

IBM Spectrum Protect Suite
Front End



Licensing Guide

Version 8.1

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Front End



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Note:

Before you use this information and the product it supports, read the information in “Notices” on page 71.

Sixth edition (March 2018)

This edition applies to version 8, release 1, modification 5 of IBM Spectrum Protect Suite – Front End and to all subsequent releases and modifications until otherwise indicated in new editions.

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What's new

IBM Spectrum Protect™ Plus can now measure the utilized size of protected applications on physical servers. The utilized size is measured by terabyte (TB).

The measurement script and the manual process for measuring the capacity of virtual machines protected by the Data Protection for VMware component have changed. New examples are provided for the measurement script and new steps are provided for the manual measurement.

Changed and new information in this guide is indicated by a vertical bar (|) to the left of the change.

Chapter 1. Offering overview

IBM Spectrum Protect Suite – Front End provides flexible, pay-as-you-grow data protection.

IBM Spectrum Protect Suite – Front End includes the following features:

- A bundle of nine IBM Spectrum Protect products
- Pricing and licensing are based on a front-end terabyte metric
- Installation of as many bundled components as needed to help protect your environment

IBM Spectrum Protect Suite Entry – Front End includes the following features:

- A bundle of nine IBM Spectrum Protect products
- Pricing and licensing are based on a front-end terabyte metric
- 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

Unless otherwise stated, the name "IBM Spectrum Protect Suite – Front End" is used interchangeably throughout this document for both offerings:

- IBM Spectrum Protect Suite – Front End
- IBM Spectrum Protect Suite Entry – Front End

Available products

Both IBM Spectrum Protect Suite – Front End offerings include the following IBM Spectrum Protect products:

IBM Spectrum Protect Extended Edition 8.1

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

IBM Spectrum Protect for Databases 8.1

Non-disruptive protection of Oracle and Microsoft SQL data

IBM Spectrum Protect for Enterprise Resource Planning 8.1

Protects vital SAP database systems efficiently, consistently, and reliably

IBM Spectrum Protect for Mail 8.1

Secures Microsoft Exchange Server data and provides granular restore processing of Microsoft Exchange Server objects

IBM Spectrum Protect for Space Management 8.1

Reclaims online disk space by moving inactive data

IBM Spectrum Protect for SAN 8.1

Maximizes storage network connections for IBM Spectrum Protect servers and client computers

IBM Spectrum Protect Snapshot 8.1

Advanced snapshot backup and restore features for applications and file systems.

IBM Spectrum Protect Plus 10.1

Superior data protection and data accessibility capabilities for virtual environments.

IBM Spectrum Protect for Virtual Environments 8.1

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

How data is measured

IBM Spectrum Protect Suite – Front End capacity pricing and licensing is based on a per-terabyte (TB) charge for the size of the primary data that is protected.

You do not need to license replicated data.

IBM Spectrum Protect Suite – 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 Spectrum Protect Snapshot 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.

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.

Note: The methods described in this guide are for planning and estimation purposes.


IBM Spectrum Protect Suite – Front End uses the binary TB measurement:

1 TB = 2^{40} = 1 099 511 627 776 bytes

Measure the capacity for your IBM Spectrum Protect Suite – Front End products by completing these steps: The measurement process is completed in the following order:

1. Measure the front-end capacity of your protected data by using one or more of the following methods:

Measure in Operations Center (Best practice)

Use the license calculations provided by the Operations Center ( > **Licensing**). These calculations dynamically monitor your capacity usage. See the online help in the Operations Center and the client product documentation for additional information.

Measure by script, application-specific command, or special process if it is not possible to measure in the Operations Center

In some cases, you might not be able to use the Operations Center for measuring your front-end capacity. For example, you might have an older client that simply does not report the required information. In those cases, you can either:

- Run a provided script against the IBM Spectrum Protect server or application server. Create the summary report by using the Central Reporting Tool.
 - Use an application-specific command. A step-by-step procedure is provided for each application.
 - Follow the special process for IBM Spectrum Protect Plus. See technote 2011349 for more information.
2. Place the output files (for your measurement) in 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 IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT, .CSV, or .JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – Front End.

IBM Spectrum Protect Suite – Front End measurement scripts

Table 1. IBM Spectrum Protect Suite – Front End measurement scripts for Linux systems

Script for Linux systems	Name	Description
dsmfecc	Central Reporting Tool	The command-line interface that creates single XML reports and a summary report.
dsmfecc-00.pl	IBM Spectrum Protect Extended Edition measurement script	Queries the IBM Spectrum Protect environment to report the front-end capacity for all IBM Spectrum Protect 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. Prerequisite: A connection to the Oracle Server must exist for the Oracle instance owner.
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. Prerequisite: A connection to the SAP Database Server must exist for the DB2 instance owner.

Table 1. IBM Spectrum Protect Suite – Front End measurement scripts for Linux systems (continued)

Script for Linux systems	Name	Description
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. Prerequisite: A connection to the SAP Database Server must exist for the Oracle instance owner.
dsmfecc-05.pl	Data Protection for SAP HANA	Queries the application server to report the front-end capacity for all SAP HANA databases.
dsmfecc-08.pl	IBM Spectrum Protect for Space Management measurement script	Queries the IBM Spectrum Protect environment to report the front-end capacity for all premigrated and migrated files.
dsmfecc-15.pl	IBM Spectrum Protect Snapshot for DB2® measurement script	Queries the IBM Spectrum Protect Snapshot environment to report the front-end capacity for all DB2 databases. Prerequisite: You must be the application instance owner to run this script.
dsmfecc-16.pl	IBM Spectrum Protect Snapshot for Oracle measurement script	Queries the IBM Spectrum Protect Snapshot environment to report the front-end capacity for all Oracle databases. Prerequisite: You must be the application instance owner to run this script.
dsmfecc-17.pl	IBM Spectrum Protect Snapshot for Oracle in SAP environments measurement script	Queries the IBM Spectrum Protect Snapshot environment to report the front-end capacity for all Oracle databases within an SAP environment. Prerequisite: You must be the application instance owner to run this script.

Table 1. IBM Spectrum Protect Suite – Front End measurement scripts for Linux systems (continued)

Script for Linux systems	Name	Description
dsmfecc-18.pl	IBM Spectrum Protect Snapshot for Custom Applications measurement script	<p>Queries the IBM Spectrum Protect Snapshot environment to report the front-end capacity for all file systems or custom applications.</p> <p>Prerequisite: You must be the IBM Spectrum Protect Snapshot instance owner to run this script.</p>

Table 2. IBM Spectrum Protect Suite – 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	IBM Spectrum Protect Extended Edition measurement script	<p>Queries the IBM Spectrum Protect environment to report the front-end capacity for all IBM Spectrum Protect backup-archive clients.</p> <p>Run this script in Windows PowerShell.</p>
dsmfecc-01.ps1	Data Protection for Microsoft SQL Server measurement script	<p>Queries the application server to report the front-end capacity for all Microsoft SQL Server databases.</p> <p>Run this script in Windows PowerShell.</p> <p>Prerequisite: A connection to the Microsoft SQL Server must exist for this shell.</p>
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>Prerequisite: A connection to the Oracle Server must exist for the Oracle instance owner.</p>

Table 2. IBM Spectrum Protect Suite – Front End measurement scripts for Microsoft Windows (continued)

File for Microsoft Windows	Name	Description
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>Prerequisite: A connection to the SAP Database Server must exist for the DB2 instance owner.</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>Prerequisite: A connection to the SAP Database Server must exist for the Oracle instance owner.</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 script in Windows PowerShell.</p> <p>Prerequisite: A connection to the Microsoft Exchange Server must exist for this shell.</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> <p>Run this script from VMware vSphere PowerCLI.</p> <p>Prerequisite: VMware vSphere PowerCLI must be installed on the system where dsmfecc-10.ps1 is issued.</p>
dsmfecc-11.ps1	Data Protection for Microsoft Hyper-V measurement script	<p>Queries the application server to report the front-end capacity for all Hyper-V virtual machines.</p>

Table 2. IBM Spectrum Protect Suite – Front End measurement scripts for Microsoft Windows (continued)

File for Microsoft Windows	Name	Description
dsmfecc-13.ps1	IBM Spectrum Protect Snapshot for Microsoft Exchange Server measurement script	<p>Queries the IBM Spectrum Protect Snapshot environment to report the front-end capacity for all Microsoft Exchange Server databases.</p> <p>Prerequisites:</p> <ul style="list-style-type: none"> • You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and run Windows administrative commands. • You must use Windows PowerShell version 3 or higher.
dsmfecc-14.ps1	IBM Spectrum Protect Snapshot for Microsoft SQL Server measurement script	<p>Queries the IBM Spectrum Protect Snapshot environment to report the front-end capacity for all Microsoft SQL Server databases.</p> <p>Prerequisites:</p> <ul style="list-style-type: none"> • You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and run Windows administrative commands. • You must use Windows PowerShell version 3 or higher.
dsmfecc-18.ps1	IBM Spectrum Protect Snapshot for Custom Applications measurement script	<p>Queries the IBM Spectrum Protect Snapshot environment to report the front-end capacity for all file systems or custom applications.</p> <p>Prerequisites:</p> <ul style="list-style-type: none"> • You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and run Windows administrative commands. • You must use Windows PowerShell version 3 or higher.

Frequently asked questions

You can find answers to several frequently asked questions in this topic.

- *I already know my front-end capacity: how do I generate a summary report without running measurement scripts against all of my applications?*

Specify the Central Reporting Tool fastpath parameter. For more information, see “Central Reporting Tool” on page 22.

- *How do I run the tools on a Windows, Linux, or AIX system?*

Open a command prompt and go to the directory where you extracted the IBM Spectrum Protect Suite – Front End measurement tools. Refer to your operating system documentation for instructions about how to open a command prompt. Root user rights (Linux or AIX) or administrator rights (Windows) are required for some measurement tools.

- *My IBM Spectrum Protect server does not operate on a Windows, Linux, or AIX system. How can I measure the front-end capacity?*

The measurement scripts for the following products use an administrative connection to query the IBM Spectrum Protect server:

- Data Protection for VMware
- IBM Spectrum Protect Extended Edition

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

The measurement scripts for the following products that are 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
- IBM Spectrum Protect for Space Management

As a result, no query of the IBM Spectrum Protect server occurs.

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

Command-line parameters, syntax, and examples for each product measurement script are provided in Chapter 4, “Command-line arguments by product,” on page 27.

- *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 affect 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 IBM Spectrum Protect Suite – Front End licensing unless they are backed up independently from the database backup by the IBM Spectrum Protect 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 as a 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 IBM Spectrum Protect for Virtual Environments and an agent as a guest, the utilized size must be measured only once. See the section that describes how to measure VMware capacity.
- If you run the IBM Spectrum Protect backup-archive client as a guest, see the section that describes how to measure front-end capacity for that component.
- If you run the IBM Spectrum Protect backup-archive client as a guest and also protect the guest with IBM Spectrum Protect for Virtual Environments, see the section that describes how to measure front-end capacity for those products.

- *Where do I locate documentation for the IBM Spectrum Protect products that are bundled with IBM Spectrum Protect Suite - Front End?*

Links to documentation for the IBM Spectrum Protect products are provided in the version-specific IBM Spectrum Protect Suite information portal. Information portals can be found at IBM Spectrum Protect Suite products.

- *How do I obtain customer support?*

IBM software support is available only for the function that is purchased with a IBM Spectrum Protect Suite – Front End product identifier (PID). The licensing tools are not covered. When you contact IBM software support, specify one of the PIDs on the following table to receive entitled assistance.

Table 3. IBM Spectrum Protect Suite – Front End PIDs

Offering	PID
IBM Spectrum Protect Suite – Front End	5725-X07
IBM Spectrum Protect Suite Entry – Front End	5725-X08 or 5641-FEA

Front-end TB definition

The licensee must obtain sufficient entitlements for the aggregate amount of data that is protected by the program. For IBM Spectrum Protect Suite – Front End, "program" refers to the IBM Spectrum Protect products that are included in the bundle. Therefore, the customer must license the full number of terabytes (TB) that are protected by any and all of the products in the IBM Spectrum Protect Suite – Front End bundle. For specific licensing terms, refer to the product license.

Table 4 on page 10 provides a summary of each bundled product and the object that is to be licensed with IBM Spectrum Protect Suite – Front End TB licensing.

Table 4. Front-end terabyte definition

Product	Protected object
IBM Spectrum Protect for Databases	Utilized size of the databases (excluding transaction logs and replica database copies).
IBM Spectrum Protect Extended Edition	Active backups.
IBM Spectrum Protect for Enterprise Resource Planning	Utilized size of the database (excluding log files).
IBM Spectrum Protect Snapshot	Utilized size of the protected database or application.
IBM Spectrum Protect for Mail	Microsoft Exchange Server: Utilized size of the databases (excluding transaction logs and replica database copies).
IBM Spectrum Protect for Space Management	A best practice is to back up before Space Management Migration. The IBM Spectrum Protect Extended Edition active backup is used for the measurement. If the migrated files are not backed up by the IBM Spectrum Protect backup-archive client, then the premigrated size and migrated size of the migrated files is used.
IBM Spectrum Protect for SAN	This product moves data that is already protected and measured by IBM Spectrum Protect clients. There is no need to measure this product for entitlement.
IBM Spectrum Protect Plus	Virtual machines: Number of protected virtual machines. Physical servers: Utilized size of the protected database or application.
IBM Spectrum Protect for Virtual Environments	Utilized size of the protected virtual machines.

Front-end definition by product

Table 5 provides a detailed description of the product and measurement criteria that is associated with each product included with the IBM Spectrum Protect Suite – Front End product bundle.

Table 5. Front-end definition by product

Product	Summary of measurement criteria
IBM Spectrum Protect Extended Edition	A measurement script is run against the IBM Spectrum Protect server. The script aggregates active data for IBM Spectrum Protect Extended Edition clients per IBM Spectrum Protect server.
IBM Spectrum Protect for Databases: Data Protection for Microsoft SQL Server	A measurement script is run against the application server. The script aggregates the utilized size of protected Microsoft SQL Server databases. A manual procedure that uses the sp_spaceused command is also available in “Data Protection for Microsoft SQL Server” on page 49.

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

Product	Summary of measurement criteria
IBM Spectrum Protect 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>
IBM Spectrum Protect 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 51.</p>
IBM Spectrum Protect 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 “IBM Spectrum Protect for Enterprise Resource Planning” on page 52.</p>
IBM Spectrum Protect 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>
IBM Spectrum Protect for Virtual Environments: Data Protection for Microsoft Hyper-V	<p>A measurement script is run against the application server. The script aggregates the utilized size for all virtual machines.</p>
IBM Spectrum Protect for SAN	N/A
IBM Spectrum Protect for Space Management	<p>A measurement script is run against the IBM Spectrum Protect 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 “IBM Spectrum Protect for Space Management” on page 60.</p>
IBM Spectrum Protect Plus	See technote 2011349 for more information.
IBM Spectrum Protect Snapshot	<p>Measurement scripts are run against the environments that are protected by IBM Spectrum Protect Snapshot. The scripts aggregate the utilized size of protected databases or applications.</p> <p>The manual procedure that uses the diskpart (Windows file system) or df (Linux or UNIX file system) command is available in “IBM Spectrum Protect Snapshot” on page 56. The resulting size must be added manually to the size of the protected applications and databases.</p>

Front-end measurement worksheet

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

For information about product-specific parameters, see Chapter 4, “Command-line arguments by product,” on page 27.

To measure front-end capacity in your environment, complete the following steps:

1. Run the IBM Spectrum Protect Suite – Front End tools on a Linux or Microsoft Windows system:
 - Download the IBM Spectrum Protect Suite – 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`

2. Collect data from your IBM Spectrum Protect servers. Record the IBM Spectrum Protect server names in your environment:

- _____
- _____
- _____
- _____

Collect data from any active backup from the IBM Spectrum Protect backup-archive client.

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

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

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

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

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.pl --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
- _____ Microsoft SQL Server database
- _____ Microsoft SQL Server database
- _____ 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.
- _____ on operating system Linux/Windows.
- _____ on operating system Linux/Windows.
- _____ 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.
- _____ on operating system Linux/Windows.
- _____ on operating system Linux/Windows.
- _____ on operating system Linux/Windows.

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

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

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

```
dsmfec-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
> .\dsmfec-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
- _____ SAP HANA database
- _____ SAP HANA database
- _____ SAP HANA database

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

```
dsmfec-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/dsmfeci_out directory:

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

8. Collect data in your environment from any databases or applications that are protected by IBM Spectrum Protect Snapshot. Record the name of each database or application in your environment.

- _____ database or application
- _____ database or application
- _____ database or application
- _____ database or application
- _____ database or application
- _____ database or application

- a. Use the following command syntax for each DB2 database that is protected by IBM Spectrum Protect Snapshot on Linux. You must be the application instance owner to run this script.

```
dsmfec-15.pl --namespace=name --directory=output directory
--applicationentity=database name --fcminstance=instance directory
--fcmprofile=path and name of profile
```

- b. Use the following command syntax on Linux for each Oracle database database that is protected by IBM Spectrum Protect Snapshot. You must be the application instance owner to run this script.

```
dsmfecc-16.pl --applicationpassword=password --namespace=name
--directory=output directory --fcminstance=instance directory
--fcmprofile=path and name of profile
```

- c. Use the following command syntax on Linux for each Oracle databases within an SAP environment that is protected by IBM Spectrum Protect Snapshot. You must be the application instance owner to run this script.

```
dsmfecc-17.pl --applicationpassword=password --namespace=name
--directory=output directory --fcminstance=instance directory
--fcmprofile=path and name of profile
```

- d. Use the Linux or Windows commands for any file systems or custom applications that are protected by IBM Spectrum Protect Snapshot. Use the following command syntax on Linux. You must be the IBM Spectrum Protect Snapshot instance owner to run this script. The file list that you specify should include the appropriate directories for the protected file system or custom application.

```
dsmfecc-18.pl --directory=output directory --fcminstance=instance directory
--fcmprofile=path and name of profile --filelist=path and name of file
```

Use the following command syntax on Windows for each file system or custom application. You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and Windows administrative commands.

```
dsmfecc-18.ps1 -namespace name -directory output directory
-fcminstance instance directory -tsmoptfile path and name of options file
-configFile path and name of configuration file
```

- e. Use the following command syntax on Windows for each Microsoft Exchange Server that is protected by IBM Spectrum Protect Snapshot. You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and Windows administrative commands.

```
dsmfecc-13.ps1 -namespace name -fcminstance instance directory
-directory output directory -tsmoptfile path and name of options file
-configFile path and name of configuration file
```

- f. Use the following command syntax on Windows for each Microsoft SQL Server database that is protected by IBM Spectrum Protect Snapshot. You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and run Windows administrative commands.

```
dsmfecc-14.ps1 -namespace name -fcminstance instance directory
-directory output directory -tsmoptfile path and name of options file
-configFile path and name of configuration file
```

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

The best practice is to back up files before you migrate them with IBM Spectrum Protect for Space Management. Therefore, IBM Spectrum Protect Suite – Front End measures the active backups for the systems that are managed by IBM Spectrum Protect for Space Management. The IBM Spectrum Protect 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 IBM Spectrum Protect Extended Edition measurement script.

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

```
dsmfecc-08.ps1 --namespace=NODENAME --applicationentity=filesystem
--directory=output directory
```

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

```
> ./dsmfecc-08.ps1 --namespace=FOXTROT --applicationentity=/SMSVT/mmfs1
--directory=/tmp/dsmfecc_out
```

10. Collect data for IBM Spectrum Protect Plus by following the steps in technote 2011349.
11. 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.
- _____ on operating system Windows.
- _____ on operating system Windows.
- _____ on operating system Windows.

From within the VMware vSphere PowerCLI user interface, use the following 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:\Program Files\Tivoli\TSM\baclient\dsm.DEV_DC.opt"
-tsminstall "c:\Program Files\Tivoli\TSM\baclient"
```

12. 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
- _____ Microsoft Hyper-V Server
- _____ Microsoft Hyper-V Server
- _____ 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 .
```

Chapter 2. Measuring front-end capacity by script

Use this procedure to automatically calculate the front-end capacity measurement for your IBM Spectrum Protect Suite – Front End bundled product with a measurement script.

Before you begin

Download and extract the IBM Spectrum Protect Suite – 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 “IBM Spectrum Protect Suite – Front End measurement scripts” on page 3.
- The IBM Spectrum Protect server must be version 6.2 (or later).
- Run the measurement script on any Linux or Windows system in the environment that has the IBM Spectrum Protect backup-archive client installed.
- The IBM Spectrum Protect backup-archive client version must be compatible with IBM Spectrum Protect server version 6.2 (or later). See the *TSM Server-Client Compatibility and Upgrade Considerations* technote for a list of compatible versions:
<http://www.ibm.com/support/docview.wss?uid=swg21053218>

About this task

This task guides you through the steps to run a IBM Spectrum Protect Suite – Front End product measurement script against the IBM Spectrum Protect 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 Chapter 4, “Command-line arguments by product,” on page 27.
2. Repeat Step 1 for all IBM Spectrum Protect products that you want to include in the IBM Spectrum Protect Suite – 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.20161104081326.txt file:

```

root@blackpearl > cat /tmp/dsmfecc_out/dsmfecc.MyShop.20161104081326.txt

*****
***** IBM Spectrum Protect Suite - Front End *****
***** Front-End Terabyte (TB) Capacity Report *****
*****

Component Name                               Product ID  Managed Objects  TB Protected
-----
IBM Spectrum Protect Client                   00          3,884,948        3660.066
Data Protection for Microsoft SQL Server      01          383,838           0.734
Data Protection for Oracle                    02          24,242           56.791
IBM Spectrum Protect for Space Management (HSM) 08          5,858           9045.356
-----
Total                                         4,298,886      12762.947

Customer ID                                  : MyShop
Total Front End TB size associated with IBM Spectrum Protect
Suite - Front End entitlement                 : 12762.947
Date time of this report                      : Fri Nov  4 08:13:26 2016
Collection dates                             : Wed Nov  2 12:09:05 2016
                                              - Fri Nov  4 08:13:24 2016

Input:
/tmp/dsmfecc_out/

List of products and components associated with
IBM Spectrum Protect Suite - Front End or IBM Spectrum Protect Snapshot.
(However, based on the particular environment for which this report was generated, it may only
include information for a subset of the complete list of products and components.)

-----
ID   Name
00   IBM Spectrum Protect Extended Edition : IBM Spectrum Protect Client
01   IBM Spectrum Protect for Databases : Data Protection for Microsoft SQL Server
02   IBM Spectrum Protect for Databases : Data Protection for Oracle
08   IBM Spectrum Protect for Space Management
-----

Abbreviations used in this report:
ARC  Archive data
HSM  Hierarchical storage management data
FCM  IBM Spectrum Protect Snapshot data
FE   IBM Spectrum Protect Snapshot front end data
BE   IBM Spectrum Protect Snapshot back end data
LUN  IBM Spectrum Protect Snapshot logical unit data
OL   IBM Spectrum Protect Snapshot data offload to IBM Spectrum Protect Server
NOL  IBM Spectrum Protect Snapshot no data offload to IBM Spectrum Protect Server
FP   Information based on direct --fastpath input
-----

```

In this example, the number of protected front-end TB is 12762.947 TB.

5. To determine the number of front-end TB that are required for IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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:

$$3.48 \text{ TB} + 23688.14 \text{ TB} = 23691.62 \text{ TB}$$

b. Round up the total TB to the nearest whole TB:

$$23691.62 \text{ TB} = 23692 \text{ TB}$$

The total number of front-end TB that are required for IBM Spectrum Protect Suite – Front End licensing is 23692 TB.

Chapter 3. Measuring front-end capacity manually

Use this procedure to manually calculate the front-end capacity measurement for your IBM Spectrum Protect Suite – Front End bundled product in a single XML report.

Procedure

1. Collect the front-end capacity measurement for your product as described in Chapter 5, “Measure front-end capacity by application-specific command,” on page 49.
2. Run the **dsmfec** **--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 **dsmfec --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 IBM Spectrum Protect Suite – Front End bundled product. For example, product ID 00 identifies IBM Spectrum Protect Extended Edition. See “IBM Spectrum Protect Suite – Front End measurement scripts” on page 3 for product ID numbers.

type [**BACKUP** | **ARCHIVE** | **HSM** | **FCM**]

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 IBM Spectrum Protect backup-archive client (IBM Spectrum Protect Suite – 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 IBM Spectrum Protect backup-archive client (IBM Spectrum Protect Suite – 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 IBM Spectrum Protect for Space Management client (IBM Spectrum Protect Suite – Front End component 08).

FCM

The number of objects and overall size of the objects to be measured that are related to snapshot activities in the system. For example, specify this value when you manually create a single report for the IBM Spectrum Protect Snapshot for CAA (IBM Spectrum Protect Suite – Front End component 17).

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 IBM Spectrum Protect 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.

fcmbnumberofobjects number of counted objects

Optionally specify the number of objects to count for the IBM Spectrum Protect Snapshot back end.

fcmbesize size of counted objects

Optionally specify the size of the objects to count for the IBM Spectrum Protect Snapshot back end. The size is measured in MB.

fcmlunnumberofobjects number of counted objects

Optionally specify the number of objects to count for the IBM Spectrum Protect Snapshot LUN.

fcmlunsize size of counted objects

Optionally specify the size of the objects to count for the IBM Spectrum Protect Snapshot LUN. The size is measured in MB.

- Repeat Step 1 and Step 2 for all IBM Spectrum Protect products that you want to include in the IBM Spectrum Protect Suite – Front End capacity measurement.

Central Reporting Tool

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

Syntax

If you already know your front-end capacity, you can use the following "fastpath" Central Reporting Tool syntax to create both single .XML reports and a summary report.

Linux

```
dsmfecc --fastpath --customerid=customer user ID --directory=inout and output directory --format=[TXT | CSV | JSON]
```

Windows

```
dsmfecc.exe --fastpath -customerid customer user ID -directory inout and output directory -format [TXT | CSV | JSON]
```

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 | FCM] --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 | FCM] --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 | JSON] [--reporttype=TSMSUR | FCMBE | FCMLUN]
```

Windows

```
dsmfecc.exe --summary -customerid customer -directory output directory -format [CSV | TXT | JSON] [--reporttype=TSMSUR | FCMBE | FCMLUN]
```

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:

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

fastpath

Create both single .XML reports and a summary report. The summary report uses an asterisk (*) to identify single reports that are generated with the **fastpath** parameter. For example:

Component Name	Product ID	Managed Objects	TB Protected
IBM Spectrum Protect Client	00	3,837,474	3659.700 FP
Total		3,837,474	3659.700
Customer ID	: MyShop		
Total Front End TB size associated with IBM Spectrum Protect Suite - Front End entitlement : 3659.700			
Date time of this report	: Wed Nov 2 12:09:11 2016		
Collection dates	: Wed Nov 2 12:09:05 2016 - Wed Nov 2 12:09:05 2016		
Input: /tmp/dsmfecc_out			
List of products and components associated with IBM Spectrum Protect Suite - Front End or IBM Spectrum Protect Snapshot. (However, based on the particular environment for which this report was generated, it may only include information for a subset of the complete list of products and components.)			
ID	Name		
00	IBM Spectrum Protect Extended Edition : IBM Spectrum Protect Client		
Abbreviations used in this report:			
ARC	Archive data		
HSM	Hierarchical storage management data		
FCM	IBM Spectrum Protect Snapshot data		
FE	IBM Spectrum Protect Snapshot front end data		
BE	IBM Spectrum Protect Snapshot back end data		
LUN	IBM Spectrum Protect Snapshot logical unit data		
OL	IBM Spectrum Protect Snapshot data offload to IBM Spectrum Protect Server		
NOL	IBM Spectrum Protect Snapshot no data offload to IBM Spectrum Protect Server		
FP	Information based on direct --fastpath input		

create

Create a single XML report.

summary

Parse output .XML files to generate the summary report.

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 | JSON]

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.

JSON

Generates the summary report in JavaScript Object Notation (.JSON) format.

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 that is associated with the IBM Spectrum Protect Suite – Front End bundled product. For example, product ID 00 identifies IBM Spectrum Protect Extended Edition. See “IBM Spectrum Protect Suite – Front End measurement scripts” on page 3 for product ID numbers.

type [BACKUP | ARCHIVE | HSM | FCM]

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 IBM Spectrum Protect backup-archive client (IBM Spectrum Protect Suite – 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 IBM Spectrum Protect backup-archive client (IBM Spectrum Protect Suite – 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 IBM Spectrum Protect for Space Management client (IBM Spectrum Protect Suite – Front End component 08).

FCM

The number of objects and overall size of the objects to be measured that are related to snapshot activities in the system. For example, specify this value when you manually create a single report for the IBM Spectrum Protect Snapshot for CAA (IBM Spectrum Protect Suite – Front End component 17).

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 IBM Spectrum Protect 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.

reporttype [TSMSUR | FCMBE | FCMLUN]

Specify one of the following values:

TMSUR

Creates a summary table that includes the information from IBM Spectrum Protect Suite – Front End single reports and any IBM Spectrum Protect Snapshot front-end single reports that are not flagged for the TSM integration.

This is the default value if nothing is specified.

FCMBE

Creates a summary table that includes the information from all IBM Spectrum Protect Snapshot back-end single reports. Use this report type to add the IBM Spectrum Protect Snapshot back-end capacity number to the IBM Spectrum Protect Suite back-end capacity value reported by the Operations Center when IBM Spectrum Protect Snapshot is licensed through the IBM Spectrum Protect Suite back-end bundle.

FCMLUN

Creates a summary table that includes the information from all IBM Spectrum Protect Snapshot LUN single reports. Use this report type to get a summary of the managed capacity of all IBM Spectrum Protect Snapshot client instances that are licensed through the standard IBM Spectrum Protect Snapshot front-end license (not licensed through IBM Spectrum Protect Suite or IBM Spectrum Protect Suite – Front End).

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
```

Chapter 4. Command-line arguments by product

Each IBM Spectrum Protect Suite – 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.

IBM Spectrum Protect Extended Edition

Front-end capacity for the IBM Spectrum Protect Extended Edition product is defined as the active backup for the protected files.

Use the IBM Spectrum Protect 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
- 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 IBM Spectrum Protect client EXCLUDE options are not measured in active backups. As a result, these excluded files are not included in the measurement for IBM Spectrum Protect Suite – Front End licensing.
- The measurement for IBM Spectrum Protect Suite – Front End licensing does not include the effects of deduplication and compression settings that are applied to the source files.
- Access to a IBM Spectrum Protect administrative command-line client and all IBM Spectrum Protect servers that contain protected data is required.
- If you run the IBM Spectrum Protect 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 IBM Spectrum Protect server. NDMP data does not require any additional measurement action.

Syntax

```
Linux
dsmfecc-00.pl --tsmusername=user name --tspmpassword=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 IBM Spectrum Protect server.

tspassword *password*

Specify the password for the user name that logs in to the IBM Spectrum Protect server.

namespace [*NODENAME* | *]

Specify one of the following values:

NODENAME

The IBM Spectrum Protect node name in uppercase characters.

- * Specify the wildcard character (*) to query all nodes on the IBM Spectrum Protect server.

applicationentity [*filespace* | *]

Specify one of the following values:

filespace

The file system name. This name typically corresponds to the IBM Spectrum Protect 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 IBM Spectrum Protect 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 IBM Spectrum Protect nodename TANGO. The output file (.XML) is written to the current working directory. Since the installation of the IBM Spectrum Protect 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 -tsmpassword admin
-applicationentity /gpfs1 -tsminstall "C:\Program Files\Tivoli\TSM\baclient"
-dsmoptpath "C:\Program Files\Tivoli\TSM\baclient\dsm.FE.opt"
```

IBM Spectrum Protect 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.

- Transaction log files are not included in the measurement for IBM Spectrum Protect Suite – Front End licensing
- IBM Spectrum Protect Suite – 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, IBM Spectrum Protect Suite – 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 .
```

IBM Spectrum Protect 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 IBM Spectrum Protect Suite – 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.ps1 --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 IBM Spectrum Protect Suite – Front End licensing.
- Replica databases in an AlwaysOn Availability Group (AAG) are not included in the measurement for IBM Spectrum Protect Suite – Front End licensing. Although replica backups might exist, IBM Spectrum Protect Suite – 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 .
```

IBM Spectrum Protect 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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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
```

IBM Spectrum Protect Snapshot

Front-end capacity for IBM Spectrum Protect Snapshot is defined as the utilized space of the protected database or application.

The script that you use depends on what you are protecting. You can use a script to analyze the front-end capacity for the following databases and applications when they are protected by IBM Spectrum Protect Snapshot:

- Microsoft Exchange Server databases
- Microsoft SQL Server databases
- IBM DB2 databases
- Oracle databases
- Oracle databases within an SAP environment
- Custom applications

Note: The following scripts also generate managed capacity data for IBM Spectrum Protect Snapshot when it is licensed through the IBM Spectrum Protect Suite back-end bundle or licensed through a stand-alone IBM Spectrum Protect Snapshot license (PID). Specify the `reporttype` parameter when you run the summary report to display these other managed capacity values.

Microsoft Exchange Server databases protected by IBM Spectrum Protect Snapshot

Prerequisites:

- You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and run Windows administrative commands.
- You must use Windows PowerShell version 3 or higher.

Syntax

Windows
`dsmfecc-13.ps1 -namespace name -fcminstance instance directory -directory output directory -tsmoptfile path and name of options file -configFile path and name of configuration file`

Parameters

Windows Each parameter requires a single 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.

fcminstance *instance directory*

Specify the directory of the IBM Spectrum Protect Snapshot instance that contains the database to measure. For example:

```
-fcminstance "C:\Program Files\Tivoli\FlashCopyManager"
```

directory *output directory*

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

```
-directory "C\reports"
```

tsmoptfile *path and name of options file*

Specify the absolute path to the Microsoft Exchange options file for the database protected by IBM Spectrum Protect Snapshot. For example

```
-tsmoptfile "C:\Program Files\Tivoli\tsm\TDPEExchange\dsm.opt"
```

configFile *path and name of configuration file*

Specify the absolute path to the Microsoft Exchange configurations file for the database protected by IBM Spectrum Protect Snapshot. For example:

```
-configfile "C:\Program Files\Tivoli\tsm\TDPEExchange\tdpexc.cfg"
```

Microsoft SQL Server databases protected by IBM Spectrum Protect Snapshot

Prerequisites:

- You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and run Windows administrative commands.
- You must use Windows PowerShell version 3 or higher.

Syntax

Windows

```
dsmfecc-14.ps1 -namespace name -fcminstance instance directory -directory output directory -tsmoptfile path and name of options file -configFile path and name of configuration file
```

Parameters

Windows

Each parameter requires a single 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.

fcminstance *instance directory*

Specify the directory of the IBM Spectrum Protect Snapshot instance that contains the database to measure. For example:

```
-fcminstance "C:\Program Files\Tivoli\FlashCopyManager"
```

directory output directory

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

tsmoptfile path and name of options file

Specify the absolute path to the Microsoft SQL options file for the database protected by IBM Spectrum Protect Snapshot. For example

```
-tsmoptfile "C:\Program Files\Tivoli\tsm\TDPSql\dsm.opt"
```

configfile path and name of configuration file

Specify the absolute path to the Microsoft SQL configurations file for the database protected by IBM Spectrum Protect Snapshot. For example:

```
-configfile "C:\Program Files\Tivoli\tsm\TDPSql\tdpsql.cfg"
```

DB2 databases protected by IBM Spectrum Protect Snapshot

Prerequisite: You must be the application instance owner to run this script.

Syntax

Linux

```
dsmfecc-15.p1 --namespace=name --directory=output directory
--applicationentity=database name --fcminstance=instance directory
--fcmprofile=path and name of profile
```

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
```

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.

applicationentity database name

Specify the name of the database to measure.

fcminstance instance directory

Specify the directory of the IBM Spectrum Protect Snapshot instance that protects the database to measure. It is within the acs subdirectory of your database instance directory. For example:

```
--fcminstance=/db2/DAB/sql1ib/acs
```

fcmprofile path and name of profile

Specify the full path and name of your IBM Spectrum Protect Snapshot configuration file that is within the acs subdirectory of your database instance directory. For example:

```
--fcmprofile=/db2/DAB/sql1ib/acs/profile
```

Oracle databases protected by IBM Spectrum Protect Snapshot

Use this command for Oracle databases that are outside of an SAP environment. Use the script command specified in “Oracle databases within an SAP environment that are protected by IBM Spectrum Protect Snapshot” for Oracle databases within an SAP environment.

Prerequisite: You must be the application instance owner to run this script.

Syntax

Linux

```
dsmfecc-16.p1 --applicationpassword=password --namespace=name  
--directory=output directory --fcminstance=instance directory --fcmprofile=path and  
name of profile
```

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
```

applicationpassword *password*

Specify the password for the user name that logs in to the database.

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.

fcminstance *instance directory*

Specify the directory of the IBM Spectrum Protect Snapshot instance that protects the database to measure. It is within the acs subdirectory of your database instance owner's home directory. For example:

```
--fcminstance=/oracle/DAB/acs
```

fcmprofile *path and name of profile*

Specify the full path and name of your IBM Spectrum Protect Snapshot configuration file that is within the acs subdirectory of your database instance owner's home directory. For example:

```
--fcmprofile=/oracle/DAB/acs/profile
```

Oracle databases within an SAP environment that are protected by IBM Spectrum Protect Snapshot

Use this command for Oracle databases within an SAP environment. Use the script command specified in “Oracle databases protected by IBM Spectrum Protect Snapshot” for Oracle databases that reside outside an SAP environment.

Prerequisite: You must be the application instance owner to run this script.

Syntax

Linux

```
dsmfecc-17.p1 --applicationpassword=password --namespace=name  
--directory=output directory --fcminstance=instance directory --fcprofile=path and  
name of profile
```

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
```

applicationpassword *password*

Specify the password for the user name that logs in to the database.

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.

fcminstance *instance directory*

Specify the directory of the IBM Spectrum Protect Snapshot instance that protects the database to measure. It is within the acs subdirectory of your database instance owner's home directory. For example:

```
--fcminstance=/oracle/DAB/acs
```

fcprofile *path and name of profile*

Specify the full path and name of your IBM Spectrum Protect Snapshot configuration file that is within the acs subdirectory of your database instance owner's home directory. For example:

```
--fcprofile=/oracle/DAB/acs/profile
```

Custom applications protected by IBM Spectrum Protect Snapshot

Prerequisites:

- **Linux** You must be the IBM Spectrum Protect Snapshot instance owner to run the script.
- **Windows** You must have rights to run the IBM Spectrum Protect Snapshot command-line interface and Windows administrative commands.

Syntax

Linux

```
dsmfecc-18.p1 --directory=output directory --fcminstance=instance directory  
--fcprofile=path and name of profile --filelist=path and name of file
```

Windows

```
dsmfecc-18.ps1 namespace name -directory output directory -fcminstance instance  
directory -tsmoptfile path and name of options file -configFile path and name of  
configuration 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 a single 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.

fcminstance *instance directory*

Specify the directory of the IBM Spectrum Protect Snapshot instance that protects the file systems or custom applications to measure.

Linux The acs directory is a subdirectory of your application backup user's home directory. For example:

```
--fcminstance=/CAA/DAB/acs
```

Windows For example:

```
-fcminstance "C:\Program Files\Tivoli\FlashCopyManager"
```

fcmpfile *path and name of profile*

Specify the full path and name of your IBM Spectrum Protect Snapshot configuration file that is within the acs subdirectory of your application backup user's home directory. For example:

```
--fcmpfile=/CAA/DAB/acs/profile
```

filelist *path and name of file*

Specify the full path and name of the file that contains the list of file systems and custom applications that are used with IBM Spectrum Protect Snapshot. The file that you specify must include the full path and names for the file systems and applications.

tsmoptfile *path and name of options file*

Specify the absolute path to the options file for the application protected by IBM Spectrum Protect Snapshot. For example

```
-tsmoptfile "C:\Program Files\Tivoli\FlashCopyManager\dsm.opt"
```

configfile *path and name of configuration file*

Specify the absolute path to the configurations file for the application protected by IBM Spectrum Protect Snapshot. For example:

```
-configfile "C:\Program Files\Tivoli\FlashCopyManager\fcmcfg.xml"
```

IBM Spectrum Protect for Space Management

The best practice is to back up files before you migrate them with IBM Spectrum Protect for Space Management. Therefore, IBM Spectrum Protect Suite – Front End measures the active backups for the systems that are managed by IBM Spectrum Protect for Space Management. The IBM Spectrum Protect 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 IBM Spectrum Protect Extended Edition measurement script.

Note: If you use IBM Spectrum Protect for Space Management with IBM Spectrum Protect Backup-Archive Client to restore files in stub format, use the IBM Spectrum Protect for Space Management reconcile function to correct the front-end capacity numbers after the stub restore has finished.

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 IBM Spectrum Protect 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 IBM Spectrum Protect 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
```

IBM Spectrum Protect 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.

The front-end capacity measurement uses the "Unshared" VMware property to determine the utilized size of each virtual machine. This VMware property reports the storage space that is used by that virtual machine and is not shared with any other virtual machine. This VMware property includes also the storage used by independent disks, but this is removed from the front-end capacity measurement because independent disks are not backed-up.

Note: The utilized size reported by the script and the Operations Center might not be exactly the same, even if you use the same metric. This is because the Operations Center measures the size at backup time.

When Data Protection for VMware protects a virtual machine that runs in-guest file system or application backup agents, the data protected by those agents is also counted in the overall front-end capacity measurement. Because the protected data should be counted only once, you can subtract the measurement that is reported for those file system or application backup agents.

VMware vSphere PowerCLI must be installed on the system where you issue the Data Protection for VMware measurement script.

Run the script from within the VMware vSphere PowerCLI user interface.

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  
[-debugmode true]
```

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 IBM Spectrum Protect 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 IBM Spectrum Protect client installation directory.

dsmsoptpath *path to client options file*

Specify the full path and name of the IBM Spectrum Protect client options file.

debugmode *true*

Optionally specify this parameter if you want additional information to allow deeper analysis of the measured values and the resulting counted capacity. The additional information includes the number of independent disks and thick-provisioned disks, and their sizes.

Examples

Windows The following 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  
-dsmsoptpath "C:\Program Files\Tivoli\TSM\baclient\dsm.DEV_DC.opt"  
-tsminstall "c:\Program Files\Tivoli\TSM\baclient"
```

The following example script output shows the result of a front-end capacity measurement for virtual machines. The virtual machines used for the example have thick-provisioned disks, thin-provisioned disks, and independent disks.

The script has counted three virtual machines and thirty-five disks:

- Nine are thin provisioned and are counted with the space that is committed to the virtual machine.
- Twenty-four of the disks are thick provisioned. The output shows a warning that these are counted with the full committed space. The virtual machines with thick-provisioned disks are listed. The administrator for each virtual machine can examine the in-guest utilization of these disks for a more accurate front-end capacity measurement.
- Two disks are independent. The output shows a warning that these are not protected, and therefore not counted in the "Total Size of Protected Storage."

```

*****
***** IBM Spectrum Protect Suite - Front End *****
***** Front-End Terabyte (TB) Capacity Report *****
*****
IBM Spectrum Protect for Virtual Environments : Data Protection for VMware

Detecting protected VMs for node 'MY_DATACENTER' ...

Connecting to vSphere Datacenter: mydatacenter.myshop.com ...

Name                Port      User
----                -
mydatacenter.myshop.com  441      VSPHERE.LOCAL\user

Calculating Protected Storage size querying VSphere information ...
sp_test_labvm_707:    2724MB
sp_test_labvm_708:    7847MB
sp_test_labvm_709:    2724MB

Number of protected VMs                3
Number of total disks                   35
Number of protected thin disks          9
Number of protected thick disks        24
Number of unprotected independent disks 2
Total size of Protected Storage        13,295MB

WARNING: The tool has detected 2 independent disks that are not protected and
not included in the above 'Total Size of Protected Storage'.

WARNING: The tool has detected 24 disks as THICK provisioning that are included with
their full provisioned size in the above 'Total size of Protected Storage'.
In order to have an exact estimation of the protected storage it is recommended
to check the real usage space on the following VMs:
    sp_test_labvm_707
    sp_test_labvm_709

```

The following example script output illustrates the additional values (in bold font) that are displayed when the **-debugmode true** option is included in the script command arguments. These additional values enable further analysis of the measurements and the resulting counted capacity.

```

*****
***** IBM Spectrum Protect Suite - Front End *****
***** Front-End Terabyte (TB) Capacity Report *****
*****
IBM Spectrum Protect for Virtual Environments : Data Protection for VMware

Detecting protected VMs for node 'MY_DATACENTER' ...

Connecting to vSphere Datacenter: mydatacenter.myshop.com ...

Name                               Port      User
----                               -
mydatacenter.myshop.com           443      VSPHERE.LOCAL\user

Calculating Protected Storage size querying VSphere information ...

VM 'sp_test_labvm_707': 2724MB

Number of total disks                12
Number of Thick Disks                12
Number of Thin Disks                  0
Number of Independent Disks           0

Unshared Storage                      2,724MB
Independent Disk Storage               0MB

Provisioned Storage                   4,882MB
Used/Committed Storage                2,834MB
Uncommitted Storage                   2,048MB
Thin Disk Storage                     0MB
Thick Disk Storage                    2,724MB

Memory                                2,048MB
Consumed Host Memory                  285MB

VM 'sp_test_labvm_708': 7854MB

Number of total disks                7
Number of Thick Disks                0
Number of Thin Disks                  7
Number of Independent Disks           0

Unshared Storage                      7,854MB
Independent Disk Storage               0MB

Provisioned Storage                   20,247MB
Used/Committed Storage                7,969MB
Uncommitted Storage                   12,278MB
Thin Disk Storage                     19,108MB
Thick Disk Storage                    0MB

Memory                                1,024MB
Consumed Host Memory                  960MB

VM 'sp_test_labvm_709': 2724MB

Number of total disks                16
Number of Thick Disks                14
Number of Thin Disks                  2
Number of Independent Disks           2

Unshared Storage                      4,772MB
Independent Disk Storage               2,048MB

Provisioned Storage                   10,007MB
Used/Committed Storage                6,935MB
Uncommitted Storage                   3,072MB
Thin Disk Storage                     2,048MB
Thick Disk Storage                    4,772MB

Memory                                2,048MB
Consumed Host Memory                  368MB

Number of protected VMs                3
Number of total disks                  35
Number of protected thin disks         9
Number of protected thick disks        26
Number of unprotected independent disks 2

```

Total size of Unshared Storage	15,350MB
Total Size of Independent Disks	2,048MB
Total size of Provisioned Storage	35,136MB
Total size of Used/Committed Storage	17,738MB
Total size of Uncommitted Storage	17,398MB
Total size of Thin Storage	21,156MB
Total size of Thick Storage	7,496MB
Total Size of VMs Memory	5,120MB
Total Size of Consumed Host Memory	1,613MB
Total Size of Protected Storage	13,302MB

WARNING: The tool has detected 2 independent disks that are not protected and not included in the above 'Total Size of Protected Storage'.

WARNING: The tool has detected 26 disks as THICK provisioning that are included with their full provisioned size in the above 'Total Size of Protected Storage'. In order to have an exact estimation of the protected storage it is recommended to check the real usage space on the following VMs:
 sp_test_labvm_707
 sp_test_labvm_709

For detailed information about the methodology and VMware PowerCLI queries used to measure front-end capacity, see “IBM Spectrum Protect for Virtual Environments: Data Protection for VMware” on page 61.

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 .
```

Chapter 5. 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.

IBM Spectrum Protect 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 Chapter 2, “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 IBM Spectrum Protect Suite – Front End licensing.
 - Replica databases in an AlwaysOn Availability Group (AAG) are not included in the measurement for IBM Spectrum Protect Suite – Front End licensing. Although replica backups might exist, IBM Spectrum Protect Suite – 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

2. 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:

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

3. 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.
4. To determine the number of front-end TB that are required for IBM Spectrum Protect Suite – Front End licensing, complete these steps:
 - a. 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.

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

$$4.15 \text{ GB} / 1024 = .004 \text{ TB}$$
- c. Add the total protected TB to the overall IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – 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 Chapter 2, “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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – Front End.

IBM Spectrum Protect for Enterprise Resource Planning

Front-end capacity for IBM Spectrum Protect 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 Chapter 2, “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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – 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 Chapter 2, “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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.

- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – 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 Chapter 2, “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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – Front End.

IBM Spectrum Protect Snapshot

Front-end capacity for IBM Spectrum Protect Snapshot is defined as the utilized size of the primary protected database or application.

The following procedures document how to manually calculate the front-end capacity measurement of a file system that is protected by IBM Spectrum Protect Snapshot but is not offloaded to IBM Spectrum Protect. All other IBM Spectrum Protect Snapshot front-end scenarios are covered in the respective sections.

Measuring front-end capacity for Windows file systems protected by IBM Spectrum Protect Snapshot

This procedure documents how to manually calculate the front-end capacity measurement with the **diskpart** command. To calculate this measurement with a measurement script, follow the instructions in Chapter 2, “Measuring front-end capacity by script,” on page 17.

1. Identify all drives on the Windows system that meet all of the following requirements:
 - The drive is protected by IBM Spectrum Protect Snapshot.
 - Backups of the drives are not offloaded to IBM Spectrum Protect.
2. Open a command prompt. Make sure that you run the prompt with Run as administrator selected.
3. Start the Diskpart Command-Line Utility by entering **diskpart** in the prompt.
4. Issue the **list volume** command. For example:

```
DISKPART> list volume
```

Volume ###	Ltr	Label	Fs	Type	Size	Status	Info
Volume 0	D	GRMSXFRER_E	UDF	CD-ROM	3019 MB	Healthy	
Volume 1	E			DVD-ROM	0 B	No Media	
Volume 2	H			DVD-ROM	0 B	No Media	
Volume 3				Partition	100 MB	Healthy	Offline
Volume 4	C	Local	NTFS	Partition	2000 GB	Healthy	Boot
Volume 5	P	P_DRIVE	NTFS	Partition	14 GB	Healthy	
Volume 6	F	New Volume	NTFS	Partition	350 MB	Healthy	

5. To determine the utilized size for the protected drive in GB, complete the following steps:
 - a. Issue the **select volume** command for a protected drive.
For example, if Volume 4 is a protected drive, issue the following command:


```
DISKPART> select volume 4
Volume 4 is the selected volume.
```

- b. Issue the **detail volume** command.

For example:

```
DISKPART> detail volume
Disk ###  Status          Size   Free   Dyn  Gpt
-----  -
* Disk 0   Online          2001 GB   0 B

Read-only          : No
Hidden            : No
No Default Drive Letter: No
Shadow Copy       : No
Offline           : No
BitLocker Encrypted : No
Installable       : Yes

Volume Capacity   : 2000 GB
Volume Free Space  : 979 GB
```

- c. Calculate the utilized size of the protected drive in GB by subtracting the Volume Free Space from the Volume Capacity.

For example:

2000 GB (Volume Capacity) - 979 GB (Volume Free Space) = 1021 GB

Important: If the **detail volume** command displays capacity in MB, you must convert MB to GB. Divide the MB value by 1024 to convert to GB.

6. Repeat Step 5 for each drive that meets all of the requirements that are listed in Step 1.
7. To determine the number of front-end TB that are required for IBM Spectrum Protect Suite – Front End licensing, complete these steps:
- a. Assuming that you are protecting the following six drives, add the utilized size value (in GB) for each protected drive:

```
[Volume 1] 1021 GB
[Volume 2] 360.2 GB
[Volume 3] 1193.5 GB
[Volume 4] 520 GB
[Volume 5] 806.3 GB
[Volume 6] 244.8 GB
```

The total utilized size for all protected drives is 4245.8 GB.

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

4245.8 GB /1024 = 4.01 TB

- c. Add the total protected TB to the overall IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – Front End.

Measuring front-end capacity for Linux or UNIX file systems protected by IBM Spectrum Protect Snapshot

This procedure documents how to manually calculate the front-end capacity measurement with the **df** command. To calculate this measurement with a measurement script, follow the instructions in Chapter 2, “Measuring front-end capacity by script,” on page 17.

1. Issue the following command on the system that contains file systems that are protected by IBM Spectrum Protect Snapshot:

```
df -m
```

2. Identify all file systems on the Linux or UNIX system that meet both of the following requirements:

- The file system is protected by IBM Spectrum Protect Snapshot.
- Backups of the file system are not offloaded to IBM Spectrum Protect.

3. Locate the number that is shown in the Used field for each file system that meets the requirements that are listed in Step 2.

4. Convert the Used value from MB to GB for each protected file system.

For example, the Used value is *340074* MB. To convert to GB, divide this number by 1024:

```
340074 / 1024 = 332.1 GB
```

5. To determine the number of front-end TB that are required for IBM Spectrum Protect Suite – Front End licensing, complete these steps:

- a. Add the Used value (in GB) for each protected file system:

```
[/dev/hda3] 768.9 GB
[/dev/hda1] 321.4 GB
[/dev/hda2opt] 910.1 GB
[/dev/sda2] 206 GB
[/dev/sdc1] 770.4 GB
[/dev/sdd1] 841.5 GB
```

The total utilized size for all protected drives is 3818.3 GB.

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

```
3818.3 GB / 1024 = 3.73 TB
```

- c. Add the total protected TB to the overall IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – Front End.

IBM Spectrum Protect 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 Chapter 2, “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 IBM Spectrum Protect Suite – Front End licensing
 - IBM Spectrum Protect Suite – 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, IBM Spectrum Protect Suite – 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 IBM Spectrum Protect Suite – 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:

$53.23 \text{ GB} / 1024 = .05 \text{ TB}$

- c. Add the total protected TB to the overall IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
- Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output

(.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – Front End.

IBM Spectrum Protect for Space Management

The best practice is to back up files before you migrate them with IBM Spectrum Protect for Space Management. Therefore, IBM Spectrum Protect Suite – Front End measures the active backups for the systems that are managed by IBM Spectrum Protect for Space Management. The IBM Spectrum Protect 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 Chapter 2, “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 IBM Spectrum Protect Suite – 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 GB / 1024 = 1.65 TB

- c. Add the total protected TB to the overall IBM Spectrum Protect Suite – 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 Chapter 3, “Measuring front-end capacity manually,” on page 21.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – Front End.

IBM Spectrum Protect for SAN

IBM Spectrum Protect for SAN 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 IBM Spectrum Protect for SAN allows to read and write is already protected and measured by IBM Spectrum Protect clients. Therefore, it is not necessary to measure IBM Spectrum Protect for SAN for IBM Spectrum Protect Suite – Front End licensing.

IBM Spectrum Protect 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 Chapter 2, “Measuring front-end capacity by script,” on page 17.

Review the descriptions of the following VMware terms:

- **Storage space (shared and unshared storage, used storage)**
 - The value for **provisioned storage** describes the datastore space that is guaranteed to the virtual machine. The entire space might not be used by the virtual machine if it has disks in thin-provisioned format. Other virtual machines can occupy any unused space.
 - The value for **unshared storage** describes the datastore space occupied by the virtual machine and not shared with any other virtual machines. **Shared storage** is assigned to multiple virtual machines. Those might be compute clusters.
 - The value for **used storage** describes the datastore space actually occupied by virtual machine files, including configuration and log files, snapshots, and virtual disks. When the virtual machine is running, the used storage space also includes swap files.
- **Disk type (independent disks, thick and thin provisioning)**
 - By default, a virtual disk is dependent when it is created. Dependent means that the disk is included in a virtual machine snapshot and a delta file is created. When configured instead as **independent**, the disk is omitted from the virtual machine snapshot and no delta file is created. Because the backup operation relates to virtual machine snapshots and delta files, the independent-configured disks are excluded from backup.

- For **thin-provisioned disks**, the provisioned storage can be separated into **committed and uncommitted storage**. The committed storage is the portion that is actually used for virtual machine data. The uncommitted storage is reserved for future use. For **thick-provisioned disks**, the full storage is committed to the virtual machine.

The preceding terms have the following impact to the backup and capacity counting:

- Independent disks are not protected by IBM Spectrum Protect for Virtual Environments. Therefore, those disks are excluded from the capacity counting.
- Thin-provisioned disks are counted based on the value of the committed space.
- Thick-provisioned disks are counted using the fully provisioned space.

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.

To determine the utilized size, complete the following steps for each virtual machine in your environment:

1. Use VMware vSphere PowerCLI **get-vm** commands to aggregate the utilized size of all protected virtual machines.

- a. Run the following command to obtain the size of the unshared storage:

```
$UnsharedSizeByte = 0; get-vm -name vm_name | get-view |
select -expandproperty storage | select -expandproperty perdatastoreusage |
select -expandproperty Unshared | foreach { $UnsharedSizeByte += $_ };
$UnsharedStorageMB = [math]::round($UnsharedSizeByte/1MB);
"Unshared Storage: ${UnsharedStorageMB}MB`n"
```

- b. Run the following command to find out the size of the independent disk storage:

```
$IndependentDiskStorageMB = 0; $vm = get-vm -name vm_name;
foreach ($Harddisk in $vm.Harddisks) { If ($Harddisk.Persistence -eq
"IndependentPersistent" -Or $Harddisk.Persistence
-eq "IndependentNonPersistent") { $IndependentDiskStorageMB
+= ($Harddisk.CapacityKB / 1024) } }; "Independent DiskStorage:
${IndependentDiskStorageMB}MB`n"
```

For example:

```

PowerCLI F:\Program Files\Tivoli\TSM\baclient> $UnsharedSizeByte = 0;
get-vm -name sp_test_labvm_709 | get-view | select -expandproperty storage |
select -expandproperty perdatastoreusage | select -expandproperty Unshared |
foreach { $UnsharedSizeByte += $_; }; $UnsharedStorageMB =
[math]::round($UnsharedSizeByte/1MB); "`nUnshared Storage: ${UnsharedStorageMB}MB`n"

Unshared Storage: 4772MB

PowerCLI F:\Program Files\Tivoli\TSM\baclient> $IndependentDiskStorageMB = 0;
$vm = get-vm -name sp_test_labvm_709; foreach ($Harddisk in $vm.Harddisks)
{ If ($Harddisk.Persistence -eq "IndependentPersistent" -Or $Harddisk.Persistence
-eq "IndependentNonPersistent") { $IndependentDiskStorageMB
+= ($Harddisk.CapacityKB / 1024) } }; "`nIndependent DiskStorage:
${IndependentDiskStorageMB}MB`n"

Independent Disk Storage: 2048MB

```

The VMware vSphere PowerCLI **get-vm** commands provide you with the result numbers in MB. In a later step, you will convert the numbers to TB.

2. Calculate the used capacity:
 - Subtract the independent disk size ("Independent Disk Storage") from the unshared disk size ("Unshared Storage").
 - Add the used capacity for the given virtual machine to the overall used capacity for all counted virtual machines.
3. Convert the resulting MB value to TB by using the following formula:
$$used_capacity_MB / 1024 / 1024 = used_capacity_TB$$
4. Add the total protected TB to the overall IBM Spectrum Protect Suite – Front End capacity measurement by using one of the following methods:
 - Manually input the number of total protected TB into the Central Reporting Tool as described in Chapter 3, "Measuring front-end capacity manually," on page 21. For this method you need to use the MB value for the used capacity.
 - Consolidate the total protected TB output into a format of your choice. Combine these results with the automated Central Reporting Tool output (.TXT/.CSV/.JSON) to represent the overall number of TB to license with IBM Spectrum Protect Suite – Front End.

Note: The automated tools and implementations provided by IBM count the fully provisioned size of thick-provisioned disks. In such a case, since the actual disk utilization might be substantially less, an alternative is to manually count the disk utilization as seen by the guest operating system running in the virtual machine. IBM agrees that the manual count is a legitimate alternative for audit purposes.

Chapter 6. IBM Spectrum Protect API backups

Front-end capacity for IBM Spectrum Protect API backups is based on the type of protected data.

- For file system 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 IBM Spectrum Protect API backups that are not created by IBM Spectrum Protect 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 IBM Spectrum Protect Suite – 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:
 $1863.89 \text{ GB} / 1024 = 1.82 \text{ TB}$

Appendix. Scripts for products no longer included in this version

The following scripts are for products that are no longer included in IBM Spectrum Protect Suite – Front End Version 8.1. They are provided here for convenience in case you also are using older versions of the product. For full documentation about the last release that included these products, see Version 7.1.6 of the *IBM Spectrum Protect Suite Front End Licensing Guide* at the following site: ftp://public.dhe.ibm.com/storage/tivoli-storage-management/front_end_capacity_measurement_tools

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 IBM Spectrum Protect Suite – Front End licensing.
- Access to a IBM Spectrum Protect administrative command-line client and all IBM Spectrum Protect 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 IBM Spectrum Protect Extended Edition measurement, then you do not need to complete the capacity measurement for Data Protection for IBM Domino.

Syntax

Linux

```
dsmfecc-07.pl --tmsusername=user name --tspassword=password  
--namespace=NODENAME --directory=output directory
```

Windows

```
dsmfecc-07.ps1 -tmsusername user name -tspassword password -namespace  
NODENAME -directory output directory tminstall client installation directory  
dsmpoptpath 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:

```
--tmsusername=admin
```

Windows

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

-tsmusername admin

tsmusername *username*

Specify the user name that logs in to the IBM Spectrum Protect server.

tspmpassword *password*

Specify the password for the user name that logs in to the IBM Spectrum Protect server.

namespace *NODENAME*

Specify the IBM Spectrum Protect 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 IBM Spectrum Protect client installation directory.

dsmoptpath *path to client options file*

Specify the full path and name of the IBM Spectrum Protect client options file.

Examples

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

```
> ./dsmfecc-07.pl --tsmusername=admin --tspmpassword=admin --namespace=WALTZ  
--directory=/tmp/dsmfecc_out
```

Windows This example queries front-end capacity with IBM Spectrum Protect nodename 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:\Program Files\Tivoli\TSM\baclient\dsm.FE.opt"
```

IBM Spectrum Protect Snapshot protecting VMware virtual machines

Prerequisite: You must have rights to run the IBM Spectrum Protect Snapshot command-line interface.

Syntax

Linux
**dsmfecc-19.pl --directory=*output directory* --fcminstance=*instance directory*
--fcmprofile=*path and name of profile***

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
```

directory output directory

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

fcminstance instance directory

Specify the directory of the IBM Spectrum Protect Snapshot instance that contains the virtual machine to measure.

fcmprofile path and name of profile

Specify the full full path and name of your IBM Spectrum Protect Snapshot profile configuration file.

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