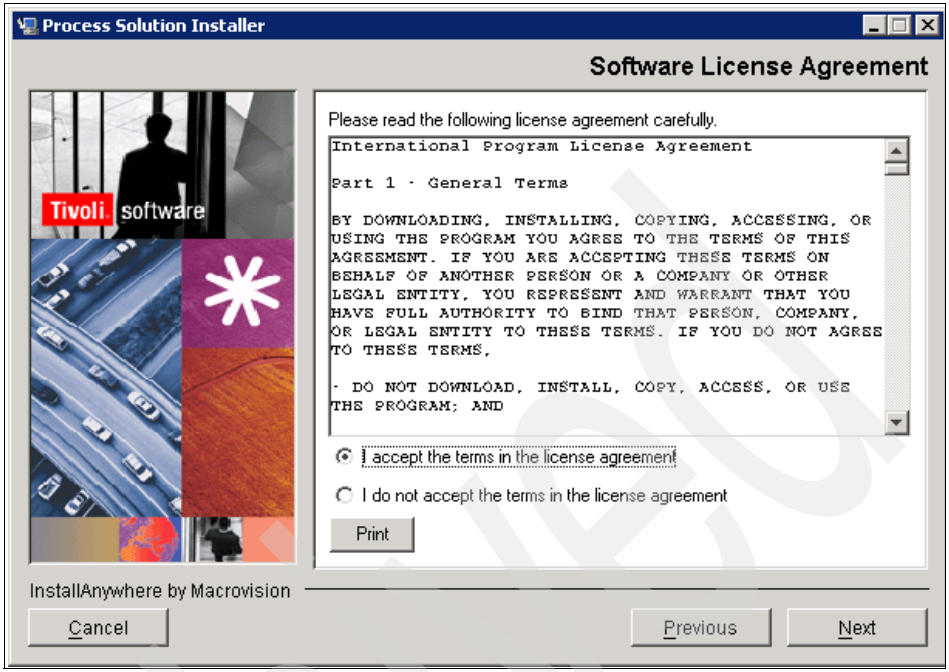


Figure 8-5 License agreement

11. Select **I accept the terms in the license agreement**.
12. Click **Next** to continue.
13. A dialog box appears to query the required credentials, as shown in Figure 8-6 on page 225.

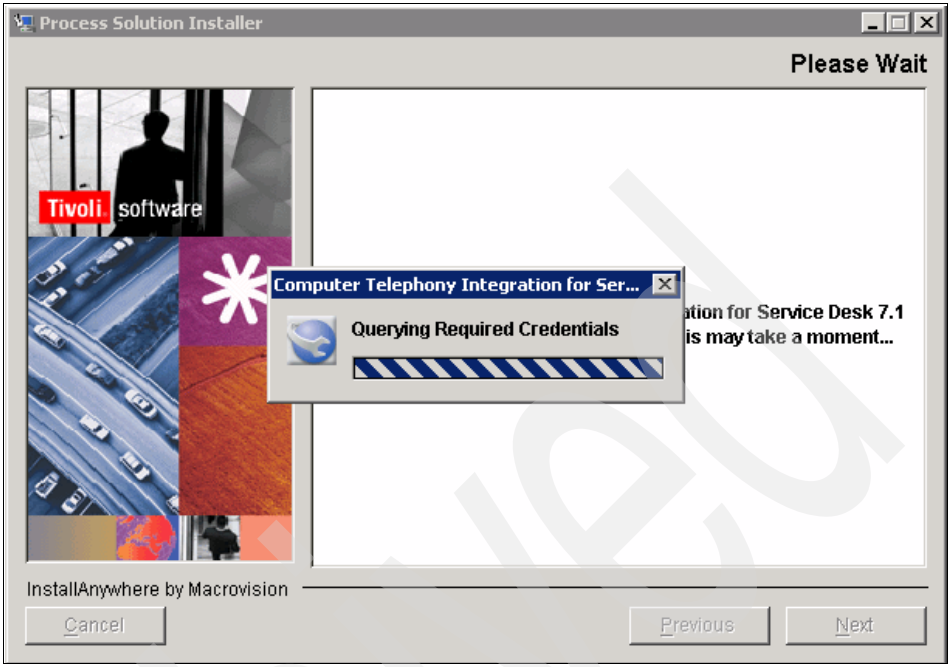


Figure 8-6 Required credentials

14. Enter the database credentials in the Middleware Login Information dialog box, as shown in Figure 8-7 on page 226. You are required to enter these credentials in order to continue. They are used to access the database and update the maximo schema with CTI-related objects.

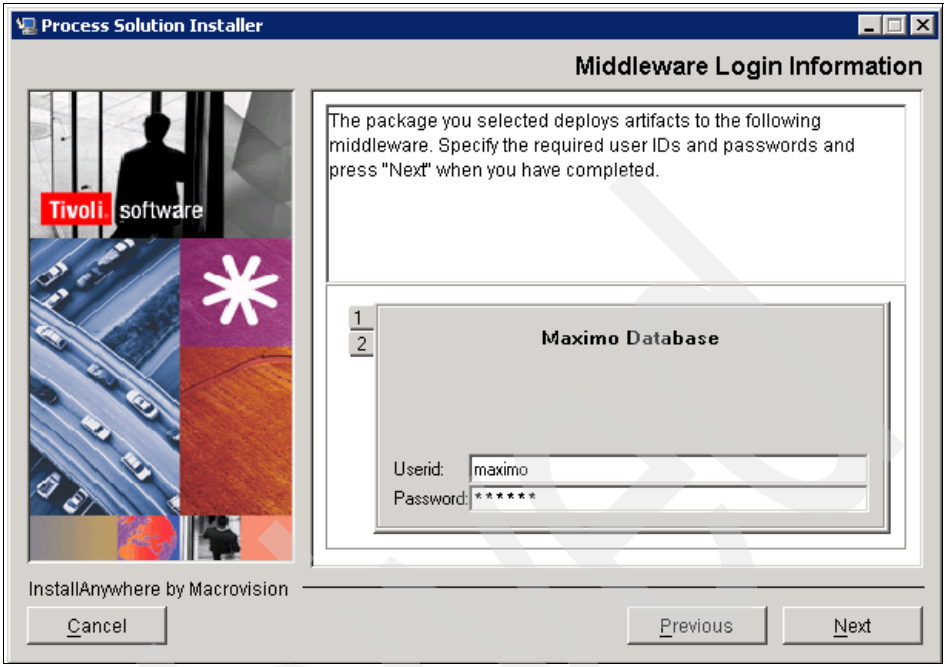


Figure 8-7 Maximo Database credentials

> **Note:** You must enter the user name and password to access the database that you created during the Tivoli SRM installation. By default, the user name is `maximo`.

15. Enter the WebSphere credentials in the Middleware Login Information dialog box, as shown in Figure 8-8 on page 227. You are required to enter these credentials in order to continue. They are used to access WebSphere, and they are used to rebuild and redeploy the EAR files.

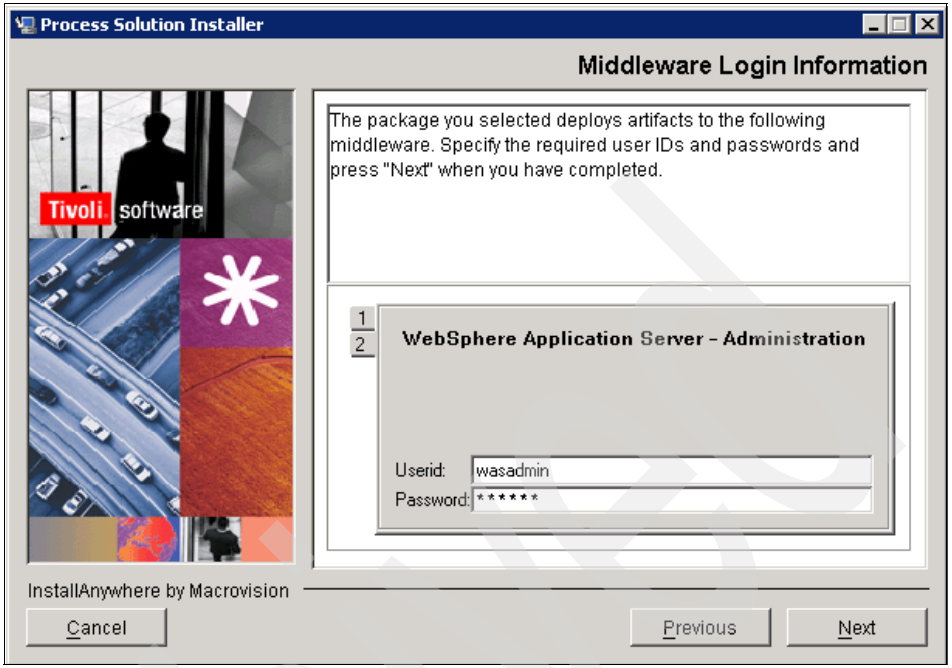


Figure 8-8 WebSphere credentials

Note: You must enter the user name and password to access the database that you created during the Tivoli SRM installation. By default, the user name is `wasadmin`.

16. Click **Next** to continue. The middleware credentials are validated, which is shown in Figure 8-9 on page 228.

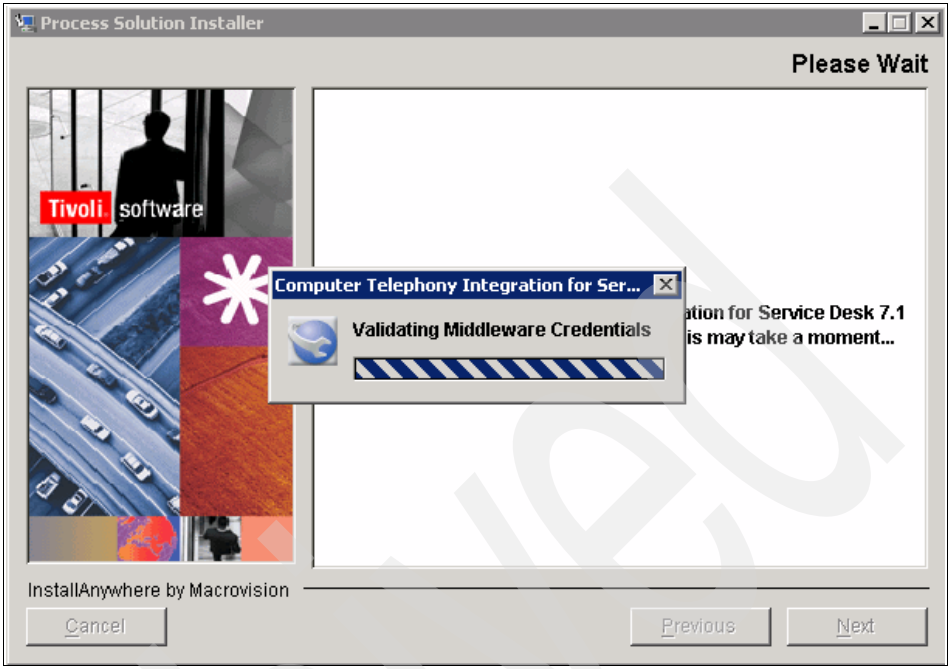


Figure 8-9 Validating middleware credentials

17. The Package Options dialog box opens, which is shown in Figure 8-10 on page 229.

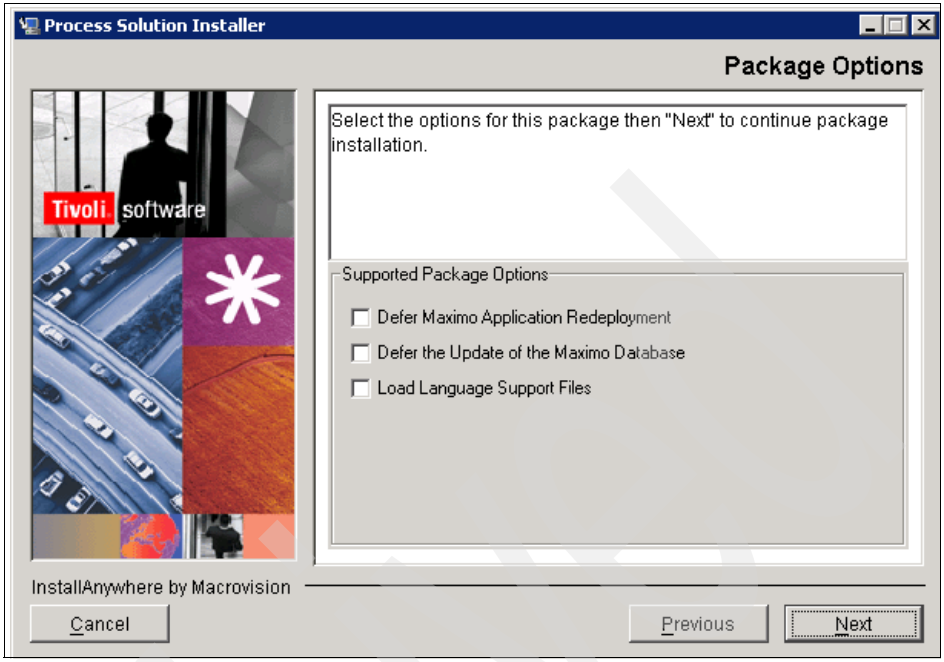


Figure 8-10 Package options

18. The option, Defer Maximo Application Redeployment, skips rebuilding and redeployment of the EAR files. You must manually execute this step to enable the CTI functions in the application.

> **Note:** Without the database updates and with only this step executed, you receive database errors when trying to retrieve unavailable objects from the database.

19. The option, Defer the Update of the Maximo Database, skips all database updates. You must manually execute this step to update the database with the necessary objects for CTI.

> **Note:** If you only execute the database update, but you have not rebuilt and redeployed the EAR files, you are not able to access the full application functions.

20. Select your package options, and click **Next** to continue. The deployment engine is initialized to verify that all installation requirements are met.

21. If all package requirements are satisfied, you can continue the actual deployment of the package (see Figure 8-11).

22. Click **Next** to continue.

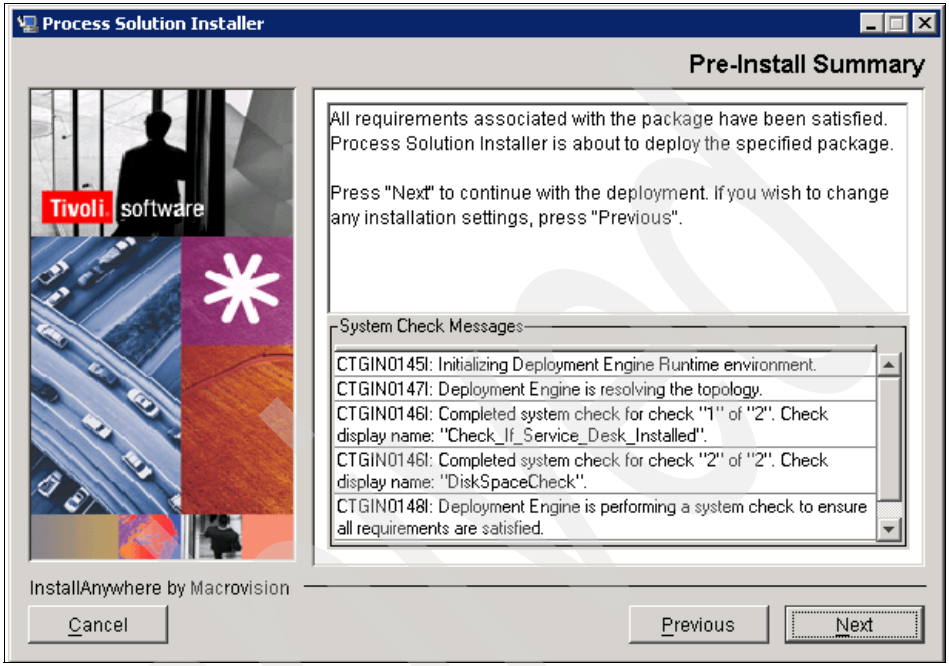


Figure 8-11 Pre-Install Summary

23. The deployment engine is initialized to start the actual deployment, as shown in Figure 8-12 on page 231.

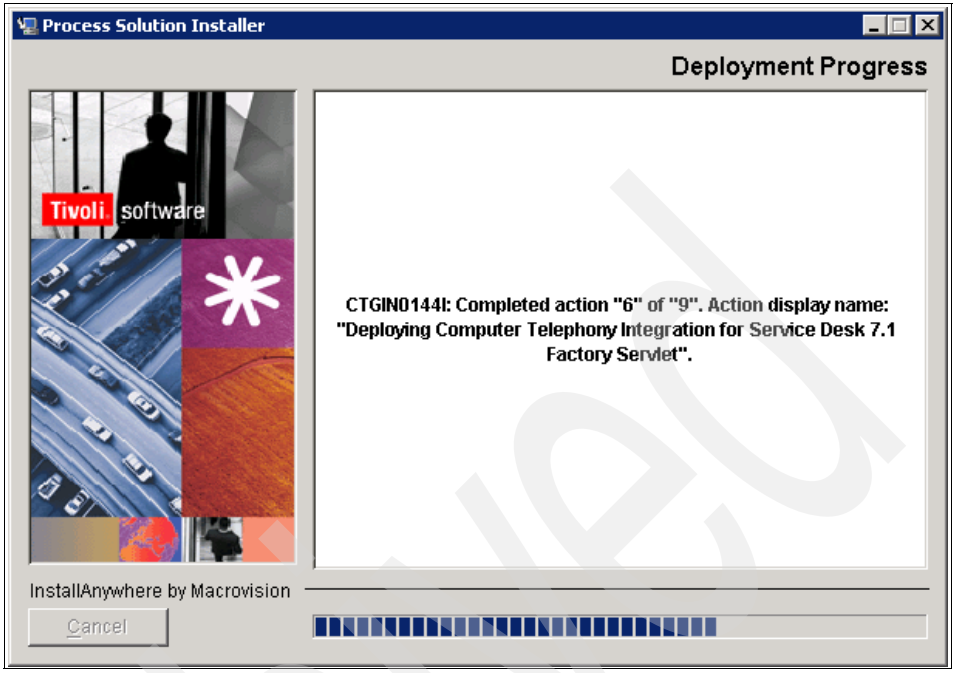


Figure 8-12 Deployment progress

24. If successful, the deployment status report is complete. You are now able to access Tivoli SRM and use the CTI solution.

8.3 CTI configuration

1. Log in to Tivoli SRM as the administrator or any user with authorization to change Tivoli SRM System Properties.
2. From the Go To menu, select **System Configuration** → **Platform Configurations** → **System Properties**.
3. Filter **Property Names** on CTI.
4. Change the Global Value field for each of the Property Names specified in Table 8-1 on page 232. Ask your Genesis administrator for the values that you have to provide in the Global Value field.

Table 8-1 System Properties changes

Property name	Property description
cti.ail.appname	Specifies the application name of the CTI system.
cti.config.host	Specifies the host name on which the CTI configuration server is running.
cti.config.port	Specifies the port that is used for communication between Tivoli SRM and the CTI configuration server.
cti.config.backup.host	Specifies the hostname on which a potential backup CTI configuration server is running (in case the primary host is not responding).
cti.config.backup.port	Specifies the port that is used for communication between Tivoli SRM and a potential backup CTI configuration server.
cti.username	Specifies the user name that can access the CTI configuration server.
cti.password	Specifies the password for the user name to access the CTI configuration server.
cti.ail.license	Specifies the URL where the CTI license server can be located.
cti.ail.period	Specifies the keep alive time for the connection to the CTI server.
cti.ail.queue	Specifies the queue name for Tivoli SRM on the CTI server.
cti.ail.timeout	Specifies the connection timeout.
cti.lookup.type	Specifies the type of lookup that is used to identify callers, which by default is phone, but it can be changed to a custom lookup.

We provide examples of the integration that we created for this book in 'Using your CTI implementation" on page 234.

Figure 8-13 on page 233 shows an example of the System Properties window with the options and values that you change.

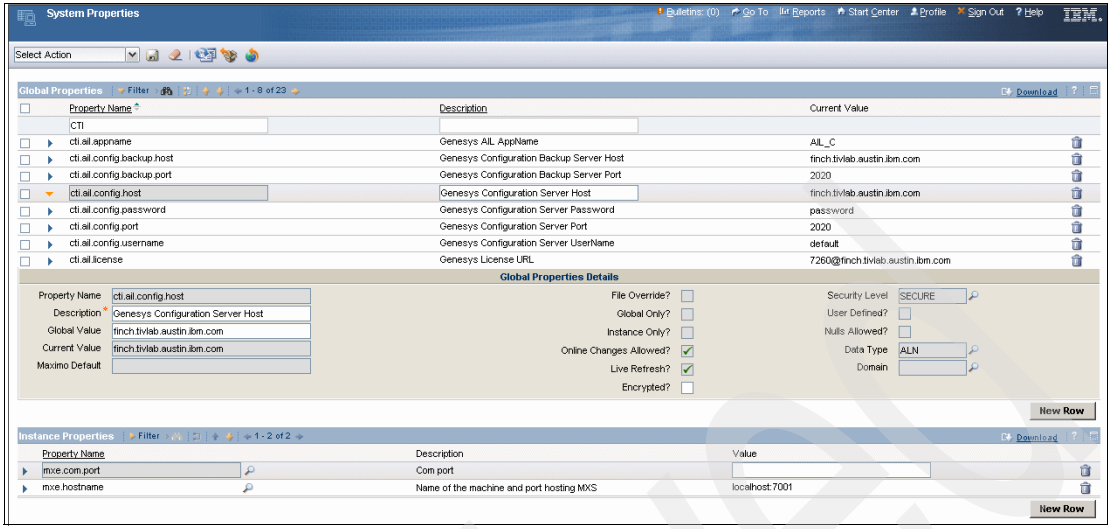


Figure 8-13 System Properties configuration example

5. Make sure that the Java.rmi.server.hostname is set. If not, change the Global Value for Property Name mxe.registry.host to the host name of the Tivoli SRM server. This property is used to define the Remote Method Invocation (RMI) binding.

8.3.1 Custom lookup configuration

CTI is provided with a default lookup, which is called *phone*. It enables the Tivoli SRM system to search the person's records for caller details based on the phone number that is provided by the CTI system. The phone number provided by the CTI system must match the phone number in a person's record exactly to be able to identify the caller and transfer data to a new Service Request (SR) record.

To use a custom lookup, instead of the default phone number, you have to change the cti.lookup.type Property to custom. The following properties are necessary and need to be changed:

- *cti.lookup.key* contains the value that you want to look up, which is provided by the CTI system.
- *cti.lookup.mxkeymap* contains the Tivoli SRM object and attribute to which you want to match the CTI data.
- *cti.mappings* contain all of the fields that you want mapped in the SR that is being opened. This property is in the format, cti.mappings=phoneKey:srColumn, and comma-delimited.

Refer to Example 8-1.

Example 8-1 Custom lookup example

```
If you want to map the data under the key EMPSERIAL in the phone call's
attached data to look up under PERSONID in the PERSON table in SRM,
specify:

cti.lookup.key=EMPSERIAL
cti.lookup.mxkeymap=PERSON:PERSONID

If you want to further map the ASSET and CLASSIFICATION in attached
data to the ASSET and CLASSIFICATION in the SR being opened by the
phone call, specify as well:

cti.mappings=ASSET:ASSET,CLASSIFICATION:CLASSIFICATION
```

8.4 Using your CTI implementation

After you have successfully installed the integration, you can use the integration. You still have a few steps to take as well as getting acquainted with the specific CTI functions.

8.4.1 Changing the URL

You must manually change the Tivoli SRM URL in order to access the Start Center with CTI Java Applet, access Tivoli SRM, and be able to use the CTI solution.

The Tivoli SRM URL after login is:

`http://[hostname]:[port]/maximo/ui/login`

To be able to use your CTI system, manually change the URL to:

`http://[hostname]:[port]/maximo/webclient/cti/index.jsp`

This URL renews the Start Center, enabling a Java Applet with the required symbols (buttons and icons) to operate the CTI system (refer to Figure 8-14 on page 235).

Figure 8-14 Start Center with CTI solution active

The CTI symbols appear in the upper left corner over the regular Start Center. If you did not log in to the CTI system, the buttons are shown in Figure 8-15.

Figure 8-15 CTI status before login

8.4.2 CTI buttons

Next, we explain each of these symbols, starting from left to right:

- Login/logout button:

  The button to either log in to or log out from the CTI system. An orange arrow to the right means that you are not logged in. A green arrow to the left means that you are logged in.

- Status icon:

  This icon shows your status, for example, if you are available to take calls or busy. A green icon indicates that you are ready (available to answer calls). A green icon with a stop sign means that you are busy (not on the phone, but

not available to answer calls). A red icon with a phone indicates that you have accepted a call and are still talking.

- Accept/end call button:

  This button answers or ends the call (hang up).

- Start/end after-call work button:

  You use this button to set the agent status to start or end after-call work.

- Ready/busy button:

  You use this button to change your status in the CTI system.

- Mute current call button:

  You can use this button to mute an active conversation. The call is put on hold for as long as you do not transfer or resume the call. The button is active/visible if you have an active conversation.

- Resume current call button:

  If you put a call on hold, you can use this button to resume the conversation. The button is active if the current conversation is put on hold.

- Transfer button:

  You can use this button to transfer the accepted call to another agent.

- Two-step transfer button:

  You can use this button to transfer an accepted call from your first transfer to another agent.

8.4.3 An example

The following example describes a call flow, using the buttons just described. We describe the following flow:

- Log in to the CTI system
- We make ourselves available to accept calls
- We accept and answer an incoming call
- We put the call on hold
- We resume the call
- We disconnect the call
- We perform after-call work
- We stop performing after-call work
- We put our status back to ready
- Log out of the CTI system

The steps in this example are:

1. Log in to the CTI system, using the login button.

   Notice that the CTI buttons change. Figure 8-16 shows the buttons that appear.

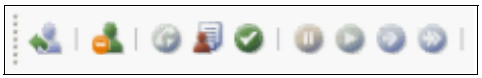


Figure 8-16 CTI status after login

Note: You are logged in, but the status button shows you are not available.

2. Provide your login credentials (Figure 8-17).

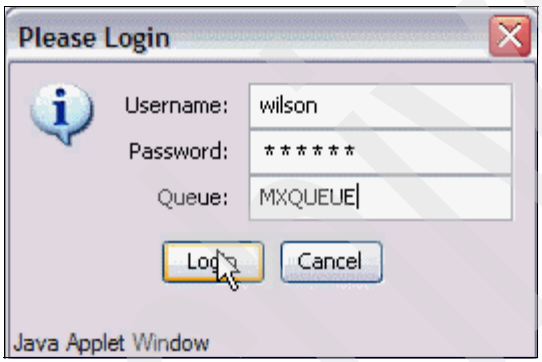


Figure 8-17 CTI login credentials

3. Enter your CTI user name, password, and queue (this the queuename that is created in your CTI solution for incoming Tivoli SRM calls), and click **Login**.
4. Set your status to ready by using the ready button, as shown in Figure 8-18.

Figure 8-18 CTI set user status to ready

Notice the change of the CTI buttons again. The buttons shown in Figure 8-19 on page 237 appear.

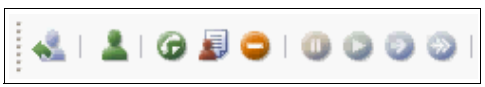


Figure 8-19 CTI status set to ready

Note: Although you are logged in, you are not able to accept incoming calls until you change your status to ready.

5. When an incoming call is registered, accept the call using the accept call button.

   Notice the change of the CTI Java Applet, while it shows the incoming call. The applet shown in Figure 8-20 appear.

Figure 8-20 Incoming call

After the call is accepted, the buttons shown in Figure 8-21 appear. The status icon shows that you accept the call.

Figure 8-21 Incoming call accepted

Upon accepting the call, a new Service Request (SR) is created and displayed, as shown in Figure 8-22 on page 238.

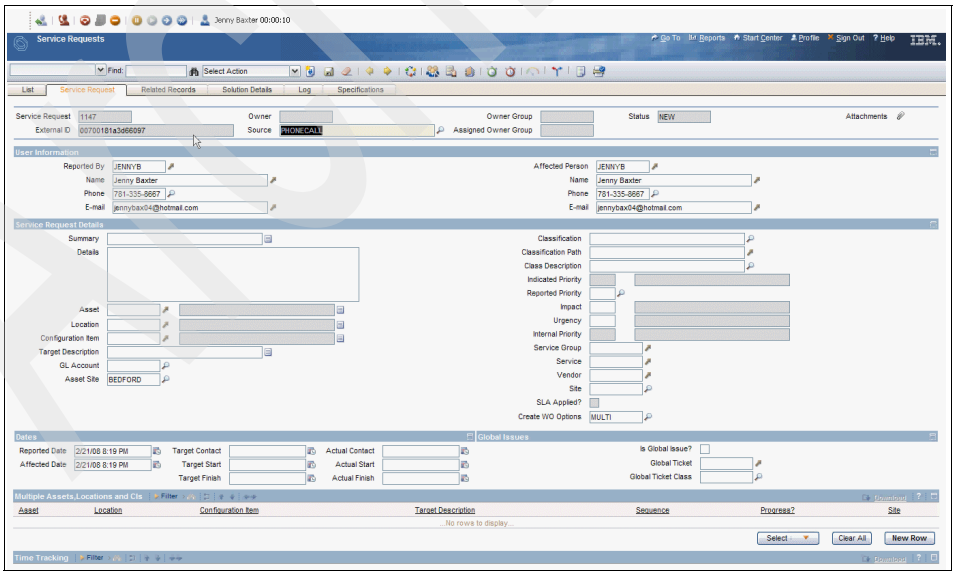


Figure 8-22 New Service Request (SR) using CTI

The External ID field is now populated with a reference ID that is used by Genesis. The Source field shows `PHONECALL` (the default) as the origin of the new record.

6. Put the call on hold, using the mute current call button, as shown in Figure 8-23.

Figure 8-23 Mute call

The applet shown in Figure 8-24 appears.

Figure 8-24 Muted call

7. Resume the call by using the resume current call button, as shown in Figure 8-25 on page 239.

Figure 8-25 Resume call

8. Disconnect the call by using the end call button, as shown in Figure 8-26.

Figure 8-26 End call

9. Change your status to perform after-call work by using the start after-call work button, as shown in Figure 8-27.

Figure 8-27 Perform after-call work

The applet shown in Figure 8-28 appears.

Figure 8-28 Performing after-call work

10. Change your status to stop performing after-call work by using the stop after-call work button, as shown in Figure 8-29.

Figure 8-29 Stop performing after-call work

11. Set your status to ready by using the ready button, as shown in Figure 8-30.

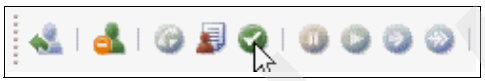


Figure 8-30 CTI set user status to ready

The buttons shown in Figure 8-19 on page 237 appear.

Figure 8-31 CTI status set to ready

Note: Although you are logged in and have stopped performing after-call work, you are not able to accept incoming calls until you change your status to ready.

12. Log out to the CTI system by using the logout button, as shown in Figure 8-32.

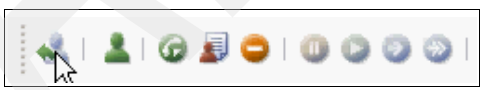


Figure 8-32 CTI logout

You are asked if you are sure, as shown in Figure 8-33.

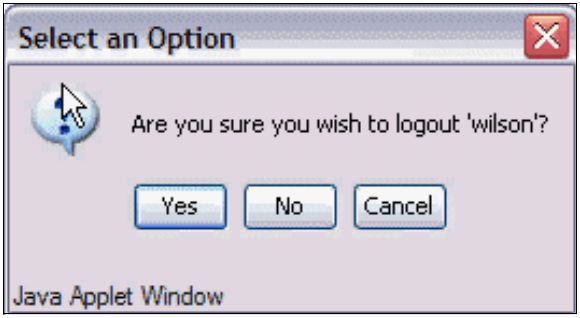


Figure 8-33 CTI logout options

8.5 Troubleshooting

We always hope that you experience no problems with the installation, configuration, or usage of Tivoli SRM and the CTI integration, but we are aware that you can experience difficulties during any of the steps described. This section is meant to give you a starting point for troubleshooting in case you might end up in an unexpected state where the interaction with your CTI system is not working.

8.5.1 Log files and debug information

During either installation, configuration, or when accessing and using your CTI integration from within Tivoli SRM, you might experience different problems. The best places to look for errors or exceptions are the Java Console in your Web browser and the SystemOut.log log file that you can find on your Tivoli SRM application server.

8.5.2 CTI Java applet did not load

If you access the specific URL to use of the CTI functions, and there are no visible changes (no applet is visible at all), something might have gone wrong during installation. Most likely, the Enterprise Archive (EAR) files are the problem, because they might not be built or deployed successfully.

In that case, rebuild and redeploy the EAR files yourself by using the procedure described in the product *System Administration Guide*. After successfully rebuilding and redeploying the EAR files, perform your previous actions again to check if the problem still exists. Contact IBM support in case the integration still does not work after you successfully install, rebuild, and redeploy the EAR files.

8.5.3 CTI Java applet failed to load successfully

If the CTI installation completes successfully, and a gray applet appears on top of the Start Center, but you cannot see the CTI buttons, check the Java console of your Web browser for errors or exceptions. For example, in Microsoft Internet Explorer®, the Sun Java™ Console is in the tools menu (see Figure 8-34 on page 242).

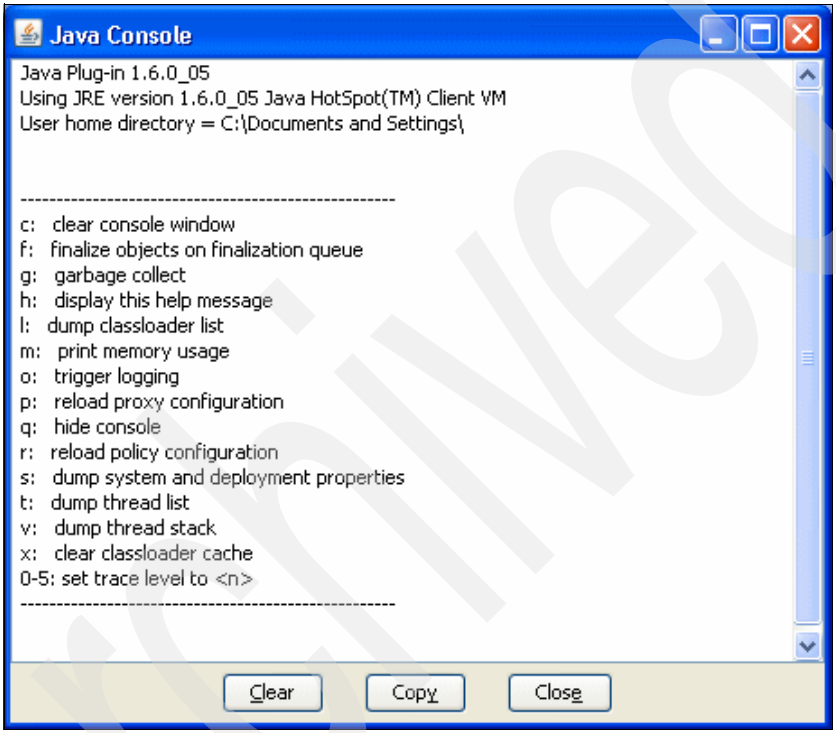


Figure 8-34 Java Console

The Tivoli SRM window shows a gray rectangle where the CTI buttons usually display. To be sure that you are looking at the latest errors or exceptions in the Java Console, you can clear the Console by using the Clear button and open the CTI URL again. Now, you can find any new error or exception in the Java Console.

RMI binding unsuccessful

If the Remote Method Invocation (RMI) binding failed during startup, you might have an issue with a system property that is not set (properly). The Java Console shows an error message, such as **"**`Class Not Found Exception`**"**.

Take the following steps to make sure that the prerequisites for the RMI binding are correct and completed:

- Make sure that the system property Java.rmi.server.hostname is set.
- Change the Global Value for Property Name mxe.registry.host to the host name of the Tivoli SRM Application Server.

Missing or incorrect system properties

It is always possible that one of the other system properties is not correctly set during configuration. Log in to Tivoli SRM as MAXADMIN or an equivalent user and open the system properties application. Check and correct all CTI properties as described in 'CTI configuration" on page 231, clear the Java Console and access the CTI URL again. If no errors or exceptions are recorded in the Java Console, your CTI solution is now operational.

Missing or incorrect class path

Make sure that you include the Java archives (JAR files) for the Genesis Platform Software Developer Kit (SDK) Agent Interaction Library in the server classpath.

There is one application server classpath for each application server in the IBM WebSphere Application Server environment. Each application server corresponds to a Java virtual machine (JVM™).

Set the classpath in one of two ways:

- Use an administrative client to set the Command Line Arguments field of the application server. Specify the classpath with the flag-classpath.
- Use an administrative client to set the application server Environment property to include a CLASSPATH variable and value.

Note: Classes put in the classpath must not reference other classes that cannot be found in this classpath.

9

High availability best practices

In this chapter, we discuss high availability considerations for integrating IBM Tivoli Service Request Manager (SRM) with other systems, such as third-party Service Desks or Event Management systems, such as Tivoli Enterprise Console (TEC).

We discuss the following topics:

- Accuracy and availability on page 246
- Event Management integration on page 246

9.1 Accuracy and availability

Two considerations are especially important when you implement the integration between two components:

- Accuracy of the information
- Availability of the information

The accuracy of the information means that the information exchanged through the integration is accurate between the two systems. For example, if a ticket is opened due to an automated event, but the source of the event is not shown correctly in the service desk and the information that is exchanged is not accurate, there is probably a defect in the integration software.

The availability of the information means that the information that is exchanged through the integration is available.

Using Event Management and Service Desk integration (assuming that the integration supports synchronization of the events) when the ticket description is updated or the ticket is closed in the service desk, but the event or events associated with the ticket are not updated within a reasonable time means that the two systems are not synchronized and information is not available.

The failure of one or more components in the integration is usually the problem. This failure can be a hardware, software, or a performance problem. The integration components cannot cope with the increased data flow.

The goal of integration is to make sure that both the accuracy and the availability of information that is exchanged is ensured. In this chapter, we focus on the availability aspect of the integration and provide guidelines about how to accomplish high availability for Tivoli SRM integration with Event Management and third-party Service Desk systems.

9.2 Event Management integration

To ensure the high availability of an integrated end-to-end environment, all components (including the integration components) must support (or be configured for) high availability.

Figure 9-1 on page 247 shows a high-level overview of which components must be evaluated for Event Management integration high availability.

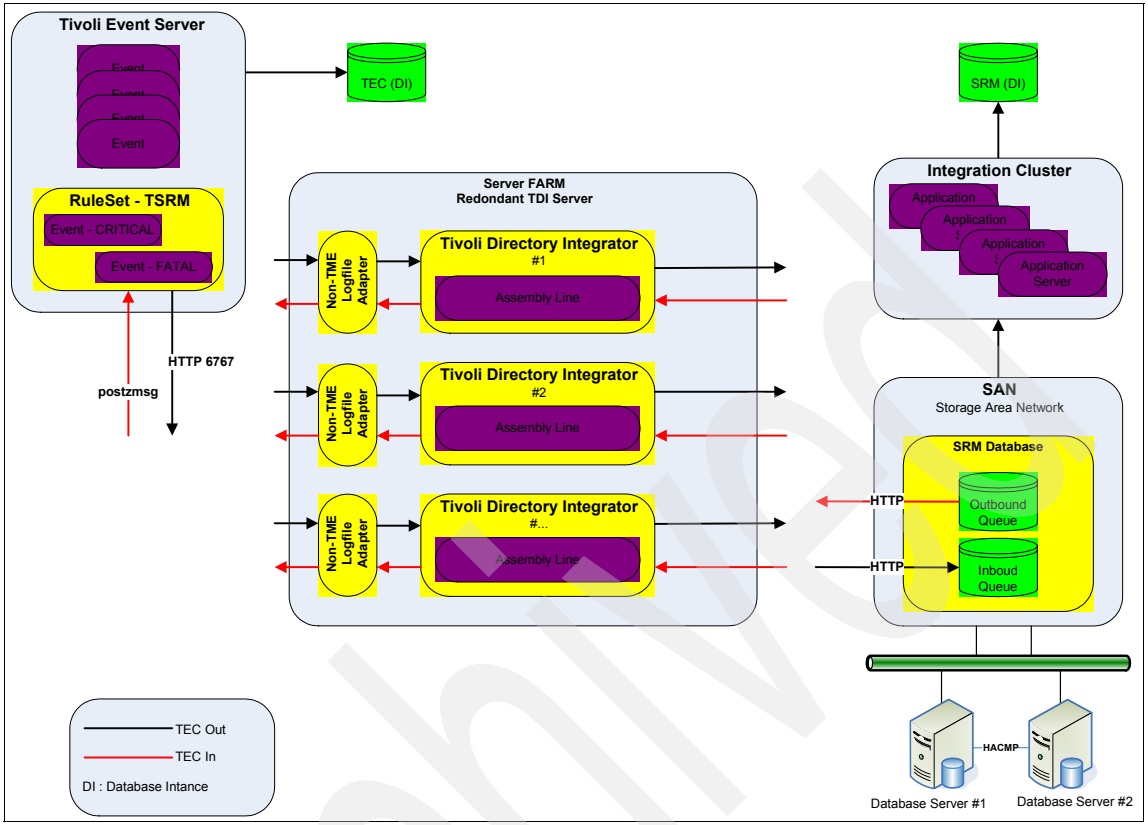


Figure 9-1 TEC integrated with Tivoli SRM for high availability

9.2.1 TEC considerations

When installing the new ruleset to support the Tivoli SRM integration, there is one parameter that allows you to define more than one Tivoli Directory Integrator (TDI) server:

```
Do you want to specify an additional TDI Server? (Y/N):
```

If you use more than one TDI server, answer `Y`. This type of configuration enables TEC to redirect the event if the active TDI server (# 1 in Figure 9-1) does not respond; therefore, the ruleset redirects the request to the next active server.

If no TDI servers respond to the TEC, the request is re-initiated later.

TEC high availability: Apart from high availability of the integration, you must also consider TEC high availability. We do not cover the installation of TEC in this book, we assume that the high availability criteria is taken into consideration when the TEC is introduced into your infrastructure.

As shipped, the ruleset defines which type of events are sent to the TDI server and what type of records are generated within the Tivoli SRM (although this is customizable). Refer to Chapter 3, “Event management integration” on page 105 for more details.

When one of the TDI servers is chosen, the configuration is kept until the Tivoli Enterprise Server is re-initialized.

9.2.2 TDI considerations

To ensure high availability of the TDI application, you must create *x* number of TDI instances to make the configuration applied at the TEC useful.

To help you understand how to implement TDI in UNIX/AIX - Windows:

- In a fully redundant virtualized environment, it easy to create multiple server instances where TDI runs multiple assembly lines to provide high availability.
- In a non-virtualized environment, you can install separate instances of TDI on separate physical boxes.
- The last option is to install multiple instances of TDI on the same server. This solution has one disadvantage. If there is a hardware problem on the server, you might lose integration capability.

In addition to the steps described in “Steps for implementing TEC integration” on page 114, if you use more than one TDI server, you need to perform the following steps after “Editing the mxe.properties file (optional)” on page 116.

Configuring a common TDI System Queue

Perform this procedure to configure a common TDI System Queue for a TEC integration environment with multiple TDI servers.

The TDI System Queue is a TDI Java Messaging Service (JMS) messaging subsystem that facilitates storing and forwarding messages between TDI Servers and AssemblyLines. When your integration environment includes multiple TDI servers, each TDI server has its own system queue. Perform the following procedure to set up the system queue on one of the TDI servers as a common queue to be shared by all of the TDI servers.

Before you perform this procedure, ensure that you have completed these tasks:

- You installed all TDI servers with the queue option set to Y (yes).
- You specified the same path to the TDI home and the TDI work (solution) directory in all TDI installations.

Repeat the following steps on each TDI server that does not host the common queue:

1. Set the environment variable *TDI_SOLDIR* to reference the location of the TDI work directory (solution directory) on this computer. For example:

   ```
   set TDI_SOLDIR=c:\ibm\tdi1031d\work
   ```

2. Remove the file PWStoreServer +TEC.MqeReg from the following directory: \work\\Registry\PWStoreServer\Queue

   Work is the TDI work directory (solution directory) on this computer. The work directory is typically a subdirectory under the TDI home directory.

3. Map a drive to the TDI server that hosts the common queue.

4. Change to your work directory and enter the following command on one line:

   ```
   CreateLocalQueue TEC null null null nolimit nolimit PWStoreServer
   "%TDI_SOLDIR%\pwstore_server.ini"
   "com.ibm.mqe.adapters.MQeDiskFieldsAdapter:D:\work\Queues"
   ```

   where:

   – *%TDI_SOLDIR%* represents the path name of the work directory on this computer.

   – *D* specifies the drive letter that you mapped to the TDI server that hosts the common queue.

   – *work* is the path name of the work directory on the TDI server that hosts the common queue. This directory path must be the same on all TDI servers.

   Note: The CreateLocalQueue command creates a new PWStoreServer+TEC.MqeReg file that specifies the location of the common queue to be shared by this TDI server.

5. Verify that the new PWStoreServer+TEC.MqeReg file is created in the directory *work*\\Queues\PWStoreServer\TEC where *work* is the TDI work directory on this computer.

Configuring a common TDI system store

Perform this procedure to configure a common TDI system store for a TEC integration environment with multiple TDI servers.

The TDI system store is a relational database that enables persistent storage (storage of objects that survive across JVM restarts). The product that implements the system store is IBM DB2 for Java, which is also known as Cloudscape®.

Note: A Cloudscape server is included with the IBM Tivoli SRM integration Toolkit and is automatically installed when you install TDI from the toolkit by using the procedure described in “Installation procedure” on page 31.

When your integration environment includes multiple TDI servers, each TDI server has its own system store. Perform the following procedure to set up the system store on one of the TDI servers as a common store to be shared by all of the TDI servers.

Complete the following steps on all TDI servers, including the TDI server that hosts the common system store:

1. Change to the work directory and open the solution.properties file.
2. In the *SYSTEM STORE* section of the file, add comment markers (#) to the lines that configure Cloudscape to run in embedded mode so that the result is similar to Example 9-1.

Example 9-1 SYSTEM STORE section one

```
## Location of the database (embedded mode) - Cloudscape 10
#com.ibm.di.store.database=TDISysStore
#com.ibm.di.store.jdbc.driver=org.apache.derby.jdbc.EmbeddedDriver
#com.ibm.di.store.jdbc.urlprefix=jdbc:derby:
#com.ibm.di.store.jdbc.user=APP
#{protect}-com.ibm.di.store.jdbc.password=APP
```

3. Remove the comment markers (#) from the lines that configure Cloudscape to run in networked mode so that the result is similar Example 9-2.

Example 9-2 SYSTEM STORE section two

```
## Location of the database to connect (networked mode) - Cloudscape 10
- DerbyClient driver
com.ibm.di.store.database=jdbc:derby://localhost:1527/C:\TDI\TDISysStor
e;create=true
com.ibm.di.store.jdbc.driver=org.apache.derby.jdbc.ClientDriver
com.ibm.di.store.jdbc.urlprefix=jdbc:derby:
```

```
com.ibm.di.store.jdbc.user=APP
{protect}-com.ibm.di.store.jdbc.password=APP
#
## Details for starting Cloudscape in network mode.
## Note: If the com.ibm.di.store.hostname is set to localhost then
remote connections are not allowed.
## If it is set to the IP address of the local machine - then remote
clients can access this Cloudscape
## instance by mentioning the IP address. The network server can only
be started for the local machine.
#
com.ibm.di.store.start.mode=automatic
com.ibm.di.store.hostname=localhost
com.ibm.di.store.port=1527
com.ibm.di.store.sysibm=true
```

4. Replace all instances of `localhost` in the preceding segment with the IP address or fully qualified host name of the computer that hosts the common system store. replace all instances of the port number (`1527` in the above example) with the actual port number that is used by the computer that hosts the common system store.
5. Replace the specified location of the TDISysStore directory (C:\TDI\TDISysStore in the preceding segment) as follows:
   - On the computer that hosts the common system store, specify the exact path to the TDISysStore directory, as in the following example:

     ```
     com.ibm.di.store.database=jdbc:derby://9.48.163.207:1527/C:\tdi_h
     ome\work\TDISysStore;create=true
     ```

   - On the other TDI servers, you can use the following shorthand notation to specify the location of the common system store:

     ```
     com.ibm.di.store.database=jdbc:derby://9.48.163.207:1527/TDISysSt
     ore;create=true
     ```

6. Locate the following segment in the solution.properties file that is shown in Example 9-3.

Example 9-3 Solution.properties file

```
### MQe JMS driver initialization properties
## Specifies the location of the MQe initialization file.
## This file is used to initialize MQe on TDI server startup.
systemqueue.jmsdriver.param.mqe.file.ini=C:\TDI\MQePWStore\pwstore_serv
er.ini
```

7. Modify the preceding statement to specify the actual location of the pwstore_server.ini file. The pwstore_server.ini file is located in the work directory. For example:

```
systemqueue.jmsdriver.param.mqe.file.ini=C:\ibm\tdi1025D\work\pwstor
e_server.ini
```

Starting the Cloudscape server

First, start the TDI Config Editor:

- On Windows, select **Start** → **Programs** → **IBM Tivoli Directory Integrator V6.1.1** → **TDI Config Editor**.
- On Linux or UNIX, run the following command: **`TDI_home_directory/ibmditk`**

Then, to start the Cloudscape server:

1. From the Store menu, select **Network Server Settings**.
2. Enter the fully qualified hostname or IP address of this computer in the Hostname field. (Do not enter localhost.) Enter the port that is used by the Cloudscape server in the Port field.

Note: This value must match the port that is specified in the solution.properties file when you set up the common system store.

3. Click **Start** to start the Cloudscape server.
4. Click **OK** on the message pop-up window that tells you the Cloudscape server is running.

Tivoli SRM considerations

For high availability of the Tivoli SRM, you can refer to the *Strategic Reuse with Asset-Based Development*, SG24-7529, IBM Redbooks publication.

9.2.3 Multiple service desks

To ensure high availability with multiple desk integrations, you need to consider extra work at the architectural design stage. In this section, we describe how to meet this requirement when this business need is identified.

Most of the time, when the IT department identifies the need to connect two service desks, there is significant planning. The most important considerations in this integration are the accuracy and the availability of the information. Several reasons for this integration are:

- Most clients already have a type of Service Management solution in place. In many cases, clients use Service Desk tools for multiple operations in the same organization. Many times, these help desk tools are a result of company acquisitions and mergers.
- Perhaps part of your IT Infrastructure is outsourced to another company, and they have their own service desk systems that they use to support your organization.

  The way to perform this integration is to integrate these systems by exchanging the Incident records and keeping them in sync.

  Note: These types of integrations are not limited to incident management. You can integrate other business processes, such as the service request record, the problem management record, and the change management record.

There are several important considerations when planning for this integration:

- How is the status synchronized between these systems?
- What happens when the incident is resolved or closed from one side?
- What type of notification is sent?
- How is the service level agreement (SLA) managed?
- Which data can the IBM Business Partner see?
- Are there new business roles and rules around this integration?

That list can be long or short depending on your business need.

Figure 9-2 on page 254 shows an example of Tivoli SRM and HP ServiceCenter integration configured for high availability.

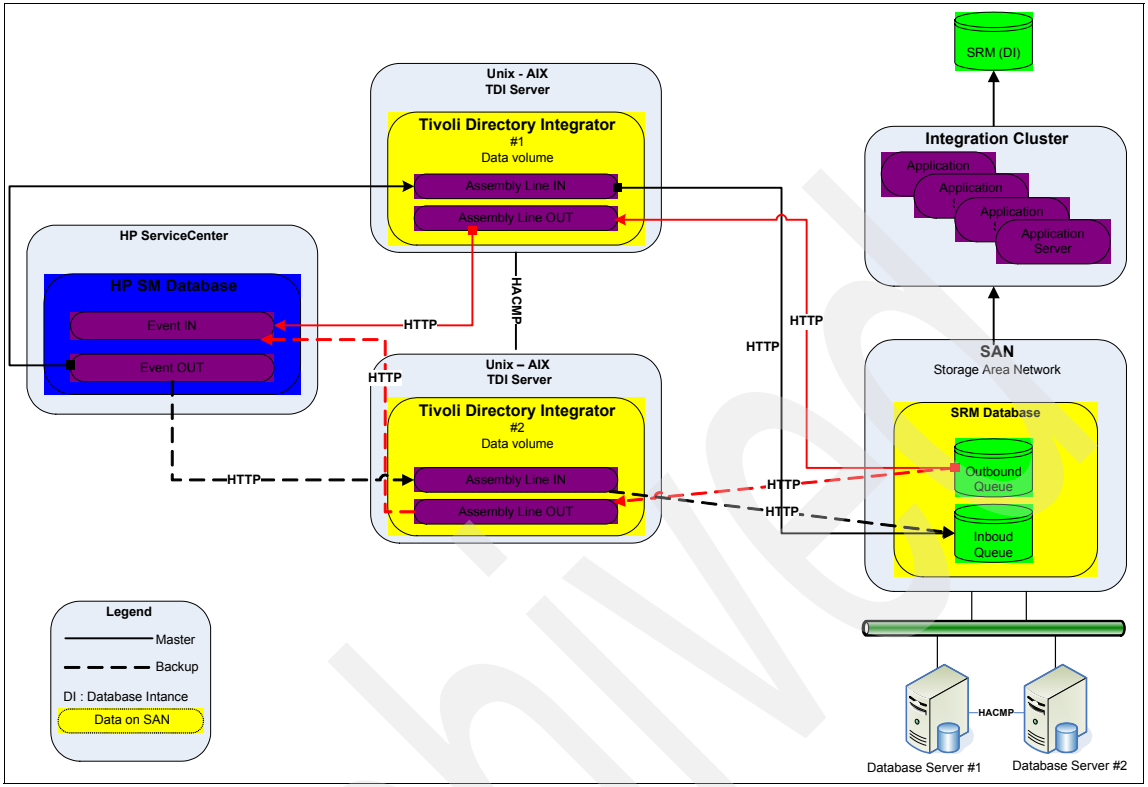


Figure 9-2 TDI high availability

TDI considerations

In Figure 9-2, to ensure the high availability of the overall integration environment, the TDI server is hosted in an AIX-based cluster, which is High Availability Cluster Multi-Processing (HACMP™), and the storage area network (SAN) is used to store the data that is exchanged between Service Desk systems. You can use other high availability mechanisms, such as Tivoli System Automation for Multiplatforms.

If your organization does not own a SAN system, it is still possible to store the data on a shared drive under an high availability system, such as HACMP.

To configure this environment, two more physical or logical Tivoli Directory Servers are required and must be configured with clustering software (HACMP in Figure 9-2 on page 254) for Hot Swap redundancy. By storing the Tivoli Directory Data on a shared or SAN drive, the integration data (or the data that is exchanged between the two Service Desk systems) is automatically updated when the second Tivoli Directory Server is up and running.

At this point, we do not lose any data in any of the systems. The dotted line in the schema in Figure 9-2 on page 254 represents the backup link that can be established between the two systems, and the full line is the active link.

Abbreviations and acronyms

ACD	automated call distribution
BPEL	Business Process Execution Language
CCMDB	Change and Configuration Management Database
CMDB	Configuration Management Database
CSV	comma-separated values
CTI	Computer Telephony Integration
DII	Dynamic Invocation Interface
DNIS	dialed
DSML	Directory Services Markup Language
EIF	Event Integration Facility
EJB	Enterprise Java Bean
ESB	Enterprise Service Bus
HTTP	Hypertext Transfer Protocol
IBM	International Business Machines Corporation
IM	Integration Module
ISM	IBM Service Management
ITIL	Information Technology Infrastructure Library
ITSO	International Technical Support Organization
JDBC	Java Database Connectivity
JMS	Java Messaging Service
JNDI	Java Naming and Directory Interface
LDAP	Lightweight Directory Access Protocol
LIC	Launch in context
LMO	Logical Management Operation
MBO	Maximo Business Object
MEA	Maximo Enterprise Adapter
Maximo	Manager
OMP	Operational Management Product
OPAL	Open Process Automation Library
OS	object structure
PMP	Process Manager Product
SAN	storage area network
SLA	service level agreement
SOA	service-oriented architecture
SOAP	Simple Object Access Protocol
SRM	Service Request Manager
SSL	Secure Sockets Layer
TADDM	Tivoli Application Dependency Discovery
TADDM	Tivoli Application Dependency Discovery Manager
TCM	Tivoli Configuration Manager
TDI	Tivoli Directory Integrator
TEC	Tivoli Enterprise Console
TIM	Tivoli Identity Manager
TPAP	Tivoli Process Automation Platform
TPM	Tivoli Provisioning Manager
UDDI	Universal Description, Discovery and Integration
UI	user interface
WSDL	Web Service Definition Language

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this book.

IBM Redbooks publications

For information about ordering these publications, refer to “How to get IBM Redbooks publications” on page 259. Note that several of the documents referenced here might be available in softcopy only:

- *Deployment Guide Series: IBM Tivoli CCMDB Overview and Deployment Planning*, SG24-7565
- *Implementing IBM Tivoli Service Request Manager V7.1 Service Desk*, SG24-7579

Online resources

These Web sites are also relevant as further information sources:

- Lotus Sametime documentation:

  http://www.ibm.com/developerworks/lotus/documentation/sametime/

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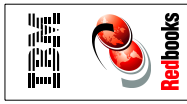

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