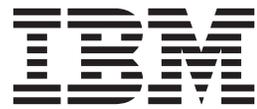


IBM Tivoli Storage Manager Suite for Unified Recovery
Front End
Version 7.1.1

Licensing Guide



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Offering overview

Tivoli Storage Manager SUR - Front End provides flexible, pay as you grow data protection.

Unless otherwise stated, Tivoli Storage Manager SUR - Front End is used interchangeably throughout this document for both offerings:

- IBM Tivoli Storage Manager Suite For Unified Recovery - Front End
- IBM Tivoli Storage Manager Suite For Unified Recovery Entry - Front End

IBM Tivoli Storage Manager Suite For Unified Recovery - Front End provides the following features:

- A bundle of 10 Tivoli Storage Manager products.
- Simplified front-end terabyte pricing and licensing.
- Installation of as many bundled components as needed to help protect your environment.

IBM Tivoli Storage Manager Suite For Unified Recovery Entry - Front End provides the following features:

- A bundle of 10 Tivoli Storage Manager products.
- Simplified front-end terabyte pricing and licensing.
- Installation of as many bundled components as needed to help protect your environment.
- Pricing on a per terabyte charge metric for a combined maximum of 100 terabytes of data.
- Support for storage environments with a maximum of two Tivoli Storage Manager servers.

Available products

Both IBM Tivoli Storage Manager Suite For Unified Recovery - Front End offerings include the following Tivoli Storage Manager products:

Tivoli Storage Manager for Databases 7.1.1

Non-disruptive protection of Oracle and Microsoft SQL data.

Tivoli Storage Manager Extended Edition 7.1.1

Highly scalable enterprise-class backup/restore, archive, and disaster recovery.

Tivoli Storage Manager for Enterprise Resource Planning 6.4.2

Protects vital SAP database systems efficiently, consistently, and reliably.

Tivoli Storage Manager FastBack 6.1

Advanced data protection and near-instant recovery for Windows and Linux servers.

Tivoli Storage Manager FastBack for Bare Machine Recovery 6.1

Restore a Windows or Linux Server operating system volume within an hour.

Tivoli Storage Manager FastBack for Exchange 6.1

Fast and easy recovery of individual email objects.

Tivoli Storage Manager for Mail 7.1.1

Secures IBM Domino and Microsoft Exchange Server data; granular restore of Microsoft Exchange Server objects.

Tivoli Storage Manager for Space Management 7.1.1

Software that moves inactive data to reclaim online disk space.

Tivoli Storage Manager for Storage Area Networks 7.1.1

Maximizes storage network connections for Tivoli Storage Manager servers and client computers.

Tivoli Storage Manager for Virtual Environments 7.1.1

Advanced protection and flexible recovery of VMware environments and Microsoft Hyper-V environments.

How data is measured

Tivoli Storage Manager SUR - Front End capacity pricing and licensing is based on a per terabyte (TB) charge metric for the size of the primary data that is protected.

Tivoli Storage Manager SUR - Front End measures the following data for licensing:

File system backups

The active backup for the protected files is measured. The active backup consists of the most recently backed up files. This backup is representative of the data that would be recovered to restore the protected files to the latest recovery point.

IBM Domino database backups

The active backup for the protected IBM Domino databases is measured. The active backup consists of the most recently backed up database. This backup is representative of the data that would be recovered to restore the protected database to the latest recovery point.

All other application backups

The utilized size of the protected primary data of the application is measured. Transaction log files are not included in the measurement for licensing.

Tivoli Storage Manager SUR - Front End uses the International System of Units (SI) binary TB measurement:

1 TB = 1099511627776 BYTE

The Tivoli Storage Manager SUR - Front End measurement process is completed in the following order:

1. Measure the front-end capacity of your protected data:

Measure by script

Run a Tivoli Storage Manager SUR - Front End product measurement script against the Tivoli Storage Manager server or application server. Then, run the Central Reporting Tool to create a summary report.

Measure by application-specific command

Calculate the front-end capacity measurement with an application-specific command. A step-by-step procedure is provided for each application.

2. Place the output files (for your measurement) to a central location, such as a directory on a file server.
3. Repeat Step 1 and Step 2 until all output data is available in a central location.

4. Run the Central Reporting Tool against the output files. This program parses all the individual output files to create a final output measurement.
5. If application-specific command measurements are also taken, add these measurements to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:
 - Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Tivoli Storage Manager SUR - Front End measurement scripts

Table 1. Available Tivoli Storage Manager SUR - Front End measurement scripts for Linux

File for Linux	Name	Description
dsmfecc	Central Reporting Tool	Command-line program that creates single XML reports and a summary report.
dsmfecc-00.pl	Tivoli Storage Manager Extended Edition measurement script	Queries the Tivoli Storage Manager environment to report the front-end capacity for all Tivoli Storage Manager backup-archive clients.
dsmfecc-02.pl	Data Protection for Oracle measurement script	Queries the application server to report the front-end capacity for all Oracle Server databases. A connection to the Oracle Server must exist for the Oracle instance owner before you run the measurement script.
dsmfecc-03.pl	Data Protection for SAP for DB2 measurement script	Queries the application server to report the front-end capacity for all SAP for DB2 databases. A connection to the SAP Database Server must exist for the DB2 instance owner before you run the measurement script.
dsmfecc-04.pl	Data Protection for SAP for Oracle measurement script	Queries the application server to report the front-end capacity for all SAP for Oracle databases. A connection to the SAP Database Server must exist for the Oracle instance owner before you run the measurement script.

Table 1. Available Tivoli Storage Manager SUR - Front End measurement scripts for Linux (continued)

File for Linux	Name	Description
dsmfecc-05.pl	Data Protection for SAP HANA	Queries the application server to report the front-end capacity for all SAP HANA databases.
dsmfecc-07.pl	Data Protection for IBM Domino measurement script	Queries the Tivoli Storage Manager environment to report the front-end capacity for all IBM Domino databases.
dsmfecc-08.pl	Tivoli Storage Manager for Space Management measurement script	Queries the Tivoli Storage Manager environment to report the front-end capacity for all premigrated and migrated files.
dsmfecc-10.pl	Data Protection for VMware measurement script	Queries the application server to report the front-end capacity for all VMware virtual machines.

Table 2. Available Tivoli Storage Manager SUR - Front End measurement scripts for Microsoft Windows

File for Microsoft Windows	Name	Description
dsmfecc.exe	Central Reporting Tool	Command-line program that creates single XML reports and a summary report.
dsmfecc-00.ps1	Tivoli Storage Manager Extended Edition measurement script	Queries the Tivoli Storage Manager environment to report the front-end capacity for all Tivoli Storage Manager backup-archive clients. Run this measurement script in Windows PowerShell.
dsmfecc-01.ps1	Data Protection for Microsoft SQL Server measurement script	Queries the application server to report the front-end capacity for all Microsoft SQL Server databases. Run this measurement script in Windows PowerShell. A connection to the Microsoft SQL Server must exist for this shell before you run the measurement script.

Table 2. Available Tivoli Storage Manager SUR - Front End measurement scripts for Microsoft Windows (continued)

File for Microsoft Windows	Name	Description
dsmfecc-02.ps1	Data Protection for Oracle measurement script	<p>Queries the application server to report the front-end capacity for all Oracle Server databases.</p> <p>A connection to the Oracle Server must exist for the Oracle instance owner before you run the measurement script.</p>
dsmfecc-03.ps1	Data Protection for SAP for DB2 measurement script	<p>Queries the application server to report the front-end capacity for all SAP for DB2 databases.</p> <p>A connection to the SAP Database Server must exist for the DB2 instance owner before you run the measurement script.</p>
dsmfecc-04.ps1	Data Protection for SAP for Oracle measurement script	<p>Queries the application server to report the front-end capacity for all SAP for Oracle databases.</p> <p>A connection to the SAP Database Server must exist for the Oracle instance owner before you run the measurement script.</p>
dsmfecc-06.ps1	Data Protection for Microsoft Exchange Server measurement script	<p>Queries the application server to report the front-end capacity for all Microsoft Exchange Server databases.</p> <p>Run this measurement script in Windows PowerShell.</p> <p>A connection to the Microsoft Exchange Server must exist for this shell before you run the measurement script.</p>
dsmfecc-07.ps1	Data Protection for IBM Domino measurement script	<p>Queries the Tivoli Storage Manager environment to report the front-end capacity for all IBM Domino databases.</p> <p>Run this measurement script in Windows PowerShell.</p>
dsmfecc-10.ps1	Data Protection for VMware measurement script	<p>Queries the application server to report the front-end capacity for all VMware virtual machines.</p>

Table 2. Available Tivoli Storage Manager SUR - Front End measurement scripts for Microsoft Windows (continued)

File for Microsoft Windows	Name	Description
dsmfecc-11.ps1	Data Protection for Microsoft Hyper-V measurement script	Queries the application server to report the front-end capacity for all Hyper-V virtual machines.
dsmfecc-12.ps1	Tivoli Storage Manager FastBack measurement script	Queries the FastBack Server to report the front-end capacity for all snapshots in the FastBack Server repository.

Frequently asked questions

- *How do I run the tools on a Windows or Linux machine?*

Open a command prompt and go to the directory where you extracted the Tivoli Storage Manager SUR - Front End measurement tools. Refer to your operating system documentation for instructions about how to open a command prompt. Root user rights (Linux) or administrator rights (Windows) are required for some measurement tools.

- *My Tivoli Storage Manager server does not operate on a Windows or Linux system. How can I measure the front-end capacity?*

The measurement scripts for the following products use an administrative connection to query the Tivoli Storage Manager server:

- Data Protection for IBM Domino
- Data Protection for VMware
- Tivoli Storage Manager Extended Edition

The measurement script runs on any node where the Tivoli Storage Manager backup-archive client is installed. As a result, the Tivoli Storage Manager server operating system or hardware platform does not affect the data collection.

The measurement scripts for the following products run on any Linux or Windows node that connects to the protected application:

- Data Protection for Microsoft Exchange Server
- Data Protection for Microsoft Hyper-V
- Data Protection for Microsoft SQL Server
- Data Protection for Oracle
- Data Protection for SAP for DB2
- Data Protection for SAP for Oracle
- Data Protection for SAP HANA
- Tivoli Storage Manager FastBack
- Tivoli Storage Manager for Space Management

As a result, no query of the Tivoli Storage Manager server occurs.

- *What parameters do I use to run the measurement scripts?*

Command-line parameters, syntax, and examples for each product measurement script is provided in “Command-line arguments by product” on page 23.

- *How do compression settings affect the capacity measurement?*

Compression settings that are applied to data during the backup operation are not reflected in the capacity measurement. However, compression settings that

impact the size of the primary data on the production server are reflected in the capacity measurement. For example, if less storage space is used in a database because of compression settings, then a reduced capacity measurement is returned.

- *Are database transaction log files included in the capacity measurement?*

Transaction log files are not included in the capacity measurement for Tivoli Storage Manager SUR - Front End licensing unless they are backed up independently from the database backup by the Tivoli Storage Manager backup-archive client.

- *How do you measure capacity for an application that is running in a virtual machine guest?*

The front-end capacity measurement for an in-guest application depends on the application type and how the data is being protected:

- If you run one of the following products in guest, use the application-specific tool to measure front-end capacity:
 - Data Protection for Microsoft Exchange Server
 - Data Protection for Microsoft SQL Server
 - Data Protection for Oracle
- If you protect virtual machines with both Tivoli Storage Manager for Virtual Environments and an agent in guest, the utilized size must be measured only once. See the section that describes how to measure VMware capacity.
- If you run the Tivoli Storage Manager Backup-Archive Client or Data Protection for IBM Domino in guest, see the section that describes how to measure front-end capacity for those products.
- If you run the Tivoli Storage Manager Backup-Archive Client or Data Protection for IBM Domino in guest and also protect the guest with Tivoli Storage Manager for Virtual Environments, see the section that describes how to measure front-end capacity for those products.

- *Where do I locate documentation for the Tivoli Storage Manager products that are bundled with Tivoli Storage Manager SUR - Front End?*

Documentation for the Tivoli Storage Manager products is available in the Tivoli® Storage Manager Suite for Unified Recovery - Front End V7.1.1 Information Portal.

- *How do I obtain customer support?*

Customer support is available for function that is purchased with the Tivoli Storage Manager SUR - Front End V7.1 program number (PID) only. Therefore, when you contact customer support, you must specify one of the following PIDs to receive entitled assistance:

Table 3. Tivoli Storage Manager SUR - Front End PIDs

Offering	PID
IBM Tivoli Storage Manager Suite For Unified Recovery - Front End	5725-R37
IBM Tivoli Storage Manager Suite For Unified Recovery Entry - Front End	5725-R38

Front-end TB definition

The licensee must obtain sufficient entitlements for the aggregate amount of data that is protected by the program. For Tivoli Storage Manager SUR - Front End, "program" refers to the Tivoli Storage Manager products that are included in the bundle. Therefore, the customer must license the full number of TB that are protected by any and all of the products in the Tivoli Storage Manager SUR - Front End bundle. For specific licensing terms, refer to the product license.

This table provides a summary view of each bundled product and the object that is to be licensed with Tivoli Storage Manager SUR - Front End TB licensing.

Table 4. Front-end terabyte definition

Product	Protected Object
Tivoli Storage Manager for Databases	Utilized size of the databases (excluding transaction logs and replica database copies).
Tivoli Storage Manager Extended Edition	Active backups.
Tivoli Storage Manager for Enterprise Resource Planning	Utilized size of the database (excluding log files).
Tivoli Storage Manager FastBack	Utilized size of all protected source volumes.
Tivoli Storage Manager for Mail	IBM Domino: Active backups (excluding log files). Microsoft Exchange Server: Utilized size of the databases (excluding transaction logs and replica database copies).
Tivoli Storage Manager for Space Management	A best practice is to back up before Space Management Migration. The Tivoli Storage Manager Extended Edition active backup is used for the measurement. If the migrated files are not backed up by the Tivoli Storage Manager backup-archive client, then the premigrated size and migrated size of the migrated files is used.
Tivoli Storage Manager for Storage Area Networks	This product moves data that is already protected and measured by Tivoli Storage Manager clients. There is no need to measure this product for entitlement.
Tivoli Storage Manager for Virtual Environments	Utilized size of the protected virtual machines.

Front-end definition by product

This table provides a detailed description of the product and measurement criteria associated with each product bundled within the Tivoli Storage Manager SUR - Front End product bundle.

Table 5. Front-end definition by product

Product	Summary of measurement criteria
Tivoli Storage Manager Extended Edition	A measurement script is run against the Tivoli Storage Manager server. The script aggregates active data for Tivoli Storage Manager Extended Edition clients and Data Protection for IBM Domino agents per Tivoli Storage Manager server.
Tivoli Storage Manager for Mail: Data Protection for IBM Domino	
Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server	<p>A measurement script is run against the application server. The script aggregates the utilized size of protected Microsoft SQL Server databases.</p> <p>A manual procedure that uses the sp_spaceused command is also available in "Data Protection for Microsoft SQL Server" on page 37.</p>
Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server	<p>A measurement script is run against the application server. The script aggregates the utilized size of protected Microsoft Exchange Server 2007 (or later) databases.</p> <p>A manual procedure that uses the Get-MailboxDatabase -status command is also available in Data Protection for Microsoft Exchange Server.</p>
Tivoli Storage Manager for Databases: Data Protection for Oracle	<p>A measurement script is run against the application server. The script aggregates the utilized size of the primary protected Oracle database.</p> <p>A manual procedure that uses the select sum command is also available in "Data Protection for Oracle" on page 39.</p>
Tivoli Storage Manager for Enterprise Resource Planning	<p>A measurement script is run against the SAP Database Server. The script aggregates the utilized size of protected databases.</p> <p>Manual procedures are also available in "Tivoli Storage Manager for Enterprise Resource Planning" on page 40.</p>
Tivoli Storage Manager for Virtual Environments: Data Protection for VMware	<p>A measurement script is run against the application server. The script aggregates the utilized size for all VMware virtual machines.</p> <p>A manual procedure that uses the VMware vSphere PowerCLI get-vm command is also available in Data Protection for VMware.</p>
Tivoli Storage Manager for Virtual Environments: Data Protection for Microsoft Hyper-V	A measurement script is run against the application server. The script aggregates the utilized size for all virtual machines.
Tivoli Storage Manager for Storage Area Networks	N/A

Table 5. Front-end definition by product (continued)

Product	Summary of measurement criteria
Tivoli Storage Manager for Space Management	<p>A measurement script is run against the Tivoli Storage Manager environment. The script aggregates the utilized size for all premigrated and migrated data.</p> <p>A manual procedure that uses the dsmdf command is also available in “Tivoli Storage Manager for Space Management” on page 47.</p>
Tivoli Storage Manager FastBack	<p>A measurement script is run against the FastBack Server. The script aggregates the utilized size for all snapshots in the FastBack server repository.</p> <p>A manual procedure that uses ProtectedDataSize.exe is also available in “Tivoli Storage Manager FastBack” on page 44.</p>
Tivoli Storage Manager FastBack for Exchange	N/A
Tivoli Storage Manager FastBack for Bare Machine Recovery	N/A

Front-end measurement worksheet

Print this worksheet as a reference when you prepare to measure front-end capacity in your environment.

- Run the Tivoli Storage Manager SUR - Front End tools on a Linux or Microsoft Windows system:
 - Download the Tivoli Storage Manager SUR - Front End measurement tools for your operating system from the following FTP download site:
ftp://public.dhe.ibm.com/storage/tivoli-storage-management/front_end_capacity_measurement_tools

Linux dsmfecc-linux.tar.gz

Windows dsmfecc-windows.zip

- Extract the tools with the following command:

Linux tar -zxvf dsmfecc-linux.tar.gz

Windows unzip -l dsmfecc-windows.zip

- Collect data from your Tivoli Storage Manager servers. Record the Tivoli Storage Manager server names in your environment:

- _____
- _____
- _____
- _____

- Collect data from any active backup from the Tivoli Storage Manager backup-archive client.

Use this command syntax for each Tivoli Storage Manager server on a Linux operating system or UNIX platform that has the Tivoli Storage Manager backup-archive client installed. The Tivoli Storage Manager backup-archive client must be configured to connect to the Tivoli Storage Manager server:

```

dsmfecc-00.ps1 --tsmusername=user name --tspmpassword=password
--namespace=[NODENAME | *] --applicationentity=[filespace | *]
--directory=output directory

```

Use this command syntax for each Tivoli Storage Manager server on Windows that has the Tivoli Storage Manager backup-archive client installed. The Tivoli Storage Manager backup-archive client must be configured to connect to the Tivoli Storage Manager server:

```

dsmfecc-00.ps1 -tsmusername user name -tspmpassword password
-namespace [NODENAME | *] -applicationentity [filespace | *]
-directory output directory

```

Linux

This example queries front-end capacity all client nodes on a Tivoli Storage Manager server:

```

dsmfecc-00.ps1 --tsmusername=admin --tspmpassword=adminpw --namespace=*
--applicationentity=/SMSVT/mmfs1 --directory=/space/fe/srv1.out

```

- b. Collect data from any active backups for the protected IBM Domino databases.

Use this command syntax for each Tivoli Storage Manager server on a Linux operating system or UNIX platform that has the Tivoli Storage Manager backup-archive client installed. The Tivoli Storage Manager backup-archive client must be configured to connect to the Tivoli Storage Manager server:

```

dsmfecc-07.ps1 --tsmusername=user name --tspmpassword=password
--namespace=NODENAME --directory=output directory

```

Use this command syntax for each Tivoli Storage Manager server on Windows that has the Tivoli Storage Manager backup-archive client installed. The Tivoli Storage Manager backup-archive client must be configured to connect to the Tivoli Storage Manager server:

```

dsmfecc-07.ps1 -tsmusername user name -tspmpassword password
-namespace NODENAME -directory output directory
-tsminstall client installation directory
-dsmoptpath path and name of client options file

```

Windows

This example queries front-end capacity with Tivoli Storage Manager node name XORRON. The output file (.XML) is written to the current working directory:

```

> .\dsmfecc-07.ps1 -namespace XORRON -directory . -tsmusername admin
-tspmpassword admin -tsminstall "C:\Program Files\Tivoli\TSM\baclient"
-dsmoptpath "C:\ProgramFiles\Tivoli\TSM\baclient\dsm.FE.opt"

```

3. Collect data from any protected Oracle databases in your environment. Record the Oracle database names in your environment and their operating system:
 - _____ on operating system Linux/Windows.
 - _____ on operating system Linux/Windows.
 - _____ on operating system Linux/Windows.
 - _____ on operating system Linux/Windows.

Use this command syntax for each Oracle server on Linux:

```

dsmfecc-02.ps1 --namespace=name --applicationusername=user name
--directory=output directory

```

Use this command syntax for each Oracle server on Windows:

```

dsmfecc-02.ps1 -namespace name -applicationusername user name
-directory output directory

```

Windows

This example queries front-end capacity with the existing database admin account, SYSDBA. It identifies the operation with the name test. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> .\dsmfecc-02.ps1 -namespace test -applicationusername sysdba -directory .
```

4. Collect data from any protected Microsoft SQL Server databases in your environment. Record the database name in your environment:

- _____ Microsoft SQL Server database

Use this command syntax for each Microsoft SQL Server:

```
dsmfecc-01.ps1 -namespace name -applicationentity database  
-directory output directory
```

Windows This example queries front-end capacity of the current Microsoft SQL Server database. It identifies the operation with the name peter. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-01.ps1 -applicationentity "." -namespace peter -directory .
```

5. Collect data from any protected SAP for DB2 databases in your environment. Record the SAP for DB2 database names in your environment and their operating system:

- _____ on operating system Linux/Windows.

Use this command syntax for each SAP Database Server on Linux:

```
dsmfecc-04.pl --namespace=name --applicationusername=name  
--directory=output directory
```

Use this command syntax for each SAP Database Server on Windows:

```
dsmfecc-04.ps1 -namespace name -applicationusername name  
-directory output directory
```

Linux This example queries front-end capacity of the SAP for DB2 database, TESTDB. It identifies the operation with the name FREE. The output file (.XML) is written to the /root/dsmfecc_out directory:

```
> su - db2erp  
> ./dsmfecc-03.pl --namespace=FREE --directory=/root/dsmfecc_out  
--applicationentity=TESTDB
```

6. Collect data from any protected SAP for Oracle databases in your environment. Record the SAP for Oracle database names in your environment and their operating system:

- _____ on operating system Linux/Windows.

Use this command syntax for each SAP Database Server on Linux:

```
dsmfecc-04.pl --namespace=name --applicationusername=name  
--directory=output directory
```

Use this command syntax for each SAP Database Server on Windows:

```
dsmfecc-04.ps1 -namespace name -applicationusername name  
-directory output directory
```

Windows This example queries front-end capacity with the existing database admin account, SYSDBA. It identifies the operation with the name test. The output file (.XML) is written to the current working directory:

```
> su - oraerp
> .\dsmfecc-04.ps1 -namespace test -applicationusername sysdba -directory .
```

7. Collect data from any protected SAP HANA databases in your environment. Record the SAP HANA database names in your environment:

- _____ SAP HANA database

Use this command syntax for each SAP Database Server on Linux:

```
dsmfecc-05.pl --applicationusername=username
--applicationpassword=password --applicationentity=database number
--namespace=instance name --directory=output directory
```

Linux This example queries front-end capacity for one SAP HANA database with the HANA instance, vhana05. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> ./dsmfecc-05.pl --applicationpassword=manager --namespace=vhana05
--applicationusername=system --applicationentity=1 --directory=/tmp/dsmfecc_out
```

8. Collect data in your environment from any protected snapshots in the FastBack server repository. Record the name of each FastBack Server in your environment:

- _____ FastBack Server
- _____ FastBack Server
- _____ FastBack Server
- _____ FastBack Server

Use this command syntax for each FastBack Server:

```
dsmfecc-012.ps1 -namespace name -directory output directory
-historyfile path to history.txt file
```

Restriction: You must run dsmfecc-012.ps1 from an account with administrator rights.

Windows This example queries front-end capacity of all snapshots in the FastBack server repository, including used storage capacity for each snapshot, as identified in the history.txt file. It identifies the operation with the name FREE. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-12.ps1 -namespace FREE -directory .
-historyfile "C:\Users\Administrator\Documents\fastback\history.txt"
```

9. Collect data from any protected active backups (from the Tivoli Storage Manager backup-archive client) for the systems that are managed by Tivoli Storage Manager for Space Management in your environment.

The best practice is to back up files before you migrate them with Tivoli Storage Manager for Space Management. Therefore, Tivoli Storage Manager SUR - Front End measures the active backups for the systems that are

managed by Tivoli Storage Manager for Space Management. The Tivoli Storage Manager Extended Edition active backup is used for this measurement.

- If you do not back up files that are migrated with Hierarchical Storage Management, then the premigrated size and migrated size of the migrated files are used when you run the **dsmfecc-08.pl** measurement script.
- If you do back up files that are migrated with Hierarchical Storage Management, then no action is required if you run the Tivoli Storage Manager Extended Edition measurement script.

Use this command syntax for each protected active backup on Linux:

```
dsmfecc-08.pl --namespace=NODENAME --applicationentity=filespace  
--directory=output directory
```

Linux This example queries front-end capacity for file system /SMSVT/mmfs1 with Tivoli Storage Manager nodename FOXTROT. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> ./dsmfecc-08.pl --namespace=FOXTROT --applicationentity=/SMSVT/mmfs1  
--directory=/tmp/dsmfecc_out
```

10. Collect data from any protected VMware virtual machine in your environment. Record the VMware vCenter Server names in your environment and their operating system:

- _____ on operating system Windows.

Use this command syntax for each VMware vCenter Server on Windows:

```
dsmfecc-10.ps1 -applicationusername VMware vCenter user ID  
-applicationpassword password  
-applicationentity vCenter Server IP address or name  
-namespace name -asnode nodename -directory output directory  
-tsminstall client installation directory  
-dsmoptpath path and name of client options file
```

Windows This example queries front-end capacity of the protected virtual machines on VMware vCenter christo.mycompany.usa.com. It identifies the operation with the name FREE. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-10.ps1 -namespace FREE -directory . -applicationusername administrator  
-applicationpassword adminpwd -applicationentity christo.mycompany.usa.com  
-asnode DEV_DC -dsmoptpath "C:\ProgramFiles\Tivoli\TSM\baclient\dsm.DEV_DC.opt"  
-tsminstall "c:\Program Files\Tivoli\TSM\baclient"
```

11. Collect data from any protected Microsoft Hyper-V virtual machine in your environment. Record the Microsoft Hyper-V Server names in your environment:

- _____ Microsoft Hyper-V Server

Use this command syntax for each Microsoft Hyper-V Server:

```
dsmfecc-11.ps1 -namespace name -directory output directory
```

Windows This example queries front-end capacity with the existing database admin account, SYSDBA. It identifies the operation with the name test. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-11.ps1 -namespace test -directory .
```

Measuring front-end capacity by script

Use this procedure to automatically calculate the front-end capacity measurement for your Tivoli Storage Manager SUR - Front End bundled product with a measurement script.

Before you begin

Download and extract the Tivoli Storage Manager SUR - Front End measurement tools from the following FTP download site:

ftp://public.dhe.ibm.com/storage/tivoli-storage-management/front_end_capacity_measurement_tools.

- The measurement tools are packaged in the `dsmfecc-windows.zip` and `dsmfecc-linux.tar.gz` files.
- For a list of measurement scripts, see “Tivoli Storage Manager SUR - Front End measurement scripts” on page 3.
- Run the measurement script on any Linux or Windows system in the environment that has the Tivoli Storage Manager Backup-Archive Client installed.
- The Tivoli Storage Manager server must be version 6.2 (or later).
- On Windows, the Tivoli Storage Manager Backup-Archive Client version 7.1.1 (or later) is required on the system where you run the measurement script.

About this task

This task guides you through the steps to run a Tivoli Storage Manager SUR - Front End product measurement script against the Tivoli Storage Manager server or application server. Then, you run the Central Reporting Tool to create a summary report:

Procedure

1. Run the measurement script with the required arguments. The script creates an output file (.XML) that contains capacity information for the environment. View the required measurement script arguments in “Command-line arguments by product” on page 23.
2. Repeat Step 1 for all Tivoli Storage Manager products that you want to include in the Tivoli Storage Manager SUR - Front End capacity measurement.
3. Place all measurement output files (.XML) to a central location, such as a directory on a file server. The Central Reporting Tool parses these files to generate the overall summary report.
4. To generate the overall summary report, issue the following Central Reporting Tool command with the required syntax arguments:

```
dsmfecc --summary --<required_arguments>
```

For example, this command:

```
root@blackpearl > ./dsmfecc --summary --customerid=MyShop  
--directory=/tmp/dsmfecc_out --format=TXT
```

Generates the following front-end measurement information in the `dsmfecc.MyShop.20140420083002.txt` file:

```

root@blackpearl > cat /tmp/dsmfecc_out/dsmfecc.MyShop.20140420083002.txt
*****
***** Tivoli Storage Manager Suite for Unified Recovery *****
***** Front-End Terabyte (TB) Capacity Report *****
*****
-----
Component Name                               Product ID  Managed Objects  TB Protected
-----
Tivoli Storage Manager Client                00          1,011,131        3.82
Data Protection for SAP for Oracle           04           50              9.54
Tivoli Storage Manager for Space Management  08        10,000,000       117.74
Data Protection for VMware                   10         10,864          23547.51
Microsoft Exchange                           14           99              9.54
-----
Total                                         11,022,144    23688.14

Customer ID                                   : MyShop
Total Front End TB size associated with TSM Suite for
Unified Recovery - Front End entitlement      : 23688.14
Date time of this report                      : Tue May 20 08:30:02 2014
Collection dates                              : Fri May 16 11:58:57 2014
                                                - Mon May 19 12:51:51 2014
Input                                         : /tmp/dsmfecc_out

```

In this example, the number of protected front-end TB is 23688.14 TB.

5. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete one of the following steps:
 - If the Central Reporting Tool summary output (generated in Step 4) applies to all protected data in your environment, round up the total TB to the nearest whole TB:

23688.14 TB = 23689 TB

The total number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing is 23689 TB.

- If application-specific command measurements are also taken, add these measurements to the Central Reporting Tool summary output generated in Step 4:

For example, in an environment that contains 10 protected SAP for Oracle databases, the total utilized size for all protected SAP for Oracle databases is 3.48 TB:

 - a. Add 3.48 TB to the 23688.14 TB identified in the Central Reporting Tool summary output that is generated in Step 6:

3.48 TB + 23688.14 TB = 23691.62 TB
 - b. Round up the total TB to the nearest whole TB:

23691.62 TB = 23692 TB

The total number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing is 23692 TB.

Measuring front-end capacity manually

Use this procedure to manually calculate the front-end capacity measurement for your Tivoli Storage Manager SUR - Front End bundled product in a single XML report.

Procedure

1. Collect the front-end capacity measurement for your product as described in “Measure front-end capacity by application-specific command” on page 37.
2. Run the **dsmfecc --create** command to view the arguments that are required to create the XML output file for the summary report.

The following parameters are available with the **dsmfecc --create** command:

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation.

productid *ID number*

Specify the two-digit ID number associated with the Tivoli Storage Manager SUR - Front End bundled product. For example, product ID 00 identifies Tivoli Storage Manager Extended Edition. See “Tivoli Storage Manager SUR - Front End measurement scripts” on page 3 for product ID numbers.

type [BACKUP | ARCHIVE | HSM]

Specify one of the following values:

BACKUP

The number of objects and overall size of the objects to be measured that are related to backup activities in the system. For example, specify this value when you manually create a single report for the Tivoli Storage Manager backup-archive client (Tivoli Storage Manager SUR - Front End component 00).

ARCHIVE

The number of objects and overall size of the objects to be measured that are related to archive activities in the system. For example, specify this value when you manually create a single report for the Tivoli Storage Manager backup-archive client (Tivoli Storage Manager SUR - Front End component 00).

HSM

The number of objects and overall size of objects to be counted that are related to Hierarchical Storage Management activities in the system. For example, specify this value when you manually create a single report for the Tivoli Storage Manager for Space Management client (Tivoli Storage Manager SUR - Front End component 08).

applicationentity *name*

Specify a unique name that is related to the capacity measurement. For example, specify the file system name or GPFS cluster name. The value exists for reference and does not affect the measurement process.

numberofobjects *number of objects*

Specify the number of objects to include in the single XML report. For

example, in an Oracle environment with five database files, specify 5. For a Tivoli Storage Manager backup-archive client environment with ten million files and directories, specify 10000000.

size *size of all objects*

Specify the overall size of objects to include in the single XML report. The size is measured in MB. For example, to include 10000000 files, and each file is 1 MB, specify 10000000.

directory *output directory*

Specify the directory of the output file (.XML) that contains the product measurements.

3. Repeat Step 1 and Step 2 for all Tivoli Storage Manager products that you want to include in the Tivoli Storage Manager SUR - Front End capacity measurement.

Central Reporting Tool

Create a single report .XML file or parse output .XML files to generate the summary report.

Syntax

Use this Central Reporting Tool syntax to create a single report .XML file:

Linux

```
dsmfecc --create= --namespace= name --productid=ID number [--type=BACKUP | ARCHIVE | HSM] --applicationentity=name --numberofobjects=number of objects --size=size of all objects --directory=output directory
```

Windows

```
dsmfecc.exe --create= --namespace= name --productid=ID number [--type=BACKUP | ARCHIVE | HSM] --applicationentity=name --numberofobjects=number of objects --size=size of all objects --directory=output directory
```

Use this Central Reporting Tool syntax to parse output .XML files to generate the summary report:

Linux

```
dsmfecc --summary --customerid= customer --directory=output directory --format=[CSV | TXT]
```

Windows

```
dsmfecc.exe --summary -customerid customer -directory output directory -format [CSV | TXT]
```

Parameters

Linux

Windows

Each parameter requires two leading dashes (--). Each variable is separated from the parameter with an equal sign (=). There is no space between the equal sign (=) and the variable. For example:

```
--directory=/tmp/dsmfecc_out
```

customerid *customer*

Specify a name that identifies the summary report.

directory *output directory*

Specify the directory where all of the measurement script output files (.XML) are located.

format [CSV | TXT]

Specify the summary report file format. You can specify:

CSV

Generates the summary report in comma-separated values (CSV) format.

TXT

Generates the summary report in plain text (.TXT) format.

create

Create a single XML report.

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation.

productid *ID number*

Specify the two-digit ID number associated with the Tivoli Storage Manager SUR - Front End bundled product. For example, product ID 00 identifies Tivoli Storage Manager Extended Edition. See "Tivoli Storage Manager SUR - Front End measurement scripts" on page 3 for product ID numbers.

type [BACKUP | ARCHIVE | HSM]

Specify one of the following values:

BACKUP

The number of objects and overall size of the objects to be measured that are related to backup activities in the system. For example, specify this value when you manually create a single report for the Tivoli Storage Manager backup-archive client (Tivoli Storage Manager SUR - Front End component 00).

ARCHIVE

The number of objects and overall size of the objects to be measured that are related to archive activities in the system. For example, specify this value when you manually create a single report for the Tivoli Storage Manager backup-archive client (Tivoli Storage Manager SUR - Front End component 00).

HSM

The number of objects and overall size of objects to be counted that are related to Hierarchical Storage Management activities in the system. For example, specify this value when you manually create a single report for the Tivoli Storage Manager for Space Management client (Tivoli Storage Manager SUR - Front End component 08).

applicationentity *name*

Specify a unique name that is related to the capacity measurement. For example, specify the file system name or GPFS cluster name. The value exists for reference and does not affect the measurement process.

numberofobjects *number of objects*

Specify the number of objects to include in the single XML report. For example, in an Oracle environment with five database files, specify 5. For a Tivoli Storage Manager backup-archive client environment with ten million files and directories, specify *10000000*.

size *size of all objects*

Specify the overall size of objects to include in the single XML report. The size is measured in MB. For example, to include 10000000 files, and each file is 1 MB, specify *10000000*.

directory *output directory*

Specify the directory of the output file (.XML) that contains the product measurements.

Examples

Linux This example generates the summary report for COMPANY. The report is based on all of the measurement script output files in the /tmp/dsmfecc_out directory. The report is generated in TXT format:

```
> dsmfecc --customerid=COMPANY --directory=/tmp/dsmfecc_out --format=TXT
```

Windows This example generates the summary report for COMPANY. The report is based on all of the measurement script output files in the C:\tmp\dsmfecc_out directory. The report is generated in CSV format:

```
> dsmfecc.exe -customerid COMPANY -directory C:\tmp\dsmfecc_out -format CSV
```

Command-line arguments by product

Each Tivoli Storage Manager SUR - Front End measurement script requires product-specific parameters.

Information for each product measurement script includes the following information:

- A description of the measurement script.
- A syntax diagram of the measurement script.
- Detailed descriptions of the measurement script parameters.
- Examples of using the measurement script.

Tivoli Storage Manager Extended Edition

Front-end capacity for the Tivoli Storage Manager Extended Edition product is defined as the active backup for the protected files.

Use the Tivoli Storage Manager Extended Edition measurement script and Central Reporting Tool to measure front-end capacity.

- If you archive data and it is not backed up, you must manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
- The active backup consists of the most recently backed up files. This backup is representative of the data that would be recovered to restore the protected files to the latest recovery point.
- Files that exist at the source (protected server) but are excluded from the backup operation with Tivoli Storage Manager client EXCLUDE options are not measured in active backups. As a result, these excluded files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
- The measurement for Tivoli Storage Manager SUR - Front End licensing does not include the effects of deduplication and compression settings that are applied to the source files.
- Access to a Tivoli Storage Manager administrative command-line client and all Tivoli Storage Manager servers that contain protected data is required.
- If your front-end capacity measurement for Tivoli Storage Manager Extended Edition includes the active Lotus Domino database backup, then you do not need to complete the capacity measurement for Data Protection for IBM Domino.
- If you run the Tivoli Storage Manager Backup-Archive Client inside a Hyper-V or VMware virtual machine guest, and you back up both applications at the virtual machine level and also from the client in guest, the protected files should be measured only once.
- Network data management protocol (NDMP) data is measured as part of the active data with the measurement script that is run against the Tivoli Storage Manager server. NDMP data does not require any additional measurement action.

Syntax

Linux

```
dsmfecc-00.pl --tmsusername=user name --tspassword=password  
--namespace=[NODENAME | *] --applicationentity=[filespace | *]  
--directory=output directory
```

Windows

```
dsmfecc-00.ps1 -tmsusername user name -tspassword password -namespace  
[NODENAME | *] -applicationentity [filespace | *] -directory directory
```

Parameters

Linux

Each parameter requires two leading dashes (--). Each variable is separated from the parameter with an equal sign (=). There is no space between the equal sign (=) and the variable. For example:

```
--tmsusername=admin
```

Windows

Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

```
-tmsusername admin
```

tmsusername *username*

Specify the user name that logs in to the Tivoli Storage Manager server.

tspassword *password*

Specify the password for the user name that logs in to the Tivoli Storage Manager server.

namespace [*NODENAME* | *]

Specify one of the following values:

NODENAME

The Tivoli Storage Manager node name in uppercase characters.

- * Specify the wildcard character (*) to query all nodes on the Tivoli Storage Manager server.

applicationentity [*filespace* | *]

Specify one of the following values:

filespace

The file system name. This name typically corresponds to the Tivoli Storage Manager filespace name.

- * Specify the wildcard character (*) to query all file systems.

directory *output directory*

Specify the directory to place the output file (.XML) that is generated by the measurement script.

Examples

Linux

This example queries front-end capacity for file system /SMSVT/mmfs1 with Tivoli Storage Manager nodename ARVID. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> ./dsmfecc-00.pl --tmsusername=admin --tspassword=admin --namespace=ARVID  
--applicationentity=/SMSVT/mmfs1 --directory=/tmp/dsmfecc_out
```

Windows This example queries front-end capacity for file system /gpfs1 with Tivoli Storage Manager nodename TANGO. The output file (.XML) is written to the current working directory. Since the installation of the Tivoli Storage Manager Client is re-locatable the correct installation path and the path to the correct configuration must be used)

```
> .\dsmfecc-00.ps1 -namespace TANGO -directory . -tsmusername admin -tspassword admin  
-applicationentity /gpfs1 -tsminstall "C:\Program Files\Tivoli\TSM\baclient"  
-dsmoptpath "C:\ProgramFiles\Tivoli\TSM\baclient\dsm.FE.opt"
```

Tivoli Storage Manager for Mail

Data Protection for IBM Domino

Front-end capacity for Data Protection for IBM Domino is defined as the size of the active backups for the protected IBM Domino databases.

Use the Data Protection for IBM Domino measurement script and Central Reporting Tool to measure front-end capacity.

- The active backup consists of the most recent backup version of each protected database. This backup is representative of the data that would be recovered to restore the protected database to the latest recovery point.
- Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
- Access to a Tivoli Storage Manager administrative command-line client and all Tivoli Storage Manager servers that contain protected data is required.
- If you already measured front-end capacity for the active IBM Domino database backup as part of the Tivoli Storage Manager Extended Edition measurement, then you do not need to complete the capacity measurement for Data Protection for IBM Domino.

Syntax

Linux
dsmfecc-07.pl --tsmusername=*user name* --tspassword=*password*
--namespace=*NODENAME* --directory=*output directory*

Windows
dsmfecc-07.ps1 -tsmusername *user name* -tspassword *password* -namespace
NODENAME* -directory *output directory* tsminstall *client installation directory
dsmoptpath *path and name of client options file*

Parameters

Linux Each parameter requires two leading dashes (--). Each variable is separated from the parameter with an equal sign (=). There is no space between the equal sign (=) and the variable. For example:

```
--tsmusername=admin
```

Windows Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

```
-tsmusername admin
```

tmsusername *username*

Specify the user name that logs in to the Tivoli Storage Manager server.

tspassword *password*

Specify the password for the user name that logs in to the Tivoli Storage Manager server.

namespace *NODENAME*

Specify the Tivoli Storage Manager node name in uppercase characters.

directory *output directory*

Specify the directory to place the output file (.XML) that is generated by the measurement script.

tsminstall *client installation directory*

Specify the Tivoli Storage Manager client installation directory.

dsmoptpath *path to client options file*

Specify the full path and name of the Tivoli Storage Manager client options file.

Examples

Linux This example queries front-end capacity with Tivoli Storage Manager nodename WALTZ. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> ./dsmfecc-07.pl --tmsusername=admin --tspassword=admin --namespace=WALTZ
--directory=/tmp/dsmfecc_out
```

Windows This example queries front-end capacity with Tivoli Storage Manager nodename XORRON. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-07.ps1 -namespace XORRON -directory . -tmsusername admin -tspassword admin
-tsminstall "C:\Program Files\Tivoli\TSM\baclient"
-dsmoptpath "C:\ProgramFiles\Tivoli\TSM\baclient\dsm.FE.opt"
```

Data Protection for Microsoft Exchange Server

Front-end capacity for Data Protection for Microsoft Exchange Server is defined as the utilized size of the primary protected Microsoft Exchange Server database.

- Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing
- Tivoli Storage Manager SUR - Front End measures the size of the primary protected Microsoft Exchange Server database only. The recovery, replica, and temporary database sizes do not apply to licensing measurements.
- When Microsoft Exchange Server Database Availability Groups (DAG) are in use, Tivoli Storage Manager SUR - Front End measures the size of the DAG primary copies only.

Syntax

Windows
dsmfecc-06.ps1 **-namespace** *name* **-directory** *directory*

Parameters

Windows Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

```
-namespace SALSA
```

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation. For example, specify the Microsoft Exchange Server name or Exchange Server DAG name to identify the server or group whose front-end capacity is being reported.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Example

Windows This example queries front-end capacity and identifies the operation with the name STAPLE. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-06.ps1 -namespace STAPLE -directory .
```

Tivoli Storage Manager for Databases

Data Protection for Oracle

Front-end capacity for Data Protection for Oracle is defined as the utilized size of the primary protected Oracle database.

- Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
- Make sure that the following conditions exist before you attempt this procedure:
 - The ORACLE_SID environment variable is set correctly.
 - The Oracle database to be measured is open.
- A connection to the Oracle Server must exist for the Oracle instance owner before you run the measurement script.

Syntax

Linux
dsmfecc-02.pl **--namespace=***name* **--applicationusername=***user name*
--directory=*output directory*

Windows
dsmfecc-02.ps1 **-namespace** *name* **-applicationusername** *user name* **-directory**
output directory

Parameters

Linux Each parameter requires two leading dashes (--). Each variable is separated from the parameter with an equal sign (=). There is no space between the equal sign (=) and the variable. For example:

```
--applicationusername=sysdba
```

Windows Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

```
-applicationusername sysdba
```

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation. For example, specify the Oracle server instance to identify the server whose front-end capacity is being reported.

applicationusername *user name*

Specify the user name that logs in to the Oracle database server.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Examples

Linux This example queries front-end capacity with the existing database admin account, SYSDBA. It identifies the operation with the name Test. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> su - ora
> ./dsmfecc-02.pl --namespace=Test --applicationusername=sysdba
--directory=/tmp/dsmfecc_out
```

Windows This example queries front-end capacity with the existing database admin account, SYSDBA. It identifies the operation with the name test. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> .\dsmfecc-02.ps1 -namespace test -applicationusername sysdba -directory .
```

Data Protection for Microsoft SQL Server

Front-end capacity for Data Protection for Microsoft SQL Server is defined as the utilized size of the primary protected Microsoft SQL Server database.

- Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
- Replica databases in an AlwaysOn Availability Group (AAG) are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing. Although replica backups might exist, Tivoli Storage Manager SUR - Front End uses the measurement of the primary protected Microsoft SQL Server database only.
- Run this measurement script in Windows PowerShell. The PowerShell must connect to the Microsoft SQL Server.

Syntax

Windows

```
dsmfecc-01.ps1 -namespace name -applicationentity database -directory output  
directory
```

Parameters

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation. For example, specify the Microsoft SQL Server name or availability group name to identify the server or group whose front-end capacity is being reported.

applicationentity *database*

Specify the Microsoft SQL Server database to measure.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Example

Windows

This example queries front-end capacity of the current Microsoft SQL Server database. It identifies the operation with the name peter. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-01.ps1 -applicationentity "." -namespace peter -directory .
```

Tivoli Storage Manager for Enterprise Resource Planning

Data Protection for SAP for DB2

Front-end capacity for Data Protection for SAP for DB2 is defined as the utilized size of the primary protected SAP for DB2 database.

Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.

Syntax

Linux

```
dsmfecc-03.pl --namespace=name --applicationentity=filespace --directory=output directory
```

Windows

```
dsmfecc-03.ps1 -namespace name -applicationentity filespace -directory output directory
```

Parameters

Linux

Each parameter requires two leading dashes (--). Each variable is separated from the parameter with an equal sign (=). There is no space between the equal sign (=) and the variable. For example:

```
--namespace=test
```

Windows

Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

```
-namespace test
```

SAP

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation. For example, specify a name to identify the SAP Database Server whose front-end capacity is being reported.

applicationentity *database*

Specify the SAP for DB2 database to measure.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Examples

Linux

This example queries front-end capacity of the SAP for DB2 database, TESTDB. It identifies the operation with the name FREE. The output file (.XML) is written to the /root/dsmfecc_out directory:

```
> su - db2erp
> ./dsmfecc-03.pl --namespace=FREE --directory=/root/dsmfecc_out --applicationentity=TESTDB
```

Windows This example queries front-end capacity of the SAP for DB2 database, TESTDB. It identifies the operation with the name test. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-03.ps1 -namespace test -directory . -applicationentity=TESTDB
```

Data Protection for SAP for Oracle

Front-end capacity for Data Protection for SAP for Oracle is defined as the utilized size of the primary protected SAP for Oracle database.

Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.

Make sure that the following conditions exist before you attempt this procedure:

- The ORACLE_SID environment variable is set correctly.
- The SAP for Oracle database to be measured is open.

Syntax

Linux

```
dsmfecc-04.pl --namespace=name --applicationusername=name --directory=output directory
```

Windows

```
dsmfecc-04.ps1 -namespace name -applicationusername name -directory output directory
```

Parameters

Linux

Each parameter requires two leading dashes (--). Each variable is separated from the parameter with an equal sign (=). There is no space between the equal sign (=) and the variable. For example:

```
--namespace=test
```

Windows

Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

```
-namespace test
```

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation. For example, specify a name to identify the SAP Database Server whose front-end capacity is being reported.

applicationusername *name*

Specify the user name that logs in to the SAP for Oracle database server.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Examples

Linux This example queries front-end capacity with the existing database admin account, SYSDBA. It identifies the operation with the name test. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> su - oraerp
> ./dsmfecc-04.pl --namespace=test --applicationusername=sysdba --directory=/tmp/dsmfecc_out
```

Windows This example queries front-end capacity with the existing database admin account, SYSDBA. It identifies the operation with the name test. The output file (.XML) is written to the current working directory:

```
> su - oraerp
> .\dsmfecc-04.ps1 -namespace test -applicationusername sysdba -directory .
```

Data Protection for SAP HANA

Front-end capacity for Data Protection for SAP HANA is defined as the utilized size of the protected SAP HANA database.

Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.

Syntax

Linux

```
dsmfecc-05.pl --applicationusername=username --applicationpassword=password
--applicationentity=database number --namespace= instance name
--directory=output directory
```

Parameters

Linux Each parameter requires two leading dashes (--). Each variable is separated from the parameter with an equal sign (=). There is no space between the equal sign (=) and the variable. For example:

```
--namespace=vhana
```

namespace *instance name*

Specify the instance name of the SAP HANA database to measure.

applicationusername *user name*

Specify the user name that logs in to the SAP HANA server.

applicationpassword *password*

Specify the password for the user name that logs in to the SAP HANA server.

applicationentity *database number*

Specify the number of the SAP HANA database to measure.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Example

Linux This example queries front-end capacity for one SAP HANA database with the HANA instance, `vhana05`. The output file (.XML) is written to the `/tmp/dsmfecc_out` directory:

```
> ./dsmfecc-05.pl --applicationpassword=manager --namespace=vhana05
--applicationusername=system --applicationentity=1 --directory=/tmp/dsmfecc_out
```

Tivoli Storage Manager FastBack

Front-end capacity for Tivoli Storage Manager FastBack is defined as the utilized size of the primary copy of data on the FastBack Server.

When Tivoli Storage Manager FastBack for Exchange or Tivoli Storage Manager FastBack for Bare Machine Recovery data exists, this data is included in the Tivoli Storage Manager SUR - Front End measurement.

Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.

Syntax

Windows

dsmfecc-012.ps1 **-namespace** *name* **-directory** *output directory* **-historyfile** *path to history.txt file*

Restriction: You must run `dsmfecc-012.ps1` from an account with administrator rights.

Parameters

Windows

Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

```
-namespace TEST
```

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation.

historyfile *path to history.txt file*

Specify the full path and name of the Tivoli Storage Manager FastBack history.txt file.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Examples

Windows

This example queries front-end capacity of all snapshots in the FastBack server repository, including used storage capacity for each snapshot, as identified in the `history.txt` file. It identifies the operation with the name `FREE`. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-12.ps1 -namespace FREE -directory .  
-historyfile "C:\Users\Administrator\Documents\fastback\history.txt"
```

Tivoli Storage Manager for Space Management

The best practice is to back up files before you migrate them with Tivoli Storage Manager for Space Management. Therefore, Tivoli Storage Manager SUR - Front End measures the active backups for the systems that are managed by Tivoli Storage Manager for Space Management. The Tivoli Storage Manager Extended Edition active backup is used for this measurement.

- If you do not back up files that are migrated with Hierarchical Storage Management, then the premigrated size and migrated size of the migrated files are used when you run the **dsmfecc-08.pl** measurement script.
- If you do back up files that are migrated with Hierarchical Storage Management, then no action is required if you run the Tivoli Storage Manager Extended Edition measurement script.

Syntax

Linux

```
dsmfecc-08.pl --namespace=NODENAME --applicationentity=filesystem  
--directory=output directory
```

Parameters

Linux

Each parameter requires two leading dashes (--). Each variable is separated from the parameter with an equal sign (=). There is no space between the equal sign (=) and the variable. For example:

```
--namespace=NODE3
```

namespace *NODENAME*

Specify the Tivoli Storage Manager node name in uppercase characters.

applicationentity *filesystem*

Specify the file system mount point.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Example

Linux

This example queries front-end capacity for file system /SMSVT/mmfs1 with Tivoli Storage Manager nodename FOXTROT. The output file (.XML) is written to the /tmp/dsmfecc_out directory:

```
> ./dsmfecc-08.pl --namespace=FOXTROT --applicationentity=/SMSVT/mmfs1  
--directory=/tmp/dsmfecc_out
```

Tivoli Storage Manager for Virtual Environments

Data Protection for VMware

Front-end capacity for Data Protection for VMware is defined as the utilized size of the protected VMware virtual machines.

When Data Protection for VMware protects a virtual machine that contains file system or application-specific agents that are also running backup operations, the following situation occurs:

- The number of TB measured for the virtual machine that is running file system or application-specific agents is also reported through active backup measurements for file system clients or through procedures that are used to measure protected application data.
- You can remove the measurement that is reported for file system clients or protected application data; the data that is gathered through the Data Protection for VMware measurement includes this data.

Syntax

Windows

```
dsmfecc-10.ps1 -applicationusername VMware vCenter user ID  
-applicationpassword password -applicationentity vCenter Server IP address or name  
-namespace name -asnode NODENAME -directory output directory  
-tsminstall client installation directory -dsmoptpath path and name of client options file
```

Parameters

Windows

Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

```
-namespace test
```

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation.

applicationusername *VMware vCenter user ID*

Specify the vCenter user ID.

applicationpassword *vCenter password*

Specify the vCenter password for the user ID that logs in to the vCenter.

applicationentity *vCenter Server IP address or name*

Specify the vCenter Server IP address or name.

asnode *NODENAME*

Specify the Tivoli Storage Manager node name in uppercase characters.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

tsminstall *client installation directory*

Specify the Tivoli Storage Manager client installation directory.

dsmoptpath *path to client options file*

Specify the full path and name of the Tivoli Storage Manager client options file.

Example

Windows This example queries front-end capacity of the protected virtual machines on VMware vCenter christo.mycompany.usa.com. It identifies the operation with the name FREE. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-10.ps1 -namespace FREE -directory . -applicationusername administrator
-applicationpassword adminpwd -applicationentity christo.mycompany.usa.com -asnode DEV_DC
-dsmoptpath "C:\ProgramFiles\Tivoli\TSM\baclient\dsm.DEV_DC.opt"
-tsminstall "c:\Program Files\Tivoli\TSM\baclient"
```

Data Protection for Microsoft Hyper-V

Syntax

Front-end capacity for Data Protection for Microsoft Hyper-V is defined as the utilized size of the protected virtual machines.

Windows

dsmfecc-11.ps1 **-namespace** *name* **-directory** *output directory*

Restriction: You must run dsmfecc-11.ps1 from an account with administrator rights.

Parameters

Windows Each parameter requires one leading dash (-). Each variable is separated from the parameter with a space. For example:

-namespace test

namespace *name*

Specify a name that identifies the measurement operation with the XML output file. This value becomes part of the XML output file name so that you can easily identify the operation.

directory *output directory*

Specify a directory to place the output file (.XML) that is generated by the measurement script.

Example

Windows This example queries front-end capacity with the existing database admin account, SYSDBA. It identifies the operation with the name test. The output file (.XML) is written to the current working directory:

```
> .\dsmfecc-11.ps1 -namespace test -directory .
```

Measure front-end capacity by application-specific command

If a measurement script is not available, calculate the front-end capacity measurement with an application-specific command. A step-by-step procedure is provided.

Tivoli Storage Manager for Databases

Data Protection for Microsoft SQL Server

Front-end capacity for Data Protection for Microsoft SQL Server is defined as the utilized size of the primary protected Microsoft SQL Server database.

This procedure documents how to manually calculate the front-end capacity measurement with **sp_spaceused**. To calculate this measurement with a measurement script, follow the instructions in “Measuring front-end capacity by script” on page 17.

- The utilized size is obtained by adding the space that is used by data (data) and the space that is used by indexes (index_size) for each protected Microsoft SQL Server database. These values are reported by issuing **sp_spaceused** for each protected Microsoft SQL Server database. You can issue **sp_spaceused** with the public role.
 - Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
 - Replica databases in an AlwaysOn Availability Group (AAG) are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing. Although replica backups might exist, Tivoli Storage Manager SUR - Front End uses the measurement of the primary protected Microsoft SQL Server database only.
1. Issue **sp_spaceused** for each protected Microsoft SQL Server database in the environment. For example:

```
USE [AdventureWorks2012]
GO
EXEC sp_spaceused
GO
```

In this example, the following sizes display for database AdventureWorks2012:

Results		Messages	
database_name	database_size	unallocated space	
1 AdventureWorks2012	205.75 MB	14.95 MB	
reserved	data	index_size	unused
1 194608 KB	97016 KB	88048 KB	9544 KB

- To determine the utilized size of the database AdventureWorks2012, add the data and index_size values:

- **database_size:** Database size (data files + log files) = 205.75 MB
- **unallocated space:** Space that is *not* reserved for use either by data or log files (Space Available) = 14.95 MB
- **reserved:** Space that is reserved for use by data and log files = 190.05 MB
- **data:** Space used by data = 97016 KB/1024 = 94.74 MB
- **index_size:** Space used by indexes = 88048 KB/1024 = 85.99 MB
- **unused:** Portion of the reserved space, which is not yet used = 9544 KB/1024 = 9.32 MB

$$94.74 + 85.99 = 180.73 \text{ MB}$$

In this example, the utilized size of the primary protected Microsoft SQL Server database (AdventureWorks2012) is 180.73 MB. Convert this value to GB:

$$180.73 \text{ MB} / 1024 = .18 \text{ GB}$$

- Repeat Step 1 and Step 2 for each protected SQL Server database in the environment. Make sure to convert each utilized size value to GB.
- To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:
 - Add the utilized size value (in GB) for each protected database:
 - [AdventureWorks2012] 94.74 (data) + 85.99 (index_size) = 180.73 MB (.18 GB)
 - [HR2013] 495.91 (data) + 202.71 (index_size) = 698.62 MB (.68 GB)
 - [FinInv2013] 713.65 (data) + 298.47 (index_size) = 1012.12 MB (.99 GB)
 - [IntComm2014] 689.11 (data) + 389.04 (index_size) = 1078.15 MB (1.1 GB)
 - [FacUpgrd2014] 865.09 (data) + 315.88 (index_size) = 1180.97 MB (1.2 GB)

The total utilized size for all protected Microsoft SQL Server databases is 4.15 GB.

- Convert the total utilized size from GB to TB:
$$4.15 \text{ GB} / 1024 = .004 \text{ TB}$$
- Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:

- Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Data Protection for Oracle

Front-end capacity for Data Protection for Oracle is defined as the utilized size of the primary protected Oracle database.

This procedure documents how to manually calculate the front-end capacity measurement with **select sum** command. To calculate this measurement with a measurement script, follow the instructions in “Measuring front-end capacity by script” on page 17.

- The utilized size is identified by the value of the size of `dba_segments` option that is reported by the **select sum** SQLPlus statement for each primary protected Oracle database.
 - Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
 - Make sure that the following conditions exist before you attempt this procedure:
 - The `ORACLE_SID` environment variable is set correctly.
 - The Oracle database to be measured is open.
1. As the Oracle instance owner, issue the **select sum** SQLPlus statement for the primary protected Oracle database in the environment. For example:

```
SELECT SUM(bytes)/1024/1024 "Meg" FROM dba_segments;
```

The following output is returned for the Oracle database:

```
bash-3.00$ sqlplus / as sysdba
SQL*Plus: Release 11.1.0.7.0 - Production on Fri May 9 21:51:42 2014
Copyright (c) 1982, 2008, Oracle. All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.7.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL> SELECT SUM(bytes)/1024/1024 "Meg" FROM dba_segments;

      Meg
-----
6864275632.351563
```

2. To determine the utilized size of the database, select from the `dba_segments` view. In this example, the utilized size of the primary protected Oracle database is `6864275632.351563` bytes. Convert this value to GB:
 $6864275632.351563 \text{ MB} / 1024 = 6703394.17 \text{ GB}$
3. Repeat Step 1 and Step 2 for each primary protected Oracle database in the environment. Make sure to convert each utilized size value to GB.
4. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:

- a. Add the utilized size value (in GB) for each protected database:

```
[FinArch] 6703394.17 GB
[Facilities] 19.62 GB
[InvestA] 86.92 GB
[HRfinan] 108.65 GB
[Consumer] 121.91 GB
```

The total utilized size for all protected Oracle databases is 6703731.27 GB.

- b. Convert the total utilized size from GB to TB:
 $6703731.27 \text{ GB} / 1024 = 6546.61 \text{ TB}$
- c. Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:
- Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Tivoli Storage Manager for Enterprise Resource Planning

Front-end capacity for Tivoli Storage Manager for Enterprise Resource Planning is defined as the utilized size of the primary protected database.

Data Protection for SAP for DB2

This procedure documents how to manually calculate the front-end capacity measurement with **GET_DBSIZE_INFO** command. To calculate this measurement with a measurement script, follow the instructions in “Measuring front-end capacity by script” on page 17.

- The utilized size is identified by the value of the `database_size` option that is reported by the **GET_DBSIZE_INFO** command for the primary protected SAP for DB2 database.
 - Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
1. As the DB2 instance owner, issue the **GET_DBSIZE_INFO** command for each protected SAP for DB2 database in the environment. For example:

```
db2as2@acsprod1:/db2/AS2>db2 "call get_dbsize_info(?,?,?,-1)"
```

In this example, the following size displays for the SAP for DB2 database AS2:

```

db2as2@acsprod1:/db2/AS2>db2 connect to as2

Database Connection Information

Database server      = DB2/AIX64 10.1.2
SQL authorization ID = DB2AS2
Local database alias = AS2

db2as2@acsprod1:/db2/AS2>db2 "call get_dbsize_info(?,?,?,-1)"

Value of output parameters
-----
Parameter Name : SNAPSHOTTIMESTAMP
Parameter Value : 2014-05-09-22.21.13.645735

Parameter Name : DATABASESIZE
Parameter Value : 356594432376

Parameter Name : DATABASECAPACITY
Parameter Value : 479773184423

Return Status = 0

```

2. To determine the utilized size for the SAP for DB2 database AS2, use Parameter Value for parameter DATABASESIZE. In this example, the value is 356594432376 bytes. Convert this value to GB:

$356594432376 / 1024 = 348236750.37 \text{ KB}$

$348236750.37 / 1024 = 340074.95 \text{ MB}$

$340074.95 / 1024 = 332.1 \text{ GB}$

In this example, the utilized size of the primary protected SAP for DB2 database is 332.1 GB.

3. Repeat Step 1 and Step 2 for each protected SAP for DB2 database in the environment. Make sure to convert each utilized size value to GB.
4. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:
 - a. Add the utilized size value (in GB) for each protected database:

```

[AS2] 332.1 GB
[AS3] 119.62 GB
[AS4] 281.87 GB
[AS5] 518.51 GB
[AS6] 611.79 GB

```

The total utilized size for all protected SAP for DB2 databases is 1863.89 GB.

- b. Convert the total utilized size from GB to TB:

$1863.89 \text{ GB} / 1024 = 1.82 \text{ TB}$

- c. Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:
 - Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Data Protection for SAP HANA

This procedure documents how to manually calculate the front-end capacity measurement with the **select sum** SQLPlus statement. To calculate this measurement with a measurement script, follow the instructions in “Measuring front-end capacity by script” on page 17.

- The utilized size is identified by the value of the `allocated_page_size` option that is reported by the **select sum** SQLPlus statement for the protected SAP HANA database. You can issue **select sum** with the public role.
 - Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
1. As the SAP HANA instance owner (<SID>ADM), issue the **select sum** SQLPlus statement for each primary protected SAP HANA database in the environment. For example:

```
esdhana01:/usr/sap/SUP/HDB00> hdbsql -i 00 -u system -p manager
'select sum(allocated_page_size) from M_CONVERTER_STATISTICS'
```

The following output displays for the SAP HANA database:

```
esdhana01:/usr/sap/SUP/HDB00> hdbsql -i 00 -u system -p manager
'select sum(allocated_page_size) from M_CONVERTER_STATISTICS'
SUM(ALLOCATED_PAGE_SIZE)
91032388608
1 row selected (overall time 20.633 msec; server time 19.802 msec)
```

2. To determine the utilized size for the SAP HANA database, use the value of `allocated_page_size`. In this example, value is *91032388608* bytes. Convert this value to GB:

```
91032388608 / 1024 = 89160028 KB
```

```
89160028 / 1024 = 87070 MB
```

```
87070 / 1024 = 85 GB
```

In this example, the utilized size of the primary protected SAP HANA database is 85 GB.

3. Repeat Step 1 and Step 2 for each primary protected SAP HANA database in the environment. Make sure to convert each utilized size value to GB.
4. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:
 - a. Add the utilized size value (in GB) for each protected database:

```
[HDB00] 85 GB
[HDB01] 195.8 GB
[HDB02] 208.2 GB
[HDB03] 465.5 GB
[HDB04] 118.7 GB
```

The total utilized size for all protected SAP HANA databases is 1073.2 GB.

- b. Convert the total utilized size from GB to TB:

```
1073.2 GB / 1024 = 1.1 TB
```

- c. Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:
 - Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.

- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Data Protection for SAP for Oracle

This procedure documents how to manually calculate the front-end capacity measurement with the **select sum** SQLPlus statement. To calculate this measurement with a measurement script, follow the instructions in "Measuring front-end capacity by script" on page 17.

- The utilized size is identified by the value of the size of `dba_segments` option that is reported by the **select sum** SQLPlus statement for each primary protected SAP for Oracle database.
 - Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
 - Make sure that the following conditions exist before you attempt this procedure:
 - The `ORACLE_SID` environment variable is set correctly.
 - The SAP for Oracle database to be measured is open.
1. As the Oracle instance owner, issue the **select sum** SQLPlus statement for the primary protected SAP for Oracle database in the environment. For example:

```
SELECT SUM(bytes)/1024/1024 "Meg" FROM dba_segments;
```

The following output displays for the SAP for Oracle database:

```
bash-3.00$ sqlplus / as sysdba
SQL*Plus: Release 11.1.0.7.0 - Production on Fri May 9 21:51:42 2014
Copyright (c) 1982, 2008, Oracle. All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.1.0.7.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL> SELECT SUM(bytes)/1024/1024 "Meg" FROM dba_segments;

      Meg
-----
6864275632.351563
```

2. To determine the utilized size of the database, select from the `dba_segments` view. In this example, the utilized size of the primary protected SAP for Oracle database is `6864275632.351563` MB. Convert this value to GB:
 $6864275632.351563 \text{ MB} / 1024 = 6703394.17 \text{ GB}$
3. Repeat Step 1 and Step 2 for each primary protected SAP for Oracle database in the environment. Make sure to convert each utilized size value to GB.
4. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:
 - a. Add the utilized size value (in GB) for each protected database:


```
[FinArch] 6703394.17 GB
[Facilities] 19.62 GB
[InvestA] 86.92 GB
[HRfinan] 108.65 GB
[Consumer] 121.91 GB
```

The total utilized size for all protected SAP for Oracle databases is 6703731.27 GB.

- b. Convert the total utilized size from GB to TB:
 $6703731.27 \text{ GB} / 1024 = 6546.61 \text{ TB}$
- c. Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:
 - Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Tivoli Storage Manager FastBack

Front-end capacity for Tivoli Storage Manager FastBack is defined as the utilized size of the primary copy of data on the FastBack Server.

This procedure documents how to manually calculate the front-end capacity measurement by running ProtectedDataSize.exe. To calculate this measurement with a measurement script, follow the instructions in “Measuring front-end capacity by script” on page 17.

- The utilized size is obtained by running ProtectedDataSize.exe against the Tivoli Storage Manager FastBack History.txt file. The History.txt file tracks all snapshots in the FastBack server repository, including used storage capacity for each snapshot.
 - When Tivoli Storage Manager FastBack for Exchange or Tivoli Storage Manager FastBack for Bare Machine Recovery data exists, this data is included in the Tivoli Storage Manager SUR - Front End measurement.
 - Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing.
1. Copy the History.txt file from the FastBack Server to your local system. The default location of History.txt is %ALLUSERSPROFILE%\Application Data\Tivoli\TSM\FastBack\Server.
 2. Run ProtectedDataSize.exe on your local system with the following syntax:
ProtectedDataSize.exe *full_path*History.txt

For example:

```
C:\Users\IBM_ADMIN>C:\ProtectedDataSize.exe "C:\history.txt"
Calculate protected data size success, the output file is C:\FAST_BACK_PROTECTED_DATA.txt.
C:\Users\IBM_ADMIN>
```

The executable file creates an output file (FAST_BACK_PROTECTED_DATA.txt) in the same directory as History.txt.

3. Open the FAST_BACK_PROTECTED_DATA.txt file with a text editor. Here is an example of the output file content:

```

Vol_signature SnapshotSize(KB) VolumeSize(KB) VolName PolicyName
0x26849fc3 180353728 419424255 SERV03-OSK-KAN VolLetter E:\ Win2008_G1
0x3c72c6af 93435776 266245181 serv50-osk-kan VolLetter D:\ Win2003_G1
0x499232a 24848 204799 POST-OSK-KAN VolLetter Boot Win2008_G1
0xfa3ed960 24848 204799 SERV02-OSK-KAN VolLetter Boot Win2008_G1
0xbdd93d38 10406352 20965375 SERV05-OSK-KAN VolLetter Z:\ Win2008_G1
0xf2c0fcfc 92440160 209709055 SERV04-OSK-KAN VolLetter E:\ Win2008_G1
0xf24228a3 82626736 209709055 SERV09-OSK-KAN VolLetter J:\ Win2008_G5
0x683e0407 78893024 167943446 serv51-osk-kan VolLetter D:\ Win2003_G1
0x6d89fbf9 46941344 175670774 serv52-osk-kan VolLetter F:\ Win2003_G1

```

Vol_signature

The backup volume signature that is expressed in hex strings.

SnapshotSize

The size of the most recent full snapshot (KB).

VolumeSize

The volume size (KB).

VolName

The name of the backup volume.

PolicyName

The policy to which the volume belongs.

4. To determine the utilized size of the primary copy of data (SERV03-OSK-KAN VolLetter E:\), view the SnapshotSize value. In this example, the utilized size is 180353728 KB. Convert this value to GB:

$$180353728 \text{ KB} / 1024 = 176126.6875 \text{ MB}$$

$$176126.6875 \text{ MB} / 1024 = 172 \text{ GB}$$

5. Repeat Step 4 for each primary copy of data on the FastBack Server. Make sure to convert each utilized size value to GB.
6. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:

- a. Add the utilized size for each primary copy of data:

```

[SERV03-OSK-KAN VolLetter E:\] 172 GB
[SERV05-OSK-KAN VolLetter E:\] 722.84 GB
[SERV09-OSK-KAN VolLetter H:\] 369.44 GB
[SERVSYS-OSK-KAN VolLetter C:\] 708.51 GB
[SERV09-OSK-KAN VolLetter Z:\] 858.36 GB

```

The total utilized size for all protected copies of data is 2831.15 GB.

- b. Convert the total utilized size from GB to TB:

$$2831.15 \text{ GB} / 1024 = 2.77 \text{ TB}$$

- c. Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:

- Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server

Front-end capacity for Data Protection for Microsoft Exchange Server is defined as the utilized size of the primary protected Microsoft Exchange Server database.

This procedure documents how to manually calculate the front-end capacity measurement with the **Get-MailboxDatabase -status** command. To calculate this measurement with a measurement script, follow the instructions in “Measuring front-end capacity by script” on page 17.

- The utilized size is identified by the DatabaseSize value that is reported by the **Get-MailboxDatabase -status** command for each protected Microsoft Exchange Server 2007 (or later) database.
 - Transaction log files are not included in the measurement for Tivoli Storage Manager SUR - Front End licensing
 - Tivoli Storage Manager SUR - Front End measures the size of the primary protected Microsoft Exchange Server database only. The recovery, replica, and temporary database sizes do not apply to licensing measurements.
 - When Microsoft Exchange Server Database Availability Groups (DAG) are in use, Tivoli Storage Manager SUR - Front End measures the size of the DAG primary copies only.
1. Issue a Windows PowerShell query for each primary protected Microsoft Exchange Server database in the environment. For example:

```
C:\Windows\system32>Get-MailboxDatabase -status | where {$_.Recovery -eq $false }  
| select name,databasesize,last*
```

In this example, the following size displays for the Microsoft Exchange Server database, Mailbox Database 2117215819:

```
Name : Mailbox Database 2117215819  
DatabaseSize : 136.1 MB (142,671,872 bytes)  
LastFullBackup : 3/27/2014 3:09:47 PM  
LastIncrementalBackup :  
LastDifferentialBackup :  
LastCopyBackup :
```

2. To determine the utilized size for the Exchange Server database, use the value of the DatabaseSize option. In this example, value is 136.1 MB. Convert this value to GB:
$$136.1 \text{ MB} / 1024 = .13 \text{ GB}$$
3. Repeat Step 1 and Step 2 for each primary protected Microsoft Exchange Server database in the environment. Make sure to convert each utilized size value to GB.
4. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:

- a. Add the utilized size value (in GB) for each protected database:

```
[Mailbox Database 2117215819] .13 GB  
[Mailbox Database02] 9.62 GB  
[Mailbox Database03] 12.92 GB  
[Mailbox Database04] 18.65 GB  
[Mailbox Database05] 11.91 GB
```

The total utilized size for all protected Microsoft Exchange Server databases is 53.23 GB.

- b. Convert the total utilized size from GB to TB:

53.23 GB / 1024 = .05 TB

- c. Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:
 - Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Tivoli Storage Manager for Space Management

The best practice is to back up files before you migrate them with Tivoli Storage Manager for Space Management. Therefore, Tivoli Storage Manager SUR - Front End measures the active backups for the systems that are managed by Tivoli Storage Manager for Space Management. The Tivoli Storage Manager Extended Edition active backup is used for this measurement.

This procedure documents how to manually calculate the front-end capacity measurement with the **dsmdf** command. To calculate this measurement with a measurement script, follow the instructions in “Measuring front-end capacity by script” on page 17.

If you do not back up files that are migrated with Hierarchical Storage Management, the premigrated size and migrated size of the migrated files is used. To calculate the front-end capacity measurement of the premigrated files, complete these steps:

1. As root user, run the **dsmdf -detail file system mount point** command for each managed file system. For example:

```
root@blackpearl > dsmdf -detail /gpfs1
```

```
HSM Filesystem:    /gpfs1
FS State:          active
Migrated Size:     1024000
Premigrated Size:  43856
Migrated Files:    10323
Premigrated Files: 2003000
Unused Inodes:     472554
Free Size:         485286400
```

2. To determine the size of the migrated files, use the values that are identified in Migrated Size and Premigrated Size. Convert this value to GB:

```
Migrated Size:    1024000 KB / 1024 / 1024 = 0.98 GB
Premigrated Size:  43856 KB / 1024 / 1024 = 0.42 GB
```

```
Sum: 0.98 GB + 0.42 GB = 1.4 GB
```

In this example, the value is 1.4 GB.

3. Repeat Step 1 and Step 2 for each migrated file system. Make sure to convert each premigrated size value to GB.
4. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:
 - a. Add the premigrated size and migrated size values (in GB) for each migrated file system:

```
[gpfs1] 1.4 GB
[gpfs3] 1018.75 GB
[fs4] 78.55 GB
[fs5] 109.18 GB
[fs6] 273.99 GB
[fs7] 206.80 GB
```

The total premigrated size and migrated size for all migrated file systems is 1688.67 GB.

- b. Convert the total size from GB to TB:
 $1688.67 \text{ GB} / 1024 = 1.65 \text{ TB}$
- c. Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:
 - Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Tivoli Storage Manager for Storage Area Networks

Tivoli Storage Manager for Storage Area Networks allows client systems to write data directly to, or read data directly from, storage devices that are attached to a storage area network (SAN). The data that Tivoli Storage Manager for Storage Area Networks allows to read and write is already protected and measured by Tivoli Storage Manager clients. Therefore, it is not necessary to measure Tivoli Storage Manager for Storage Area Networks for Tivoli Storage Manager SUR - Front End licensing.

Tivoli Storage Manager for Virtual Environments: Data Protection for VMware

Front-end capacity for Data Protection for VMware is defined as the utilized size of the protected virtual machines.

This procedure documents how to manually calculate the front-end capacity measurement with the VMware vSphere PowerCLI `get-vm` command. To calculate this measurement with a measurement script, follow the instructions in “Measuring front-end capacity by script” on page 17.

- The utilized size is identified by using either of these VMware interfaces:
 - The UsedSpaceGB value that is reported by the VMware vSphere PowerCLI `get-vm` command for each protected virtual machine.
 - The Used Storage value that is displayed in the virtual machine property Resources dialog of the VMware View Administrator interface for each protected virtual machine.
- The UsedSpaceGB and Used Storage values show the space that is occupied by virtual machine files in the virtual machine directory: configuration, log, VMDK, and snapshot files are examples of such files. The UsedSpaceGB and Used Storage values change when the virtual machine is powered on. This minor change occurs because swap files are created in the virtual machine directory and then disappear when the virtual machine is powered down.

When Data Protection for VMware protects a virtual machine that contains file system or application-specific agents that are also running backup operations, the following situation occurs:

- The number of TB measured for the virtual machine that is running file system or application-specific agents is also reported through active backup measurements for file system clients or through procedures that are used to measure protected application data.
- You can remove the measurement that is reported for file system clients or protected application data; the data that is gathered through the Data Protection for VMware measurement includes this data.

If you protect all virtual machines on a virtual host with Data Protection for VMware, you can aggregate the utilized size of all protected virtual machines with the following VMware vSphere PowerCLI `get-vm` command:

```
PowerCLI C:\Program Files\VMware\Infrastructure\VMware PowerCLI> get-vm | measure -property UsedSpaceGB -Sum
```

In this example:

```
PowerCLI C:\Program Files\VMware\Infrastructure\VMware PowerCLI> get-vm | measure -property UsedSpaceGB -Sum
Count      : 622
Average    :
Sum        : 37289.9345116299
Maximum    :
Minimum    :
Property   : UsedSpaceGB
```

The utilized size of all 622 protected virtual machines on the virtual host is 36 TB:
37289 GB / 1024 = 36 TB

To determine the utilized size for an individual virtual machine, complete the following steps:

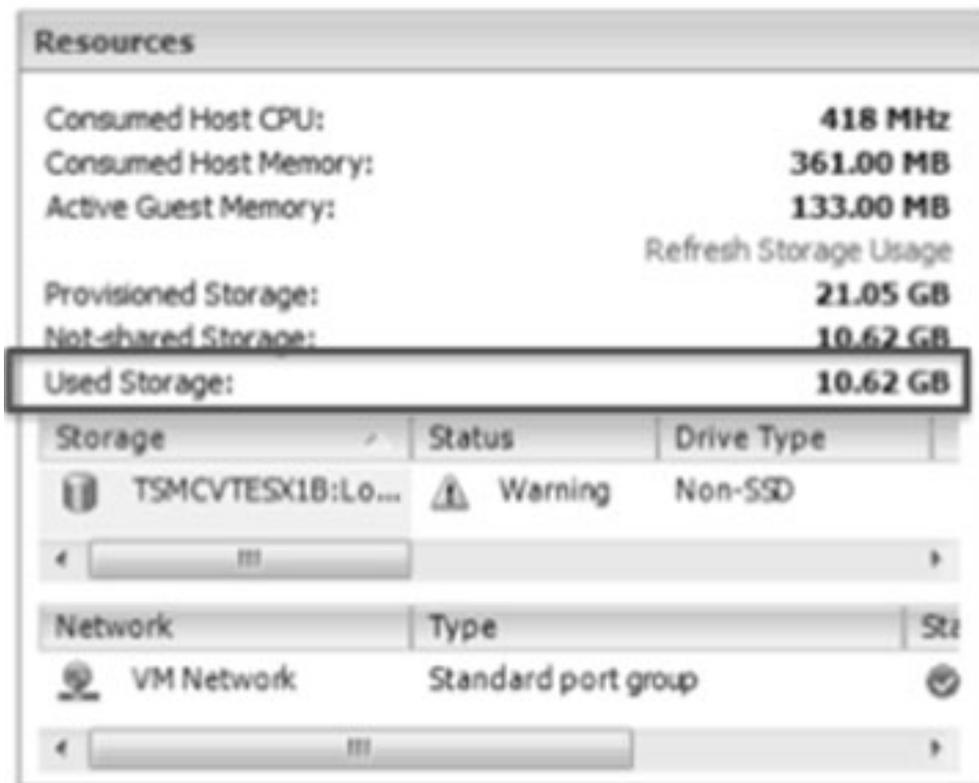
1. Issue the VMware vSphere PowerCLI **get-vm** command for each protected VMware virtual machine in the environment. For example:

```
PowerCLI C:\Windows\system32> get-vm "Linux SLES11sp1" | Select Name,
UsedSpaceGB, ProvisionedSpaceGB
```

In this example, the following sizes display for virtual machine Linux SLES11sp1:

Name	UsedSpaceGB	ProvisionedSpaceGB
Linux SLES11sp1	10.62144	21.04624

Optionally, these sizes are displayed in the virtual machine property Resources dialog of the VMware administrator interface:



2. To determine the utilized size for the virtual machine, use the value that is identified in UsedSpaceGB (VMware vSphere PowerCLI) or Used Storage (VMware administrator interface). In this example, value is 10.62 GB.
3. Repeat Step 1 and Step 2 for each protected VMware virtual machine in the environment. Make sure to convert each utilized size value to GB.
4. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:
 - a. Add the utilized size (in GB) for each protected virtual machine:

```
[Linux SLES11sp1] 10.62 GB
[Linux SLES11sp1_prod] 13.94 GB
[Windows 2012R2] 17.03 GB
[Windows 2012R2_prod] 15.71 GB
[Windows 2012R2_rec] 20.44 GB
```

The total utilized size for all protected virtual machines is 77.74 GB.

b. Convert the total utilized size from GB to TB:

$77.74 \text{ GB} / 1024 = .08 \text{ TB}$

c. Add the total protected TB to the overall Tivoli Storage Manager SUR - Front End capacity measurement with one of the following methods:

- Manually input the number of total protected TB into the Central Reporting Tool as described in “Measuring front-end capacity manually” on page 19.
- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV) to represent the overall number of TB to license with Tivoli Storage Manager SUR - Front End.

Tivoli Storage Manager API backups

Front-end capacity for Tivoli Storage Manager API backups is based on the type of protected data.

- For file system and IBM Domino database backups, this offering licenses the active backup for the protected files. The active backup consists of the most recently backed up files. This backup is representative of the data that would be recovered to restore the protected files to the latest recovery point.
- For other applications, this offering licenses the utilized size of the protected application (excluding log files).

When you measure the front-end capacity for Tivoli Storage Manager API backups that are not created by Tivoli Storage Manager Data Protection clients, consult with your IBM representative about available approaches to measure the specific application that you are protecting.

For example, to determine the number of front-end TB for a protected DB2 database, complete these steps:

1. As the DB2 instance owner, issue the **GET_DBSIZE_INFO** command for each protected DB2 database in the environment. For example:

```
db2as8@acsprod1:/db2/AS8>db2 "call get_dbsize_info(?,?,?,-1)"
```

In this example, the following size displays for the DB2 database:

```
db2as2@acsprod1:/db2/AS8>db2 connect to as2

      Database Connection Information

Database server      = DB2/AIX64 10.1.2
SQL authorization ID = DB2AS8
Local database alias = AS8

db2as8@acsprod1:/db2/AS8>db2 "call get_dbsize_info(?,?,?,-1)"

Value of output parameters
-----
Parameter Name : SNAPSHOTTIMESTAMP
Parameter Value : 2014-05-09-22.21.13.645735

Parameter Name : DATABASESIZE
Parameter Value : 356594432376

Parameter Name : DATABASECAPACITY
Parameter Value : 479773184423

Return Status = 0
```

2. To determine the utilized size for the DB2 database AS8, use Parameter Value. In this example, the value is 356594432376 bytes. Convert this value to GB:

```
356594432376 / 1024 = 348236750.37 KB
```

```
348236750.37 / 1024 = 340074.95 MB
```

```
340074.95 / 1024 = 332.1 GB
```

In this example, the utilized size of the primary protected DB2 database is 332.1 GB.

3. Repeat Step 1 and Step 2 for each protected DB2 database in the environment. Make sure to convert each utilized size value to GB.
4. To determine the number of front-end TB that are required for Tivoli Storage Manager SUR - Front End licensing, complete these steps:
 - a. Add the utilized size value (in GB) for each protected database:
[AS8] 332.1 GB
[AS9] 119.62 GB
[AS10] 281.87 GB
[AS11] 518.51 GB
[AS12] 611.79 GB

The total utilized size for all protected DB2 databases is 1863.89 GB.

- b. Convert the total utilized size from GB to TB:
 $1863.89 \text{ GB} / 1024 = 1.82 \text{ TB}$