Asigra Cloud Backup v14.2

DS-System User Guide

December 2023

asigra

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Contents

Document history

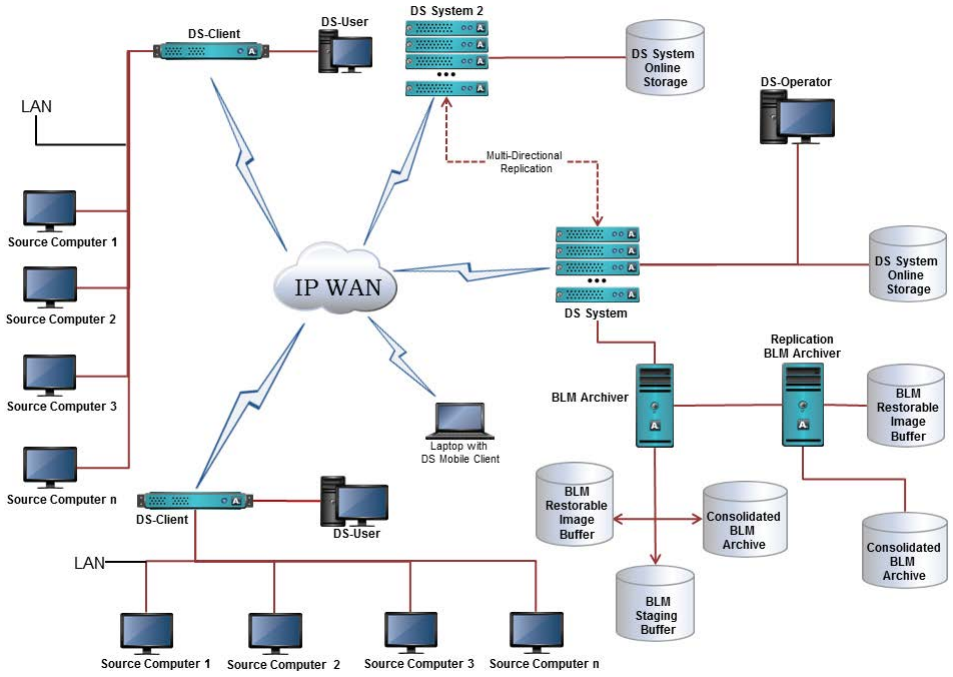
Version	Date	Summary
1.0	August 31, 2020	• Released for General Availability.
1.1	January 20, 2021	• Management Console users can now remotely manage DS-Clients without opening a port in the firewall on the DS-Client machine. Requires DS-Client v14.2.0.2, DS-System v14.2.0.2, and Management Console v14.2.0.2 or later.
1.2	August 29, 2022	• Users can now configure the number of CDR licenses a DS-System can allocate to its DS-Clients for the purpose of scanning File System backups for potentially malicious or unauthorized content during backup and restore. Requires Windows DS-License Server RLM v14.2.0.5, Windows DS-System v14.2.0.5, Windows DS-Client v14.2.0.6, and Management Console v14.2.0.6 or later. • Users can now configure the number of threads that can be used for the autonomic healing and system admin processes using the HealingThreads and SysAdminThreads advanced configuration parameters. Requires DS-System v14.2.0.5 and DS-Operator v14.2.0.5 or later.
1.3	April 10, 2023	• Management Console Global Administrators can now configure Multiperson Approval (MPA) for accounts so users require multiple people to approve a potentially destructive action that can result in the loss of data. Administrators must configure a threshold to determine how many approvals are required and select the approvers from a list of users. When a user attempts to perform a task that requires approval, the approvers receive an email with the name of the user and a description of the task and must approve or deny the request. The approval link expires after 30 minutes. A task must meet the configured approval threshold with no denials to be approved. Requires Management Console 14.2.0.8, Windows DS-Client 14.2.0.8 or Linux or Mac DS-Client 14.2.0.6, DS-System 14.2.0.6, and DS-Operator 14.2.0.6 or later. • Updated third-party components used by the DS-Operator and DS-System to address potential security vulnerabilities. Requires DS-Operator 14.2.0.6 and DS-System 14.2.0.6 or later.
1.4	December 4, 2023	• Improved performance when using a Windows DS-Client to synchronize backups that contain many folders and files. Requires Windows DS-Client 14.2.0.10 and DS-System 14.2.0.7 or later. • Users can now easily upgrade their DS-Systems using a DS-System hotfix package. Requires DS-System 14.2.0.7 or later. • Eclipse Temurin OpenJDK 17 (LTS) runtime is now bundled and installed with the DS-System software. Requires DS-System 14.2.0.7 or later. • DS-Operator users can now recover deleted data from the DS-System trash by right-clicking the backup and selecting “Recover from Trash”. Requires DS-System 14.2.0.7 and DS-Operator 14.2.0.7 or later. • Updated third-party components used by the DS-Operator and DS-System to address potential security vulnerabilities. Requires DS-Operator 14.2.0.7 and DS-System 14.2.0.7 or later.

1 Getting started

The DS-System is an off-site vault where data is backed up via an agentless DS-Client. DS-Operator is the remote management software for the DS-System.

DS-System can produce reports to track sales trends and system activities. If the DS-Client is networked with the target source computers, you can browse, back up, and restore data.

The following diagram provides an overview of the major components that interact with the DS-System.



1.1 Connecting to a DS-System

The first time you connect to a DS-System, you must log on as an administrator (Windows) or root user (Linux). You can then configure the roles for other user accounts. For more information, see Section 2.5, “Configuring roles”, on page 38.

To connect to a DS-System:

1. Start the **DS-Operator** application.
2. In the **DS-System(s)** list, select the DS-System to which you want to connect.

   NOTE: A local DS-System on the same computer as the DS-Operator you are running appears in blue. DS-Systems that are not running, appear in red.

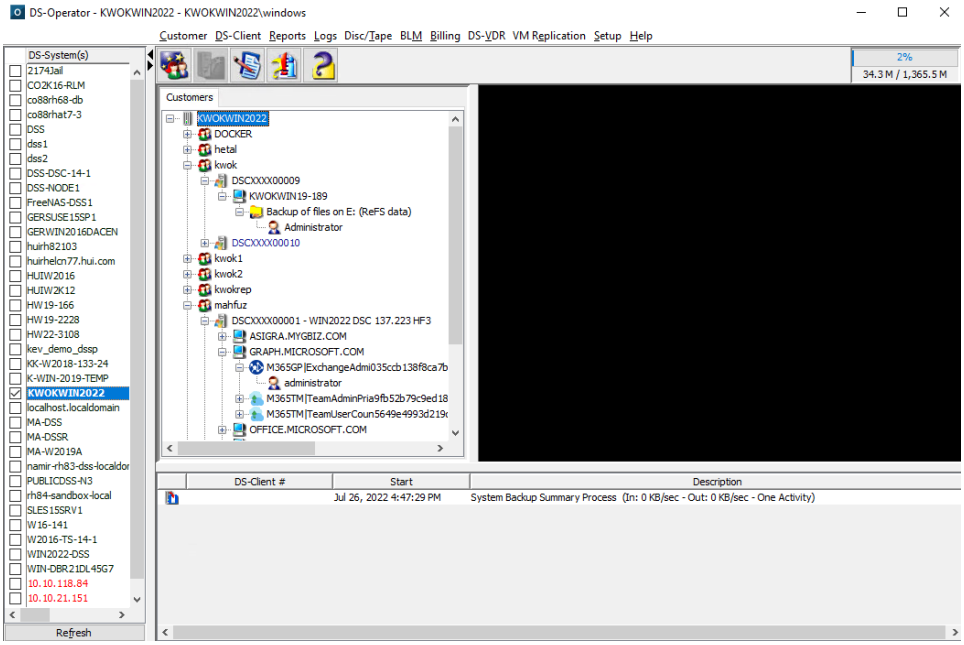
   - To add a DS-System to the initialization list, see Section 2.3, “Configuring the initialization settings”, on page 25.
   - To change the sort order of the list, right-click and select **Sort by Name** or **Sort by IP**.
   - To rescan the network for available DS-Systems, click **Refresh**.
3. In the **Protocol** box, select the protocol you want to use for communication between the DS-Operator and the DS-System. Your options are as follows:
   - **Encrypted –** All data between the DS-Operator and the DS-System will be encrypted with a random encryption key at every connection.
   - **Standard –** This option is offered only for backwards compatibility with old service or daemon versions that do not have this feature.
4. In the **User Name** box, type your user name. This must be a valid user account on the computer running the DS-System.
5. In the **Password** box, type your password.
6. In the **From** box, select the domain or computer where these credentials are defined.
7. To save the credentials for the duration of the DS-Operator session, select the **Remember Credentials** check box.
8. Click **Connect**.

When you are successfully connected, the DS-Operator main window is activated. You can connect to more than one DS-System, if available.

NOTE: If the DS-Operator loses connection to the DS-System, verify that the DS-System service is started and there are no issues with storage or the database.

1.2 Working in the DS-Operator main window

After you have successfully connected to the DS-System, you can access the functions required to manage a DS-System from the main window.



- **Title Bar** — Displays the name of the DS-System.
- **Menu Bar** — Allows you to perform the various tasks necessary to manage and administer the DS-System.
- **DS-Systems** — Allows you to perform various tasks necessary to manage and administer the DS-System. Some items in the menu bar only appear if the corresponding tool is enabled or depending on your operating system.
- **Toolbar Icons —** Provides quick access to the most commonly used features.

Icon	Function
	Create a new customer account.
	Create a new DS-Client. (Only activates when a customer is selected.)
	Opens the Activity Log
	Opens the Event Log
	Help

Table 1 Toolbar icons

- **Customers Tab —** Allows you to manage customers, DS-Clients, and view backups. DS-Clients appear in one of the following colors:
  - Black = Customer or DS-Client is active.
  - Orange = Customer or DS-Client is locked.
  - Blue = DS-Client is unregistered.
  - Red = DS-Client is deactivated.

DS-Client icon	
	Generic DS-Client (No information is available until the DS-Client connects to DS-System.)
	Windows DS-Client
	Linux DS-Client
	Mac DS-Client
	Grid DS-Client (Windows)
	DS-Mobile Client (Windows)
	DS-Notebook Client (Mac)
Overlay icon (superimposed on items in the tree)	
	A blue cross in the top-left corner of an icon indicates a DS-Client is shared for replication. For more information, see Section 9.8, “DS-System Replication”
	Item’s data is under a delete lock. For more information, see Section 3.3, “Activating or deactivating a customer account delete lock”

Table 2 Customers tab

- **Activity Monitor** — Displays the active processes running on the DS-System.
  - To view the details of a process, right-click the process, and then click **Monitor**.
  - To stop a process, right-click the process, and then click **Stop**. This action is irreversible.

NOTE: For more information, see Section 5.10, “Viewing the Activity Monitor”, on page 120.

1.3 Starting or stopping the DS-System service or daemon

On occasion, you might need to stop the DS-System using the DS-System service manager. If the DS-System is performing an activity that cannot be interrupted when it receives the stop request, the DS-System service will not stop until the activity is completed successfully.

NOTE: When you restart the DS-System service, the DS-System performs a full database dump 30 minutes after the service starts.

To start or stop a DS-System service or daemon:

NOTE: You must first stop all activities running on the DS-System, and then stop the DS-System.

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1. On the **Start** menu (Windows) or **Applications** menu (Linux), click **DS-System Service Manager**.
2. In the **DS-System Service Manager** dialog box, click **Start** or **Stop** to toggle the service on or off.

NOTE: If you are experiencing problems with a newly configured or a reconfigured setup, you must shutdown and restart the DS-System machine.

To start a Linux DS-System daemon via the command line:

- Type the following command:

  ```
  /etc/init.d/dssys start
  ```

To stop a Linux DS-System daemon via the command line:

- Type the following command:

  ```
  /etc/init.d/dssys stop
  ```

1.4 Viewing DS-System information

You can view information about the DS-System, including it's license configuration, port configuration, and Java Runtime Environment (JRE) properties.

To view the DS-System information:

1. On the **Help** menu, click **About DS-Operator**.
2. To view detailed information about the DS-System, including its license configuration, click **DS-System Info**.
3. To view the ports used by the DS-System to communicate with other components, click **Ports**.
4. To view information about the Java Runtime Environment (JRE) properties, click **JRE**.
5. Click **Close**.

1.5 Disconnecting from a DS-System

You can disconnect from a DS-System at any time. This does not close the DS-Operator application, and it does not affect other DS-System connections.

To disconnect from a DS-System:

- In the DS-Operator, clear the check box beside the DS-System.

1.6 Exiting the DS-Operator application

You can exit the DS-Operator application at any time. This closes all connections to DS-Systems.

To exit the DS-Operator:

- On the **Customer** menu, click **Exit**.

2 Configuring the DS-System

To enable the optimal functioning of the DS-System, you must configure the settings of various parameters and associated applications.

2.1 Configuring the DS-License Server

You must configure a Production DS-License Server to which the DS-System can connect to validate its license and determine how capacity is allocated.

You can also configure an Emergency DS-License Server as an alternate server that runs in parallel with the Production DS-License Server. If the DS-System cannot establish connectivity with the Production DS-License Server, the Emergency DS-License Server provides failover license authentication. For more information, see the *DS-License Server User Guide*.

To configure the DS-License Server:

1. On the **Setup** menu, click **License Server**.
2. Under **Production DS-License Server**, do the following:
   a) In the **License Server (IP/DNS)** box, type the IP address or the DNS name of the Production DS-License Server.
   b) In the **TCP Port** box, enter the TCP communication port the DS-System will use to communicate with the Production DS-License Server.

   NOTE: Do not change the port number unless you have a specific requirement to do so.

   c) In the **Verification Interval** box, enter the frequency (in minutes) at which the DS-System will verify it's license with the Production DS-License Server.
3. Under **Emergency License Server**, do the following:
   a) In the **License Server (IP/DNS)** box, type the IP address or the DNS name of the Emergency DS-License Server.
   b) In the **TCP Port** box, enter the TCP communication port the DS-System will use to communicate with the Emergency DS-License Server.

   NOTE: Do not change the port number unless you have a specific requirement to do so.

c) In the **Failover Period** box, enter the time (in minutes) that must elapse before the DS-System validates its license with the Emergency DS-License Server after the failure of the first verification with the Production License Server.

4. Click **Update**.

2.2 Configuring the DS-System settings

Most default configuration settings for the DS-System are defined during the installation. However, you might need to edit some default settings.

2.2.1 Configuring the default settings

You can configure the default settings for DS-System.

To configure the default settings:

1. On the **Setup** menu, click **Configuration**.
2. Click the **Defaults** tab.
3. Under **DS-Client Bandwidth Throttle**, do the following:
   a) Under **New Customers**, beside the **To DS-System** and **From DS-System** boxes, do one of the following:
      - To use the maximum bandwidth to perform operations as fast as possible, select **Unlimited**.
      - To define the bandwidth usage, select **Limited to ... KB/sec**, and then specify the bandwidth in KB/sec.
      - To select a bandwidth throttle schedule, select **Scheduled**. Click **[...]**, select a schedule, and then click **Select**.

      NOTE: The **To DS-System** parameter limits the backup bandwidth of the DS-Client. The **From DS-System** parameter limits the restore bandwidth of the DS-Client.

   b) Under **Existing Customers**, do the following:
      1. To adjust the bandwidth settings for all existing DS-Clients, click **Manage DS-Clients Bandwidth**.
      2. To apply the default bandwidth throttle settings to all DS-Clients, select the **Apply defaults to existing customers** check box.
4. Beside the **Customer Quota** box, click **[...]**. Under **Customer Storage Quota** and **Default DS-Client Storage Quota**, do the following:

a) In the **Quota** box, if you have selected **Limited to**, enter the quota.

b) In the **Calculation method** box, select a calculation method. Your options are as follows:

- **Based on Protected Size** – Invoicing is based on the original size of the data that is backed up to the DS-System, BLM Archiver, or Local-Only storage.
- **Based on Stored Size** – Invoicing is based on the actual size occupied by files on the DS-System, BLM, or Local-Only storage.
- **Based on Native Size** – Invoicing is based on the original size of the latest generation of all backed up files. This is the restorable size, including files deleted from source.

c) In the **Stop Backup level ... % over the quota** box, enter a value at which DS-System will stop all backups for the customer(s).

d) To send an email notification when a percentage of the quota is consumed, select the **Send E-mail when the following are reached** check box, and enter the values for the warning levels.

e) Click **OK**.

5. To specify the frequency at which the DS-System will save storage information in its logs, in the **History Interval** box, select a time interval.
6. Click **OK**.

2.2.2 Configuring the notification settings

You can configure the DS-System to send reports and notifications by email.

To configure the notification settings:

1. On the **Setup** menu, click **Configuration**.
2. Click the **Notification** tab.
3. To activate email notifications, select the **Send E-Mail notification** check box.
4. Beside the **SMTP Server** box, click **[...]**, and then do the following:
   a) In the **SMTP Server** box, type the name or IP address of the SMTP server.
   b) In the **Port** box, enter the port that the SMTP sever will use. The default port is 25.

   NOTE: Do not change the port number unless you have a specific requirement to do so.

   c) To enforce authentication for the SMTP server, select the **Server requires authentication** check box, and then type the required details.
   d) To use encryption to protect the transfer of data and information, select the **Use TLS** check box.
   e) Click **OK**.
5. In the **Send E-Mail From** box, type the email address from which the email notifications will be sent.
6. In the **E-Mail address** box, type the email address of the recipient of the email notification. Separate multiple email addresses with a semicolon.
7. To send a test email notification, click **Test**.
8. To configure when an email notification should be sent, click **Notification Settings**, and then do the following:
   a) To send a notification when the customer or DS-Client storage quota has reached a specified level, select the **Customer/DS-Client storage quota has reached the following level** check box. Configure the notification frequency.

   NOTE: You can set the customer and DS-Client storage quota levels individually in the account's corresponding profile dialog box.

b) To send a notification when the free space on storage location(s) has reached a specific level, select the **Free space on Storage Location(s) has reached the following level** check box. Configure the warning level, emergency level, stop level, and notification frequency.

NOTE: Free space notifications will occur for physical space events that occur on individual storage locations. Physical space is indicated by the **Disk Space** column in the **Extensible Storage Locations** dialog box.

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c) To send a notification between specific hours, select the **Storage usage summary, notify between... and...** check box, and then specify the hours and configure the notification frequency.

d) To send a notification when the DS-System license is about to expire, select the **License will expire in...days** check box, specify the number of days before the DS-System license expires that must be reached before a notification is sent, and then configure the notification frequency.

e) To send a notification when the DS-System has reached a specified percentage of its license storage capacity limit, select the **DS-System has reached...% of the license's storage capacity limit** check box, specify a value, and then configure the notification frequency.

f) To send a notification when the connection is lost between the director node and a leaf node, select the **Connection between Director and Leaf was lost** check box. This is applicable only for an N+1 DS-System.

g) To send a notification when an N+1 configuration is successfully configured, select the **N+1 formation process succeeded** check box.

h) To send a notification when a Remote DS-VDR restore activity is successfully completed, select the **Remote DS-VDR restore activity has finished** check box, and then configure the notification frequency.

i) To send a notification when a DR Drill is activated, select the **A DR Drill was activated** check box.

j) To send a notification when the DS-System is in a critical status, select the **DS-System is in "Critical Status"** check box, and then configure the notification frequency.

k) Click **OK**.

9. Click **OK**.

2.2.3 Configuring the SNMP settings

You can configure the DS-System to send SNMP traps. Ensure you have SNMP management software installed to receive and handle the trap information. For more information on SNMP, see the *Windows* documentation.

NOTE: You must load the *asigra.mib* file (from the DS-System installation path) with the SNMP software to receive the traps sent by the DS-System.

An SNMP trap is sent as soon as an event occurs on the DS-System. The DS-System continues sending traps at a user-defined frequency until the issue is resolved. If the DS-Client encounters errors during backup or the DS-System finds invalid file(s) on the storage drive, the DS-System sends the SNMP trap only once.

In addition, the DS-System can be configured to send a special “heartbeat” signal at a user-defined frequency that can be used to determine if the monitored service is running normally.

To configure the SNMP settings:

1. On the **Setup** menu, click **Configuration**.
2. Click the **SNMP** tab.
3. In the **Community** box, enter a community name, and then click **Add to list**.

   NOTE: To delete a community, select the community, and then click **Remove**.

4. Under **Destination host list**, click **Add**. Type a host name or IP address from your network, and then click **OK**. Repeat to add as many destination host names or IP addresses as required.
   - To modify a destination host, select the host, and then click **Edit**.

   NOTE: To delete a destination host, select the host, and then click **Remove**.

5. Click **Event Settings**, and then do the following:
   a) Under **Events to be monitored**, select the event(s) that you want to monitor.
   b) Under **Notification frequency**, configure the notification frequency for the monitored events.
   c) To send traps as heartbeats at a specific frequency, select the **Send traps as heartbeats every [...]** check box, and then select a frequency.
   d) Click **OK**.
6. Click **OK**.

2.2.4 Viewing the DS-Tools

DS-Tools are features enabled on the DS-System through its license. For more information, see Section 2.1, “Configuring the DS-License Server”, on page 15.

To view the DS-Tools:

1. On the **Setup** menu, click **Configuration**.
2. Click the **DS-Tools** tab. The following information is displayed:

Feature	Description
DS-Recovery Tools	Allows users to backup and restore individual email messages from Microsoft Exchange Server and Microsoft Outlook or data from Microsoft SharePoint Server
Local Storage	Allows users to save backup data in local storage on the DS-Client machine.
Local-Only Capacity	Allows users to save an allocated amount of backup data in local storage on the DS-Client machine.
Disc/Tape	Allows users to copy online backup data to disc/tape media.
Snapshot Manager	Allows users to transfer backup data to another volume without having to use the scripting required by native storage management software.
Local DS-VDR	Allows users to clone virtual machines from one standalone host to another even if there is no shared storage available between the two hosts.
Remote DS-VDR	Allows users to restore a backed up virtual machine to a standby virtualization server.
Antimalware/CDR	Allows users to scan File system or Microsoft 365 backups for malware and/or scan File System backups for potentially malicious or unauthorized content based on predefined policies during the backup and restore process.
Autonomic Healing	Improves the integrity of the DS-System by automatically finding corrupted files.
Backup Lifecycle Management	Allows users to copy, remove, and destroy backed up data from the DS-Client or DS-System.
DS-Billing Module	Allows users to collect billing information and prepare billing reports (invoices, etc.).
Replication	Allows users to replicate backup data between DS-Systems.
DS-NOC	Allows the DS-System to work with the DS-NOC module.
GEO Location	Allows users to track devices and remotely wipe data from mobile devices to prevent data breach and identity theft if the device is lost or stolen.
VM Replication Capacity	Indicates if VM replication is based on the capacity of the virtual machines the DS-System can distribute among it DS-Clients.
VM Replication Count	Indicates if VM replication is based on the total number of virtual machines that can be protected by the DS-System.

Table 1 DS-Tools

2.2.5 Configuring the SOAP integration settings

The SOAP integration settings allow you to configure the DS-System to verify a DS-Client connection with a third-party web service.

NOTE: All DS-Client connections send a SOAP verification to the third-party web service. DS-Client activities will only be allowed if the third-party web service does not return an error message.

To configure the SOAP Integration settings:

1. On the **Setup** menu, click **Configuration**.
2. Click the **SOAP Integration** tab.
3. To enable SOAP integration, select the **Integration Enabled** check box.
4. In the **URL** box, type the web address of the third-party web service.
5. In the **Namespace** box, type the value of the namespace parameter as defined in the third-party web service. The DS-System must get this information from the creator of the web service.
6. In the **SOAP Action** box, type the SOAP function that must run when the DS-System passes the DS-Client connection data.
7. In the **Timeout (sec)** box, enter the duration in seconds that the DS-System will wait for a response from the web service.
8. If the web service (SOAP server) requires qualified namespaces for parameters, select the **Qualify Parameters** check box.
9. To enforce authentication for the web service, select the **HTTP Authentication** check box, and then enter the user name and password.
10. To verify the settings, click **Test**, and in the **Test SOAP Integration** dialog box, do the following:
    a) In the **DS-Client Number** box, type the number of the DS-Client you want to send to the web service.
    b) In the **Account Number** box, type the name or number of the account you want to send to the web service.
    c) To send the contents of a file to the web service, beside the **Cookie** box, click **[...]**. Select a file, click **Open**.
    d) Click **Test**.
    e) Click **Close**.
11. Click **OK**.

2.2.6 Configuring the DS-Client admin settings

You can configure the DS-System to limit the number of concurrent Daily Admin or Weekly Admin activities run by the DS-Client. By default, all DS-Client accounts are scheduled to run Daily Admin and Weekly Admin activities between 20:00 hrs. and 06:00 hrs.

NOTE: For N+1 DS-Systems, the limit is applied to each node separately.

To configure DS-Client admin settings:

1. On the **Setup** menu, click **Configuration**.
2. Click the **DS-Client Setting** tab.
3. To limit DS-Client activities, select the **Limit DS-Client Admin activities** check box.
4. In the **Maximum concurrent Admin activities** box, enter the maximum number of concurrent Admin activities that you want to run. Any activity above this limit is placed in a queue.
5. In the **Maximum Admin waiting time** box, enter the time in minutes after which the queued Admin processes will start automatically.
6. Click **OK**.

2.2.7 Configuring the encryption key settings

Encryption keys are used for creating DS-Client Customer Registration Information (CRI) files or running system validation on backed up files. DS-Client encryption keys are stored in the DS-System database in encrypted format.

NOTE: If you enable DS-Client encryption key management in the DS-System, the customer must also configure the encryption keys on the DS-Client. For more information, see the *DS-Client User Guide*.

To configure the encryption key settings:

1. On the **Setup** menu, click **Configuration**.
2. Click the **Encryption Keys** tab.
3. To enable DS-Client encryption key management, select the **Enable DS-Client Encryption Key Management** check box.

4. To require all DS-Clients to use encryption key management on the first connection, select the **Mandatory Encryption Key Management** check box.

NOTE: No activities will be allowed until the encryption keys are enabled on the DS-Client.

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5. To require the DS-System to send a copy of the encryption keys to the BLM Archiver for the validation of archive packages, select the **Forward DS-Client Encryption Keys to BLM Archiver** check box.
6. To clear all DS-Client encryption keys from the DS-System database, select the **Clear All Existing DS-Client Encryption Keys** check box.
7. Click **OK**.

2.2.8 Configuring the DS-NOC settings

You can configure the DS-NOC settings that are applied to DS-Clients created using the DS-NOC.

To configure DS-NOC settings:

1. On the **Setup** menu, click **Configuration**.
2. Click the **DS-NOC** tab.
3. Under **Bandwidth Throttle for new DS-Clients**, configure the bandwidth throttle settings for DS-Clients created using the DS-NOC. For more information, see Section 2.2.1, “Configuring the default settings”, on page 16.
4. Under **Storage Quota for new DS-Clients**, configure the storage quota for DS-Clients created using the DS-NOC. For more information, see Section 2.2.1, “Configuring the default settings”, on page 16.
5. Under **Storage Group for new Customers/DS-Clients**, select a storage group. To configure a storage group, beside the Storage Groups box, click **[...]**. For more information, see Section 2.6.1, “Configuring an extensible storage location”, on page 41.
6. Click **OK**.

2.3 Configuring the initialization settings

You can configure the initial settings from the DS-Operator without logging in to the DS-System. These settings are applicable only to this DS-Operator installation.

2.3.1 Configuring the connection settings

To speed up your logon process in large network environments, you can configure the connection settings to specify an address where the DS-Operator will look for a DS-System service. This can speed up your logon process in large network environments. You can also configure the DS-Operator to scan entire subnets.

NOTE: If you do not specify an address, the DS-Operator scans the local computer and its subnet.

To configure connection settings:

1. On the **Setup** menu, click **Initialization**.
2. Click the **Connection** tab.
3. In the **LAN search time** box, enter the time in seconds that the DS-Operator should spend scanning the LAN for DS-Systems.

   NOTE: If you set this value to 0, the DS-Operator will not scan the LAN. Only the local DS-System that is running will appear in the DS-System(s) connection list.

4. Under **Additional DS-Systems**, do one of the following:
   - To add a DS-System, click **Add**.
   - To modify a DS-System, select the DS-System, and then click **Modify**.

     NOTE: To delete a DS-System, select the DS-System, and then click **Remove**.

5. In the **Add / Modify a DS-System** dialog box, do the following:
   a) To add a single DS-System, click **Single DS-System**. Type the IP or DNS address of the DS-System you want to add, and then click **OK**.
   b) To add an N+1 configuration, click **N+1 DS-System**, and then click **Add**.
      - To add a single IP address, click **Hostname or an IP address**, enter the host name or IP address, and then click **OK**.

- To add multiple IP addresses, click **IP Range**, type the IP addresses in the corresponding boxes, and then click **OK**.
- To add an N+1 configuration, click **Load**, and select the text file containing the IP addresses of all the nodes in the N+1 configuration.

c) In the **Port** box, enter the port the DS-Operator will use to communicate with the DS-System.

NOTE: Do not change this setting unless you have a specific requirement to do so.

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d) To discover a DS-System on the network, select the **Use UDP protocol to discover DS-System** check box.

e) Click **OK**.

6. Under **Additional Subnets**, do one of the following:
   - To add a subnet, click **Add.**
   - To modify a subnet, select the subnet, and then click **Modify**.

NOTE: To delete a subnet, select the subnet, and then click **delete**.

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7. In the **Add/Modify a Subnet** dialog box, do the following:
   a) In the **Address** box, type the address of the subnet where the DS-Operator will search for available DS-Systems.
   b) In the **Port** box, enter the port the DS-System servers will use for communicating.

NOTE: Do not change this setting unless you have a specific requirement to do so.

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   c) Click **OK**.
8. Click **OK**.

NOTE: DS-Operator will scan the LAN for all active DS-Systems regardless of whether there are entries in the Additional DS-Systems list. DS-Systems in the Additional DS-Systems list that are not detected will appear in red. A DS-System on the local computer will appear in blue.

2.3.2 Configuring the regional settings

You can configure the DS-System language and regional settings.

To configure the regional settings:

1. On the **Setup** menu, click **Initialization**.
2. Click the **Regional** tab.
3. In the **GUI Language** box, select a language for the DS-Operator.
4. Under **Date/Time display format**, do one of the following:
   - To use standard formatting conventions of a particular language, click **Format using**, and then select a language.
   - To customize the formatting, click **Use custom formatting**, and then configure the format that you want to use.
5. Under **Date Format Strings**, specify the format that you want to use for dates.
6. Under **Number Format Strings**, specify the format that you want to use for numbers.

   NOTE: You can edit the number format strings only if you have selected Use custom formatting.

7. Click **OK**.

2.3.3 Configuring the plug-in settings

Some plug-ins are automatically applied, depending on the configuration of the DS-System. You can manually enable or disable and configure these settings.

To configure the plug-in settings:

1. On the **Setup** menu, click **Initialization**.
2. Click the **Plugins** tab.
3. Enable or disable the plug-ins as required.
4. To configure a plug-in, select plug-in, and then click **Configure**.
5. Specify the plug-in settings, and then click **OK**.
6. Click **OK**.

2.3.4 Configuring the keep alive settings

The keep alive settings limit the amount of idle time on the DS-Operator, after which the connection with DS-System will be terminated.

To configure the keep alive settings:

1. On the **Setup** menu, click **Initialization**.
2. Click the **Keep Alive** tab.
3. Under **Keep Alive Settings**, do the following:
   a) In the **Send "Keep Alive" probes when a connection is idle for '...' seconds** box, enter the amount of time the DS-Operator connection must be idle before the DS-System starts sending keep alive probes.
   b) In the **Send keep alive probes every '...' seconds** box, enter the interval at which the DS-System will send keep alive probes until it receives a response or the maximum number of probes have been sent.
   c) In the **Terminate Connection after trying '...' times** box, enter the maximum number of retries before the DS-Operator terminates the connection with the DS-System.
4. Under **Refresh Settings**, do the following:
   a) To automatically refresh the DS-System list after a connection is lost, select the **Automatically refresh the DS-System list after losing a connection** check box.
   b) In the **Refresh after '...'** box, enter the time in seconds after which the next refresh will happen.
5. Click **OK**.

2.3.5 Configuring the units of measurement

You can configure the units that are displayed in the DS-Operator monitor windows, logs, and reports.

To configure the units of measurement:

1. On the **Setup** menu, click **Initialization**.
2. Click the **Units** tab.
3. To retain the default settings, select the **Keep default settings** check box.
4. To customize the settings, clear the **Keep default settings** check box, and then specify the units of measurement.
5. Click **OK**.

2.4 Configuring the advanced settings

By default, the DS-System is optimized for maximum performance. However, advanced configurations are available for users who want to change the DS-System behavior.

NOTE: Some of these parameters are used to apply a consistent setting across all nodes in an N+1 configuration because individual nodes might have different configurations in the *dssys.cfg* file. For more information see, Section 2.18, "Updating the DS-System configuration file parameters", on page 75.

To configure the advanced settings:

1. On the **Setup** menu, click **Advanced Configuration**.
2. To change the value of an advanced configuration parameter, select the parameter, and then click **Edit**
3. In the **Value** box, enter a value, and then click **OK**.
4. To update the list, click **Refresh**.
5. Click **Close**.

The following is a list of the advanced configuration parameters:

Parameter	Description / Values
AllowStorageLock	Locks the online storage for third-party snapshots. • 0 (Off) = (default) • 1 (On) = DS-System will display a **Lock online storage for snapshot** option in the System Activities Administration dialog box. **Note**: Requires the DS-System to be restarted.
AllowUnencryptedConnections	DS-System accepts unencrypted connections from the DS-Operator. • 0 = Off • 1 = On (default)
AutoUpgrade	Method by which DS-Client upgrades are handled. • 0 = Disables automatic upgrades. • 1 = Enables automatic upgrades.
CleanActivityLog	Number of months after which Activity Logs are automatically cleaned by the delete logs process. • Default: 12 • Range: 0-360 (0 = disabled)
CleanAudit	Number of months after which audit trail logs are automatically cleaned by the delete logs process. • Default: 0 • Range: 0-360 (0 = disabled)
CleanClientEvent	Number of months after which client Event Logs are automatically cleaned by the delete logs process. • Default: 6 • Range: 0-360 (0 = disabled)

Table 2 Advanced configuration parameters

Parameter	Description / Values
CleanClusterEvent	Number of months after which N+1 Event Logs are automatically cleaned by the delete logs process. • Default: 12 • Range: 0-360 (0 = disabled)
CleanDeleteLogs	Number of months after which GDPR delete logs are automatically cleaned by the delete logs process. • Default: 1 • Range: 0-360 (0 = disabled)
CleanEventLog	Number of months after which Event Logs are automatically cleaned by the delete logs process. • Default: 12 • Range: 0-360 (0 = disabled)
CleanHealingHistory	Number of months after which healing history logs are automatically cleaned by the delete logs process. • Default: 12 • Range: 0-360 (0 = disabled)
CleanLibLink	DS-System cleans orphaned library links. • 0 = Off (default) • 1 = On
CleanLoadSummary	Number of months after which load summary logs are automatically cleaned by the delete logs process. • Default: 12 • Range: 0-360 (0 = disabled)
CleanStorageHistory	Number of months after which storage history logs are automatically cleaned by the delete logs process. • Default: 12 • Range: 0-360 (0 = disabled)
CleanStorageSummary	Number of months after which storage summary logs are automatically cleaned by the delete logs process. • Default: 12 • Range: 0-360 (0 = disabled)
ClientDBDumpDays	Number of days the DS-System will retain DS-Client database dumps. • Default: 2 • Range: 1-10
ClientDeleteThread	Number of processing threads that should be started for the delete DS-Client process. This parameter is applicable if a DS-Client is being moved to the trash directory. • Default: 2 • Range: 1-100
DBDumpDays	Number of days for which database dumps must be retained in the primary storage dump sub-folder. • Default: 2 • Range: 1-10,000

Table 2 Advanced configuration parameters

Parameter	Description / Values
DBDumpEnd	Time when the database backup should end. If this value is less than the DBDumpStart value, the database backup is completed the next day. For Windows: • Default: 23 • Range: 0-23 For Linux: • Default: 17 • Range: 0-23
DBDumpMethod	DS-System performs database backup during the dump window created between DBDumpStart and DBDumpEnd. For Windows: • 0 = differential, DS-System performs a full database dump every day and a differential backup of its database every hour. • 1 = full, DS-System performs a full database dump once a day and no differential backups. For Linux: • 0 = custom, DS-System dumps the database in a compressed TAR format. • 1 = tar, DS-System dumps the database in an uncompressed TAR format. • 2 = plain text, DS-System dumps the database in plain text format.
DBDumpPath	Destination folder where the DS-System database dump will be saved. The SQL service account must have read/write permission for the dump location.
DBDumpStart	The hour at which the database backup window will start. For differential backups, the start time is also when the full database dump occurs. For Windows: • Default: 0 • Range: 0-23 For Linux: • Default: 8 • Range: 0-23
DefaultHardwareResetTimer	Amount of time (in minutes) for the DS-Client to connect and perform a hardware registration activity. • Default: 5 • Range: 1-10,080
DefaultTrashDays	Minimum number of days that a file must stay in the trash folder of an extensible storage location before it is removed by the empty trash process. • Default: 7 • Range: 0-99 If you specify a value of 0, the data will not be permanently deleted until midnight the following day.
DeltaCheckOption	Whether validation of delta reconstruction indexes must be performed during the Autonomic Healing process. • Default: 0 • Range: 0-2 – 0 = validate delta index only – 1 = skip validation of delta indexes – 2 = validate delta index and check delta block checksum
DirectorMode (N+1 specific)	Specifies how the DS-Directory operates in an N+1 DS-System. • 0 = Dedicated DS-Director, will not accept DS-Client connections • 1 = DS-Director works as a normal DS-System to accept DS-Client connections **Note**: Requires the DS-System to be restarted.

Table 2 Advanced configuration parameters

Parameter	Description / Values
DirScanLimit	Number of directories that can be opened at the same time by a DS-Client synchronization process to limit DS-System I/O. • Default: 5 • Range: 1-1000 **Note**: Requires the DS-System to be restarted.
DirStoreSafeMode	Determines how the DS-System saves directory metadata. If the parameter is enabled, DS-System saves the directory descriptor information as follows: • Individual _dirdesc files in the corresponding directories where the backed up data appears. • Consolidated _dir_store file from all directories in a backup. If the parameter is disabled, DS-System saves the directory descriptor information only in the consolidated _dir_store file from all directories. There are three levels of _dirdesc files: • Backup set - Contains information about the backup. • Share - Contains information about the share. • Directory - Contains information about the directory. If a _dirdesc file is corrupted or missing, the following actions are taken by the DS-System: • When autonomic healing and System Admin detect a _dirdesc file corruption, an error is reported in the DS-System Event Log for the activity and the directory is skipped by the autonomic healing or System Admin process. • When backup activities are running, the _dirdesc file is automatically overwritten without checking its validity. • When synchronization activities are running, the corrupted or missing _dirdesc file is replaced with information received from the DS-Client. If the DS-Client cannot provide this information, the DS-System creates a _dirdesc file with alternate file information in the form: `RECOVER_DIR_<dir_id>` • 0 = Off • 1 = On (default)
DirStoreVacuum	Threshold percentage that must be reached before the DS-System cleans up empty space in the _dir_store file for backups. • Default: 5 (e.g. 5%) • Range: 0-100
DisasterRecoveryMode	Mode in which DS-System should run - normal or disaster recovery. **Important**: This parameter should be used only in case of an actual failure in the DS-System's extensible storage. • 0 = Off, Run DS-System in normal mode (default) • 1 = On, Run DS-System in disaster recovery mode **Note**: Requires the DS-System to be restarted.
DSSysGroup	Configure DS-System groups for replication. • 0 = Off • 1 = On **Note**: Requires the DS-System to be restarted.
EmerPMFreq	Frequency (in hours) at which emergency messages will be written to the Event Log. • Default: 1 • Range: 1-24

Table 2 Advanced configuration parameters

Parameter	Description / Values
EmptyTrashThread	Number of additional threads that should be used to perform the empty trash process. Default: 1 Range: 0-99
EmptyTrashTime	Start time (hour of day) for the empty trash process. Default: 6 Range: 0-23
ExcludeRecycleDelta	To include or exclude recycled delta generations from calculations of stored size. • 0 (Off) = DS-System includes recycled delta generations. • 1 (On) = DS-System excludes recycled delta generations. **Note**: Requires the DS-System to be restarted.
FailBackupOnBLMError	Select action to be taken if the movement of data to the BLM Archiver fails for backups configured with the BLM (Infinite Generations) option. • 0 (Off) = The backup ignores the BLM error. • 1 (On) = The backup of that specific generation will fail.
FileStoreCache	Number of consolidated FileStores that can be open at the same time. This applies to the backup, disc/tape write-to-buffer, autonomic healing, BLM Archiver, and replication processes. • Default: 2 • Range: 0-100 **Note**: 0 means only the current FileStore is allowed to be open. Higher values require more system resources.
FileStoreVacuum	The percentage of the total number of deleted files in the FileStore that must be reached before System Admin triggers a Vacuum FileStore process. Each FileStore (in each directory) is assessed separately. • Default: 5 (i.e. 5%) • Range: 0-100
FileWriteTrunkSize	Volume of data that is cached for write operations to the online storage. This parameter allows you to optimize write performance. • Default: 32 (KB)
FixDeltaChain	Fix a long delta chain during the optimization process if the number of deltas for a file is longer than the value for the **Default delta chain length** parameter. This applies only to 'on-demand' master /delta optimizations triggered from DS-Operator. • 0 = Off • 1 = On
GrpEncrypt	To use encrypted communication for a DS-System group. All DS-Systems in the group must have the same setting: • 0 = Off • 1 = On
GrpPort	Specifies the DS-System group communication port. • Default: 4409 **Note**: Requires the DS-System to be restarted.
GrpSerialCode	Specifies the DS-System group serial code. • Default: 0 • Range: 0-2,147,483,647
HealingProcess	Number of autonomic healing processes that start simultaneously. • Default: 3 • Range: 1-256

Table 2 Advanced configuration parameters

Parameter	Description / Values
HealingThreads	Number of threads that can be used for the autonomic healing process. • Default: 1 • Range: 1-32
LibCreateCount	Specifies the number of copies of the same content that must be backed up before a library file is created. • Default: 3 • Range: 2-10 **Note**: Requires the DS-System to be restarted.
LicExpireNotif	Number of days before the DS-System license expires for DS-System to send a notification. • Default: 7 • Range: 1-100
LicNotifFreq	Notification frequency (in hours) before the license expires (LicExpireNotif) and license capacity (LicStorageNotif) parameters. • Default: 1 • Range: 1-24
LicStorageNotif	Specifies the license storage capacity warning level percentage. When available capacity falls below this amount, DS-System sends a notification. • Default: 1000 (e.g. 10% left / 90% used) • Range: 1-10000, default is 1000
MaxBlockSize	Maximum block size (in bytes) when sending messages. • Default: 0 • Range: 0-65,536 (0 = no maximum)
MaxCommunicationManagersPerProcessingThread	Maximum number of communication managers per processing thread. • Default: 10 • Range: 1-10
MaxCommunicationManagersPerThread	Maximum number of communication managers per thread. • Default: 10 • Range: 1-10
MaxPrivateDays	Maximum number of days to keep potential libraries in the DS-System database. • Default: 365 • Range: 60-10,000
MaxPrivateItems	Maximum number of potential libraries to keep in the DS-System database. • Default: 1,000,000 • Range: 10,000-1,000,000,000
MaxReceivingQueueSize	Maximum number of pending requests in the receiving queue. • Default: 20 • Range: 20-1024 **Note**: Requires the DS-System to be restarted.
MaxSendingQueueSize	Maximum number of pending requests in the queue. • Default: 20 • Range: 20-1024 **Note**: Requires the DS-System to be restarted.
MemEmerLevel	Critical level of free memory at which an emergency notification is sent. • Default: 0 (no check performed) • Range: 0-10,000
MemWarnLevel	Critical level of free memory at which a notification is sent. • Default: 0 (no check performed) • Range: 0-10,000

Table 2 Advanced configuration parameters

Parameter	Description / Values
MinLibFileSize	Minimum size (in KB) for library files on the DS-System. Potential library files smaller than this value will be ignored by the common file elimination process. • Default: 32 • Range: 32-102,400
MLRCache	Number of consolidated FileStores that can be open at the same time. This applies only to backup processes for email level backups. • Default: 10 • Range: 0-100
MultiStorage	Specifies if multiple storage locations can be configured on the same volume. • 0 (Off) = (Default) Do not allow multiple storage locations on the same volume. • 1 (On) = Allow multiple storage locations on the same volume.
NativeSize	Specifies if the DS-System will save the native size information in its “dsset_size” table, which can only be viewed if the database is queried directly. • Default: 0 • Range: 0-2 – 0 — Disabled. DS-Client will not send native size data to DS-System. – 1 — Enabled. DS-Client will send native size. – 2 — Enabled. DS-Client will send native size.
OLEmerLevel	Emergency notification level for the available space in the online storage based on the following space events configured for extensible storage locations: • Physical space is represented by the Disk Space column. • Logical space is represented by the Used Size column. • Default: 200 (2%) • Range: 1-10,000
OLStopLevel	Stop notification level for the available space in the online storage based on the following space events configured for extensible storage locations: • Physical space is represented by the Disk Space column. • Logical space is represented by the Used Size column. Default: 50 (0.5%) • Range: 1-10,000
OLWarnLevel	Warning notification level for the available space in the online storage based on the following space events configured for extensible storage locations: • Physical space is represented by the Disk Space column. • Logical space is represented by the Used Size column. • Default: 500 (5%) • Range: 1-10,000
PubLibSwitch	Global public library switch. • 0 (Off) = No public libraries. • 1 (On) = Allows public libraries (default).
ReadOnly	Read-only DS-System. • 0 (Off) = Normal DS-System (default) • 1 (On) = DS-System will run with read-only storage. It does not allow or perform any activities that alter the storage. **Note**: Requires the DS-System to be restarted.
RecoveryLibThreads	Number of threads used to recover libraries during DS-System disaster recovery if the DisasterRecoveryMode parameter is set to 1. • Default: 4 • Range: 1-16

Table 2 Advanced configuration parameters

Parameter	Description / Values
RecoveryProcess	The number of disaster recovery processes that can start on each DS-System node at the same time. When the disaster recovery process finishes processing a backup, the DS-Client must perform a DS-System based synchronization. Weekly Admin or scheduled backups initiate this synchronization automatically. • Default: 4 • Range: 1-100
RecoveryValidateFile	Disaster recovery will perform file level validations which will significantly affect performance. It is recommended that you perform autonomic healing instead because it has more advanced file level validations. • 0 = Off • 1 = On
RecycleSwitch	Enables delta recycling which affects the frequency of master file reconstructions. • 0 = Off, backups are slower due to the greater number of reconstructions. • 1 = On, backups are faster at the expense of storage.
RemoteVDRMaxSched	Maximum number of scheduled Remote DS-VDR activities that are allowed to run concurrently. • Default: 10 • Range: 0-99
RemoteVDRPowerOnPrioDelayDef	Default delay time (in seconds) for the Power On option if multiple virtual machines are configured for Remote DS-VDR. • Default: 60 • Range: 0-3600
RemoteVDRRetry	Number of times DS-System will attempt to connect to the Remote DS-VDR Tool. • Default: 5 • Range: 0-99
RemoteVDRWait	Amount of time (in minutes) that the DS-System will wait before retrying to connect to the Remote DS-VDR Tool. • Default: 5 • Range: 0-99
RepairFromReplication	How the DS-System will handle corrupted generations discovered by the autonomic healing, System Admin, validation, or system validation processes. • 0 = Off - If a corrupted generation is found, the process will delete the file without trying to recover it from the replication DS-System. • 1 = On (default)
ReplicationCheck	Interval (in hours) at which a replication check is performed for shared DS-Clients. • Default: 6 • Range: 0-360 (0 = disabled)
ReplicationDelThreads	Number of delete threads that should be started for replication. • Default: 2 • Range: 1-100
ReplicationProcess	Maximum number of concurrent replication processes on each node configurable at DS-System level for each DS-System in a replication group. • Default: 4 • Range: 0-100
ReplicationRecvThreads	Number of receive threads that should be started for replication: • Default: 4 • Range: 1-100

Table 2 Advanced configuration parameters

Parameter	Description / Values
ReplicationSendThreads	Number of send threads that should be started for replication. • Default: 2 • Range: 1-100
SkipDBDump	Specifies if the DS-System will skip the database backup (dump). • 0 (Off) = (default) The DS-System database is backed up (dumped) based on the DBDumpMethod, DBDumpStart, and DBDumpEnd. • 1 (On) = Skips the database backup (dump).
SmallFileCount	Threshold to consolidate small files (non-master/delta) in the same online storage directory into one large FileStore during System Admin. • Default: 10 • Range: 0-10,000 **Note**: 0 means all small files in a directory will be consolidated to the FileStore.
SMTPDebug	Specifies if debug information for the SMTP send message process is logged. This debug information is saved to the DS-System Event Log. • 0 = Off (default) • 1 = On
SyncDRScan	Specifies if a disaster recovery scan is performed during synchronization. • 0 (Off) = (default) Disables the scan unless an entire backup is missing on the DS-System. • 1 (On) = Forces a scan during any backup synchronization from DS-Client which is more secure.
SysAdminProcess	Number of System Admin processes that can start on each DS-System node at the same time. • Default: 1 • Range: 1-20
SysAdminThreads	Number of threads that can be used for the System Admin process. • Default: 4 • Range: 1-32
TcpBufferSize	Buffer size for communication (in bytes). • Default: 34,752 (Windows), 0 (Linux) • Range: 0-34,752,000
TcpNoDelay	Disables or enables the TCP option TCP_NODELAY. This can be useful in a high latency TCP environment where the round-trip time for messages is slow. • 0 = Off • 1 = On (default)
TrashSwitch	Configures the trash feature on the DS-System. • 0 = Off, data deleted from DS-System online storage is permanently removed. • 1 = On (default), processes that delete data from the DS-System will move deleted files to the corresponding extensible storage location's trash folder.
UseClientSNAP	Uses a third party snapshot for DS-Client BLM point-in-time copy requests to unlock a backup as quickly as possible. • 0 (Off) = DS-System locks a backup for the duration of the BLM Archiving activity. • 1 (On) = DS-System integrates with third-party software to create a snapshot of the required directories.
UseSnapshot	Uses a storage snapshot for DS-System snapshot-capable processes. • 0 = Off (default) • 1 = On

Table 2 Advanced configuration parameters

Parameter	Description / Values
VADPCfgDevIgnoreList	Specifies the VM configuration parameters to ignore, such as device keys, during an incremental virtual machine restore via Remote DS-VDR. This parameter applies only to VMware vCenter Server backups. Device keys are listed in regular expressions.
VADPCfgIgnoreList	Specifies the VM configuration parameters to ignore, during an incremental virtual machine restore via Remote DS-VDR. This parameter applies only to VMware vCenter Server backups. Root keys are listed in regular expressions.
WarnPMFreq	Specifies the warning message frequency (in hours). • Default: 4 • Range: 1-24

Table 2 Advanced configuration parameters

2.5 Configuring roles

You can configure roles to restrict access to DS-System functionality to specific users or a groups. Initially the DS-System permits logons from an Administrator on Windows or a root user on Linux.

NOTE: You cannot assign roles to users from the Administrators group (Windows) or the root super-user (Linux). The DS-Operator will ignore all additional permissions and allow that user only to edit roles for other users.

To configure roles:

1. On the **Setup** menu, click **Roles**.
2. In the **Assign Roles** dialog box, do one of the following:
   - To assign a role, click **Add**.
   - To modify a role, select a user or group, and then click **Edit**.

   NOTE: To delete a role, select the user or group that you want to delete, and then click **Remove**.
3. In the **Add/Edit Role** dialog box, do the following:
   a) In the **Type** box, select whether you are assigning the role to a user or to a group.
   b) In the **User/Group Name** box, type a name for the user or group.
   c) In the **From** box, select the domain or server where the user or group is defined.
   d) Under **Roles**, select the role(s) for the user or group. Your choices are as follows:

- **View Logs** – View the logs stored on the DS-System.
- **Data Operator** – Perform daily maintenance tasks, generate reports, and manage customers, DS-Clients, and DR Drills.
- **Account Manager** – Manage account profiles and create, update, and delete customers or DS-Clients.
- **Export CRI** – Export the DS-Client CRI (Customer Registration Information) file. For more information, see Section 4.3, “Exporting DS-Client registration information”, on page 93.

e) Click **OK**

4. To update the list, click **Refresh**.
5. Click **Close**.

2.6 Configuring extensible storage locations

Extensible storage locations allow the DS-System to use multiple storage paths at the same time when storing data. Extensible storage locations can be configured as local drives or UNC paths.When you create an extensible storage location, you must assign it to a storage group. If you do not create storage groups, the storage location is automatically assigned to the default storage group, which cannot be deleted from the DS-System. Data backed up from the DS-Client is saved in the extensible storage location(s) of the selected storage group.

All extensible storage locations contain the following:

- **data** — Folder containing the customer data.
- **Storage_Label.txt** — Text file containing the extensible storage location ID and its path.
- **tmp/temp** — Folder containing temporary files (one is used for normal operations and the other is used by some of the modules).
- **trash** — Folder containing all deleted files.

In addition to the above, the primary storage location contains the following:

- **cd** — Folder containing the disc/tape contents.
- **cluster** — Folder containing the N+1 configuration file (filename: `config`). Required only for N+1 DS-Systems.
- **dump** — Folder containing the DS-System database dumps.
- **logs** — Folder containing the archived log files with entries that were removed from the DS-System database by the Clear DS-System Logs feature and Delete Logs processes.
- **Upgrade** — Folder containing all the DS-Client upgrade packages.

The DS-System automatically balances its data across the available space for each storage location in the same storage group, but not between different storage groups. If you change the extensible storage locations associated with a storage group, only new backup data will be affected. The DS-System can also integrate with NAS storage volumes to use their native snapshot capability when performing read-only tasks.

When a snapshot is used, the DS-System can free the backup lock on the corresponding backup immediately. You must have a functioning NAS with defined storage volumes and it must be visible to the DS-System. Storage volume snapshot integration is enabled by the **UseSnapshot** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

You can expand the DS-System capacity by adding a new storage location without the need to shut down the DS-System service. The DS-System automatically creates the new directory structure. The DS-System can be configured to send email or SNMP notifications when the available storage space is low.

IMPORTANT: After you start the DS-System service or daemon, you must not change the primary storage location (**BackupRoot** parameter from *dssys.cfg*), because this is the starting point for all the extensible storage locations.

If a storage location is nearing its capacity, you can add a new extensible storage location. When you configure an extensible storage location, you must define the maximum amount of data that can be stored at the location. The DS-System automatically tracks how much data is in each storage location and balances the new data that is backed up across the different storage locations.

2.6.1 Configuring an extensible storage location

When configuring an extensible storage location, consider the following:

- If the DS-System license is less than 2 TB, one extensible storage location for the DS-System should be sufficient.
- If the DS-System license is over 2 TB, all DS-System storage locations should be approximately the same size and not be less than 2 TB.

NOTE: You can associate one storage group with multiple extensible storage locations. The DS-System balances the data across storage locations belonging to the same storage group.

Extensible storage works at the file-level, so each file must be saved entirely in the free space existing on the same storage location. This is applicable for each generation backed up and also applies during the reconstruction process. The DS-System must always have sufficient free space available on a storage location to reconstruct the largest stored file on that location.

NOTE: By default, a DS-System running on Windows does not allow the adding of multiple storage locations on the same DS-System. You can configure this option using the **MultiStorage** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”.

To configure an extensible storage location:

1. On the **Setup** menu, point to **Storage**, and then click **Extensible Storage**. The following information is displayed:

Column	Description
Group	Storage Group to which the corresponding Extensible Storage Location belongs.
ID	ID that is automatically assigned to the Storage Group by the DS-System.
Path	Path of the storage location.
Size (Used)	Logical size configured for each storage location.
Entries (Used)	Number of files as a percentage of the Maximum Files set for the storage location.
Disk Space	Current amount of physical disk space left on the storage location.
Size (Trash)	Native size of the files in the trash folder of a storage location.
Files (Trash)	Total number of files in the trash folder of a storage location.

Table 3 Extensible Storage Locations

2. Do one of the following:

- To add a new storage location, click **Add**.
- To modify a storage location, select the storage location, and click **Edit**.

NOTE: To delete a storage location, select the storage location, and then click **Delete**. You can delete a storage location only if it has been retired.

- To update the statistics for a storage location, click **Scan**. For more information, see Section 2.6.2, “Scanning an extensible storage location”, on page 44.
- To empty the trash of a storage location, select the storage location, and then click **Empty Trash**. For more information, see Section 2.6.3, “Emptying trash from an extensible storage location”, on page 44.
- To retire a storage location, select the storage location, and then click **Retire**. For more information, see Section 2.6.4, “Retiring an extensible storage location”, on page 45.
- To update the list of storage locations, click **Refresh**.

3. In the **New / Edit Storage Location** dialog box, do the following:

   a) Beside the **Path** box, click **[...]** and select a path visible to the DS-System computer.

   b) In the **Total Size** box, select the total size available.

   c) In the **Guard Size** box, select a reserve amount as a free space buffer.

NOTE: The guard size for a new extensible storage location should be 10% of the total size.

   d) The amount in the **Maximum Size** box is calculated automatically based on the total size minus the guard size. When the DS-System reaches 100% of the maximum size for any of the storage locations, the DS-System enters a read-only state and rejects all backup activities until some additional storage space is added to the storage location or some space is freed up on the storage location.

   e) In the **Maximum Files** box, select the maximum number of individual files to be stored in the location. This number must be based on the recommendations for the file system of the storage location and is used to balance the data between different extensible storage locations within the same storage group.

NOTE: When this maximum limit is reached, the DS-System continues to save data on the storage location.

f) To configure the list of storage groups, beside the **Storage Group** box, click **[...]**, and then do one of the following:

- To add a storage group, click **Add**. Configure the storage group, and then click **OK**.
- To modify a storage group, select the storage group, and then click **Edit**. Configure the storage group, and then click **OK**.
- To update the list of storage groups, click **Refresh**.

NOTE: To delete a storage group, select the storage group, and then click **Delete**.

NOTE: Each storage group has its own internal ID number. If you change the name of a storage group that is already assigned to a storage location, it will update automatically (the internal ID does not change).

g) To integrate the extensible storage location with a specific NAS storage volume (separate purchase and configuration required), beside the **Storage Volume** box, click **[...]**, and do one of the following:

NOTE: The **Snapshot Path** box does not appear for EMC VNX storage volumes because it is handled internally through the vendor API.

- To add a storage volume, click **Add**. Configure the storage volume and then click **OK**.
- To modify a storage volume, select the storage volume, and then click **Edit**. Configure the storage volume and then click **OK**.

NOTE: To delete a storage volume, select the storage volume, and then click **Delete**.

h) Click **Close**.

4. To set the fill levels for all storage locations, beside the **Fill Levels** box, click **[...]**. Configure the storage fill levels, and then click **OK**.

NOTE: These are the levels at which the DS-System automatically starts sending data to other storage locations within the same storage group until all locations have an equal fill level. The DS-System sends backup data to the storage location that has the lowest fill level in its storage group.

5. Click **Close**.

2.6.2 Scanning an extensible storage location

You can update the statistics for an extensible storage location by triggering a scan process. The scan process will go through all the files from the DS-System online storage structure to retrieve and update the statistics.

To scan an extensible storage location:

1. On the **Setup** menu, point to **Storage**, and then click **Extensible Storage**.
2. Select the extensible storage location that you want to update and click **Scan**.
3. In the **Additional scan threads** box, enter the number of additional threads that you want to use for the scan process.
4. To generate accurate scan results, select the **Require Storage Lock** check box. The storage scan will start only if no other activity is using the storage, and it will complete successfully only if the scan is uninterrupted.
5. Click **Start**.

2.6.3 Emptying trash from an extensible storage location

By default, the trash feature is enabled on the DS-System. When enabled, deleted files from an extensible storage location are moved to the trash folder.

From the customer perspective, the data is deleted. From the service provider perspective, the data is not deleted until the trash folder is emptied. You can recover deleted data from the DS-System trash folder after it has been deleted from the DS-System online storage. For more information see, Section 5.4, “Recovering deleted data from the DS-System trash”, on page 113.

NOTE: You can configure the empty trash feature using the **TrashSwitch** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

To empty trash from an extensible storage location:

1. On the **Setup** menu, point to **Storage**, and then click **Extensible Storage**.
2. Select an extensible storage location, and then click **Empty Trash**.
3. In the **Remove files older than this number of days** box, enter the number of days after which data in the trash is permanently deleted.

NOTE: If you specify a value of 0, then data will be deleted only after midnight the following day.

---

4. In the **Additional empty trash threads** box, enter the number of additional process threads.
5. Click **Empty Trash**.

2.6.4 Retiring an extensible storage location

You can retire a storage location so no new backup data is sent to the storage location, and then move backups to other storage locations in the same storage group. To retire a storage location, you must have at least two extensible storage locations in the same storage group.

NOTE: If you plan to retire the primary storage location, there are additional considerations and steps to perform. For more information, see Section 2.6.5, “Retiring the primary storage location”, on page 46.

To retire an extensible storage location:

1. On the **Setup** menu, point to **Storage**, and then click **Extensible Storage**.
2. Select the storage location that you want to retire, and then click **Retire**.
3. When the system prompts you to confirm, click **Yes**.

NOTE: The DS-System is locked while it scans all the backups in the retired storage location. No new backup data is sent to the retired storage location. New backup data is redirected to the other location(s) in the storage group or to other storage groups.

---

4. To start the retirement process, click **Start**. For more information, see Section 2.6.6, “Monitoring a retired storage location”, on page 48.

2.6.5 Retiring the primary storage location

You can retire the primary storage location for the DS-System specified by the Backup Root parameter in the dssys.cfg file. This process requires manual changes to the DS-System database and a restart of the DS-System.

To retire the primary storage location:

1. On the **Setup** menu, click **System Activities**, and then click **Disable**.
2. On the **Setup** menu, point to **Storage**, and then click **Extensible Storage**.
3. In the **Extensible Storage Locations** dialog box, configure the default storage group, so that it contains only two storage locations:
   - The existing primary storage location that is to be retired.
   - The storage location with the next (sequential) lowest ID number will become the primary storage location. For example, if you have four locations (IDs 1, 2, 3, 4), and ID 1 is the current primary, you must make ID 2 the new primary storage location.

   IMPORTANT: Use only the default storage group with these two storage locations. If required, temporarily change the storage group of any other storage location that shares this group to ensure that there is only one other location where the DS-System can re-assign the primary storage location.

4. Select the primary storage location and click **Retire**. For more information, see Section 2.6.4, “Retiring an extensible storage location”.

   The DS-System automatically re-assigns the primary storage links to the other storage location in the default storage group.

   NOTE: If you have temporarily changed the storage group of any other storage locations, revert the changes. You must close the Retire Storage Monitor window, edit the storage location(s), and then re-open it.

5. In the **Retire Storage Monitor** dialog box, click **Start** to move the data from the primary storage location to the other location.

   NOTE: If a Stop button is displayed, it means the DS-System is already monitoring and will begin retiring the storage automatically.

6. In the **Retire Storage** dialog box, select the number of simultaneous processing threads to use (one thread is used per backup), and then click **OK** .
7. Stop the DS-System service after the retiring primary storage location process is completed.

8. Copy the **cd**, **cluster**, **dump**, and **logs** folders to the new primary storage location.
9. Open the DS-System configuration file dssys.cfg, and change the following values to the path of the new primary storage location:
   - Backup Root: new_primary_path
   - Del Root: new_primary_path\Del
   - Temp Root: new_primary_path\Temp
   - Upgrade Path: new_primary_path\Upgrade

   NOTE: For Linux DS-Systems, use a forward slash for the sub-folder paths, for e.g, path/del.

10. Manually edit the DS-System database (Microsoft SQL or PostgreSQL) with the following SQL statement:

    `DELETE FROM Storage_Locations WHERE ID=<primary_storage_id>`

    where primary_storage_id is the lowest corresponding ID from the Extensible Storage Locations dialog box list.

    This command removes the existing primary storage location. The next lowest ID number becomes the new primary storage location. The new primary storage location must be the same one where the links were re-assigned in step 5.

    IMPORTANT: Do not make any other changes to this table or the database.

11. Start the DS-System service or daemon and verify that there are no errors.

2.6.6 Monitoring a retired storage location

You can configure the Retire Storage Monitor to continuously check for retired storage locations and automatically trigger the movement of data from a retired storage location to other storage locations.

- Backup set data and client libraries are moved to storage locations with the same storage group configured for the DS-Client.
- Data in account libraries is moved to the storage group configured for the account.
- Public libraries are moved to the default storage group.

To monitor retiring storage locations:

1. On the **Setup** menu, point to **Storage**, and then click **Retire Storage Monitor**.
2. If the DS-System is not configured to continuously monitor retired storage locations, click **Start**.
3. In the **Processes to start** box, enter the number of simultaneous retirement processes you want to start, and then click **OK**.

NOTE: If the process is interrupted because an activity lock exists on a backup that needs to be moved, the last time processed will appear in the Status column. The DS-System will retry the process after 5 minutes.

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4. To start the process again immediately, click **Stop**, and then click **Start**.
5. To update the list, click **Refresh**. The Remaining box shows how many retirement requests are pending. The process is finished when 0 is displayed.
6. Click **Close**.

To reactivate a retired storage location, open the Edit Storage Location dialog box. For more information, see Section 2.6.1, “Configuring an extensible storage location”, on page 41.

Once a storage location has been retired, you can delete it from the **Extensible Storage Locations** list. For more information, see Section 2.6.10, “Deleting an extensible storage location”, on page 51.

2.6.7 Replacing an extensible storage location

When the DS-System cannot access any of its storage locations, the DS-System service will stop. In the event of hardware failure on an extensible storage location, we recommend you contact your service provider for technical support.

NOTE: If there is nothing wrong with the extensible storage location but you want to replace it with better hardware, we recommend you retire the storage location to avoid DS-System downtime. For more information, see Section 2.6.4, “Retiring an extensible storage location”, on page 45.

2.6.8 Optimizing storage space

You can configure the DS-System to optimize storage space whenever System Admin processes a storage folder.

To optimize storage space:

1. On the **Setup** menu, point to **Storage**, and then click **Optimize Storage Space**.
2. To optimize files with a specific number of recycled generations, select the **Optimize files with at least [...] recycled generations** check box, and then enter the number of generations. If the value is 0, all recycled generations are cleaned.
3. To optimize files with recycled generations of a specific size, select the **Optimize files with at least [...] KB recycled generations** check box, and then enter the size in KB**.** If the value is 0, all recycled generations are cleaned.
4. To optimize files if the last generation is older than a specific number of days, select the **Optimize files if last generation older than [...] days** check box, and then enter the number of days. If the value is 0, all recycled generations are cleaned.
5. To optimize files whose cumulative delta size is a minimum percentage of the master size, select the **Optimize files with cumulative delta size at least [...]% of master size** check box, and then enter a percentage. The DS-System will reconstruct delta files only if all the corresponding negative delta generation(s) plus the first positive one (the one that will become master) are larger than the specified percentage of the negative master generation.
6. Click **OK**.

2.6.9 Monitoring extensible storage locations (Linux)

Linux DS-Systems cannot automatically detect if a storage location is mounted. You must configure the DS-System to monitor the mount points of the storage locations. Once configured, the DS-System will perform the check every 5 minutes.

- If the DS-System detects a storage issue when monitoring an extensible storage location, it stops all current activities and interrupts all connections to the DS-System storage.
- For the first inaccessible mount point detected, a notification is sent to the email address configured in the **Administrator Notification** settings. For more information, see Section 2.2.2, “Configuring the notification settings”, on page 18.
- The DS-System remains in a frozen state and checks if the storage locations are accessible every 2 minutes.
- When all storage locations are accessible, the DS-System automatically reverts to its normal state and accepts incoming connections.

To monitor extensible storage locations on a Linux DS-System:

1. On the **Setup** menu, point to **Storage**, and then click **Mount-point Monitor**.
2. Select the check box beside each mount point that you want to monitor.

NOTE: You must monitor all mount points used as storage locations. The first mount point listed is the root folder of the DS-System computer.

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3. Click **OK**.

2.6.10 Deleting an extensible storage location

You can delete only retired and empty storage locations. You cannot delete the primary storage location because it contains the extensible storage links to other storage locations.

Before you can delete an extensible storage location, you must retire it, move its data to other storage locations using the retire storage activity, and then remove it as the primary storage location by altering the Backup Root value in the dssys.cfg file and DS-System database. You can delete the storage location after restarting the DS-System. For more information, see Section 2.6.5, “Retiring the primary storage location”, on page 46.

To delete a storage location:

1. On the **Setup** menu, point to **Storage**, and then click **Extensible Storage**.
2. Select the retired storage location that you want to delete, and then click **Delete**.
3. When the system prompts you to verify your selection, click **Yes**.

The Group value is changed to Deleted and the storage location is removed from the extensible storage locations list when the DS-System restarts.

NOTE: To reactivate this storage location, assign it to any other valid storage group other than Deleted in the Edit Storage Location dialog box.

2.7 Configuring the activity priority schedule

You can configure the priority of individual activities on the DS-System and apply these changes to all DS-Client accounts or individual DS-Client accounts.

Consider the following when assigning priority levels:

- Activity priority is an internal priority level assigned to different activities that can run on the DS-System and occur at the backup level.
- When a higher priority activity locks a backup, it prevents lower priority activities from accessing the backup until he high priority activity has finished.
- Activities that are at the same priority level cannot interrupt one another. The first activity to lock a backup will maintain the lock until it has finished.
- Lower priority activities must always wait for higher priority activities to finish with a backup. Similarly, lower priority activities can be interrupted if a higher priority activity requests access to a backup they are processing.

IMPORTANT: The initial settings for the default schedule are the recommended activity priorities for the DS-System. Do not change these settings unless you are familiar with the DS-Client activity patterns on the DS-System.

Since a backup can only be processed one activity at a time, each activity on the DS-System has a priority level that resolves conflicts when more than one activity tries to process the same backup. This determines the order in which activities can access and lock a backup for processing.

The following is a list of default activity priorities:

	Activity	lock_type [1]	Default Priority Level (Lower # is higher priority)	Valid Range
1	System Compression	lock_type=12	1	1-10
2	Disaster Recovery	lock_type=15	1	1-2
3	Replication Receive	lock_type=22	1	1-10
4	Replication Delete	lock_type=23	1	1-10
5	Backup	lock_type=1	2	2-10
6	Restore	lock_type=3	2	2-10
7	Delete	lock_type=4	2	2-10
8	Retention	lock_type=5	2	2-10
9	Synchronization	lock_type=6	2	2-10
10	Validation	lock_type=7	2	2-10
11	Migration	lock_type=8	2	2-10
12	BLM Archiving	lock_type=9	2	2-10
13	Replication Send	lock_type=21	3	2-10
14	Replication Send - Repair	lock_type=32	3	2-10
15	Retire Storage	lock_type=16	4	2-10
16	Storage Scan	lock_type=17	5	2-10
17	System Validation	lock_type=13	6	2-10
18	File optimization	lock_type=14	6	2-10
19	Group Admin	lock_type=19	7	2-10
20	Deactivate DS-Client	lock_type=28	9	1-20
21	System Admin	lock_type=10	10	2-12
22	System Autonomic Healing	lock_type=11	11	2-12
23	CDP backup	lock_type=2	12	2-12
24	System Backup	lock_type=25	13	10-20
25	Storage Statistics	lock_type=18	14	10-20
26	Clean Libraries	lock_type=26	15	2-20
27	Clean Logs	lock_type=30	16	2-20
28	Empty Trash	lock_type=31	17	10-20

Table 4 DS-System default activity priorities

1 The **lock_type** number refers to the ID that is displayed in the **System Status - Backup Set Locks** tab (DS-Operator > Setup menu > System Activities: System).

Initially, there is one default activity priority schedule and all DS-Client accounts are assigned to it. The default activity priority schedule has two schedule details:

- The first detail covers the entire week (7-days / 24-hours) and contains a list of all the activities that are currently using the default settings. If you delete this detail or any activities in the Activity Priority list, any new details created will still work against the default priority settings.

- The second detail covers regular business hours (08:00-18:00 Monday to Friday) and contains (initially) one activity: CDP. Its priority is increased (with respect to its default setting) from “12” to “2”. The effect is that during business hours, CDP backups that are protecting high value data changes will not be interrupted by activities such as System Admin, autonomic healing, replication, etc.

Only one detail can apply at a time. For each activity that is about to start, the DS-System checks which activity priority should apply at that day and time. If any details overlap (e.g. start at the same time on the same day), the DS-System selects the detail that ends sooner (closer to the current time on DS-System). If two details start and end at the same time on the same day, the latest (bottom / lowest) one in the Schedule Detail list is applied.

NOTE: To change the activity priorities for all DS-Client accounts at the same time, you can adjust the default schedule.

To configure an activity priority schedule:

1. On the **Setup** menu, click **Activity Priority Schedule**.
2. Under **Activity Priority Schedule**, do one of the following:
   - To add an activity priority schedule, click **New**.
   - To modify an activity priority schedule, select the schedule, and then click **Modify**.
   - To update the list of activity priority schedules, click **Refresh**.
   - To restore the default settings, click **Restore Defaults**.

     NOTE: To delete an activity priority schedule, select the schedule, and then click **Delete**.

3. In the **New**/**Modify Activity Priority Schedule Name** dialog box, type the name of the priority schedule, and then click **OK**. New activity monitor schedules will have the same schedule details as the default schedule.
4. Under **Schedule Details**, do one of the following:
   - To add a schedule detail, click **New**.
   - To modify a schedule detail, select the schedule detail, and then click **Modify**.

     NOTE: To delete a schedule detail, select the schedule detail, and then click **Delete.**

   - To update the schedule details list, click **Refresh**.

5. In the **New / Modify Schedule Detail** dialog box, select the days, start time, and end time for the schedule detail, and then click **OK**. New schedule details will have a blank Activity Priority list.
6. Under **Activity Priority**, do one of the following:
   - To add an activity priority, click **New**.
   - To modify an activity priority, select the activity priority, and then click **Edit**.

   NOTE: To delete an activity priority, select the activity priority, and then click **Delete**.

   - To update the list of activity priorities, click **Refresh**.
7. In the **New/Modify Activity Priority** dialog box, do the following:
   a) In the **Activity Type** box, select the type of activity.
   b) In the **Priority** box, enter a priority level (number between 2 and 10).
   c) Click **OK**. The default schedule is automatically assigned to all new and existing DS-Client accounts.
8. To reassign a DS-Client to a different activity priority schedule, select the activity priority schedule from which you want to reassign a DS-Client, and then do the following:
   a) Under **DS-Clients assigned to this activity priority schedule**, click **Assign to DS-Client**.
   b) In the **Activity Priority Management** dialog box, to view DS-Clients belonging to a specific customer, beside the **Account #** box, click **[...]**, and then do the following
      1. In the **Customer Name** box, type the name of the customer.
      2. In the **Account #** box, type the account number.
      3. Click **Find**.
      4. Select the account for which you want to view DS-Clients, and then click **Select**.
   c) Select the DS-Client that you want to reassign to the activity priority schedule (use the Ctrl key to select multiple DS-Clients), and then click **Set**.
   d) Click **Close**.
9. Click **Close**.

2.8 Configuring the delta chain settings

You can configure the DS-System with specific master-delta chain reconstruction settings for each backup type. These changes can be applied at the customer or DS-Client level and the task can be scheduled to run at regular intervals on the DS-System. For more information, see Section 2.14, “Configuring scheduled tasks”, on page 65.

IMPORTANT: The delta chain length sets a limit that balances the backup (space) efficiency of the deltas with the restore performance of having a full master and a shorter delta chain. You should adjust the master-delta chain settings only if you are familiar with the data activity patterns of the DS-Clients on your DS-System.

The global default master-delta chain setting is 9 and is applied in the absence of any other configuration. This value is used when the optimization task runs on schedule or on demand to correct the delta chain length for a file's generations. After the initial backup, the DS-Client normally sends only delta changes to keep the backup times as short as possible. The DS-System must regularly run an optimization task on the backup files to rebuild a master when the delta chain of a backup file crosses the configured limit.

NOTE: Since replication DS-Systems only receive deltas, at least one optimization task must be scheduled to periodically fix delta chains.

You can configure delta chain settings for specific DS-Clients, customers, or the entire DS-System. The most specific delta chain setting is at the DS-Client level and only one setting can apply per DS-Client. This overrides any customer-level configuration, which itself overrides the global default setting for the DS-System.

To configure the delta chain settings:

1. On the **Setup** menu, click **Delta Chain Configuration**.
2. Under **Configuration**, do one of the following:
   - To add a delta chain configuration, click **New**. Type a name for the delta chain configuration, and then click **OK**.
   - To modify a delta chain configuration, select the configuration, and then click **Modify**. Type a name for the delta chain configuration, and then click **OK**.
   - To update the list, click **Refresh**.

     NOTE: To delete a delta chain configuration, select the configuration, and then click **Delete**.

3. Under **Configuration Details**, do one of the following:
   - To add a delta chain configuration detail, click **New**. Select the backup type, enter the delta chain length, and then click **OK**.
   - To modify a delta chain configuration, select the configuration, and then click **Modify**. Select the backup type, enter the delta chain length, and then click **OK**.
   - To update the list, click **Refresh**.

   NOTE: To delete a delta chain configuration, select the configuration, and then click **Delete**.

4. Under **Customers assigned to this delta chain configuration**, do the following:
   a) To assign a customer to a delta chain configuration, click **Assign**.
   b) In the **Assign Customers to delta chain configuration** dialog box, select the customer(s) you want to assign to the delta chain configuration, and then click **Apply**.
   c) When finished, click **Close**.

   NOTE: To delete a customer from a delta chain configuration, select the customer, and then click **Remove**.

5. Under **DS-Clients assigned to this delta chain configuration**, do the following:
   a) To assign a DS-Client to a delta chain configuration, click **Assign**.
   b) In the **Assign DS-Clients to delta chain configuration** dialog box, select the DS-Client(s) you want to assign to the delta chain configuration, and then click **Apply**.
   c) When finished, click **Close**.

   NOTE: To delete a DS-Client from a delta chain configuration, select the DS-Client, and then click **Remove**.

After you have created at least one delta chain configuration, you can schedule the DS-System to run the optimization task. For more information, see Section 2.14.7, “Scheduling delta chain optimization”, on page 73.

2.9 Configuring the printer settings

The DS-Operator can interface with the existing printers configured on the computer when it is installed.

To configure the printer settings:

1. On the **Setup** menu, click **Printer Setup**.
2. In the **Print** dialog box, use the **General**, **Page Setup**, and **Appearance** tabs to configure the printer.

2.10 Configuring the branding settings

The branding settings are defined on each DS-System or are pushed from the DS-Billing Server. If no branding settings are configured, branding will not appear in the DS-System reports.

To configure the branding settings:

1. On the **Setup** menu, click **Branding**, and then do one of the following:
   - To add branding, click **Add**.
   - To modify branding, select the branding, and then click **Modify**.

   NOTE: To delete branding, select the branding, and then click **Remove**.

2. In the **Add / Modify Branding** dialog box, do the following:
   a) In the **Description** box, type a name for the branding setting.
   b) In the **Logo Image**, select the branding image.
   c) To assign as the default branding, select the **Default Branding** check box.
   d) Click **OK**.
3. To update the list of available branding, click **Refresh**.
4. Click **Close**.

2.11 Configuring the service provider information

As a service provider, you can configure your company's information as you want it to appear in the DS-System reports.

To configure the service provider information:

1. On the **Customers** tab, select a DS-System.
2. Right-click and select **Service Provider Info**.
3. Type the required information, and then click **OK**.

2.12 Configuring the appearance of the main window

You can configure the appearance of the DS-Operator main window.

To configure the appearance of the main window:

1. On the **Setup** menu, point to **Look & Feel**, and then select one of the available themes.
2. If you selected the **Metal** theme, you can further configure the look and feel as follows:
   a) On the **Setup** menu, click **Initialization**.
   b) Click the **Look & Feel** tab. This tab will not appear for other themes.
   c) Under **Metal Theme**, select a default theme or under **Custom Colors**, select your colors, and then click **OK**.

2.13 Managing the DS-System activities

The DS-System provides tools to perform real-time troubleshooting. You can view the system status, enable or disable system activities, clear the database logs, and clean orphaned libraries. You can also communicate with users connected to the DS-System, disconnect other users, view the database connections and threads, and shut down the DS-System computer.

2.13.1 Viewing the system status

You can view DS-System status information when checking performance or troubleshooting. System status information includes current network connections, database connections, threads, and connection managers.

To view the system status:

1. On the **Setup** menu, click **System Activities**.
2. Click **System**.
3. To view the network connections, click the **Network Connections** tab, and then do one of the following:
   a) To send a message to a user who is currently connected to the DS-System, select the user and then click **Send Message**. In the **Send Message** box, type the message, and then click **Send**.
   b) To remove a connection from the DS-System, select the connection, and then click **Disconnect**. You can also send a message to inform the user before you remove the connection.
4. To view the database connections, click the **Database Connections** tab.
5. To view the threads, click the **Threads** tab.
6. To view the backup locks, click the **Backup Set Locks** tab.
7. To view the connection managers, click the **Managers** tab.
8. To view the replication requests, click the **Replication Requests** tab. (This tab only appears if the **DSSysGroup** advanced parameter is enabled.)
9. To update the data, click the **Refresh**.
10. Click **Close**.

2.13.2 Enabling or disabling system activities

You can configure the DS-System to refuse connections from all DS-Clients. This can be useful when you need to perform maintenance on the DS-System that might interfere with backup or restore processes.

To enable or disable system activities:

1. On the **Setup** menu, click **System Activities**.
2. In the **System Activities Administration** dialog box, do one of the following:
3. To enable or disable system activities, click **Enable/Disable**.

2.13.3 Deleting the DS-System logs

You can delete the DS-System log entries that are older than a specific number of months. The cleared logs are archived by month to text files in a logs subfolder in the DS-System Backup Root path.

NOTE: You can configure the DS-System to automatically clear DS-System logs using the **CleanActivityLog** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

To delete the DS-System logs:

1. On the **Setup** menu, click **System Activities**.
2. Beside **Clear DS-System logs**, click **Clear**.
3. In the **Delete logs** dialog box, select the check box beside the log for which you want to delete the entries, and enter how old the logs must be, and then click **Delete**.
4. Click **Close**.

2.13.4 Cleaning orphaned libraries

You can remove orphaned library files that were deleted by the customer from online storage at least 30 days ago. If you set the **CleanLibLink** advanced configuration parameter value to 1 (ON), this process also scans the DS-System database for orphaned library links and deletes those records from the database.

NOTE: The clean libraries function must be scheduled to run at regular intervals to identify orphaned libraries and clean any that have been in that state for at least 30 days. This process does not lock the DS-System, therefore it can run in parallel while the DS-System performs backup and restore activities. For more information, see Section 2.14.6, “Scheduling the cleaning of libraries”, on page 72.

To clean orphaned libraries:

1. On the **Setup** menu, click **System Activities**.
2. Beside **Clean Libraries**, click **Clean**.
3. When the system prompts you to confirm deletion, click **Yes**.

2.13.5 Running system validation

You can run a system validation process to check the restorability of data in the DS-System online storage at the backup level and validate the latest generation or all the generations of the backup files.

You can trigger the validation process from the DS-Client or DS-System. If you trigger the validation process from the DS-Client, you must enter the account and DS-Client encryption keys. If you trigger the validation process from the DS-System, you must forward the DS-Client encryption keys to the DS-System. For more information, see Section 2.2.7, “Configuring the encryption key settings”, on page 23.

IMPORTANT: Validation is a disk I/O intensive process for the DS-System. It is similar to a regular restore, but instead of writing to a target location, the decrypted and decompressed data is discarded after generating the file signature.

When the validation process is triggered, the following occurs:

- For each file generation, the DS-System checks the file header, delta, and library linking.
  - If everything is fine, the DS-System attempts to validate the data by performing a procedure similar to a virtual restore. The data is decrypted and decompressed to generate the original signature.
  - If the process fails due to a decryption or decompression issue, the validation process fails.
- The DS-System compares the generated signature with the original one. If the signatures match, the validation process is successful.
  - If the validation process is initiated by the DS-Client, any errors are reported in the DS-System and DS-Client Event Log.
  - If the validation process is initiated by the DS-System, any errors are reported in the DS-System Event Log.
  - For other failures where the DS-System can confirm the file is corrupted, the file is moved to the trash along with dependent files. The corresponding error is reported in the DS-System and DS-Client Event Log.
- If the DS-System is part of a replication group, the validation process attempts to retrieve the file from one of the replication DS-Systems.
  - If the file is successfully retrieved, no action is required from the DS-Client.
  - If the file is not successfully retrieved, the backup is marked out-of-sync and the DS-Client synchronizes and resends the file.
- If a file’s restorability status cannot be determined, the DS-System skips the validation of the file. The corresponding error is reported in both the DS-System and DS-Client Event Logs.

- If a file originally did not have a signature required for validation, a warning is reported.
- If any bad files are removed, the DS-System marks the backup as out of sync at the end of the validation process.

NOTE: For information on how the validation process differs from autonomic healing, see Section 9.1.2, “Autonomic healing vs. validation”, on page 164.

You must constantly run autonomic healing on the DS-System to locate and fix corruptions or inconsistencies as soon as possible. Corruptions or inconsistencies can result in files not being restorable and the backup cannot be synchronized. For more information, see Section 9.1.1, “Autonomic healing vs. System Admin”, on page 162.

To run system validation:

1. On the **Customers** tab, right-click the backup for which you want to run system validation, and then click **Run System Validation**.
2. If the DS-System is running in an N+1 configuration, in the **N+1 ID to perform activity** box, select the DS-System on which you want to run the validation process.
3. In the **Generations to validate** box, select the generation you want to validate. Your options are as follows:
   - **Latest** – The latest generation of the backup data.
   - **All** – All generations of the backup data.
4. In the **Additional validation threads** box, enter the number of additional threads you want to use for the validation process.
5. Click **OK**. You can verify the validation results in the Activity Log.

2.13.6 Running system compression

If you have configured a backup with no compression type in the DS-Client, you can run system compression on the backup to compress data in the DS-System online storage. The DS-System uses ZLIB for the compression type and only compresses files larger than 32 KB.

NOTE: To run system compression on a backup, you must enable DS-Client encryption key management and you must forward the DS-Client encryption key(s) to the DS-System. For more information, see Section 2.2.7, “Configuring the encryption key settings”, on page 23.

To run system compression:

1. On the **Customers** tab, right-click the backup for which you want to run system compression, and then click **Run System Compression**.
2. In the **Additional validation threads** box, enter the number of additional threads you want to use for the compression process.
3. If the DS-System is running in an N+1 configuration, in the **N+1 ID to perform activity** box, select the DS-System on which you want to run the compression process.
4. In the **Additional validation threads** box, enter the number of additional threads you want to use for the compression process.
5. Click **OK**. You can verify the system compression results in the Activity Log.

2.13.7 Shutting down the DS-System

You can shutdown a standalone DS-System only.

To shut down the DS-System:

1. On the **Setup** menu, click **System Activities**.
2. Beside **System Shutdown in Progress**, click **Initiate**.
3. In the **Initiate System Shutdown** dialog box do the following:
   a) In the **Shutdown in [...] Seconds** box, enter the time in seconds after which you want the system to shut down.
   b) To send a message to users currently connected to the DS-System, type a message in the **Send Message** box.
   c) To restart the DS-System after shutdown, select the **Reboot System** check box.
4. Click **Shutdown**.

NOTE: To cancel the shutdown process, click **Abort**.

2.14 Configuring scheduled tasks

Since some DS-System tasks consume more DS-System resources, you can schedule when tasks run.

2.14.1 Scheduling autonomic healing

You can schedule when autonomic healing tasks run on the DS-System. For more information, see Section 9.1, “Autonomic healing”, on page 161.

NOTE: The number of autonomic healing processes that run when the schedule starts depends on the value of the **HealingProcess** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

To schedule autonomic healing:

1. On the **Setup** menu, click **Schedule**, and then do one of the following:
   - To add an autonomic healing schedule, click **Add**.
   - To modify an autonomic healing schedule, select the schedule, and then click **Edit**.
   - To update the list of schedules, click **Refresh**.

   NOTE: To delete an autonomic healing schedule, select the schedule, and then click **Delete**.

2. On the **Select Schedule Type** page, select **Autonomic Healing**, and then click **Next**.
3. On the **Select Schedule Time** page, do the following:
   a) Under **Detail Type**, select the frequency of the schedule.

   NOTE: If you select Start with DS-System, all other details will be erased, and the autonomic healing process starts when the DS-System starts.

   b) Under **Daily Frequency**, beside **Start at**, specify when the schedule will start.

c) To specify a time and day when the scheduled activity must end, select the **End at... after... day(s) from start day** check box, and enter the time and the number of days.

NOTE: If you do not specify an end time, the scheduled process will continue until it is manually stopped or the DS-System is stopped.

d) Click **Next**.

4. On the **Autonomic Healing Option** page, do the following:

   a) Under **Speed control**, do one of the following:

   - To add a speed setting, click **Add**, and then configure the speed at different times during the day. If no setting is configured, the default speed is 50%.
   - To delete a speed setting, select the setting, and then click **Delete**.

   b) To run the autonomic healing task once on every backup and then stop processing, select the **Run Autonomic Healing once every backup set and then stop** check box.

   c) Click **Finish**.

5. Click **Close**.

2.14.2 Scheduling validation

You can schedule when system validation tasks run on the DS-System. Each system validation task can be performed on all backups or on the backups of a specific DS-Client. For more information, see Section 2.13.5, “Running system validation”, on page 62.

To schedule validation:

1. On the **Setup** menu, click **Schedule**, and then do one of the following:

   - To add a scheduled validation task, click **Add**.
   - To modify a scheduled validation task, select a scheduled task, and then click **Edit**.

   NOTE: To delete a scheduled validation task, select a scheduled task, and then click **Delete**.

   - To update the list of scheduled tasks, click **Refresh**.

2. On the **Select Schedule Type** page, select **Validation**, and then click **Next**.

3. On the **Select Schedule Time** page, do the following:

a) Under **Detail Type**, select the frequency of the schedule.

b) Under **Daily Frequency**, beside **Start at**, specify when the schedule will start.

- To specify a time and day when the scheduled activity must end, select the **End at... after... day(s) from start day** check box, and enter the time and the number of days.

c) Click **Next**.

4. On the **System Validation Option** page, do the following:

a) In the **Generations to validate** box, select the generation you want to validate. Your options are as follows:

- To validate the latest generation of the backup data, select **Latest**.
- To validate all the generations of the backup data, select **All**.

b) In the **Concurrent validation processes** box, enter the number of validations you want to run concurrently. The default number of concurrent validations is 3.

c) In the **Additional validation threads** box, enter the number of validations you want to run concurrently. The default number of concurrent validations is 0.

d) Click **Next**.

5. On the **Select DS-Client(s)** page, do one of the following:

- To add a DS-Client to be validated, click **Add**. Select the DS-Client(s) you want to validate, and then click **Select**.
- To modify the DS-Client backups to be validated, select the DS-Client, and then click **Edit**. Do one of the following:
  - To select all the backups, select the **All Backup Sets** check box, and then click **Select**.
  - To select a specific backup, clear the selection for **All Backup Sets**, select a backup from the list, and then click **Select**.

NOTE: To delete a DS-Client from the validation list, select the DS-Client, and then click **Delete**.

---

6. Click **Finish**.
7. Click **Close**.

2.14.3 Scheduling the System Admin process

You can schedule when System Admin tasks run on the DS-System. Each task will perform one pass through each backup on the DS-System. For more information, see Section 4.4, “Running System Admin on a DS-Client account or backup”, on page 94.

The DS-System Admin process verifies the physical consistency of files once every 30 days. When the DS-System Admin detects a corrupted file, it moves the file and its dependents to a folder where all corrupted files are stored.

If the DS-System is part of a replication group, the DS-System Admin process attempts to recover the corrupted file from one of the other replication DS-Systems. If the DS-System Admin successfully recovers the file, no action is required by the DS-Client.

If the DS-System is not part of a replication group or the valid file is not found on a replication DS-System, the DS-System Admin process deletes the invalid data. The backup is marked as out-of-sync so the DS-Client can synchronize it later. If the file still exists on the source computer, you can back it up again to the DS-System.

You can clean recycled generations to optimize storage space based on the number of generations, the total size of recycled generations, or the age of recycled generations. For more information, see Section 2.6.8, “Optimizing storage space”, on page 49.

The **RecycleSwitch** advanced configuration parameter determines if delta generation recycling is performed. Recycling increases the speed of backups, but also increases the DS-System storage size until master reconstruction or optimization is performed. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

To schedule the System Admin process:

1. On the **Setup** menu, click **Schedule**, and do one of the following:
   - To add a scheduled System Admin task, click **Add**.
   - To modify a scheduled System Admin task, select a scheduled task, and then click **Edit**.

   NOTE: To delete a scheduled System Admin task, select a scheduled task, and then click **Delete**.

   - To update the list of scheduled tasks, click **Refresh**.
2. On the **Select Schedule Type** page, select **System Admin**, and then click **Next**.
3. On the **Select Schedule Time** page, do the following:

a) Under **Detail Type**, select the frequency of the schedule.

b) Under **Daily Frequency**, beside **Start at,** specify the time at which the schedule must start.

- To specify a time and day when the scheduled activity must end, select the **End at... after... day(s) from start day** check box, and enter the time and the number of days.

c) Click **Next**.

4. On the **System Admin Option** page, under **Scan Options**, select the type of scan that you want the System Admin to perform on the backups. Your options are as follows:

   - To scan all the folders and files, select the **Perform Regular Scan to Update Statistical Info** check box, and then select **Regular** or **Full**.
   - To verify only new or modified directories, select the **Perform Full Scan to Update Stored Size Invoice Info** check box. File consistency check is not performed.

5. Click **Finish**.

6. Click **Close**.

2.14.4 Scheduling the emailing of reports

To schedule when the DS-System will email reports, you must configure the DS-System to send notifications. For more information, see, Section 2.2.2, “Configuring the notification settings”.

To schedule the emailing of reports:

1. On the **Setup** menu, click **Schedule**, and then do one of the following.

   - To add a scheduled email task, click **Add**.
   - To modify a scheduled email task, select it and click **Edit**.

   NOTE: To delete a scheduled email task, select the scheduled email task, and then click **Delete**.

   - To update the list of tasks, click **Refresh**.

2. On the **Select Schedule Type** page, select **E-Mail Report**, and then click **Next**.

3. On the **Select Schedule Time** page, do the following:

   a) Under **Detail Type**, select the frequency of the schedule.

   b) Under **Daily Frequency**, specify the time at which the schedule must start.

c) Click **Next**.

4. On the **Email Report option** page, do one of the following:
   - To add a scheduled report, click **Add**.
   - To modify a scheduled report, click **Edit**.

NOTE: To delete a scheduled report, select the report, and then click **Delete**.

---

5. In the **Add/Modify Scheduled Report** dialog box, do the following:
   a) In the **Description** box, type a description of the report you want to generate and send by email.
   b) In the **E-mail** box, type the email address of the recipient.
   c) Specify whether you want the report to be in **HTML** or **CSV** format.
   d) In the **Report Type** box, select the type of report you want to send.
   e) Under **Options** do one of the following:
      - To generate a scheduled report for all customers, select **All Customers**.
      - To generate a scheduled report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
      - To generate a scheduled report for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
   f) Click **OK**.
   g) Click **Finish.**
6. Click **Close**.

2.14.5 Scheduling the exporting of reports

You can schedule when the DS-System will export reports.

To schedule the exporting of reports:

1. On the **Setup** menu, click **Schedule**, and then do one of the following:
   - To add a schedule, click **Add**.
   - To modify a schedule, select the schedule, and then click **Edit**.
   - To update the list of schedules, click **Refresh**.

   NOTE: To delete a schedule, select the schedule, and then click **Delete**.

2. On the **Select Schedule Type** page, select **Disk Report**, and then click **Next**.
3. On the **Select Schedule Time** page, do the following:
   a) Under **Detail Type**, select the frequency of the schedule.
   b) Under **Daily Frequency**, specify the time at which the schedule must start.
   c) Click **Next**.
4. On the **Disk Report Option** page, do the following:
   a) To add/modify a scheduled report, click **Add** or **Edit**.
   b) In the **Description** box, type a description of the report you want to generate and send by email.
   c) In the **Directory** box, click **[...]**, and select a directory where you want the report to be written.
   d) Specify whether you want the report to be in **HTML** or **CSV** formate.
   e) In the **Report Type** box, select the type of report you want to send.
   f) Under **Options**, do one of the following:
      - To generate a scheduled report for all customers, select **All Customers**.
      - To generate a scheduled report for a specific customer, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer.
      - To generate a scheduled report for a specific DS-Client, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client.
   g) Click **OK**.
   h) Click **Finish**.

5. Click **Close**.

2.14.6 Scheduling the cleaning of libraries

You can schedule when the DS-System runs clean library tasks. For more information, see Section 2.13.4, “Cleaning orphaned libraries”.

To schedule the cleaning of libraries:

1. On the **Setup** menu, click **Schedule**, and then do one of the following:
   - To add a scheduled task for cleaning of libraries, click **Add**.
   - To modify a scheduled task for cleaning of libraries, select the schedule, and then click **Edit**.

     NOTE: To delete a scheduled task for cleaning libraries, select the schedule, and then click **Delete.**

   - To update the list, click **Refresh**.
2. On the **Select Schedule Type** page, select **Clean Libraries**, and then click **Next**.
3. On the **Select Schedule Time** page, do the following:
   a) Under **Detail Type**, select the frequency of the schedule.
   b) Under **Daily Frequency**, beside **Start at**, specify the time at which the schedule must start.
      - To specify a time and day when the scheduled activity must end, select the **End at... after... day(s) from start day** check box, and enter the time and the number of days.

   c) Click **Finish**.
4. Click **Close**.

2.14.7 Scheduling delta chain optimization

You can schedule when the DS-System runs delta chain optimization tasks. During optimization, the DS-System enforces the master-delta chain length to the files in each directory. For more information, see Section 2.8, “Configuring the delta chain settings”, on page 56.

To schedule delta chain optimization:

1. On the **Setup** menu, click **Schedule** and then do one of the following:
   - To add a scheduled delta chain optimization task, click **Add**.
   - To modify a scheduled delta chain optimization task, select a task, and then click **Edit**.
2. On the **Select Schedule Type** page, select **Delta Chain Optimization**, and then click **Next**.
3. On the **Select Schedule Time** page, do the following:
   a) Under **Detail Type**, select the frequency of the schedule.
   b) Under **Daily Frequency**, beside **Start at**, specify the time at which the schedule must start.
      - To specify a time and day when the scheduled activity must end, select the **End at... after... day(s) from start day** check box, and enter the time and the number of days.
   c) Click **Next**.
4. On the **Delta chain optimization option** page, do the following:
   a) To specify which items you want to be optimized, in the **Optimization selection** box, select one of the following:
      - **All backup sets** – All the backups on the DS-System are optimized.
      - **Modified directories** – Only directories flagged by the DS-System as modified since the last optimization task was run are optimized.
      - **Modified backup sets** – Only modified backups and their directories are optimized.
   b) To specify the number of optimization processes that can run concurrently, in the **Concurrent optimization processes** box, enter the number of processes.
   c) Click **Finish**.
5. Click **Close**.

2.15 Changing your password

You can change the password of a current user who is logged in to the DS-System. This feature is not supported on N+1 DS-Systems.

To change your password:

1. On the **Setup** menu, click **Change Password**.
2. In the **Old Password** box, type your existing password.
3. In the **New Password** and **Verify** boxes, type your new password.
4. Click **OK**. The new password takes effect the next time you log in to the DS-System.

2.16 Converting a physical path

You can convert a physical path on the DS-System to identify information.

To convert a physical path:

1. On the **Setup** menu, click **Storage Path Converter**.
2. In the **Physical Path** box, type the physical path of the DS-System storage location.

NOTE: If you open this dialog box from the Event Log, the physical path might be automatically filled in if an appropriate event was selected.

---

3. Click **Resolve**.

2.17 Viewing the memory allocation

You can view the memory allocated to the current instance of the DS-Operator.

To view the memory allocation:

- On the Setup menu, click Show Memory. A memory usage bar appears in the top right corner. When you hover the cursor over the bar, the following information appears in a tooltip:
  - **Maximum Memory**: Maximum amount of memory the DS-Operator can use on the computer.
  - **Total Memory**: Total Amount of memory allocated to the DS-Operator.
  - **Free Memory**: Amount of memory allocated to the DS-Operator that is still available to use.
  - **Used Memory**: Amount of memory allocated to the DS-Operator that is currently being used.

2.18 Updating the DS-System configuration file parameters

The DS-System has a configuration file (dssys.cfg) that is created during the installation process and contains parameter and value pairs. We recommend you do not change these values unless necessary.

NOTE: If you make any changes to the configuration file, you must restart the DS-System service or daemon for the changes to take effect.

The DS-System configuration file contains the following parameters:

Parameter	Description
External IP Addr	External IP address is a public IP address for DS-Clients to connect to the DS-System. • By default, this parameter is not set. DS-Operator will export all available internal (private) IP address(es) for the DS-System when you create a CRI file. • If set, this value is exported into a CRI file you generate from DS-Operator. • For N+1 DS-Systems, type the External IP address of the local DS-System node.
ClusterID (N+1 DS-Systems only)	Identifies the DS-System node inside the N+1 configuration with a unique ID number.
Backup Root	Main storage location or the root directory on the DS-System for the online storage.
Del Root	Root directory where corrupted files or data from deleted clients are stored.
Temp Root	Temporary directory - a local directory (at least 20GB) that DS-System can use for various activities. If it is not set, DS-System will set it on the same drive as the Backup Root. For N+1 DS-Systems, this key must be configured on each node to have a local path with enough space allocated for the temporary directory.
Upgrade Path	Any valid path containing the DS-Client automatic upgrade packages.
License File	Key from previous versions that required a specific license file for a DS-System for historical purposes only.
Database Type	Type of the database - MSSQL or Postgresql.
Database User	The username for the account used by DS-System to connect to the dssystem database.
Database Password	Password required to connect to the DS-System database. This must be in an encrypted format. **Note**: To generate an encrypted version of your postgres password, use the Asigra Encryption Tool (asigraenc). For information, see the *Tools User Guide*.
Database Instance	Database instance name - **Windows**.
Database Host	**Windows** – Hostname for the database instance. For a SQL Server on the local computer, the value is “(local)”. **Linux** – IP address or computer_name of the PostgreSQL instance

Table 5 DS-System configuration file parameters

Parameter	Description
Database Home	Directory where the PostgreSQL client is installed - **Linux only**.
Database Port	Service port on the database server available for DS-System connections - **Linux only**.
DS-Client Port	Port used by DS-System to communicate with DS-Client. A Windows DS-System also listens on the port listed in the Windows services file. If both configurations are available and are different, DS-System will listen on both the ports.
DS-Operator Port	Port used by DS-System to communicate with DS-Operator. A Windows DS-System considers this setting, only if the DS-Operator Port is missing from the Windows services file.
Installation Path	Valid path on the DS-System computer where the DS-System binaries are installed. A Linux DS-System uses this path for upgrades to the DS-System software, therefore this key should not be changed.

Table 5 DS-System configuration file parameters

2.18.1 Locking the online storage for snapshot

You can lock the online storage of a DS-System and allow a third-party application to take a snapshot of the online storage. This option is available only if you have configured the **AllowStorageLock** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

To lock the DS-System online storage:

1. On the **Setup** menu, click **System Activities**.
2. In the **System Activities Administration** dialog box, beside **Lock online storage for snapshot**, click **Lock**.
3. When the snapshot is finished, click **Unlock**.

2.18.2 Using an automated script to lock storage

Instead of manually operating the Lock and Unlock buttons, you can use a third-party application to run an automated script to lock the storage by manipulating the storage_lock table in the DS-System database.

column name	Description
lock_cmd	This value must be set by the third-party application. • 1 = lock (all attempts to change the online storage will be paused) • 2 = unlock (instructs DS-System to release the online storage for normal operation)
lock_status	The third-party application must wait until this value changes from “0” before performing the snapshot. This may take a few moments in an N+1 configuration (where multiple nodes must each lock their storage). • 0 = normal • non-zero = locked

Table 6 Storage lock details

Ensure that the third-party application performs the following sequence:

1. Set `lock_cmd` to “1”.
2. Wait until *lock_status* is not zero.
3. Run snapshot.
4. Set `lock_cmd` to “2”.

IMPORTANT: Do not alter any other table in the DS-System database.

---

3 Working with customer accounts

You must create a customer account for each customer who will back up data to the DS-System using the DS-Client.

When creating customer accounts, consider the following:

- The first DS-Client that registers an account encryption key for a customer account sets the key and it cannot be changed.
- Since encryption keys are entered by the person installing the DS-Client, the best practice is to make a new DS-Client immediately after the customer account is created.
- Ensure all users who install a DS-Client belonging to the same customer account use the same account encryption key. If any other key or key type is selected, the DS-Client will fail to connect to the DS-System.

NOTE: If you are using DS-Billing as part of your implementation, you should use the DS-Billing application to create and maintain customer accounts since you have access to billing-specific dialog boxes and settings that are not available in the DS-Operator. For more information, see the DS-Billing User Guide.

3.1 Configuring a customer account

You must create a new customer account for every new customer. From the customer account, you can then define DS-Client accounts.

NOTE: This procedure describes the pages in the New Customer Wizard, which correspond to the tabs in the Edit Customer Profile dialog box.

To create a customer account:

1. On the **Customer** menu, click **New**.
2. On the **Customer profile info** page, do the following:
   a) In the **Account #** box, type an account ID number for the customer account.
   b) In the **Company** box, type the name of the company for the customer account.
   c) In the **Contact** box, type the name of the contact person for the customer account.
   d) In the **Email Address** box, type the email address to which notifications will be sent for the customer account.

e) In the **Storage Group** box, select the storage group for the customer account. New DS-Clients automatically use this storage group. To configure a storage group, click **[...]**, and then do one of the following:

- To add a storage group, click **Add**.
- To modify a storage group, select a storage group, and then click **Edit**.
- To update the list of storage groups, click **Refresh**.

NOTE: To delete a storage group, select a storage group, and then click **Delete**.

---

f) To share the customer account for replication, select the **Share for replication** check box.

g) To enable DS-Client users to view additional information about the stored size in the Backup Sets Report, select the **Show "stored size" in Backup Sets report for all DS-Clients** check box.

h) To apply a default backup policy for all the DS-Clients under the customer account, select the **Enable a default Backup Policy for DS-Clients under this Account** check box. To modify a DS-Client Backup Policy, click **Edit**, and then do one of the following:

- Type the text in XML format.
- Copy and paste the text from a valid config-update.xml file.
- Click **Import**, and then browse and select a valid config-update.xml file.
- To export the config-update.xml, click **Export**.

IMPORTANT: When you select this option, the DS-System takes control of the management of the DS-Client, the next time the DS-Client makes a connection.

---

i) Click **Next**.

3. On the **Customer storage quota** page, do the following:

a) To configure customer quota management, select the **Enable Customer Quota management** check box.

b) In the **Quota** box, enter the quota.

c) In the **Calculation method** box, select a calculation method. Your options are as follows:

- **Based on Protected Size** – Invoicing is based on the original size of the data that is backed up to the DS-System, BLM Archiver, or Local-Only storage.
- **Based on Stored Size** – Invoicing is based on the actual size occupied by files on the DS-System, BLM, or Local-Only storage.
- **Based on Native Size** – Invoicing is based on the original size of the latest generation of all backed up files. This is the restorable size, including files deleted from source.

d) In the **Stop Backup level ... % over the quota** box, enter a value at which DS-System will stop all backups for the customer(s).

e) To send an email notification when a percentage of the quota is consumed, select the **Send E-mail when the following are reached** check box, and enter the values for the warning levels.

f) Click **Next**.

4. On the **Defaults for new DS-Clients** page, do the following:

a) Under **Default DS-Client Bandwidth Throttle**, select the bandwidth in the **To DS-System** box and in the **From DS-System** box. Your options are as follows:

NOTE: The **To DS-System** parameter limits the backup bandwidth of the DS-Client. The **From DS-System** parameter limits the restore bandwidth of the DS-Client.

- **Unlimited** – The backup or restore bandwidth is not limited to any value.
- **Limited to ... KB/sec** – The backup or restore bandwidth is limited to the specified value.
- **Scheduled** – You can adjust the bandwidth throttle as per a schedule. For more information, see Section 3.1, “Configuring a customer account”, on page 79.

NOTE: To modify the bandwidth settings for any DS-Client account, on the Customer menu, click Bandwidth Throttle. Select the check box beside each DS-Client account you want to configure.

---

b) Under **Default DS-Client Storage Quota**, select a quota. If you selected **Unlimited**, proceed to the next step.

NOTE: To modify the storage quota for a customer, select a customer. On the Customer menu, click Edit, and then click the Storage Quota tab.

---

c) If you selected **Limited to**, then beside **Limited to** enter a value.

d) In the **Calculation method** box, select a calculation method. Your options are as follows:

- **Based on Protected Size** – Original size of the data that is backed up to the DS-System, BLM Archiver, or Local-Only storage.
- **Based on Stored Size** – Actual size occupied by files on the DS-System, BLM, or Local-Only storage.
- **Based on Native Size** – Original size of the latest generation of all backed up files. This is the restorable size, including files deleted from source.

e) In the **Stop Backup level ... % over the quota** box, enter a value at which DS-System will stop all backups for the customer(s).

f) To send an email when specified warning levels are reached, select the **Send E-mail when the following are reached** check box, and then enter the values for the warning levels.

g) In the **History Interval** box, select the interval at which DS-System will record storage history information for the DS-Client.

h) Click **Next**.

5. On the **LDAP server settings** page, do the following:

a) To configure the LDAP server settings for the customer account, select the **Enable LDAP integration** check box.

b) Beside the **LDAP server** box, click **[...]**, and then do one of the following:

- To add a LDAP server, click **Add**.
- To modify a LDAP server, select the LDAP server and then click **Modify**.

NOTE: To delete a LDAP server, select the LDAP server, and then click **Delete**.

---

c) In the **IP address** box, type the IP address of the LDAP server.

d) In the **Port** box, enter the port number the LDAP server will use to communicate with the DS-System. The default port is 389.

NOTE: Do not change the port number unless you have a specific requirement to do so.

---

e) In the **Description** box, type a description to help identify the LDAP server.

f) In the **Authentication** box, select how the DS-System sends the credentials to the LDAP server. Your options are as follows:

- To connect with the user name and domain, select **Domain Account**.
- To connect with the user name and domain using NTLM (Windows only), select **NTLM**.
- To connect using the distinguished name (DN), select **Distinguished Name**.

g) If you selected **NTLM** (Windows only) or **Domain Account**, do the following:

1. In the **User name** box, type the user account on the LDAP server. This account must be able to list all of the LDAP server users and their status.
2. In the **User domain** box, type the domain where the user account will be validated.

NOTE: These credentials are used to configure LDAP user validation in the DS-Client. Each DS-Client will have a separate user account on the LDAP server.

---

h) If you selected **Distinguished Name**, in the **User DN** box, type the distinguished name of the user. This is usually in the following format: `cn=admin,cn=users,DC=domain,DC=company,DC=com`

i) In the **Password** box, type the password for the user account.

j) In the **Confirm password** box, re-type the password for the user account.

k) To automatically push the LDAP server configuration to other DS-Systems of a replication group, select the **Synchronize between DS-System Groups** check box.

l) To verify the configuration with the LDAP server, click **Verify**.

m) Click **Save**.

n) Select the LDAP server you want to use, and then click **Select**.

6. Click **Finish**.

3.2 Configuring the hotfix directory

If you have a large number of customers, you can place each hotfix in a separate directory and assign the hotfix to the customer's DS-Clients as required.

Each hotfix folder must have a unique name and be created as a subfolder in the AutoUpgrade folder on the DS-System. You can copy the hotfix file to the corresponding hotfix folder. If more than one hotfix is placed in the same folder, only the latest hotfix will be applied.

IMPORTANT: DS-Clients must be upgraded the to the same version as the DS-System to connect to the DS-System. Before applying any hotfix to the DS-System, read the hotfix release notes.

Before you begin:

A hotfix sub-folder must exist in the AutoUpgrade folder of the DS-System. This is the **Upgrade Path** parameter listed in the *dssys.cfg* file. If this key does not exist, you must add it and restart the DS-System.

- The hotfix folder must have a unique, easily identifiable name (such as "hot_fix_13_0_0_2" or "customer_abc_hotfixes").
- Place the corresponding hotfix files in this folder. If more than one hotfix version is placed in the same folder (such as "13.0.0.3" and "13.0.0.7"), only the latest version (13.0.0.7) will be applied.

To configure a hotfix directory:

1. On the **Customers** tab, select the DS-System or customer account for which you want to configure the hotfix directory.
2. On the **Customer** menu, select **Hotfix Directory**.
3. In the **Hotfix Directory** dialog box, do one of the following:
   - To display a list of customer accounts, select **Show customers**.
   - To display a list of DS-Client accounts, select **Show DS-Clients**.
   - To display all customer and DS-Client accounts, select **Show All**.
4. To filter the results, under **Select by**, do one of the following:
   - To filter by a customer account number, click **Account #**, type the account number or click **[...]** to select the customer account, and then click **Find**.
   - To filter by account number, click **Account #**, type the account number, or click **[...]** to select the account number, and then click **Find**.
   - To filter by DS-Client account number, click **DS-Client**, type the DS-Client number, or click **[..]** to select the DS-Client account, and then click **Find**.

5. Beside the **Hotfix Directory** box, click **[...]**. Select the hotfix directory you want to use, and then click **Select**.

NOTE: If a hotfix directory is set at the customer account level, all the DS-Clients associated with the customer account will use that hotfix directory unless an individual DS-Client is assigned to another hotfix directory. Once a DS-Client is configured with a hotfix directory, it will download the latest hotfix from that directory.

---

6. Select the customers or DS-Clients to which you want to apply the hotfix, and click **Apply**. The **Hotfix Directory** column will update automatically.
7. Click **Close**.

NOTE: You can use the DS-Client Version Report to track the version status of the DS-Clients.

3.3 Activating or deactivating a customer account delete lock

The delete lock feature allows you to override data deletion processes for all DS-Clients at the customer account level or at the individual DS-Client level. When a delete lock is applied, any request to delete data from the online storage for a locked DS-Client is denied. A Delete Lock icon identifies customer accounts that have been locked.

- If a BLM Archiver is available, any data that would be deleted is moved to BLM.
- If a BLM Archiver is not available, any on-demand delete request will fail and an error will be reported. Recycled generations deletion will not occur. For example, if a backup item is configured for 30 generations, and there are 30 generations online, with the delete lock, the next backup will not recycle (overwrite) the oldest generation. Instead, 31 generations will be kept online. This will continue as long as the delete lock is enabled on the DS-Client.

To configure a delete lock for a customer account:

1. On the **Customers** tab, right-click the customer account containing the DS-Clients you want to lock or unlock, and select **Activate Delete Lock** or **Deactivate Delete Lock**.
2. In the **Activate / Deactivate Delete Lock** dialog box, in the **Comment** box, type some descriptive information. This comment will be appended for historical purposes in the DS-System database.
3. Click **Lock** or **Unlock** to activate or deactivate the delete lock.

3.4 Deleting a customer account

You can delete a customer account only if there are no associated DS-Clients.

NOTE: For information about removing DS-Clients from a customer account, see Chapter 4, “Working with DS-Client accounts”.

To delete a customer account:

1. On the **Customers** tab, select the customer account you want to delete.
2. On the **Customer** menu, click **Delete**.
3. When the system prompts you to confirm that you want to delete the customer account, click **Yes**.

4 Working with DS-Client accounts

You must create a DS-Client account on the DS-System before your customers can use the DS-Client to back up data.

4.1 Configuring a DS-Client account

For each customer account, you must create a DS-Client account and then send the DS-Client number to the customer. For more information, see: Section 4.3, “Exporting DS-Client registration information”, on page 93.

NOTE: This procedure describes the pages in the New DS-Client Wizard, which correspond to the tabs in the Modify DS-Client dialog box.

To create a DS-Client account:

1. On the **Customers** tab, select the customer for which you want to create a new DS-Client account.
2. On the **DS-Client** menu, click **New**.
3. On the **DS-Client Connection info** page, do one of the following:
   - To allow connections from any IP address, select **Allow any IP**.
   - To allow connections from specific IP address(es), select **Specific IP Address(es)**.

   a) If you selected **Specific IP Address(es)**, do one of the following:
      - To add a DS-Client connection, click **Add**.
      - To modify a DS-Client connection, select the connection, and then click **Modify**.

      To specify a single IP address, select **Single IP**, type the IP address, and then click **OK**. To specify a range of IP addresses, select **IP Range**, type the IP addresses, and then click **OK**.

      NOTE: To remove a DS-Client connection, select the connection, and then click **Remove**.

      ---

   b) To require the DS-Client to be registered with the DS-System before backups can be performed, select the **Requires Registration** check box.

   c) Click **Next**.
4. On the **DS-Tools for the new DS-Client** page, do the following:

a) Select the features you want to enable for the DS-Client. Your options are as follows:

- **DS-Recovery Tools** – Enables the DS-Client to use the DS-Recovery Tools to perform item level backup and restore of Microsoft Outlook, Microsoft Exchange, and Microsoft SharePoint.
- **Local Storage** – Enables the DS-Client to keep the latest generation of the online data in local storage of a backup at the customer's DS-Client site.
- **Disc/Tape** – Enables DS-Client users to request a disc/tape backup of their data.
- **Antimalware/CDR** – Enables the DS-Client to scan File system or Microsoft 365 backups for malware and/or scan File System backups for potentially malicious or unauthorized content based on predefined policies during the backup and restore process.
- **Snapshot Manager** – Enables the DS-Client to use the Snapshot Manager feature to perform snapshot transfers.
- **Disable Common Files** – Enables DS-Client users to exclude backup files from common file storage reduction.
- **Backup Life Cycle Management** – Enables the DS-Client to use the BLM Archiver feature to archive data. If you select this tool, you must define at least one BLM billing scale.
- **Enable VM Replication** – Enables VM replication on the DS-Client.

b) In the **Local-Only Capacity** box, select the method you want to use to measure capacity, and then enter a value. This allows the data of a designated backup to be retained only in local storage at the customer's site. Your options are as follows:

- **Protected Size** – This is the original size of the data that is backed up to the DS-System, BLM Archiver, or Local-Only storage.
- **Stored Size** – This is the actual size occupied by files on the DS-System, BLM Archiver, or Local-Only storage.
- **Native Size** – This is the original size of the latest generation of all backed up files. It is the restorable size, including files deleted from source.

c) In the **Local DS-VDR Count** box, enter a value for the total Local DS-VDR count that has been allocated to the DS-Client. The allocated count is reduced by one for each virtual machine that is cloned.

d) In the **Remote DS-VDR Count** box, enter a value for the total Remote DS-VDR count that has been allocated to the DS-Client. The allocated count is reduced by one for each backup that is configured to use the Remote DS-VDR feature.

e) If you enabled VM replication, do the following:

1. Beside **VM Replication Capacity**, specify if you want the capacity to be unlimited or enter the capacity amount.
2. Beside **VM Replication Count**, specify if you want the count to be unlimited or enter the number of replicated virtual machines.

f) Click **Next**.

5. On the **DS-Client parameters** page, do the following:

a) Under **Bandwidth Throttle**, select the bandwidth in the **To DS-System** box and in the **From DS-System** box. Your options are as follows:

NOTE: The parameter To DS-System limits the backup bandwidth of the DS-Client. The parameter From DS-System limits the restore bandwidth of the DS-Client.

- **Unlimited** – The backup or restore bandwidth is not limited to any value.
- **Limited to ... KB/sec** – The backup or restore bandwidth is limited to the specified value.
- **Scheduled** – You can adjust the bandwidth throttle as per a schedule. For more information, see Section 3.1, “Configuring a customer account”, on page 79.

b) Under **DS-Client Storage Quota**, to configure DS-Client quota management, select the **Enable DS-Client Quota Management** check box.

c) In the **Quota** box, enter the quota.

d) In the **Calculation method** box, select a calculation method. Your options are as follows:

- **Based on Protected Size** – Original size of the data that is backed up to the DS-System, BLM Archiver, or Local-Only storage.
- **Based on Stored Size** – Actual size occupied by files on the DS-System, BLM, or Local-Only storage.
- **Based on Native Size** – Original size of the latest generation of all backed up files. This is the restorable size, including files deleted from source.

e) In the **Stop Backup level box ... % over the quota** box, enter a value at which DS-System will stop all backups for DS-Clients of the customer(s).

f) To send an email when specified warning levels are reached, select the **Send E-mail when the following are reached** check box, and then enter the values for the warning levels.

g) Under **RLM Trial DS-Client**, to classify the recovery activities of the DS-Client separately during the trial period, select the **Trial DS-Client for restore activities** check box. You can enable this option only when creating a new DS-Client.

h) Click **Next**.

6. On the **DS-Client advanced options** page, do the following:

a) Under **DS-Client Report**, to enable users to view the stored size in a Backup Sets Report, select the **Show "stored size" in backup sets report** check box.

b) Under **Storage History Setting**, in the **History Interval** box, select the interval at which the DS-System will record storage history information for the DS-Client.

NOTE: This information is used in the Storage Trend Report. More frequent intervals require more space in the DS-System database, but provide more precise storage trend information.

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c) In the **Storage Group** box, select where the DS-System will save data that is backed up from the DS-Client. For information on how to configure a storage location, see Section 2.6.1, "Configuring an extensible storage location", on page 41.

- To add a storage group, click **[...]** beside **Storage Group**, and then click **Add**. Type a name and description for the storage group in their corresponding boxes, click **OK**, and then click **Close**.
- To modify a storage group, select a storage group, and then click **Edit**.

NOTE: To delete a storage group, select a storage group and then click **Delete**.

- To update the list of storage groups, click **Refresh**.

d) To enable two-factor authentication on the DS-Client, do the following:

1. Select the **Enable two-factor authentication** check box.
2. In the **Email Address** box, type the email address to which the DS-System will send notifications.

NOTE: When you enable two-factor authentication, only authorized users can delete a backup, backup data, or assign a retention rule to an existing backup while logged on to the DS-Client. Authorized users will be required to type an authentication code that the DS-System generates. If you disable two-factor authentication, you must type your current DS-Operator log on password in the **Password** box that appears

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e) In the **Description** box, type the descriptive text you want to appear beside the DS-Client number on the **Customers** tab.

f) Under **Mass Deployment**, do the following:

1. To specify the number of DS-Clients that can automatically register to use the mass deployment template, select the **Auto-registration counter** check box, and then specify the number of DS-Client accounts that can be created.

2. To include the computer name in the description of each DS-Client that registers to use the mass deployment template, select the **Fill up description with DS-Client computer name** check box.

NOTE: For more information on the DS-Client mass deployment template, see Section 4.13, “Using a DS-Client mass deployment template”, on page 104.

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g) Under **DS-Client Backup Policy**, do one of the following:

- To use the default DS-Client backup policy, select the **Use Customer's default Backup Policy** check box. For more information, see Section 3.1, “Configuring a customer account”, on page 79.
- To define a custom DS-Client backup policy, select the **Define a Backup Policy for this DS-Client** check box, and then click **Edit**. In the **Edit DS-Client Backup Policy** dialog box, type, copy and paste, or import the default backup policy text. For more information, see Section 4.12, “Using a centrally managed backup policy”, on page 103.

h) Click **OK**.

7. Click **Finish**.

4.2 Viewing DS-Client information

You can view information about a DS-Client once it is connected to the DS-System.

To view DS-Client information:

1. On the **Customers** tab, select the DS-Client for which you want to view the information.
2. On the **DS-Client** menu, click **DS-Client Info**. The following information is displayed:

Parameter	Description
DS-Client Grid Node	Information about a specific grid node. This field appears only for Grid DS-Clients.
Computer Name	Name of the computer.
Operating System	Operating system of the computer.
Database Build	Build number of the database.
DS-Client Build	Build number of the DS-Client application.
DBMS	Name of the database being used.
Instance	IP address of the database instance.
DS-Client Version	Version of the DS-Client.
Installation	Type of DS-Client installation.
Info Received	Date and time when the information was received by the DS-System.
Private Encryption Key Available	Indicates if the DS-Client private encryption key has been saved in the DS-System database.
Account Encryption Key Available	Indicates if the DS-Client account encryption key has been saved in the DS-System database.
Encryption Keys Received at	Date and time the encryption keys were received by the DS-System.

Table 1 DS-Client information

3. Click **Close**.

4.3 Exporting DS-Client registration information

You can export the registration information for a DS-Client to a CRI (Customer Registration Information) file for distribution to the customer. The customer can browse for this file during the DS-Client installation

NOTE: To export multiple CRI files, add the **External IP Addr** parameter to the DS-System configuration file (dssys.cfg). If the value is set, the **DS-System Address** box will be populated with those IP addresses. For more information see, Section 2.18, “Updating the DS-System configuration file parameters”, on page 75.

To export DS-Client registration information:

1. On the **Customers** tab, select the DS-Client account for which you want to export DS-Client registration information.
2. On the **DS-Client** menu, click **Export Registration Info**. The information that will be exported to the CRI file is displayed.

   NOTE: If you have configured the DS-Client to forward its encryption keys, you have the option of exporting them to the CRI file so that anyone can recreate a functioning copy of the DS-Client. To export the encryption keys, select the **Export DS-Client Encryption Keys** check box.

3. To add or modify an IP address, beside **DS-System Address**, click **[...]**, and then click **Add** or **Modify**. Type the IP address of a DS-System and click **OK**. By default, the DS-System Address box is populated with all available private IP addresses used by the DS-System.

   NOTE: To delete an IP address, select the IP address, and then click **Delete**.

4. In the **Save as** box, a default path and file name are suggested. You can change the path and file name as required.
5. Click **OK**.

4.4 Running System Admin on a DS-Client account or backup

You must regularly run the System Admin process to update the storage information. This information is used in the various reports generated by the DS-System. You can run the System Admin process at the DS-Client level or backup level.

To run System Admin:

1. On the **Customers** tab, select the DS-Client account or backup for which you want to run the System Admin process.
2. On the **DS-Client** menu, click **Run System Admin**.

NOTE: For a backup, right-click the backup, and select **Run System Admin**.

---

3. If the DS-System is running in an N+1 configuration, in the **N+1 ID to Perform Activity** box, select the node on which you want to run the System Admin process.
4. To perform regular scans of the DS-System to update the statistical information, select the **Perform Regular Scan to Update Statistical Info** check box, and then select a method. Your options are as follows:
   - **Full**: The System Admin process scans all folders and files.
   - **Regular**: The System Admin process skips folders checked by a previous System Admin process, and scans only new or modified folders.
5. To perform a full scan of the DS-System to update the stored size invoice information, select the **Perform Full Scan to Update Stored Size Invoice Info** check box. This checks only the stored size. File consistency checks are not performed.
6. Click **OK**.

4.5 Configuring a DS-Client account for hardware registration

When a DS-Client connects to the DS-System for the first time, it automatically registers its hardware and operating system information with the DS-System database. If the DS-Client account is configured to register with the DS-System, each subsequent connection to the DS-System is validated against the registered hardware profile.

NOTE: Ensure the IP address of the DS-Client is correct and the **Requires Registration** check box is selected on the **DS-Client Connection** tab. For more information see, Section 2.3.1, “Configuring the connection settings”, on page 25.

You must coordinate this activity with the customer so they can manually register the DS-Client. For enhanced security, registration must be performed within the registration window you configure.

NOTE: Manual hardware registration must be performed only if an existing DS-Client requires reregistration.

To configure a DS-Client account for hardware registration:

1. On the **Customers** tab, select the DS-Client you want to configure for hardware registration.
2. On the **DS-Client** menu, click **Hardware Registration**.
3. To register the DS-System with a DS-Client along with a hardware reset, select the **Register with DS-Client Hardware Reset** check box.
4. In the **Registration Timer** box, enter the time in minutes the DS-System will allow for the DS-Client to complete the manual registration. The default is 5 minutes.
5. Click **OK**.

NOTE: If the hardware or operating system of a registered DS-Client computer is changed after it has been registered, the DS-Client will receive an error for all connections to the DS-System until it is reregistered.

4.6 Deactivating a DS-Client account

You must deactivate a DS-Client account before you can delete the files on the DS-Client. Deactivated DS-Client accounts appear in red on the Customers tab.

To deactivate a DS-Client account:

1. On the **Customers** tab, select the DS-Client account you want to deactivate.
2. On the **DS-Client** menu, click **Deactivate**.
3. In the **DS-Client #** box, type the DS-Client number.
4. Click **Deactivate**.
5. When the system prompts you to confirm deactivation, click **Yes**.

4.7 Reactivating a DS-Client account

You can reactivate a deactivated DS-Client account to use the same configuration it had at the time of deactivation.

To reactivate a DS-Client account:

1. On the **Customers** tab, select the DS-Client account you want to reactivate.
2. On the **DS-Client** menu, click **Reactivate**.
3. When the system prompts you to confirm reactivation, click **Yes**.
4. To specify a date when the service ends for DS-Billing, in the **Service Ends** box, enter a date.
5. Click **OK**.

4.8 Removing a DS-Client account and its backed up files

Removing files from a DS-Client is an irreversible action. You can remove files only from a deactivated DS-Client account. For more information, see Section 4.6, “Deactivating a DS-Client account”, on page 96.

NOTE: Depending on the DS-System configuration, files are either deleted immediately or moved to a trash folder. If deleted data is moved to the trash folder of the corresponding storage location, ensure you run periodic **Empty Trash** processes. For more information, see Section 2.6.3, “Emptying trash from an extensible storage location”, on page 44.

To remove a DS-Client account and its backed up files:

1. On the **Customers** tab, select the deactivated DS-Client you want to remove.
2. On the **DS-Client** menu, click **Remove DS-Client and backed up files**.
3. If the DS-System is registered with a BLM Archiver, do the following:
   - To save a copy of the data to the BLM Archiver before deleting it, select the **Archive all DS-Client data to BLM before deletion** check box.
   - To use a new BLM archive package, select the **Force new BLM Archive package** check box.
   - To allow the BLM archive package to contain references to older packages, select the **Use back-references** check box. This saves space by removing data redundancy. The default is for each archive package to contain all the required files.
4. In the **Password** box, type your DS-Operator password.
5. Click **Remove**.

4.9 Managing DS-Client upgrades

To perform an automatic upgrade of a DS-Client, you must approve and configure the DS-Client upgrade in the DS-Operator.

IMPORTANT: Without approval, the DS-System will not send the auto-upgrade package to the DS-Client.

Each DS-Client sends information to the DS-System every 24 hours indicating its status. This information includes the DS-Client version, type, platform, database, database location, and available database space. You can use this information to manage the upgrade process for all the DS-Clients in your environment by specifying whether you want to perform the upgrade the next time the DS-Client connects to the DS-System or schedule the upgrade for a specific date.

NOTE: To globally disable automatic upgrades, set the value of the AutoUpgrade advanced configuration parameter to 0 in the advanced configuration. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

The DS-User, DS-MLR, and DS-Recovery Tools installations download their automatic upgrade packages from the DS-Client, which retrieves the packages from the DS-System. The default folder location depends on the type of automatic upgrade package:

- DS-Client full release: `<Backup_Root>\Upgrade\Default\`
- DS-Client service pack or hotfix: `<Backup_Root>\Upgrade\`
- DS-User, DS-MLR, or DS-Recovery Tools: `<Backup_Root>\Upgrade\`

It is recommended to retain the default folder locations. However, you can select any location visible to the DS-System, provided the path is a valid physical drive or UNC path the DS-System can access without requiring a user name and password. You cannot use a mapped drive. If you change the default folder locations, you must manually copy any new upgrade files to the new folders.

NOTE: To configure the DS-Clients of a specific sales group with upgrade packages that have different software branding, you must use the DS-Billing application. For more information, see the *DS-Billing User Guide*.

To manage DS-Client upgrades:

1. On the **Setup** menu, click **DS-Client Upgrade Configuration**. The following information is displayed:

Column	Description
Customer Account	Name of the customer account.
DS-Client Number	Number of the DS-Client.
Version	Version of the DS-Client software.
Description	Description of the DS-Client.
Type	Type of installation.
Platform	Operating system on which the DS-Client is installed.
Database	Type of database installed on the DS-Client.
Available Locations	Selected location for the DS-Client database.
Received Time	Time when DS-Client information was received.
Action	Method to be used to perform upgrade.
Status	Status of the upgrade.
Approval Time	When the upgrade was approved.

Table 2 DS-Client Upgrade Configuration

NOTE: The space required for the DS-Client database is calculated as follows: 5 GB + 2.5 x the database size. An additional 2 GB of disk space is required to download the DS-Client upgrade package and extract its content to a temporary location. If the original DS-Client database is embedded PostgreSQL, the DS-Client will retain a copy of the database for 2 weeks after the upgrade, after which it will automatically remove it.

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2. In the **Customer Account** box, select the customer account for which you want to upgrade the DS-Clients.
3. In the **Version** box, select the version of the DS-Client you want to upgrade.
4. In the **Status** box, select the status of the DS-Client upgrade.

NOTE: If the current location does not have enough space for the DS-Client database, it will be displayed in red. To change the location of the DS-Client database, click […].

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5. Under **Multiple Items selection**, do one of the following:
   a) To select all DS-Clients, click **Select All**.
   b) To clear all DS-Clients, click **Deselect All**.
6. Under **Perform Upgrade**, do one of the following:

a) To perform the upgrade the next time the selected DS-Clients connect to the DS-System, click **On Connection**.

b) To perform the upgrade of the selected DS-Clients during a specific time period, click **On Schedule**, and then select the time period in the **From** and **To** boxes.

7. To approve the upgrade for DS-Clients in Pending status, select the DS-Client, and then click **Approve**.
8. To cancel the upgrade for DS-Clients in Approved status, select the DS-Client, and then click **Decline**. The DS-Client status changes back to Pending.
9. Click **Save**.

NOTE: If an approved upgrade fails for any reason, the DS-Client automatically rolls back to the previous version and the status changes to Failed. You can click the status message for more information. The DS-Client continues to function while you resolve the upgrade failure.

4.10 Managing DS-Client hotfixes

By default, hotfixes are automatically applied the first time the DS-Client connects to an upgraded DS-System. However, you can manage the hotfix process for all the DS-Clients in your environment by specifying whether you want to apply the hotfix the next time the DS-Client connects to the DS-System or schedule the hotfix for a specific date. If you disable automatic upgrades, you must manually perform upgrades and apply hotfixes on the DS-Client.

NOTE: DS-Client hotfixes must be placed in the DS-System Upgrade folder. For more information, see Section 3.2, “Configuring the hotfix directory”, on page 84.

To manage DS-Client hotfixes:

1. On the **Setup** menu, click **DS-Client Hotfix Configuration**. The following information is displayed:

Column	Description
Customer Account	Name of the customer account.
DS-Client Number	Number of the DS-Client.
Version	Version of the DS-Client software.
Description	Description of the DS-Client.
Type	Type of installation
Platform	Operating system on which the DS-Client is installed.

Table 3 DS-Client Hotfix Configuration

Column	Description
Action	Method to be used to apply hotfix.

Table 3 DS-Client Hotfix Configuration

2. Under **Multiple Items selection**, do one of the following:

   a) To select all DS-Clients, click **Select All**.

   b) To clear all DS-Clients, click **Deselect All**.

3. Under **Apply Hotfix**, do one of the following:

   a) To apply the hotfix the next time the selected DS-Clients connect to the DS-System, click **On Connection**.

   b) To apply the hotfix manually to the selected DS-Clients, click **Manually**.

   c) To apply the hotfix to the selected DS-Clients during a specific time period, click **On Schedule**, and then select the time period in the **From** and **To** boxes.

4. Click **Apply**.

5. Click **Save**.

4.11 Sending DS-System IP configuration updates to DS-Clients

The DS-System can send an update of its IP address configuration to its DS-Clients, including new, updated, or changed IP addresses.

NOTE: At least one existing DS-System IP address must be functional so the DS-Client can connect to receive the update.

To send DS-System IP configuration updates to DS-Clients, you must copy an XML format file to the Update folder on the DS-System machine. The name of the file determines if the update applies to all DS-Clients, DS-Client belonging to a specific customer account, or a specific DS-Client. For example:

- update.xml – Applies to all DS-Clients.
- update_xxxx.xml – Applies to all DS-Clients belonging to a specific customer (where xxxx is the account number, for example: update_CUST000001.xml).
- update_xxxx.xml – Applies to a specific DS-Client (where xxxx is the DS-Client number, for example: update_DSCXXXX00001.xml).

If more than one update is applicable to a specific DS-Client, the highest priority update will take precedence. The update priority is in the following sequence:

- An update specific to a DS-Client.
- An update specific to a customer account.

- An update for all DS-Clients.

The update file is an XML file with the following schema:

```
<!ELEMENT asigra-config-update
(system-connection,secondary-connection*)>
<!ELEMENT system-connection (dns*)>
<!ELEMENT secondary-connection (dns*)>
<!ELEMENT dns (#PCDATA)>
```

The DNS entries contain either the DNS name of the DS-System or the DS-System IP address. The following is a sample file:

```
<asigra-config-update>
   <system-connection>
      <dns> sys1.yourcompany.com </dns>
      <dns> sys2.yourcompany.com </dns>
      <dns> 192.168.1.203 </dns>
   </system-connection>
   <secondary-connection>
      <dns> backup1.yourcompany.com </dns>
      <dns> backup2.yourcompany.com </dns>
   </secondary-connection>
   <secondary-connection>
      <dns> 10.11.12.13 </dns>
   </secondary-connection>
   <secondary-connection>
      <dns> finalfallback.yourcompany.com </dns>
   </secondary-connection>
</asigra-config-update>
```

The DS-Client will download the auto-update during the System Admin process when it connects to the DS-System. The DS-Client will save the update file as *update.xml* in the buffer path.

The DS-Client will replace existing IP addresses from the primary connection entries with the newly received IP addresses (if any). In case the update does not contain any IP addresses, the existing primary connection will be retained.

NOTE: When DS-Systems are part of a DS-System replication group, their DS-Clients can be configured with secondary DS-System connection information for failover purposes. For more information on how to configure the DS-System for replication, see Section 9.8, “DS-System Replication”, on page 190.

In the XML update file, the primary DS-System connection is the first one and it is placed between the <system-connection> tags. This is the DS-System where backup data is normally sent. Later, the data is replicated to the other DS-Systems in the DS-System replication group (if the DS-Client has been shared for replication).

Secondary DS-System connection information is optional. You can update this information for DS-Clients to take advantage of the alternate replication DS-Systems, whenever they cannot reach the primary DS-System.

All other connections (to any other DS-System) are secondary connections, with each replication DS-System placed between its own set of <secondary-connection> and </secondary-connection> tags. Each secondary connection will be added as a separate line in the DS-System connection settings for the DS-Client.

4.12 Using a centrally managed backup policy

You can control the configurations and activities for a DS-Client remotely from the DS-System by enabling a centrally managed backup policy. All policies (backups, schedules, retention rules, etc.) are managed by the DS-System.

When you configure a centrally managed backup policy, the XML file must have the same structure as the config-update.xml. Sample XML files are available for the Windows DS-Client, Linux DS-Client, Mac DS-Client, DS-Mobile Client, and DS-Notebook Client on the DVD. You can modify the sample XML file as required, and then cut and paste or import the text as part of the configuration process. No validation is performed on the XML file so you must test and verify that it works.

After the centrally managed backup policy is configured, the DS-Client downloads the *backup_policy.xml* file from the installation directory the next time it connects to the DS-System. The DS-Client detects the changes and applies the updates each time you change the backup policy.

When the centrally managed backup policy option is enabled for the DS-Mobile Client (Windows) and DS-Notebook Client (Mac), the auto-configuration feature is disabled for the DS-Client. Only XML configurations obtained directly from the DS-System are applied. It will not apply to *config-update.xml* or *backup_policy.xml* files that are manually copied to the DS-Client installation directory.

NOTE: For instructions on how to configure a default backup policy for all DS-Clients belonging to a customer account, see Section 3.1, “Configuring a customer account”, on page 79. For information on how to configure a backup policy for individual DS-Client accounts, see Section 4.1, “Configuring a DS-Client account”, on page 87.

4.13 Using a DS-Client mass deployment template

The mass deployment feature allows you to use XML files to silently deploy a large number of Windows DS-Client accounts on the DS-System and automatically configure each DS-Client.

IMPORTANT: Mass deployment is supported only for standalone DS-Clients.

Instead of manually creating multiple DS-Client accounts, you can create a mass deployment template and reuse the same connection information for all DS-Client accounts you want to deploy under a customer account. For more information, see Section 4.3, “Exporting DS-Client registration information”, on page 93.

The DS-Clients initially connect to the DS-System to register as a template DS-Client and are automatically assigned a sequential DS-Client number.

IMPORTANT: When the Auto-registration counter reaches a value of 1, you cannot create any new DS-Clients. Until you clear the Auto-registration counter option, the template DS-Client account will not allow itself to be registered as an actual DS-Client account.

If the **Requires Registration** option is enabled in the template DS-Client account, the DS-System checks the hardware cookie it receives with those of all existing DS-Clients under the same customer account each time a new DS-Client request is received. If a matching cookie is found, the DS-System reassigns the existing DS-Client number corresponding to the matching cookie. If the **Requires Registration** option is disabled, a new DS-Client number is generated every time a new DS-Client installation is requested from the template DS-Client account. For more information on the mass deployment of DS-Clients, see the *DS-Client Mass Deployment Guide*.

4.14 Finding a customer or DS-Client account

You can search for a specific customer or DS-Client account.

To find a customer or DS-Client account:

1. On the **Customer** menu, click **Find Customer**.
   a) To find a customer in the list, select the customer, and click **Select**.
   b) To find a specific customer, in the **Customer Name** box, type the name of the customer that you require, and then click **Find**. Select the customer, and then click **Select**.
2. On the **DS-Client** menu, click **Find DS-Client**.
   a) To find a specific customer, in the **Customer Name** box, type the name of the customer, and then click **Find**. Select the customer, and then click **Select**.
   b) To find a specific customer account number, in the **Account #** box, type the customer account number, and then click **Find**. Select the DS-Client, and then click **Select**.
   c) To find a specific description, in the **Description** box, type the description, and then click **Find**. Select the DS-Client, and then click **Select**.
   d) To find a specific computer name, in the **Computer Name** box, type the name of the computer, and then click **Find**. Select the DS-Client, and then click **Select**.

NOTE: Under **Selection**, you can select the columns you want to view.

4.15 Locking a customer or DS-Client account

You can lock and unlock customer or DS-Client accounts. If a customer account is locked, none of the associated DS-Clients can connect to the DS-System. If a DS-Client account is locked, the DS-Client cannot connect to the DS-System.

To lock or unlock a DS-Client account:

1. On the **Customers** tab, select the customer or DS-Client account you want to lock or unlock.
2. To lock or unlock a customer account, on the **Customer** menu, click **Lock** or **Unlock**.
3. To lock or unlock a DS-Client account, on the **DS-Client** menu, click **Lock** or **Unlock**.

4.16 Exporting a customer or DS-Client account

You can export a customer or a DS-Client account to another customer account or DS-System.

NOTE: You can export data to the same extensible storage location or a different storage location. If you export to a location on the same storage volume, the import customer process will be faster.

Before you begin the export process, you must do the following:

- Ensure enough space is available for the export and import processes.
- Ensure the DS-System computer does not restart during the export process.
- Ensure enough logical space is available in each extensible storage location. If a storage location runs out of logical space, backup processes will not be allowed.
- Run the System Admin and autonomic healing processes on the DS-Client account you want to export.
- Deactivate the DS-Client accounts you want to export. For more information, see Section 4.6, “Deactivating a DS-Client account”, on page 96.

IMPORTANT: You must check for errors at each step during the export process.

1. On the **Customers** tab, select the customer or DS-Client account you want to export, and then do one of the following:
   - To export a customer account, on the **Customer** menu, click **Export Customer**.
   - To export a DS-Client account, on the **DS-Client** menu, click **Export DS-Client**.
2. In the **Processes to start** box, enter the number of threads you want to use to write data to the buffer. The default value is 3.
3. In the **Export to** box, type the path on the DS-System or DS-System network where you want to export the customer or DS-Client account, or click **[...]** to browse for the path.
   - For Windows, the path must be in the following format:

     `\\computer_name\share_path`
   - For Linux, the path must be a mount point in the following format:

     `/export_path`

4. Click **Start**.

NOTE: The Overwrite Options dialog box appears if the DS-System detects that usable data exists in the export location. This is possible if the previous export process was stopped or interrupted. You can choose to overwrite the data and restart from the beginning or try to resume from the point before the first error.

---

5. To save customer logs that are not imported to the new DS-System, do the following:

   a) On the **Customers** tab, select the customer account for which you have just started the export process.

   b) On the **Customer** menu, click **Export History**.

   c) Click **[...]**, and select a path (buffer directory) on the DS-System or DS-System network to save the history (database logs) for this customer.

   d) Click **Save**.

4.17 Importing a customer or DS-Client account

Any customer or DS-Client account that has been successfully exported can be imported to a new customer account on the same DS-System or a different DS-System. For more information, see Section 4.16, “Exporting a customer or DS-Client account”, on page 106.

Before you begin the import process, you must create a target DS-Client account on the destination DS-System under the required customer account. For more information, see Section 4.1, “Configuring a DS-Client account”, on page 87.

IMPORTANT: The new customer account must have the same account encryption key as the original customer account.

To import a customer or DS-Client account:

1. On the new destination DS-System, do the following:

   a) On the **Customers** tab, select the customer or DS-Client account you want to import, and then do one of the following:

   - To import a customer account, on the **Customer** menu, click **Import Customer**.
   - To import a DS-Client account, on the **DS-Client** menu, click **Import DS-Client**.

b) In the **Import from** box, type the path on the DS-System or DS-System network where you want to import the customer or DS-Client or click **[...]** to browse for the path.

c) Click **Start**. One of the following will occur:

- If the DS-System can find a storage location on the same volume as the specified path, the **Move** dialog box appears. The data (excluding library files) is moved to the storage location, but the storage distribution might not be balanced after the import process.
- If the logical size available to the DS-System in the storage location is less than the data being moved, a warning message appears. There is enough physical space because the move process is simply renaming files in the storage location. However, the DS-System cannot move new files into that storage location because the DS-System does not have enough available logical space.
- If the DS-System cannot find a storage location on the same volume as the specified path, and you click **Yes** in the confirmation dialog box, the DS-System automatically balances the import of data among all its storage locations for the storage group of the DS-Client account.

2. On the old source DS-System, do the following:

a) Select the imported DS-Client account.

b) On the **DS-Client** menu, click **New Registration Info**.

c) In the **Enter New Registration Info** dialog box, do the following:

1. In the **Account #** box, type the new account number of the DS-System.
2. In the **DS-Client #** box, type the new account number of the DS-Client.
3. In the **DS-System address** box, type the new IP address of the DS-System.
4. Click **Save**.

You must inform your customer of their new DS-Client number so they can update their DS-Client configuration with the new DS-Client number and DS-System IP address. You can also export the registration information for the DS-Client to a CRI file. For more information, see Section 4.3, “Exporting DS-Client registration information”, on page 93.

4.18 Activating a customer or DS-Client account delete lock

You can override data deletion processes at the customer or DS-Client account level. Once a delete lock is applied, any request to delete data from a locked customer or DS-Client account will be denied. A Delete Lock icon denotes customer or DS-Client accounts that have been locked.

- If a BLM Archiver is available, any data that would be deleted is moved to BLM.
- If a BLM Archiver is not available, any on-demand delete request (including delete from a retention process) will fail and an error will be reported. Recycled generations deletion will not occur. For example, if a backup item is configured for 30 generations, and there are 30 generations online, with the delete lock, the next backup will not recycle (overwrite) the oldest generation. Instead, 31 generations will be kept online (overriding the DS-Client's backup setting). This will continue as long as the delete lock is enabled on the DS-client.

To activate a customer or DS-Client account delete lock:

1. On the **Customers** tab, right-click the customer or DS-Client account you want to lock, and then click **Activate Delete Lock** or **Deactivate Delete Lock**.
2. In the **Comment** box, type some descriptive information. This comment will be appended for historical purposes in the DS-System database.
3. Click **Lock** or **Unlock**.

4.19 Resetting the LDAP user settings

If you configured the customer account to integrate with a third-party LDAP server, you can reset the LDAP user settings for an associated DS-Client. Resetting the LDAP user settings will force the DS-Client to validate the settings again, including the password, before the DS-System will permit any DS-Client activities.For more information, see Section 3.1, "Configuring a customer account", on page 79.

To reset the DS-Client account LDAP user settings:

1. On the **Customers** tab, select the DS-Client account for which you want to reset the LDAP user settings.
2. On the **DS-Client** menu, click **Edit**, and then click the **LDAP** tab.
3. Click **Reset**.

4.20 Deleting a DS-Client account

You can delete an unregistered DS-Client account immediately. Unregistered DS-Clients appear blue on the Customers tab.

To delete a DS-Client account:

1. On the **Customers** tab, select the DS-Client account you want to delete.
2. On the **DS-Client** menu, click **Delete**.
3. When the system prompts you to confirm you want to delete the DS-Client account, click **Yes**.

NOTE: If you manually delete a shared DS-Client from one DS-System in a replication group, replication will not automatically remove replicated DS-Clients from the replication DS-System. You must manually deactivate and remove the DS-Client from each replication DS-System.

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5 Managing the DS-System

You can manage the DS-System, including backing up and recovering the DS-System database.

5.1 Backing up the DS-System database

By default, the Windows DS-System performs a full database backup to the primary storage location once a day at midnight and appends a differential dump to that database backup file every hour thereafter.

We recommend you perform daily backups of the DS-System database and online storage data to an off-site location. If you have two or more DS-Systems, you can configure them for replication. For more information, see Section 9.8, “DS-System Replication”, on page 190.

IMPORTANT: You must not schedule additional Microsoft SQL Server maintenance jobs on the Microsoft SQL Server database, because the differential dumps depend on each previous differential backup.

5.2 Performing a daily DS-System database dump

When the DS-System starts, a database dump is automatically performed, provided a dump does not already exist from the current date. By default, the dump is located in the primary storage location, which you can configure using the **DBDumpPath** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

By default, the DS-System retains the last two database dumps. When consolidating SQL database dumps, the DS-System compresses the older database dump.

For Microsoft SQL Server databases, consider the following:

- The DS-System performs an hourly differential backup of the database. If the database dump for the current date does not exist, the DS-System performs a full database dump.
- If the database is in full recovery mode, the DS-System performs a backup of the transaction logs.
- DBCC is executed before the daily database dump. If DBCC fails, the database dump will not be performed.

IMPORTANT: The SQL service account must have read/write permission for the dump location (UNC path).

5.3 Recovering the DS-System database

The DS-System is configured to perform a full database backup every day. However, you might need to recover the database in the event of a hard disk failure.

To restore the disk holding the log files:

1. Perform a full backup of the DS-System database (data files) immediately.
2. Replace the failed disk.

To restore the disk holding the data files:

1. Back up the current active transaction log.
2. Replace the failed disk.
3. Restore the most recent backup of the database without recovering the database.
4. If you perform other backups between two consecutive daily backups, do the following:
   - If differential backups exist, restore the most recent one.
   - Restore each transaction log backup created since the database or differential backup in the same sequence in which they were created without recovering the database.

NOTE: You can restore the database to the state it was at the point of failure if the current transaction log file for the database is available and not corrupted.

---

5. Apply the most recent log backup and recover the database.

If you restore from an older DS-System database dump, you might have the following issues:

- New or modified DS-Client and customer information since the dump time are lost.
- Activity logs and Event Logs since the dump time are lost.
- Reports since the dump time are lost.
- Potential libraries information since the dump time is lost. Libraries might not get reused and new library creation will take longer for some library files.
- Invalid library links may prevent synchronization of backups and this means no backup or restore for that particular set until the links are manually fixed.
- Used libraries might be marked as unused in the restore database. The Clean Library process will delete these files and the restore process for these files will fail. This error will not be detected during the next backup. To resolve this issue, run a full System Admin process.

- New library numbers will start with the last ID found in the database, potentially overwriting existing libraries and rendering restored data useless.

The loss of information described in the first five points does not affect the online files. The issue described in the last point would result in overwriting valid files with new ones. Restoring files linked to such libraries will retrieve completely different files and will fail because of a different signature, encryption or compression.

To address this issue, do the following:

- Whenever you restore the database from an older dump, you must update the information in the database with the current online storage before proceeding further. This process adds records to the database for all the libraries created after the dump. Synchronization is triggered when the DS-System service starts, if the *db_number* has a negative value from the *ds_data* table in the database. For example, if the *db_number* is 231, change it to –231.
- After you restore the database dump, but before you start the DS-System service, ensure you run the latest installation to apply the latest database patches. Also ensure the **db_number** field from the **ds_data** table in the database has a negative value.

NOTE: We recommend you run a full System Admin process as soon as the DS-System service starts.

5.4 Recovering deleted data from the DS-System trash

If the trash feature has been enabled on the DS-System, deleted files are moved to the trash folder. However, the data is not deleted until the trash folder is emptied.

You can recover deleted data from the DS-System trash folder after it has been deleted from the DS-System online storage.

To recover deleted data from the DS-System trash folder:

- On the **Customers** tab, right-click the backup for which you want to recover deleted data, and then click **Recover from Trash**.

5.5 Monitoring critical errors

You can configure the DS-System to monitor for critical errors. If the number of critical errors exceeds the specified limit within the configured time period, the status of the DS-System changes to **Critical**. When in Critical status, the configured administrative processes are stopped or prevented from starting, which prevents any automatic corrective deletion of data by those processes.

To configure critical error monitoring:

1. On the **Setup** menu, click **Critical Errors Monitoring**.
2. Click the **Configuration** tab, and then do the following:
   a) To enable critical error monitoring, select the **Enable DS-System Critical Errors Monitor** check box.
   b) If the DS-System in critical status, click **Reset**.
   c) In the **Set DS-System to Critical status when errors limit reached** box, enter the number of errors that must occur for the DS-System status to change to Critical.
   d) In the **Time Period** box, select the time period that the specified number of errors must occur within for the DS-System status to change to critical.
3. To add or modify a monitored event, click the **Monitored Errors** tab, and then do one of the following:
   - To add a monitored event, click **Add** and then do the following:
     a) In the **Event #** box, type the unique number assigned to the specific event you want to be monitored.
     b) In the **Category** box, select the event category.
     c) In the **Type** box, select the event type.
     d) In the **Description** box, type a description for the event.
     e) Click **Add**.
   - To modify a monitored event, select the event, click **Modify**, and then do the following:
     a) In the **Type** box, select the event type.
     b) In the **Description** box, type a description for the event.
     c) Click **Modify**.
   - To search for a specific event that has occurred on the DS-System, select the event, and the click **Select**. For more information, see Section 7.2, “Viewing the Event Log”, on page 133.
   - To delete a monitored event, select the event, and then click **Remove**.

4. To configure the administrative processes that must be stopped when the DS-System is in a critical status, click the **Administrative Processes** tab, and then do the following:

   a) To add an administrative process, click **Add**.

   b) In the **Administrative Processes** box, select the administrative process, and then click **Add**.

5. Click **OK**.

5.6 Viewing backup information

Backups are organized in a hierarchical order on the DS-System with the following structure

- DS-Systems contain customer accounts
- Customer accounts contain DS-Client accounts
- DS-Client accounts contain backups.

For backups on the DS-System, you can view information about backed up files, including generations of the same file and storage options.

To view backup information:

1. On the **Customers** tab, right-click the backup for which you want to view the information, and then select one of the following options:

   - **Fast Browse** – This option omits the statistics for large folders. The information is cached until you refresh or restart the service.
   - **Browse** – This option displays folder information, file information, and storage statistics.

2. Right-click the folder containing the files you want to view, and then click **Show Files**.

3. For additional information on the file, right-click the file, and then click **Storage info**. The **Storage Info** dialog box displays the following information:

Column	Description
Gen	Corresponding file generation.
Backup Time	Time stamp when the file was backed up.
Last Modified	Time stamp when the file was last edited.
File Type	DS-System online file type for the file that was backed up.
Link ID	• Master/Delta – If value is zero, there are no dependent generations. Any value other than zero, is the generation ID of the next generation in the delta chain. • Library File – ID of the DS-Library file.

Table 1 Storage information details

Column	Description
Flags	Backup option that has been applied to a particular file. P – Permissions S – Backup Streams G – Digital Signature M – Master File D – Delta E – Extended Attributes (Netware) B – Bindery (Netware) N – NDS (Netware) R – Registry (Windows) X – POSIX
Attr	Attribute of the backed up file. The options are: R – Read Only H – Hidden S – System A – Archive C – Compressed D – Directory
Size	Original size of the file.
DS Size	Actual size of the file as stored on the DS-System.
Stream Size	Full transmission size of the file, including file security, permissions, streams, etc.
Encryption	Type of encryption used for the file.
Compression	Type of compression used for the file.
Archive ID	Archive package number for the generation.
Archive Time	Time when the corresponding generation was pushed to BLM Archiver from the online storage. If there is data in this field, it means that this generation has been archived, and can be restored only from a BLM restorable image.

Table 1 Storage information details

4. To verify the link information for a specific generation of a file, which confirms the DS-System can find the required components for the backup generation, select the file, and then click Verify Link.

   - For Delta generations, this verifies the links to required data blocks in previous generations (back to the master).
   - For Master and Regular files, this verifies the link to the source file.
   - For Library files, this verifies the link to the source library file.

5. To optimize a master generation of a file by reducing the storage space it occupies, select the master generation, and then click Optimize. If the preceding generation is also a master, the DS-System converts it to a delta that depends on it.

NOTE: To optimize a backup, right-click the backup, and then select Run Master/Delta Optimize. By default, the DS-System optimizes the master files of the backup at the block-level and converts back-to-back masters into the

master-delta chain. Additional optimization depends on the **FixDeltaChain** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

6. To restore a specific backed up generation of a file, select the file, click **Restore**, and then do the following:
   a) In the **Private Key Type** box, select the encryption type. In the **Private Key** box, type the DS-Client private encryption key.
   b) In the **Account Key Type** box, select the encryption type. In the **Account Key** box, type the customer account encryption key.
   c) In the **Restore Reason** box, select the reason for the restore request.
   d) Click **Restore**.
   e) In the **Save as** window, select the destination for the restored file.

NOTE: Only one generation can be restored at a time. When attempting to restore a generation from a backup with multiple files and inter-dependent components, the restored files might not be usable. Even if you restore all the component files, you would require the DS-Client to resolve them to the original backup state. If the file is backed up with File Permissions / ACL (“P” flag) or Streams (“S” flag), those permissions or streams are not restored.

7. To refresh the list of files, click **Refresh**.
8. Click **Close**.

5.7 Viewing statistics

You can view the statistics for a customer account, DS-Client account, backup, or a folder within the backup. The information displayed shows the last backup date, original file size, and the file size occupied on the DS-System. These statistics categorize the backup files as library, regular, master, or delta.

To view statistics for a customer account, DS-Client account, or backup:

1. On the **Customers** tab, right-click the customer account, DS-Client account, or backup for which you want to view the statistics, and then click **Statistics**. The following tabs are displayed:
   - **System Admin Statistics** – Displays statistics gathered during the last System Admin process.
   - **Real-time Statistics** – Displays current statistics from the DS-System database.
   - **BLM Statistics** – Displays statistics from the BLM Archiver.

2. Click **Close**.

To view statistics for a folder in a backup:

1. On the **Customers** tab, right-click the backup containing the folder for which you want to view the statistics, and then click **Browse**.
2. Right-click the folder, and then click **Statistics**. The following information is displayed:

Columns	
Size (KB)	Original backup size of the file.
DS Size (KB)	Size of the file on the DS-System.
Files #	Number of files.
Rows	
Library	DS-Library common files.
Regular	Non-common files that do not have Master or Delta attributes.
Master	First backup of a DS-Delta file.
Delta	Subsequent backup of a file using th DS-Delta savings technology.
Archive	Archive stubs of files that have been pushed to archive. These files are available only from the BLM Archiver.
Total	Total for all file types.

Table 2 Item Statistics

3. Click **Close**.

5.8 Viewing library statistics

All items that are backed up to the DS-System are scanned to determine whether duplicate copies exist online. If a copy exists, the file is saved as a library file, which is a link to the common library file will be saved, rather than the entire file to reduce storage space on the DS-System.

Library files are saved in the client library, customer library, or public library, depending on where the duplication occurs:

- Common files within DS-Client backups are saved to the client library using the DS-Client encryption key.
- Common files within customer account backups are saved to the customer library using the customer account encryption key.
- Common files from different customer account backups are saved to the public library and no encryption is used.

To view the library statistics:

1. On the **Customers** tab, right-click the DS-System, customer account, or DS-Client account for which you want to view the library statistics, and then click **Library Statistics**.
2. Click **Close**.

5.9 Viewing library files

You can search for and view library files. The information displayed indicates the customer account, and DS-Client account using the selected library file.

To view library files:

1. On the **Setup** menu, click **Libraries**, and then do the following:
   - To view unencrypted library files, click **Public** tab
   - To view encrypted files associated with a customer account, click the **Customer** tab. Beside the **Account #** box, click **[...]**, and then select the customer account ID for which you want to view the library files.
   - To view encrypted files associated with a DS-Client account, click the **DS-Client** tab. Beside the **DS-Client #** box, click **[...]**, and then select the DS-Client number for which you want to view the library files.
   - To view unused library files, click the **Not Used** tab.
   - To view a specific library file by it's ID number, click the **Library ID** tab. In the **ID** box, enter the ID number of the library file.
2. To select the number of files to display with a specific characteristic, enter a number in the **Show first [...] with** box, and then select the characteristic.
3. Click **Find**.
4. To view the usage of a library file, select the library file, and then click **Select**. In the **Usage for Library file [...]** dialog box, select the library file, and then click **File Info**. The file information with the DS-System path, originating computer, backup name, and backup date is displayed under **File Information**.

5. To invalidate a library file that you suspect contains inaccurate or incomplete data, select the library file, and then click **Invalidate**. When the system prompts you to confirm, click **Yes**. In the **Libraries** dialog box, the **Valid** column indicates the current status of the library file.

NOTE: Data in invalidated libraries can be restored. For invalidated libraries, the DS-Client retransmits the library contents the next time a backup process identifies the same file has been backed up. Invalidating a library file means the actual common file stored in the DS-System online storage is replaced with the next backup that contains the common file.

---

6. To view the header and storage information of a library file, select the library file, and then click **Show Header**.
7. Click **Close**.

5.10 Viewing the Activity Monitor

You can view the activities currently running on the DS-System. The system backup summary process is the first process that appears in the Activity Monitor list and monitors the cumulative addition or removal of backup data to the DS-System from the time the DS-System service was started.

To view the Activity Monitor:

1. In the **Activity Monitor**, right-click the activity you want to monitor, and then click **Monitor**. The following information is displayed:

Parameter	Description
Working on	
Dir	Share\directory that is currently being processed.
Set	Computer\backup\owner associated with the directory that is currently being processed.
Stop	If available, click to stop the process.
Progress	
Library	Original size and number of files stored using the DS-Library storage scheme.
Delta	Original size and number of files stored using the DS-Delta storage scheme.
Regular	Original size and number of files stored as non-delta and non-library files.
Total	Total size (original) and number of files stored for the process.
Time	Elapsed time since the beginning of the process.
Errors	Number of errors that occurred during the process.
Warnings	Number of warnings that occurred during the process.
Physical	File space occupied by the files on the DS-System storage.
Status	Relevant status comments about the process.

Table 3 Current activity monitor details

NOTE: The *Working on* section contains real-time information on the current directory and backup that is being processed. The *Progress* section shows a breakdown of the categories of files being processed.

2. To view the events for a process, click **Events**. For more information, see Section 7.2, “Viewing the Event Log”, on page 133.

3. To stop a process, right-click the process, and then click **Stop**. This action is irreversible.

5.11 Viewing the current delta chain length information

You can view the current delta chain length information that applies to a specific backup or all backups in a DS-Client account.

To view the current delta chain length information:

1. On the **Customers** tab, right-click the DS-Client account or backup for which you want to view the current delta chain length information, and then click **Delta-Chain Length Info**.
   - For DS-Client accounts, a list of all the backups types and the current (DS-Client level) delta chain lengths that apply is displayed.
   - For backups, the specific delta chain length that is currently applicable is displayed.

   NOTE: For more information on configuring the delta chain settings, see Section 2.8, “Configuring the delta chain settings”, on page 56

2. Click **Close**.

5.12 Viewing the DS-Client monitoring settings for DS-NOC

You can view a list of the DS-Clients on the DS-System that are being monitored by the DS-NOC.

NOTE: You must enable this tool from the DS-NOC.If configured correctly, the DS-NOC automatically connects to the DS-System.

To view the DS-Client monitoring settings for DS-NOC:

1. On the **Setup** menu, click **DS-Client Monitoring Settings**. The following information is displayed:

Fields	Description
DS-NOC address	IP address of the DS-NOC monitoring the DS-System.
URL address	URL address of the DS-NOC monitoring the DS-System.
DS-NOC System name	Name of the DS-NOC monitoring the DS-System.
Connection Frequency	Frequency at which the DS-NOC will connect to the DS-System it is monitoring.
Retry when failure	Number of attempts DS-NOC will make to connect to the DS-System and the time interval between these attempts.

Table 4 DS-Client monitoring settings

Fields	Description
Synchronized at	Date and time at which the DS-System was synchronized.
Monitored DS-Clients	List of DS-Clients monitored by the DS-NOC displaying the customer account name, account number, and DS-Client account number.

Table 4 DS-Client monitoring settings

2. To remove a DS-NOC from the DS-NOC Address drop-down list, select the DS-NOC, and click **Remove**.
3. To update the information, click **Refresh**.
4. Click **Close**.

5.13 Sending DS-System maintenance notifications to DS-Clients

You can send notifications to DS-Client users regarding maintenance downtime or other messages as required. These messages appear under the menu bar of the DS-User when it is connected to the DS-Client.

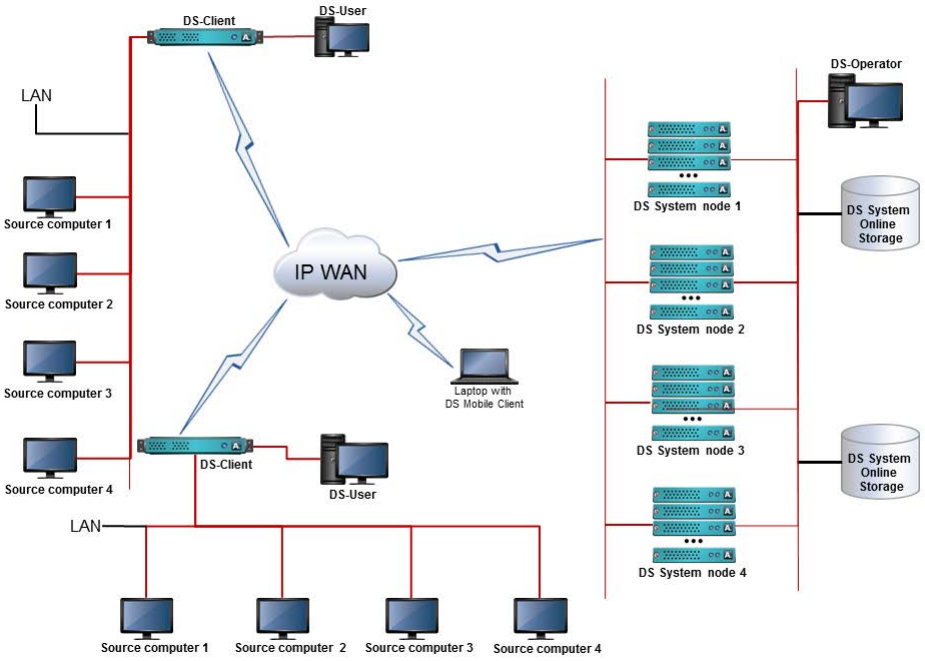
To send DS-System maintenance notification to DS-Clients:

1. On the **Setup** menu, click **Maintenance Notification**.
2. To send a notification, click **New**, and then do the following:
   a) In the **Send the following** box, select **Maintenance Notification**.
   b) Type the notification you want to send.
   c) Beside the **On** box, enter the date and time when the maintenance will occur.
   d) Beside the **for [...] hour(s)** box, enter the duration of the maintenance.
   e) Click **OK**. When the system prompts you to confirm, click **Yes**.
3. To send a message, click **New**, and then do the following:
   a) In the **Send the following** box, select **Message**.
   b) Type the message you want to send.
   c) Beside the **Expires on** box, select the date and time when the message will no longer be displayed.
   d) Click **OK**. When the system prompts you to confirm, click **Yes**.
4. To refresh the list of messages, click **Refresh**.
5. To delete a message, select the message, and then click **Delete**.
6. Click **Close**.

6 Managing an N1 configuration

An N+1 DS-System configuration consists of at least three DS-System nodes on the same LAN working together to provide backup and restore services for DS-Clients. Each DS-System node performs its own storage and retrieval activities, but shares a common database and online storage.

NOTE: The DS-System must be licensed for this type of configuration in the DS-License Server. For more information, see the *DS-License Server User Guide*.



To ensure the nodes do not run conflicting activities, one node is chosen as the DS-Director. The DS-Director node keeps track of the data storage, sends notifications, and distributes scheduled activities for the entire N+1 DS-System.

NOTE: For an N+1 DS-System with 10 or more nodes, the DS-Director is dedicated to DS-Director tasks only.

All the nodes share the backup processing load. If a node fails, the N+1 DS-System continues running as long as more than half of its nodes are active. This is represented by the formula (n/2)+1, as shown in Table 14.

Total number of nodes	Minimum number of active nodes required to keep system running	Maximum number of inactive nodes
3	2	1
5	3	2
8	5	3

Table 1 N+1 DS-System configuration formula

If the number of active nodes is less than the minimum number required to keep the system running, the N+1 DS-System switches to standby mode and waits until enough DS-System nodes start before accepting connections.

NOTE: For detailed instructions on how to install and configure an N+1 DS-System, see the *Server Software Installation Guide*.

6.1 Managing the N1 nodes

You can manage N+1 nodes without shutting down the entire N+1 DS-System.

To manage the N+1 nodes:

1. On the **N+1** menu, click **Status**.
2. Click the **List** tab, and then do the following:
3. To add an N+1 node, click **Add Node**, and then do the following:
   a) In the **IP/DNS** box, type the IP address or DNS name of the node you want to add.
   b) In the **Port** box, enter the port number the node will use for communicating with other nodes of the N+1 configuration.

      NOTE: Do not change the port number unless you have a specific requirement to do so.

   c) Click **OK**. The new node is displayed at the bottom of the list. Make a note of the node ID.

IMPORTANT: You must install the DS-System software on the new node and point to the same database and online storage used by the N+1 DS-System. Do not start the DS-System service.

4. To manually update the status of the N+1 nodes in the list, click Refresh. To update the status automatically after a specific interval, in the Refresh every [...] seconds box, enter the number of seconds.
5. To stop an N+1 node, select the node, click **Stop Node**, and then do the following:
   a) Select how you want to handle current activities on the DS-System. Your options are as follows:
      - **Wait for all running activities to complete** – Stops the DS-System on the selected node after all current activities are completed.
      - **Stop when all activities complete or force stop after [...] minute(s)**: Stops the DS-System on the selected node after all current activities are completed or forces the activities to stop after a specified time.
   b) Click **OK**. No new activities on the node will be allowed to run.
   c) Click **Close**.

IMPORTANT: You cannot restart a stopped node from the DS-Operator. If you stop the DS-Director node, you must reconfigure the N+1 DS-System.

---

6. To delete an N+1 node, select the node, and then click **Delete Node**. When the system prompts you to confirm you want to delete the node, click **Yes**.

NOTE: The node is marked as deleted in the N+1 Cluster config file. You can only remove the last node in the list after stopping the DS-System service or daemon.

---

7. To view the current status of the N+1 DS-System configuration, click the Graph tab, and then do the following:
   a) In the **Graph Layout** box, specify if you want to view the N+1 configuration in Linear or Star format.
   b) To update the status of the N+1 configuration automatically after a specific interval, in the **Refresh every [...] seconds** box, enter the number of seconds.
8. Click **Close**.

6.2 Viewing the N1 configuration Event Log

You can view the N+1 Log to see all the events specific to the N+1 DS-System configuration.

To view the N+1 configuration Event Log:

1. On the **N+1** menu, click **Log**.
2. To filter the results, under **Select by**, do the following:
   a) To specify a different start date and time, beside the **From** box, click **[...]**. No events before this date and time will be displayed.
   b) To specify a different end date and time, beside the **To** box, click **[...]**. No events after this date and time will be displayed.
   c) To filter by a specific event, from the **Event Type** box, select the activity.
   d) Click **Find**.
3. Click **Close**.

6.3 Upgrading a standalone DS-System to an N1 DS-System

Before you upgrade a standalone DS-System to an N+1 DS-System, you must determine how many nodes you require in the N+1 configuration and prepare the required hardware accordingly.

IMPORTANT: For Windows DS-Systems, if the storage locations are configured as local drives, you must change them to UNC paths in the DS-System *dssys.cfg* file and in the storage_locations table of the database.

To upgrade a standalone DS-System to and N+1 DS-System:

1. Use the DS-License Server application to configure the DS-System.
   - Change the DS-System configuration from **Standalone** to **N+1**.
   - Configure the IP address(es) for each node in the N+1 configuration. The DS-License Server will validate the license for the DS-System only if a connection is established with one of the IP addresses.
2. Stop the DS-System service or daemon on the standalone DS-System.
3. Install the DS-System software on each node in the N+1 configuration.
   a) Ensure all DS-System nodes can access the standalone DS-System database and online storage.
   b) During the installation process, select the database instance being used by the standalone DS-System and the existing primary storage location.

4. Update the *dssys.cfg* file for all the N+1 DS-System nodes and add the following line:

   `ClusterID : <number>`

   where `<number>` is a value from 1 to *n* that identifies the DS-System node in the N+1 configuration.

5. Update the N+1 configuration file:

   `<backup_root>/cluster/config`

   a) In the backup root of the DS-System, create a sub-folder named *cluster*.

   b) In the folder, create a text file called *config* and add the required lines to this text file in the following format:

   ```
   IP_of_node_#1 port_number
   IP_of_node_#2 port_number
   ```

IMPORTANT: Ensure the IP addresses are listed in the same order as the numbering of the N+1 nodes from the *dssys.cfg* file.

---

6. Start the N+1 nodes one-by-one to join the N+1 configuration, and then connect to the N+1 DS-System using the DS-Operator.

7. Update all DS-Clients with the new DS-System IP configuration information. Otherwise, the DS-Clients will connect to only one node which is the original standalone DS-System. For more information, see Section 4.11, “Sending DS-System IP configuration updates to DS-Clients”, on page 101.

7 Viewing logs

You can view logs from the DS-System database to see past activities and events that have occurred on the DS-System.

Old logs are cleared from the database based on the advanced configuration settings. You can also clear logs from the database manually. For more information, see Section 2.13.3, “Deleting the DS-System logs”, on page 61.

NOTE: If the log contains a large number of entries, a warning is displayed. You have the option to display a specific number of entries or can continue with the option of displaying all the entries, which can be a lengthy process.

7.1 Viewing the Activity Log

The Activity Log displays the activities that occurred on the DS-System.

To view the Activity Log:

1. On the **Logs** menu, click **Activity Log**.
2. To filter the results, under **Filter**, do the following:
   a) To specify a different start date and time, beside the **From** box, click **[...]**. No activities before this date and time will be displayed.
   b) To specify a different end date and time, beside the **To** box, click **[...]**. No activities after this date and time will be displayed.
   c) To filter by a specific activity, from the **Activity Type** box, select the activity.
   d) To filter by a specific customer account number, select **Customer**, click **[...]**, and then select the customer account number for which you want to view the Activity Log.
   e) To filter by a specific DS-Client account number, select **DS-Client**, click **[...]**, and then select the DS-Client account number for which you want to view the Activity Log.
   f) To filter by a specific backup, in the **Backup Set** box, type the backup ID number or click **[...]**, select the backup for which you want to view the Activity Log, and then click **OK**. By default, this field is empty and displays the Activity Log for all backups.
   g) To view the Activity Log for a particular node of the N+1 configuration, under **System ID**, select the node.
3. Click **Find**. The following information is displayed:

Column	Description
Account #	Customer account number associated with the activity.
DS-Client #	DS-Client number associated with the activity.
Type	Type of activity.
Description	Backup set associated with the activity.
Errors	Number of errors that occurred during the activity.
Warnings	Number of warnings that occurred during the activity.
Session Start	Date and time the activity was started.
Session End	Date and time the activity was completed.
Duration	Length of time between the start and end time.
Completion	How the activity finished: Premature – the activity was stopped before the process could complete normally. Successful – the activity completed normally. With errors # – activity completed normally, but with errors.
Files	Number of files that were transferred or processed.
Online Inc (Bytes)	Online incremental – net addition or reduction of data to the online storage after completion of the listed transfer session.
Online Amt (Bytes)	Total amount of regular (non-delta generation or library) files after completion of the session.
Transit Amt (Bytes)	Total amount of data transferred/processed between the DS-Client and DS-System (including compression & encryption).
Delta Amt (Bytes)	Total amount of data transferred or processed that are delta generation files, excluding master files.
Library Amt (Bytes)	Total amount of data transferred that was saved to the common files libraries.
ID	ID number of the activity.
Set ID	Backup set ID number for the corresponding activity.
Note	Additional information for the activity.
DS-Client Status	Reason why the DS-Client stopped the activity.

Table 1 Activity Log details

4. To view the Event Log for an activity, select an activity, and then click **Event Log**
5. To view the DS-Client Event Log, select an activity, and then click **DS-Client Event Log**.

NOTE: Some logs for the last activity of a DS-Client will not be available until the next activity connects from that DS-Client.

6. Click **Close**.

7.2 Viewing the Event Log

The Event Log displays the error, warning, and information messages that occurred on the DS-System for the period selected.

To view the Event Log:

1. On the **Logs** menu, click **Event Log**. By default the log displays all the events for the current day.
2. To filter the results, under **Select by** do the following:
   a) To specify a different start date and time, beside the **From** box, click **[...]**. No events before this date and time will be displayed.
   b) To specify a different end date and time, beside the **To** box, click **[...]**. No events after this date and time will be displayed.
   c) To view events of a specific type, in the **Type** box, select an event.
   d) To view events associated with a specific category, in the **Category** box, select a category.
   e) To view events associated with a specific user, in the **User** box, type the name of the user.
   f) To view events associated with a specific ID, select the **ID** check box, and then enter an ID number.

   NOTE: If you select ID, then the From and To parameters are not applicable.

   g) To view events associated with a specific event number, type the number in the **Event #** box.
3. To exclude specific events from the Event Log, click **Exclude**, and then do the following:
   a) To add an event to the exclusion list, in the **Event #** box, type the associated event number, and then click **Add**.
   b) To delete an event from the exclusion list, select the associated event number, and then click **Remove**.
   c) To remove all event from the exclusion list, click **Clear**.
   d) To select a particular event, click **Select**. In the **Select Event #** dialog box, select an event, click **Select**, and then click **OK**. This event number is then displayed in the **Exclude Event #** dialog box.
   e) Click **OK**.
4. Click **Find**. The following information is displayed:

Column	Description
Time	Date and time that the event occurred.
User	Name of the DS-Client or the DS-System user whose account logged the error.
Category	Category of the message.
Event #	The error ID code.
ID	The session ID number associated with the event.
Text	The IP connection, if available.
Description	description of the selected event.

Table 2 Event Log details

NOTE: To convert the physical path of a specific folder or file for an event, select the event, and then click **Convert**. For more information, see Section 2.16, “Converting a physical path”, on page 74.

5. Click **Close**.

7.3 Viewing the Audit Trail

The audit trail displays a record of all changes made to the DS-System database.

To view the Audit Trail:

1. On the **Logs** menu, click **Audit Trail**.
2. To filter the results, under **Select by**, do the following:
   a) To specify a different start date and time, beside the **From** box, click **[...]**. No activities before this date and time will be displayed.
   b) To specify a different end date and time, beside the **To** box, click **[...]**. No activities after this date and time will be displayed.
   c) To view the Audit Trail for a specific operation, in the **Operation** box, select the operation.
   d) To view the Audit Trail for a specific table in the database that was modified, in the **Table** box, select the table.
   e) To view the Audit Trail for a specific user, in the **User** box, type the user name.
3. Click **Find**. The following information is displayed:

Column	Description
Time	Time when the database change was performed.

Table 3 Audit Trail log details

Column	Description
User	Name of the user who performed the modification.
Operation	Type of operation that was performed on the database.
Table	Database table that was changed.
Description	Details of the database change.

Table 3 Audit Trail log details

4. Click **Close**.

7.4 Viewing the Recovery Log

The Recovery Log displays a record of all recovery-based activities, including DS-Client initiated restores, Disc/Tape requests, and individual file restores from either the DS-Operator or DS-NOC. This log is used to count the total recovery amount used for billing purposes.

To view the Recovery Log:

1. On the **Logs** menu, click **Recovery Log**.
2. To filter the results, under **Filter**, do the following:
   a) To specify a different start date and time, beside the **From** box, click **[...]**. No activities before this date and time will be displayed.
   b) To specify a different end date and time, beside the **To** box, click **[...]**. No activities after this date and time will be displayed.
   c) To view restore activities of a specific type, in the **Restore Type** box, select the type of restore that you want to view.
   d) To filter by a specific customer account number, select **Customer**, click **[...]**, and then select the customer account for which you want to view the Recovery Log.
   e) To filter by a specific DS-Client account number, select **DS-Client**, click **[...]**, and then select the DS-Client for which you want to view the Recovery Log.
   f) To filter by a specific backup, in the **Backup Set** box, type the backup ID number or click **[...]**, select the backup for which you want to view the Recovery Log, and then click **OK**. By default, this field is empty and displays the Recovery Log for all backups.
   g) To view the recovery activity for a specific backup, type the backup ID number or click **[...]**, select a backup, and then click **OK**.

3. Click **Find**. The following information is displayed:

Column	Description
Account #	Customer account associated with the corresponding activity.
DS-Client #	DS-Client associated with the corresponding activity.
Backup Set	Backup set associated with the corresponding activity.
Type	Type of restore that was performed and counts as a recovery activity.
Date	Date and time the recovery activity was started.
Size (Bytes)	Total size of the corresponding recovery activity.
Session ID	ID number of the corresponding activity.
Set ID	Backup set ID number of the corresponding activity.
DR Drill	Indicates if the recovery activity counts as a DR Drill.
Trial	Indicates if the recovery activity is a RLM DS-Client recovery.

Table 4 Recovery log details

4. Click **Close**.

8 Working with reports

You can generate, print, or export reports based on activities performed on the DS-System. You can also create custom reports based on the data from the DS-System database tables.

NOTE: A toolbar at the top of the report has icons that you can use to navigate, print, or save the report.

8.1 Generating a Backup Sets Report

The Backup Sets Report displays information about the backups associated with a customer or DS-Client account.

To generate a Backup Sets Report:

1. On the **Reports** menu, click **Backup Sets**.
2. To generate a report for all the backups associated with a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
3. To generate a report for all the backups associated with a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
4. In the **Branding** box, select the branding you want to apply to the report.
5. Click **View**. The following information is displayed:

Columns	Description
DS-Client #	DS-Client number.
Backup Set	Share/name/owner of the backup.
Protected Size	Protected size or original size of the backup data.
Stored Size	Stored size or size of the backup data on the DS-System.
Native Size	Original size of the latest generation of all backed up files. This is the restorable size, including files deleted from source.

Table 1 Backup Sets Report

6. To print the report, click the **Print** icon on the menu bar.
7. To export the report to a file, click the **Save** icon on the menu bar.

8.2 Generating a Backup Status Report

The Backup Status Report displays the status of backups associated with a customer or DS-Client account.

To generate a Backup Status Report:

1. On the **Reports** menu, click **Backup Status**.
2. Beside the **From Time** box, click **[...]**, and then enter the date and time from which you want to generate the Backup Status Report.
3. To view the report for all customer accounts, select **All Customers**.
4. To view the report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
5. To view the report for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
6. In the **Branding** box, select the branding you want to apply to the report.
7. To view the backup status for each DS-Client account, select the **Show DS-Client Backup Status** check box, and then do the following:
   - To view deactivated DS-Clients, select the **Include deactivated DS-Clients** check box.
   - To view unregistered DS-Clients, select the **Include unregistered DS-Clients** check box.
   - To view DS-Client backups with a specific type of status, select the **Show DS-Client Backup Sets** check box, and then select the status.
8. Click **View**. The following information is displayed:

Column	Description
Customer Name	Name of the customer.
Customer Backup Status Summary	Overall backup status of the customer for the report period.
DS-Client #	DS-Client number.
Description	Text that was entered for DS-Client properties.
Version	DS-Client version number at the last connection with DS-System.
Status	status of the backup activity.
Backup Status Summary	A summary of the backup activity.
Backup Set	Name and location of the backup.
Last Backup	Date when the last time a backup activity ran for the corresponding backup.
Completion	How the last backup activity finished for the corresponding backup.

Table 2 Backup Status Report

9. To export the report as an XML file, click **Export**, and then click **Save**.
10. To print the report, click the **Print** icon on the menu bar.
11. To export the report to a file, click the **Save** icon on the menu bar.

8.3 Generating a Backup/Restore Report

The Backup/Restore Report displays the backup and restore activities for a backup associated with a customer or DS-Client account for a specified period.

To generate a Backup/Restore Report:

1. On the **Reports** menu, click **Backup/Restore**.
2. Beside the **From** box, click **[...]**, and select the earliest date you want to display. No records before this date and time will be displayed.
3. Beside the **To** box, click **[...]**, and select the latest date you want to display. No records after this date and time will be displayed.
4. To view the report for all customer accounts, select **All Customers**.
5. To view the report for a specific customer account, select **Customer**, beside **Account #** click **[...]**, and then select a customer account.
6. To view the backup status for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** click **[...]**, and then select a DS-Client account.
7. In the **Branding** box, select the branding you want to apply to the report.
8. Click **View**. The following information is displayed:

Column	Description
Account # / DS-Client #	Customer account and DS-Client numbers for the corresponding activity.
Date	Date of the corresponding activity for he summary of a single DS-Client.
Connections	
Time (min)	Duration of connections to the DS-System.
#	Number of connections to the DS-System.
Backup Activities	
# of files	Number of files that have been backed up.
Protected Size	Original size of data backed up to the DS-System.
#	Number of backup activities
Restore Activities	
# of Files	Number of restored files.
Protected Size	Size of data restored.
#	Number of restore activities.

Table 3 Backup/Restore Report

9. To print the report, click the **Print** icon on the menu bar.
10. To export the report to a file, click the **Save** icon on the menu bar.

8.4 Generating a BLM Destruction Certificates Report

The BLM Destruction Certificates Report displays the destruction certificates generated by the BLM Archiver. You must enable the BLM module in the DS-System license for this report to be available.

To generate a BLM Destruction Certificates Report:

1. On the **Reports** menu, click **BLM Destruction Certificates**.
2. Select the year and month for which you want to generate the report.
3. To filter by a specific customer or DS-Client account, click **[...]**. Select the level at which you want to apply the search, and then click **OK**.
4. In the **Branding** box, select the branding you want to apply to the report.
5. Click **View**. The following information is displayed:

Column	Description
Destroyed Archive	Details of the archive package that was destroyed.
Backup Set Information	Details of the backup associated with the destroyed archive package.
Destruction Information	Details of the item destroyed and the destruction type.
Destruction Request	Details of who requested and who authorized the destruction.

Table 4 BLM Destruction Certificates Report

6. To print the report, click the **Print** icon on the menu bar.
7. To export the report to a file, click the **Save** icon on the menu bar.

8.5 Generating a DS-Client Version Report

The DS-Client Version Report displays the DS-Client version, the DS-Client type, and whether the DS-Client is compatible with the DS-System.

To generate a DS-Client Version Report:

1. On the **Reports** menu, click **DS-Client Version**.
2. To view the report for all DS-Client accounts, select **All DS-Clients**.
3. To view the report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
4. To view the report for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client.
5. In the **Sorted by** box, select how you want to sort the information in the report.
6. In the **Branding** box, select the branding you want to apply to the report.
7. Click **View**. The following information is displayed:

Column	Description
DS-Client #	Number of the DS-Client.
Customer Name	Name of the customer associated with the DS-Client.
DS-Client Type	Type of DS-Client and installation platform.
Version	Version of the DS-Client.
DB Build	Latest DS-Client database build patch that has been applied.
Compatible	Whether the DS-Client is compatible with the DS-System.
Operating System	Operating system running on the DS-Client computer.
Info Received	Last time that DS-Client connected with the DS-System and sent it's version information.
Statistics • Version information is available. • Version information is not available. • Total number of DS-Clients.	
Version Compatibility Comparison of the DS-Client versions with the DS-System version. • Compatible with (current DS-System version number) • Number of DS-Clients that need to be upgraded before they are compatible with the current DS-System version. • Number of DS-Clients that need to update their database to the latest build patch before they are compatible with the current DS-System version.	
Operating Systems Total number of DS-Clients installed on each operating system. • Windows • Linux • Mac OS	

Table 5 DS-Client Version Report

Column	Description
Windows DS-Clients List of Windows DS-Client installation configurations. • DS-Mobile DS-Clients • Standalone DS-Clients • Grid DS-Clients	
Linux DS- Clients • RedHat • SUSE	
Macintosh DS-Clients List of Macintosh DS-Client installation configurations. • DS-Notebook Clients • Regular DS-Clients (i386) • Regular DS-Clients (PowerPC)	

Table 5 DS-Client Version Report

8. To print the report, click the **Print** icon on the menu bar.
9. To export the report to a file, click the **Save** icon on the menu bar.

8.6 Generating a DS-VDR Usage Report

The DS-VDR Usage Report displays the DS-VDR Tool count and allocation for each DS-Client account on the DS-System.

To generate a DS-VDR Usage Report:

1. On the **Reports** menu, click **DS-VDR Usage**.
2. In the **Sorted by** box, select how you want to sort the information in the report.
3. In the **Branding** box, select the branding you want to apply to the report.
4. Click **View**. The following information is displayed:

Column	Description
DS-Client List	List of DS-Clients associated with the DS-System.
DS-Client #	Number of the DS-Client.
Customer Name	Name of the customer associated with the DS-Client.
Local DS-VDR Last Validation	The last time that the DS-Client validated it's Local DS-VDR license count with the DS-System.
Local DS-VDR Count	Local DS-VDR Count allocated by the DS-System Administrator to each DS-Client.
Local DS-VDR Used	The count when each time a DS-Client is used by a Local DS-VDR Tool to clone a Virtual Machine. This count is reduced by 1 and the value is updated when the DS-Client connects to DS-System.
Remote DS-VDR Count	Remote DS-VDR Count allocated by the DS-System administrator to each DS-Client.

Table 6 DS-VDR Usage Report

Column	Description
Remote DS-VDR Used	The count when each time a backup is configured for Remote DS-VDR from the DS-System side. This count is reduced by 1.

Table 6 DS-VDR Usage Report

5. To print the report, click the **Print** icon on the menu bar.
6. To export the report to a file, click the **Save** icon on the menu bar.

8.7 Generating an Enabled Tools Report

The Enabled Tools Report displays the tools enabled for a customer or DS-Client account.

To generate an Enabled Tools Report:

1. On the **Reports** menu, click **Enabled Tools**.
2. To view the report for all customer accounts, select **All Customers**.
3. To view the report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
4. To view the report for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
5. In the **Sorted by** box, select how you want to sort the information in the report.
6. In the **Branding** box, select the branding you want to apply to the report.
7. Click **View**. The following information is displayed:

Column	Description
DS-Client #	Number of the DS-Client.
Customer Name	Name of the customer associated with the DS-Client.
Enabled Tools	Tools enabled for the corresponding DS-Client.

Table 7 Enabled Tools Report

8. To print the report, click the **Print** icon on the menu bar.
9. To export the report to a file, click the **Save** icon on the menu bar.

8.8 Generating a Global List of Customers Report

The Global List of Customers Report displays the storage for each DS-Client on the DS-System.

To generate a Global List of Customers Report:

1. On the **Reports** menu, click **Global List of Customers**.
2. In the **Sorted by** box, select how you want to sort the information in the report.
3. In the **Branding** box, select the branding you want to apply to the report.
4. To include DS-Client accounts without any data in the report, select the **Include DS-Clients with no data** check box.
5. Click **View**. The following information is displayed:

Column	Description
DS-Client #	Number of the DS-Client.
Customer Name	Name of the customer associated with the DS-Client.
Creation Date	Date when the DS-Client was created.
Status	Status of the DS-Client.
Protected Size	Original size of data backed up to the DS-System.
Stored Size	Actual size of data on the DS-System.
Native Size	Original size of latest generation of all backed up files.

Table 8 Global List of Customers Report

6. To print the report, click the **Print** icon on the menu bar.
7. To export the report to a file, click the **Save** icon on the menu bar.

8.9 Generating a Local-Only Capacity Report

The Local-Only Capacity Report displays the DS-Clients that have Local-Only capacity allocated by the DS-System.

To generate a Local-Only Capacity Report:

1. On the **Reports** menu, click **Local-Only Capacity**.
2. In the **Sorted by** box, select how you want to sort the information in the report.
3. In the **Branding** box, select the branding you want to apply to the report.
4. Click **View**. The following information is displayed:

Column	Description
DS-Client #	Number of the DS-Client.
Customer Name	Name of the customer associated with the DS-Client.
Last Validation	The last time that the DS-Client validated it's local-only capacity with the DS-System
Calculation	How DS-Client is configured to calculate the amount of local-only storage used.
Quota (GB)	Local-Only capacity allocated to the DS-Client.
Used (GB)	Current local-only amount used.

Table 9 Local-Only Capacity Report

5. To print the report, click the **Print** icon on the menu bar.
6. To export the report to a file, click the **Save** icon on the menu bar.

8.10 Generating a Recovery Report

The Recovery Report displays the recovery activities for a customer or DS-Client account for a specified period. This report is available only if the DS-System is connected to a DS-License Server RLM.

To generate a Recovery Report:

1. On the **Reports** menu, click **Recovery**.
2. Beside the **From** box, click **[...]**, and select the earliest date you want to display. No records before this date and time will be displayed.
3. Beside the **To** box, click **[...]**, and select the latest date you want to display. No records after this date and time will be displayed.
4. To view the report for all customer accounts, select **All Customers**.
5. To view the report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
6. To view the report for a specific DS-Client account, select **DS-Client**, beside **DS-Client #** click **[...]**, and then select a DS-Client account.
7. In the **Category** box, select the recovery activity.
8. In the **Branding** box, select the branding you want to apply to the report.
9. Click **View**. The following information is displayed:

Column	Description
Account # / DS-Client #	Customer account number and the DS-Client number.
Date	Date of corresponding activities for the summary of a single DS-Client.
Online	Number of recovery activities from the DS-System online storage initiated by DS-Client and the restore amount.
Disc/Tape	Number of recovery activities involving Disc/Tape requests initiated either from DS-System or DS-Client and the restore amount.
DS-Operator	Number of recovery activities initiated from DS-Operator and the restore amount.
DS-NOC	Number of file recovery activities initiated from DS-NOC and the restore amount.

Table 10 Recovery Report

10. To print the report, click the **Print** icon on the menu bar.
11. To export the report to a file, click the **Save** icon on the menu bar.

8.11 Generating a Restore Activities Report

The Restore Activities Report displays the restore activities for a customer or DS-Client account for a specified period.

To generate a Restore Activities Report:

1. On the **Reports** menu, click **Restore Activities**.
2. Beside the **From** box, click **[...]**, and select the earliest date you want to display. No records before this date and time will be displayed.
3. Beside the **To** box, click **[...]**, and select the latest date you want to display. No records after this date and time will be displayed.
4. To view the report for all customer accounts, select **All Customers**.
5. To view the report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
6. To view the report for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
7. In the **Sorted by** box, select how you want to sort the information in the report.
8. In the **Branding** box, select the branding you want to apply to the report.
9. Click **View**. The following information is displayed:

Column	Description
Account #	Customer account number.
DS-Client #	Corresponding DS-Client number.
Activity ID	Unique activity ID.
Machine Name	Name of the original backup source computer.
Backup Set Name	Corresponding backup name.
Restore Reason	Reason for restore as specified by the user who performed the restore.
# of Files Restored	Number of files that were restored.
Stored Amount Restored	Space occupied by restored files (including compression) on the DS-System.
Native Amount Restored	Space occupied by files after being restored (and decompressed) to the target computer.
Restore Start Time	Time when the restore process started.
Restore End Time	Time when the restore process finished.
Duration	Duration of the restore process.

Table 11 Restore Activities Report

10. To print the report, click the **Print** icon on the menu bar.
11. To export the report to a file, click the **Save** icon on the menu bar.

8.12 Generating a RLM Trial Client Report

The RLM Trial Client Report displays the DS-Clients created with the **RLM Trial DS-Client** option that are still in the trial period. This report is available only if the DS-System is connected to a DS-License Server RLM.

To generate a RLM Trial Client Report:

1. On the **Reports** menu, click **RLM Trial DS-Client**.
2. To view the RLM Trial Client report for all customer accounts, select **All Customers**.
3. To view the RLM Trial Client report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
4. To view the RLM Trial Client report for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
5. In the **Sorted by** box, select how you want to sort the information in the report.
6. In the **Branding** box, select the branding you want to apply to the report.
7. Click **View**. The following information is displayed:

Column	Description
DS-Client #	Number of the DS-Client.
Customer Name	Company name from the customer profile.
Account #	Customer account number.
Service Start Date	Date when the DS-Client was created.
Trial End Date	Date when the RLM trial period ends.
Trial Recovery Count	Number of trial recoveries that have been performed.
Trial Recovery Size	Amount recovered for the trial recoveries.

Table 12 RLM Trial Client Report

8. To print the report, click the **Print** icon on the menu bar.
9. To export the report to a file, click the **Save** icon on the menu bar.

8.13 Generating a Storage Quotas Report

The Storage Quotas Report displays the storage limit quotas set for the customer and DS-Client accounts on a DS-System.

To generate a Storage Quotas Report:

1. On the **Reports** menu, click **Storage Quotas**.
2. To view the Storage Quotas report for all customer accounts, select **All Customers**.
3. To view the Storage Quotas report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
4. To view the Storage Quotas report for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
5. In the **Sorted by** box, select how you want to sort the information in the report.
6. In the **Branding** box, select the branding you want to apply to the report.
7. To view only customer or DS-Client accounts that have reached the stop backup level, select the **Show only Customers/DS-Clients that have reached Stop Backup Level** option.
8. Click **View**. The following information is displayed:

Column	Description
Customer Name	Name of the customer.
DS-Client #	Number of the DS-Client.
Quota	Maximum storage limit for the corresponding customer or DS-Client. • Customers – Total storage of all the DS-Clients of the customer must not exceed this quota. • DS-Client – Total storage of all the backups of the DS-Client must not exceed this quota.
Calculation	Method of quota calculation.
Used	Space currently used by the customer or DS-Client.
Used (%)	Space currently used as a percentage of the available quota.

Table 13 Storage Quotas Report

9. To print the report, click the **Print** icon on the menu bar.
10. To export the report to a file, click the **Save** icon on the menu bar.

8.14 Generating a Storage Usage Report

The Storage Usage Report displays the current storage usage for the customer and DS-Client accounts on the DS-System.

To generate a Storage Usage Report:

1. On the **Reports** menu, click **Storage Usage**.
2. To view the Storage Usage report for all customer accounts, select **All Customers**.
3. To view the Storage Usage report for a specific customer account, select **Customer**. Beside the **Account #** box, click **[...]**, and then select a customer account.
4. To view the Storage Usage report for a specific DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
5. In the **Sorted by** box, select how you want to sort the information in the report.
6. In the **Branding** box, select the branding you want to apply to the report.
7. Select the columns that you want to view in the report.
8. Click **View**. The following information is displayed:

Column	Description
Account #	Account number.
Customer Name	Name of the customer.
DS-Client #	Number of the DS-Client.
Protected Size	Actual size of files as they are backed up. Average – size of protected data since the beginning of the current month. Peak – highest amount of protected data since the beginning of the current month.
Stored Size	Current or physical size of files on the DS-System. Average – size of files since the beginning of the month. Peak – highest value of file size since the beginning of the current month.
Native Size	Protected size of the latest generation of all data that the DS-Client has backed up to the DS-System, including data deleted from source but still online.
BLM Protected Size	Actual size of files as they are backed up. Average – size of files since the beginning of the month. Peak – highest value of file size since the beginning of the current month.
BLM Stored Size	Physical size of files on the BLM Archiver. Average – size of files since the beginning of the month. Peak – highest value of file size since the beginning of the current month.

Table 14 Storage Usage Report

9. To print the report, click the **Print** icon on the menu bar.
10. To export the report to a file, click the **Save** icon on the menu bar.

8.15 Viewing the Activity Distribution Report

The Activity Distribution Report displays a visual representation of the activities from the Activity Log. Click an activity to view the activity detail. Double-click to view the associated Event Log.

To view the Activity Distribution Report:

1. On the **Reports** menu, point to **Charts**, and then click **Activity Distribution**.
2. Beside the **From** box, click **[...]**, and select the earliest date you want to display. No records before this date and time will be displayed.
3. Beside the **To** box, click **[...]**, and select the latest date you want to display. No records after this date and time will be displayed.
4. To view the Activity Distribution report for a specific customer account, select **Customer**, click **[...]**, and then select a customer account.
5. To view the Activity Distribution report for a specific DS-Client account, select **DS-Client**, click **[...]**, and then select a DS-Client account.
6. Click **Find**.
7. To filter the results by a specific system, under **System ID** select the DS-System.To view the report for large time periods, slide the **Zoom** bar to adjust the display.
8. Click an activity to view the activity details. The following information is displayed:

Column	Description
Account #	Customer account number associated with the activity.
DS-Client #	DS-Client number associated with the activity.
Type	Type oaf activity.
Description	Backup set associated with the activity.
Errors	Number of errors that occurred during the activity.
Warnings	Number of warnings that occurred during the activity.
Session Start	Date and time the activity was started.
Session End	Date and time the activity was completed.
Duration	Length of time between the start and end time.

Table 15 Activity Distribution Report

Column	Description
Completion	How the activity finished: Premature – the activity was stopped before the process could complete normally. Successful – the activity completed normally. With errors # – activity completed normally, but with errors.
Files	Number of files that were transferred or processed.
Online Inc (Bytes)	Online incremental – net addition or reduction of data to the online storage after completion of the listed transfer session.
Online Amt (Bytes)	Total amount of regular (non-delta generation or library) files after completion of the session.
Transit Amt (Bytes)	Total amount of data transferred/processed between the DS-Client and DS-System (including compression & encryption).
Delta Amt (Bytes)	Total amount of data transferred or processed that are delta generation files, excluding master files.
Library Amt (Bytes)	Total amount of data transferred that was saved to the common files libraries.
ID	ID number of the activity.
Set ID	Backup set ID number for the corresponding activity.
Note	Additional information for the activity.
DS-Client Status	Reason why the DS-Client stopped the activity.

Table 15 Activity Distribution Report

9. Double-click an activity to view the associated Event Log.
10. Click **Close**.

8.16 Viewing the DS-System Uptime Report

The DS-System Uptime Report displays a visual representation of when the DS-System was unavailable.

To view the DS-System Uptime Report:

1. On the **Reports** menu, point to **Charts**, and then click **DS-System Uptime**.
2. To view the report as a graph, click **Chart**.
3. To view the report with different parameters, do the following:
   a) In the **Year** box, enter the year.
   b) In the **Month** box, enter the month.
   c) In the **Every** box, enter the interval at which the data is collected.
   d) Click **Refresh**.
4. To view a summary of the total data, click **Statistics**.

8.17 Viewing the Load Summary Report

The Load Summary report displays the memory and transfer load placed on the DS-System.

To view the Load Summary Report:

1. On the **Reports** menu, point to **Charts**, and then click **Load Summary**.
2. In the **Chart Type** box, select whether you want to view a line or bar chart.
3. To change the information that is displayed, do the following:
   a) Click **Series**.
   b) Select the load summary data you want to view.
   c) Click **OK**.
4. Beside the **From** box, click **[...]**, and select the earliest date you want to display. No records before this date and time will be displayed.
5. Beside the **To** box, click **[...]**, and select the latest date you want to display. No records after this date and time will be displayed.
6. In the **Interval** box, select the interval on the horizontal axis of the load summary graph. The default interval is 1 day.
7. To update the display, click **Refresh**.

8.18 Viewing the Storage Summary Report

The Storage Summary Report displays the storage information for a customer or DS-Client account gathered from the System Admin process.

NOTE: You must schedule the System Admin to run with the Perform Regular Scan to Update Statistical Info option selected. For more information, see Section 2.14.3, “Scheduling the System Admin process”, on page 68.

To view the Storage Summary Report:

1. On the **Reports** menu, point to **Charts**, and then click **Storage Summary**. Hover the cursor over any point on the graph, to view the statistics.
2. Select an interval option to generate the report at a specific interval.
3. Beside the **From** box, click **[...]**, and select the earliest date you want to display. No records before this date and time will be displayed.
4. Beside the **To** box, click **[...]**, and select the latest date you want to display. No records after this date and time will be displayed.
5. Select **Customer**, click **[...]**, and then select the customer account for which you want to view the report.
6. Select **DS-Client**, click **[...]**, and then select the DS-Client account for which you want to view the report.
7. Click **Series**, select the items you want to view, and then click **OK**.
8. To adjust the placement of the graph on the chart, under **Scales**, select a value for **Amount**, **Time**, and **Files**.
9. Under **View**, select a display option.
10. Click **Refresh**. To view the statistics, hover your cursor over any point on the graph.
11. Click **Close**.

8.19 Viewing the Storage Trend Report

The Storage Trend Report displays the storage trend for the DS-System gathered from individual DS-Clients, based on their storage history settings.

To view the Storage Trend Report:

1. On the **Reports** menu, point to **Charts**, and then click **Storage Trend**.
2. Beside the **From** box, click **[...]**, and select the earliest date you want to display. No records before this date and time will be displayed.
3. Beside the **To** box, click **[...]**, and select the latest date you want to display. No records after this date and time will be displayed.
4. Beside **Displayed DS-Client**, click **[...]**, and then select the DS-Client account for which you want to view the storage trend report.
5. In the **Viewed Interval** box, select a value to change the interval at which the storage trend is displayed.
6. Under **View**, select a display option.
7. Click **Series**, select the items you want to view, and then click **OK**.
8. Click **Refresh**.
9. Click **Close**.

NOTE: The peak and average amounts are reset to the current stored or protected size at the beginning of each month.

8.20 Exporting DS-Client information to a file

You can export information about a DS-Client to a file.

To export DS-Client information to a file:

1. On the **Reports** menu, click **DS-Client Info**.
2. To export information for all DS-Client accounts, select **All DS-Clients**.
3. To export information for a DS-Client account associated with a specific customer account, select **Customer**, click **[...]**, and then select the customer account.
4. To export information for a specific DS-Client account, select **DS-Client**, click **[...]**, and then select the DS-Client account.
5. To include DS-Client accounts with no data, select the **Include DS-Clients with no data** check box.
6. To include the storage size for the previous month, select the **Storage size for previous month** check box.
7. In the **Sorted by** box, select how you want to sort the information.
8. Under **Column Selection**, select the columns you want to include in the exported CSV file.
9. Click **Export**.
10. Click **Close**.

8.21 Generating a customized report

You can generate your own reports based on the data provided from the database tables. A third-party application called JasperReports (https://www.jaspersoft.com) is required to create a customized report using the exported data set.

8.21.1 Exporting a data set file for a custom report

Before you generate a custom report, you must export a data set file containing the fields from the database. To generate multiple custom reports, you must use the data fields to create a reusable custom report template.

To create a data set file:

1. On the **Reports** menu, click **Customized Data**.
2. On the **Data Set** page, do the following:
   a) In the **Data Set** box, do one of the following:
      - To create a data set, select **<New>**.

- To use an existing data set, select a data set from the list.

b) In the **View** box, select a view, which is a pre-defined group of tables from the database. You can select only one view per data set.

c) Click **Next**.

NOTE: Data set selections are saved in the DS-Operator .ini file (oper.ini).

3. On the **Display Columns** page, do the following:

   a) To add a data field, select the field in the **Available Columns** list and then click **Add**. To select multiple fields, use the SHIFT or CTRL keys.

   b) To remove a data field, select the field from the **Selected Columns** list, and then click **Remove**.

   c) To change the order of the selected data fields, click **Up** and **Down**. This is the order in which the data fields will be written.

   d) Click **Next**.

4. On the **Order by columns** page, to select the order in which the data set will be sorted, do the following:

   a) To add a data field, select the field from the **Available Columns** list and then click **Add**. To select multiple fields, use the SHIFT or CTRL keys.

   b) To remove a data field, select the field from the **Selected Columns** list and then click **Remove**.

   c) To change the order of the selected data fields, click **Up** and **Down**. This is the order in which the data fields will be written.

   NOTE: If you do not make a selection, data will be written as it is read from the database. This sort order is not used by JasperReports.

   d) Click **Next**.

5. On the **Set Data Filters** page, to set the filters for the data, do the following:

NOTE: If you do not set any filters, all data is exported. If you set a filter, only data that matches the filter is exported.

a) In the **Filter Column**, select the data field that you want to filter.

b) Configure the available filter options for the data field. The **Filter Value** displays how the filter will be applied to the corresponding data field.

NOTE: If the filter value is left blank, no filter will be applied and all data for that field will be returned.

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c) Click **Next**.

6. On the **Data Set Name** page, specify a name for the data set as follows:

   a) In the **Data Set Name** box, type a name for the data set.

   b) To save the data set settings (except for data filters) in the DS-Operator .ini file (`oper.ini`) so that you can reuse the same data set, select the **Save data set settings** check box.

   c) To export the data set to a file, select the **Export data to file** check box.

   d) Click **Next**.

7. On the **Data Set Summary** page, review the summary to ensure that the data set is customized as required, and then click **Finish**.

8. If you selected the **Export data to file** option, save the data set as an XML or CSV file.

NOTE: To create a custom report template using Jasper reports, you must save the exported data set file in XML format. After you have created a jasper file, copy it to the local\report subdirectory where the DS-Operator is installed. If the folder does not exist, create it.

8.21.2 Creating a custom report using exported data

After you have exported a data set file, you can create a custom report using the exported data set.

To create a custom report using exported data:

1. On the **Reports** menu, click **Customized Reports**.
2. On the **Select a report template** page, do the following:
   a) In the **Template name** box, select a custom report template.
   b) In the **File name** box, the path to the custom report template is displayed.
   c) In the **Query string** box, the internal query that was specified when the report was created using JasperReports is displayed.
   d) In the **View** box, the view that the data set is based on is displayed.
   e) Click **Next**.
3. On the **Set Data Filters** page, do the following:
   a) In the **Filter Column**, select the data field that you want to filter.
   b) Configure the available filter options for the data field. The **Filter Value** column displays how the filter will be applied to the data field.

   NOTE: By default, all data is displayed in the report. If you set a filter, the custom report will display only data that matches the filter.

   c) Click **Next**.
4. On the **Select order by columns** page, do the following:
   a) To add a data field, in the **Available Columns** list, select the data field you want to add, and then click **Add**.
   b) To remove a data field, in the **Selected Columns** list, select the data field that you want to remove, and then click **Remove**.

   NOTE: To select multiple fields, use the SHIFT or CTRL keys.

   c) To change the order of the data fields, select the data fields, and then click **Up** or **Down**.This is the order in which the data fields will be written.

   NOTE: If you do not make a selection, data will be displayed as it is read from the database.

   d) Click **Next**.
5. On the **Confirm Report Summary** page, click **Finish**.

8.22 Configuring the font for reports

You can customize the font used in PDF reports the DS-System service generates for each DS-Operator.

To configure the font for reports:

1. On the **Reports** menu, click **Report Setup**.
2. In the **Report Font** box, click **Select**.
3. Browse for a font file, and then click **Open**.

   Click **OK**.

9 Using premium backup and recovery services

There are several premium backup and recovery services you can use.

9.1 Autonomic healing

Autonomic healing improves the integrity of a backup by automatically finding and attempting to correct corrupted files in the DS-System online storage.

You can run autonomic healing on demand or configure the process to run when the DS-System starts. The following factors affect the time to complete one pass of the DS-System storage:

- Number of storage locations on the DS-System.
- Number of files on the DS-System storage locations.
- Number of autonomic healing processes running on one DS-System storage location at the same time from multiple nodes.

Autonomic healing works at the file level for all backup data and features a speed throttle that enables it to slow down when the DS-System is experiencing a high load.

NOTE: To further reduce the scan time, you can configure the autonomic healing process to validate only the metadata information for a file by setting the value of the **DeltaCheckOption** advanced configuration parameter to 0. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

9.1.1 Autonomic healing vs. System Admin

Autonomic healing features advanced detection and repairing capabilities to continuously monitor the DS-System storage for data corruptions.

When corruptions are found, the autonomic healing process alerts the DS-System administrator with a notification for each backup and records the anomalies that can be fixed automatically or manually. The autonomic healing process either resolves the issue or moves the file to the trash location.

If the DS-System is part of a replication group, the autonomic healing process attempts to retrieve a correct version of the file from one of the other DS-Systems in the group. If the retrieval fails, the backup is marked as out-of-sync and the DS-Client is forced to synchronize the backup and resend a replacement for the corrupted file during the next backup session.

The Autonomic healing and System Admin processes do not delete files unless they are orphaned recycled generations. The files are moved to the trash directory under the Backup Root location.

Functionality	Description	Autonomic Healing	System Admin
Update Storage Statistics	Scan online size	No	Yes
	Update library link information in DS-System DB	No	Yes
	Update Statistical information	No	Yes
Running options	On-demand start/stop	Yes	Yes
	Speed adjust based on DS-System Load	Yes	No
	Minimum checking interval	1 hour	30 days
	Automatically resume on file level	Yes	No
	Balanced task assignment between processes	Yes	No
Reporting & Notification	Report damage/inconsistencies in Event Log	Yes	Yes
	Send notifications	Yes	Yes

Table 1 Autonomic healing vs. System Admin.

Functionality	Description	Autonomic Healing	System Admin
Check Capabilities	Check File Headers damage/ inconsistencies	Yes	Yes
	Check Directory Stream Headers damage/ inconsistencies	Yes	Yes
	Check library link damage/ inconsistencies	Yes	Yes
	Check Delta file damage/ inconsistencies	Yes	No
	Check file name damage/ inconsistencies across generations	Yes	No
	Check Directory ID/name damage/ inconsistencies	Yes	No
	Check File ID/name damage/ inconsistencies	Yes	No
	Check orphaned recycled generations caused by data damage/corruption	Yes	No
	Check session damage/inconsistent across generations	Yes	No
Fixing Capabilities	Delete corrupted files (move to deleted files folder)	Yes	Yes
	If DS-System is part of a replication group, attempt to retrieve the deleted files from a Replication DS-System. If all deleted files are successfully retrieved in this manner, skip step 3 (below).	Yes	Yes
	Mark backup as out-of-sync after deletion or corrupted files are fixed	Yes	Yes
	Fix files/directories ID damage/ inconsistencies	Yes	No
	Fix directory location damage/inconsistencies	Yes	No
	Fix file name damage/inconsistencies within directories	Yes	No
	Fix file name damage/inconsistencies across generations	Yes	No
	Fix delta linking/reconstruction damage/ inconsistencies	Yes	No
	Fix library link damage/inconsistencies	Yes	Yes
	Remove orphaned recycled generations caused by data damage/inconsistencies	Yes	No
	Clean recycled generations to optimize storage space.	No	Yes
	Fix session damage/inconsistencies across generations	Yes	No
Manager	Regular monitoring of the progress	Yes	Yes
	Separate monitor to monitor and manage the process on selected backups	Yes	No
	Integrated processing history management	Yes	No

Table 1 Autonomic healing vs. System Admin.

9.1.2 Autonomic healing vs. validation

The validation process verifies there are no corruptions or inconsistencies that would result in files not being restorable.

Function	Description	Autonomic Healing	Validation
Triggering	Triggered from DS-Client or DS-System	DS-System	DS-Client or DS-System
	Who makes decision when and how to run	Service provider	Customer
	Automatic triggering method	Configure	Schedule
	Can run continuously	Yes	No
Running options	On-demand start/stop	Yes	Yes
	Speed adjustable based on DS-System Load	Yes	No
	Can automatically resume on file level	Yes	Yes
	Customized selection (on dir/file/generation level)	No	Yes
Checking Capabilities	File Headers for damage/inconsistencies	Yes	Yes
	Directory Stream Headers for damage/ inconsistencies	Yes	No
	Library link for damage/inconsistencies	Yes	Yes
	Delta file for damage/inconsistencies	Yes	Yes
	File name for damage/inconsistencies across generations	Yes	No
	Directory ID/name for damage/inconsistencies	Yes	No
	File ID/name for damage/inconsistencies	Yes	No
	Orphaned recycled generations caused by data damage/corruption	Yes	No
	Session damage/inconsistencies across generations	Yes	No
	Corruptions causing decryption problems	No	Yes
	Corruptions causing decompression problems	No	Yes
	Corruptions causing digital signature does not match	No	Yes

Table 2 Autonomic Healing vs. validation

Function	Description	Autonomic Healing	Validation
Fixing Capabilities	Delete corrupted files (move to trash folder)	Yes	Yes
	If DS-System is part of a replication group, attempt to retrieve the deleted files from a Replication DS-System. If all deleted files are successfully retrieved in this manner, skip step 3 (below).	Yes	Yes
	Mark backup as out-of-sync after deletion or corrupted files are fixed	Yes	Yes
	Files/directories ID damage/inconsistencies	Yes	No
	Directory location damage/inconsistencies	Yes	No
	File name damage/inconsistencies within directories	Yes	No
	File name damage/inconsistencies across generations	Yes	No
	Delta linking/reconstruction damage/ inconsistencies	Yes	Partially
	Library link damage/inconsistencies	Yes	No
	Remove orphaned recycled generations caused by data damage/inconsistencies	Yes	No
	Clean recycled generations to optimize storage space.	Yes	No
	Session damage/inconsistencies across generations	Yes	No
Reporting	Damage/inconsistencies in Event Log	Yes	Yes
	Damage/inconsistencies in DS-Client Event Log	No	Yes

Table 2 Autonomic Healing vs. validation

9.1.3 Configuring the autonomic healing process

You can configure the autonomic healing process to scan specific backups and assign the priority.

To configure the autonomic healing process:

1. On the **Setup** menu, point to **Autonomic Healing**, and click **Autonomic Healing Manager**.
2. To filter the list, under **Select by**, do the following:
   a) To scan backups flagged as **Selected**, select the **Selected Backup Set** check box.
   b) To scan backups associated with a specific customer account, in the **Select** box select **Customer**, click **[...]**, and then select the customer account.
   c) To scan backups associated with a specific DS-Client account, in the **Select** box select **DS-Client**, click **[...]**, select the DS-Client account, and then click **Select**.
   d) To scan specific backup types, beside **Set Type**, click **[...]**, select the backup type, and then click **OK**.
   e) To filter the results by errors or warnings, in the **Errors/Warnings**, select the required option.
3. Under **View by**, select **Current** or **History** to switch between the current backup list and a historical list.
4. To update the list, click **Refresh**.
5. To view the Event Log of autonomic healing processes for a backup in the Event Log, select the backup, and then click **Event Log**.
6. To select the autonomic healing option(s) for a backup, select the backup, and then click **Set Options**. The options are as follows:
   - **Select** – Flags the backup for a one-time autonomic healing process.
   - **Promote** – Moves up the priority of a backup up in the autonomic healing processing order.
   - **Force DR scan** – Verifies all storage links in the extensible storage locations, which increases the duration of the autonomic healing scan.
   - **Full speed** – Removes all speed control settings for the autonomic healing process so the backup is processed as fast as possible.
7. To change the priority of a backup in the autonomic healing process order, select a backup, click **Set Priority**, and then select the priority level.
8. Click **Close**.

9.1.4 Starting the autonomic healing process

You can start the autonomic healing process on demand and run multiple autonomic healing processes concurrently. To view the status of the autonomic healing process for individual backups, open the Autonomic Healing Manager.

NOTE: You can schedule the autonomic healing process. For more information, see Section 2.14.1, “Scheduling autonomic healing”, on page 65.

You can open the **Autonomic Healing Manager** to view the status of individual backups and the autonomic healing process details at the backup level.

To start the autonomic healing process:

1. On the **Setup** menu, point to **Autonomic Healing**, and then click **Start Autonomic Healing**.
2. Do one of the following:
   - To process all backups continuously in the background, select **Process all backup sets (continuously in the background)**.
   - To process only the backups you configured, select **Process selected backup sets (once only)**.
3. In the **Processes to start** box, enter the number of concurrent autonomic healing processes you want to run.

   NOTE: Running several concurrent autonomic healing processes will decrease the overall performance of the DS-System.

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4. Click **Start**.

9.1.5 Stopping the autonomic healing process

You can stop the autonomic healing process at any time.

To stop autonomic healing:

1. On the **Setup** menu, point to **Autonomic Healing**, and then click **Stop Autonomic Healing**.
2. To stop the autonomic healing process, select one of the following options:
   - **Stop All Autonomic Healing** – Stops all running autonomic healing processes.
   - **Stop Selected Autonomic Healing** – Stops only on-demand autonomic healing processes. Scheduled and background autonomic healing processes continue to run.
   - **Stop Scheduled Autonomic Healing** – Stops only scheduled autonomic healing processes. On-demand and background autonomic processes continue to run.
   - **Stop Background Autonomic Healing** – Stops only background autonomic healing processes. On-demand and scheduled autonomic processes continue to run.
3. Click **OK**.

9.2 Backup Lifecycle Management (BLM)

You can use the Backup Lifecycle Management (BLM) feature with the DS-System, DS-Client, and BLM Archiver to copy, remove, and destroy backup data.

You can restore backup data that has been previously sent to the BLM Archiver from the DS-System (on-demand) or DS-Client (on-demand or scheduled).

Data is stored by the BLM Archiver in archive packages. Each restorable image represents data from a single backup and can contain multiple generations of files.

You must enable this feature as part of your license agreement and activate it through the DS-License Server. Once activated, the feature is automatically available to all DS-Client accounts on the DS-System.

NOTE: You must configure a BLM billing scale using the DS-Billing application. This billing scale is applied to DS-Client data stored by the BLM Archiver. For more information, see Section 9.4, “DS-Billing”, on page 176.

9.2.1 Registering a BLM Archiver

You must register each BLM Archiver you want to use with the DS-System. You must also register the DS-System with the BLM Archiver. For more information, see the *BLM Archiver User Guide*.

To register a BLM Archiver:

1. On the **BLM** menu, click **Register**.
2. In the **Address** box, type the IP address of the BLM Archiver you want to register with the DS-System.
3. In the **Port** box, enter the port the BLM Archiver will use to communicate with the DS-System.

NOTE: Do not change the port number unless you have a specific requirement to do so.

---

4. In the **Protocol** box, select the protocol to be used for communication between the DS-System and the BLM Archiver. The options are as follows:
   - **Encrypted**: All data between the DS-System and BLM Archiver is encrypted with a random encryption key on every connection.
   - **Standard**: This option is offered only for backwards compatibility with old service or daemon versions that do not have this feature.
5. In the **Assistant Threads** box, enter the number of additional file processing threads the DS-System will use for each BLM archiving activity. The default is 2.
6. In the **Bandwidth Throttle** box, select the bandwidth throttle the DS-System will use for BLM archiving processes. The options are as follows:
   - **Unlimited** – The bandwidth is not limited to any value.
   - **Limited to ... KB/sec** – The bandwidth is limited to the specified value.
   - **Scheduled** – You can adjust the bandwidth throttle based on a schedule. Click **[...]** and select a bandwidth throttle schedule. For more information, see the *DS-Billing User Guide*.
7. Under **Available Accounts**, click **Refresh** to update the list of available accounts. The available accounts are defined on the BLM Archiver. An account is displayed if the IP address of the DS-System matches or is within the range of IP addresses specified for the account on the BLM Archiver.
8. Select the DS-System, and then click **Finish**.
9. To modify the BLM Archiver settings, on the BLM menu click **Status**, modify the settings, and then click **OK**.

9.2.2 Creating a BLM archive request

You can create a BLM archive request on demand from the DS-System using the DS-Operator. You can also create a copy of the latest generation or all generations of the items in a backup.

To create a BLM Archive request:

1. Under **Customers**, right-click the backup for which you want to create a BLM archive request, and then click **BLM Archive**.
2. On the **Select items for archiving** page, select the items from the backup you want to include in the BLM archive package, and then click **Next**.
3. On the **Review selection and select archiving options** page, under **Archive Options**, do the following:
   a) In the **Session Label** box, type a description for the archive request.
   b) In the **Generations to include** box, select one of the following options:
      - **All** – Includes all the generations in the archive package.
      - **Latest** – Includes only the latest generation in the archive package.
   c) To use a new archive package rather than have the archive request added to the current archive package, select the **Close active package** option, and then select one of the following options:
      - **At session start** – A new archive package is created and the existing package is closed when the session starts. The new archive request is added to the new archive package.
      - **At session end** – The new archive request uses the existing archive package when the session ends. The existing package is closed when the archiving process is completed.

      NOTE: Once an archive package is closed, no new data is added to it. Subsequent archiving requests create new archive packages.

   d) To allow the archive package to contain references to older archive packages, select the **Reference previous archive packages** option. This reduces data redundancy.
   e) To use third-party snapshots for the BLM archive requests, select the **Use 3rd Party Snapshot** option. For more information, see Section 9.2.3, “Using a third-party snapshot with BLM Archiver”, on page 171.
4. Click **Finish**.

9.2.3 Using a third-party snapshot with BLM Archiver

When creating a BLM archive request, if you select the option to use a third-party snapshot, the DS-System integrates with the third-party software to create a snapshot of the required folders. Once the snapshot is created, the DS-System unlocks the backup and the BLM request is performed from the snapshot data.

If you do not select the option to use a third-party snapshot, the DS-System locks the backup for the duration of the BLM archive process.

IMPORTANT: Ensure the third-party software is installed and configured correctly, otherwise the backup will remain locked until you delete the BLM request.

If you select the option of creating a third party snapshot, DS-System integrates with the third-party software to create a snapshot of the required directories. Once the snapshot is created, DS-System unlocks the backup and the BLM request is performed from the snapshot data.

To use a third-party snapshot with BLM Archiver:

When using a third-party snapshot with the BLM Archiver, the following occurs:

- The DS-System writes a request file (sreq_n.txt) to the blm_pitc subfolder on the DS-System for the third-party software to read, where n is the request number. This file lists all the storage locations where the requested backup data is located.
- The third-party software reads the file and copies the data, and then writes a response file (sresp_n.txt) to the primary storage location in the blm_pitc subfolder on the DS-System. This file lists the image locations from where the DS-System should read the data.

  NOTE: The request and response files and must be in Text File Format (UTF-8, no Unicode marker) and the order of the folders must be identical.

- The third-party software deletes the request file (sreq_n.txt). The DS-System unlocks the backup.
- The DS-System starts copying data to the BLM Archiver from the third-party snapshot location.
- When the BLM archive process is finished, the DS-System deletes the response file (sresp_n.txt).

9.2.4 Viewing active BLM archive requests

You can view active BLM archive requests on the DS-System.

NOTE: For BLM archive requests that were stopped or interrupted, you can't restart or delete the request because the backup will remain locked until the archive process is finished or the request is deleted.

To view active BLM archive requests:

1. On the **BLM** menu, click **Active Archive Requests**.
2. Under **Filter**, do the following:
   a) To filter the list by customer account number, beside the **Account #** box, click **[...]**, and then select a customer account.
   b) To filter the list by DS-Client account number, beside the **DS-Client #** box, click **[...]**, and then select a DS-Client account.
   c) To filter the list by the creation date of the archive package, beside the **Created Before** or **Created After** box, click **[...]**, and then select a date.
   d) To update the list, click **Refresh**
3. To restart an archive request, select the archive request, and then click **Start**.
4. To delete an archive request, select the archive request, and then click **Delete**.
5. When the system prompts you to confirm, click **Yes**.
6. Click **Close**.

9.2.5 Registering a DS-Client with a BLM Archiver

The DS-Client account must appear in the BLM Archiver tree to import data to the BLM Archiver using the DS-Client tape converter. If a DS-Client account does not have any archive packages on the BLM Archiver, it will not appear in the tree.

To register a DS-Client with a BLM Archiver:

- Under **Customers**, right-click the DS-Client account you want to register with the BLM Archiver, and then click **Register DS-Client with BLM**. If successful, the DS-Client account appears in the corresponding BLM Archiver and the following confirmation is displayed in the DS-System Event Log:

  ```
  BLM connection established in order to register the DS-Client.
  No data will be transmitted.
  ```

NOTE: For information on how to import data from the DS-Client to the BLM Archiver using the DS-Client tape converter, see the *BLM Archiver User Guide*.

9.3 Disc/tape requests

For each disc/tape request, you can generate the restore data in disc/tape format. The DS-System copies the requested data to a buffer path. From that path, you can copy or burn the data to any media that you choose.

NOTE: A disc/tape request initiated from the DS-Client or DS-System will lock the corresponding backup until the request is successfully completed or deleted from the Disc/Tape Orders list.

When using disc/tape requests for disaster recovery purposes, you must create an **unlimited** media type to use for the disc/tape buffer and perform the write to buffer process using multiple threads.

9.3.1 Configuring the disc/tape media

Before you configure the disc/tape media, you must ensure the DS-System has sufficient buffer space where the files will be copied and a disc burner or tape writer, if applicable. The DS-Client must have the Disc/Tape tool enabled.

To configure the disc/tape media:

1. On the **Disc/Tape** menu, click **Media**.
2. In the **Disc/Tape Media** dialog box, do one of the following:
   - To add a new media type, click **Add**.
   - To modify a media type, select the media, and then click **Modify**.

   NOTE: To delete a media type, select the media, and then click **Delete**.
3. In the **Media Name** box, type a name for the media.
4. In the **Media Type** box, select the type of media.
5. Beside **Media Size**, select the size of the media from the following options:
   - **Limited size** – Disc/tape requests are written into buffer folders that will accommodate the size of the media.
   - **Unlimited size** – Disc/tape requests are written to a single buffer location, but can take advantage of multiple write threads for faster performance.

   NOTE: The media size option is available only for the disk media type.
6. In the **Total Capacity (MB)** box, type the capacity of each unit of the media type.

7. In the **Guard Size (MB)** box, type the buffer capacity that is subtracted from the total capacity of the media unit for the purpose of calculating how many units are required.
8. In the **Block Size (Bytes)** box, type the size of the smallest block the disk controller can read or write.

> ***NOTE:*** Do not change this value unless you have a requirement to do so.

9. Click **OK**.

You can now use the disc/tape option from the DS-Client to create disc/tape snapshots at the backup level from the DS-System. For more information, see the *DS-Client User Guide*.

9.3.2 Initiating a disc/tape request

DS-Client users can request a disc/tape backup on demand to obtain a snapshot of the latest generation of a backup or selective files from a backup.

To initiate a disc/tape request:

1. Under **Customers**, right-click the backup for which you want to initiate a disc/tape request, and then click **Disc/Tape Request**.
2. In the **Name** box, type the name of the customer.
3. In the **Phone** box, type the phone number of the customer.
4. In the **Address** box, type the address of the customer.
5. In the **Media** box, select the media you want to use.
6. Click **OK**. The request is added to the Disc/Tape Orders list. You can now write the requested data to the disc/tape buffer.

9.3.3 Generating a disc/tape order

To generate a disc/tape order, you must instruct the DS-System to write the files to the disc/tape buffer.

To generate a disc/tape order:

1. On the **Disc/Tape** menu, click **Generate**.
2. To filter the results, under **Select by**, do the following:
   a) To specify a different start date and time, select the **From** check box, click **[...]**, select a date, and enter the time. No orders before this date will be displayed.
   b) To specify a different end date and time, select the **To** check box, click **[...]**, select a date, and enter the time. No orders after this date will be displayed.
   c) To view the disc/tape orders for a particular customer, select **Customer**. Beside **Account #**, click **[...]**, and then select the customer account,
   d) To view disc/tape orders associated with a specific DS-Client account, select **DS-Client**. Beside **DS-Client #**, click **[...]**, and then select a DS-Client account.
   e) To update the list, click **Refresh**.
   f) Select a disc/tape request with the status **Purchased**, and then click **Write to Buffer**.

NOTE: For N+1 DS-Systems, you will be prompted to select which N+1 node will perform the activity.

---

3. In the **Generate Files to Buffer** dialog box, do the following:
   a) If you selected a disk media with unlimited size, in the **Processes to start** box, enter the number of threads you want to use to write data to the buffer.
   b) In the **Path** box, click **[...]**, and select the path where the disc/tape files will be written.
   c) In the **Restore Reason** box, select a reason for the disc/tape request.
   d) If the backup is currently available in a scheduled recovery drill period, in the **Restore classification** box, select the type of restore.
   e) Click **OK**.
4. In the **Disc/Tape Meta-data Encryption** dialog box, select the type of encryption you want to use for the metadata, and then click **OK**.

The **Overwrite Options** dialog box appears if you are retrying the **Write to Buffer** process for a disc/tape request and the DS-System detects that usable data exists in the disc/tape buffer. This can happen if the previous process was stopped. You can choose to overwrite the data and restart from the beginning or resume from the point where the last **Write to Buffer** process was interrupted. Click **OK**.

When complete, the request status displays **Finished** in the **Disc/Tape Orders** dialog box.

5. Copy the data from the buffer location to the media specified in the disc/tape request.
6. Click **More Info** and ship the media to the mailing address specified.
7. When the files in the buffer have been written to the selected media, mark the request as **Mailed**.
8. Select the order with the status **Finished**, and then click **Mark Mailed**.
9. Type the number of copies of the media to send and click **OK**. The files will be automatically deleted from the buffer.

   In the **Disc/Tape Orders** dialog box, the status of the order will change to **Mailed**. At this point, all data from that request in the buffer location is deleted.

   Once a request is **Mailed**, the accompanying charge will be applied to the DS-Client Additional Charges list for the applicable month, if it is configured in DS-Billing. For more information, see the *DS-Billing User Guide*.
10. To delete a request, select the request, and then click **Delete**. When the system prompts you to confirm, click **Yes**.

9.4 DS-Billing

Billing is performed using the DS-Billing application which is a separate module that can be configured to interact with the DS-System. For more information, see the *Server Software Installation Guide* and *DS-Billing User Guide*.

9.4.1 Registering a DS-Billing server

You must register each DS-Billing server you want to use with the DS-System. You must also register the DS-System with the DS-Billing server. For more information, see the *DS-Billing User Guide*.

To register a DS-Billing server:

1. On the **Billing** menu, click **Billing Registration**.
2. In the **IP** box, type the IP address of the target DS-Billing server.
3. Click **OK**.

9.5 DR Drill requests

DS-Systems licensed from a DS-License Server RLM can allocate DR Drill capacity to specific backups so you can perform a disaster recovery drill.

NOTE: This option applies only to DS-Systems that are connected to a DS-License Server configured for the Recovery License Model (RLM).

During the scheduled drill period, when a recovery activity is performed on a flagged backup, an additional option appears that allows you to specify if the activity is a DR Drill. The following recovery activities will show the Restore classification option if it is available in the DS-Operator:

- Disc/Tape requests when they are written to the buffer. For more information, see Section 9.3, “Disc/tape requests”, on page 173.
- Restore of a file generation via the DS-Operator.

Regular restores from the DS-System online storage initiated by the customer through the DS-User display the Restore classification option at the end of the restore wizard. For more information, see the *DS-Client User Guide*.

9.5.1 Configuring a DR Drill request

You can configure a DR-Drill request.

To configure a DR drill request:

1. On the **DR Drill** menu, click **Manage DR Drills**.
2. In the **DR Drill Requests** dialog box, do one of the following:
   - To add a DR Drill Request, click **Add**.
   - To modify a DR Drill Request, select the request, and then click **Edit**.

   NOTE: To delete a DR Drill Request, select the request, and then click Delete. You can delete DR Drills only when they are in Pending status.

3. In the **New/Update DR Drill Request dialog box,** do the following:
   a) In the **Backup Set** box, click **[...]**, and then select the backup you want to configure for a DR Drill.
   b) In the **Scheduled Start Date** box, select the date when you want the DR Drill to start for the selected backup.

c) In the **Quota** box, enter the maximum amount that can be restored for the backup during the DR Drill.

NOTE: The allocated amount is deducted from the DR Drill capacity of the DS-System license when the drill period starts. For more information, see Section 2.1, “Configuring the DS-License Server”, on page 15.

4. To filter the results, under **Select by**, do the following:

   a) To specify a different start date and time, beside the **From** box, click **[...]**. No activities before this date and time will be displayed.

   b) To specify a different end date and time, beside the **To** box, click **[...]**. No activities after this date and time will be displayed.

   c) To filter by customer account, select **Customer**. Beside the **Account #** box click **[...]**, and then select the customer account.

   d) To filter by DS-Client account, select **DS-Client**. Beside the **DS-Client #** box, click **[...]**, and then select the DS-Client account.

   e) To view the status of DR Drill requests, select the **Show DR Drill History** check box.

5. To update the list, click **Refresh**.

6. Click **Close**.

9.6 Initial backup

The initial backup feature can be a lengthy process because all files must be backed up. Users can speed up this process by backing up their data to a local buffer location that is directly connected to a DS-Client or visible on the LAN, and then ship the media to the physical location where the DS-System resides.

NOTE: The initial backup process must be coordinated with the DS-Client administrator.

9.6.1 Importing an initial backup

Instruct your customer to register their DS-Client with the DS-System. They can then create as many initial backups as required, which are written to a media buffer that is physically shipped to the DS-System location. For instructions, see the DS-Client User Guide."

NOTE: An initial backup buffer must contain backups from the same DS-Client.

When you receive the initial backup media, connect it to the network so that it is visible to the DS-System. You can then import the data to the DS-System. Once the data is imported to the DS-System, DS-Client users can continue performing scheduled and on-demand backups with incremental changes.

NOTE: If the file system on the initial backup buffer cannot be read directly by the operating system on the DS-System side, NFS or CIFS can be used for the initial backup import.

To import an initial backup:

1. On the DS-System, create the customer and DS-Client account.
2. In the DS-Operator, under **Customers**, select the DS-Client account whose data is in the initial backup buffer.
3. On the **DS-Client** menu, click **Import Initial Backup**. For N+1 DS-Systems, you will be prompted to select which N+1 node will perform the activity.
4. Beside the **Import initial backup from** box, click **[...]**. Select a path where the DS-System can read the initial backup data, and then click **OK**. The path should be in the following format:
   - For Windows:

     `<local_drive>:\initial_backup_dir`

     or

     `\\server\share\initial_backup_dir`
   - For Linux:

     `/initial_backup_directory`

   NOTE: For N+1 DS-System, the initial backup is performed by the selected node. Ensure the initial backup buffer is directly attached to the selected node or is specified as a UNC path the node has rights to access.
5. In the **Available Backup Set** list, select the backups you want to import, and then click **[>>>]**. The backups move under the **Selected Backup Set for Import** list.

6. In the **Initial Backup Meta-data Encryption** dialog box, enter an encryption key, and then click **OK**.
7. Click **OK**.
8. In the **Initial Backup Import Options** dialog box, under **Select import method**, select an import method. Your options are as follows:
    - **Move** — This option is available only for unencrypted buffer data. If the DS-System can find a storage location on the same volume as the specified path, the move option is available as an import method. If the logical size available to the DS-System in the storage location is less than the data being moved, a warning appears. The DS-System will not move files in that storage location if no logical space is available.
    - **Copy** — This option will automatically balance the imported data across all the storage locations in the storage group.
9. Under **Options**, select one of the following:
    - **Concurrent import activities** — Each import activity represents a different backup that is processed in parallel.
    - **Additional threads for each import activity** — Number of additional processing threads to run for each import activity.
10. Click **Start**. When completed, DS-Client users can run scheduled or on-demand backups. You must verify the Activity Log after the import has completed.

9.7 Remote DS-VDR

The Remote DS-VDR feature can be configured for Microsoft Hyper-V Server and VMware vCenter Server backups to allow users to initiate disaster recovery restores for virtual machines. The backup must be of an entire virtual machine that is already stored in the DS-System online storage.

IMPORTANT: Remote DS-VDR is not supported for Microsoft Hyper-V Server cluster configurations.

Remote DS-VDR must be licensed for the DS-System from the DS-License Server in the form of an incremental counter called the Remote DS-VDR count. The DS-System administrator can assign the license count to DS-Client accounts individually from this pool. Remote DS-VDR is a service that runs on a remote Windows or Linux computer and can be configured using the DS-Operator.

NOTE: You must install the Remote DS-VDR Tool on a Remote DS-VDR computer and the service or daemon must be running. For instructions on how to install the Remote DS-VDR Tool, see the *Server Software Installation Guide*.

Since Remote DS-VDR only supports restoring master or delta generations and not regular files, DS-Client users must configure the backup with three or more generations. When a backup is scheduled for a Remote DS-VDR restore, the latest backed up generation is automatically restored to a standby virtualization server. In the event of a disaster or other unforeseen event, you can immediately switch to the standby virtualization server. The DS-System can connect to multiple Remote DS-VDR services, thereby distributing the load.

The configuration and management of the Remote DS-VDR service is performed on the DS-System using the DS-Operator. The DS-Client has no direct involvement with Remote DS-VDR. However, you must enable encryption key forwarding on the DS-Client to forward the encryption keys to the DS-System so they are stored in the DS-System database. For more information, see Section 2.2.7, “Configuring the encryption key settings”, on page 23.

For each restore session, the DS-System provides the required encryption key(s) for the corresponding backup to the Remote DS-VDR service so it can handle multiple restore sessions from different DS-Clients. The encryption keys remain in encrypted format and are retained in temporary memory during each Remote DS-VDR restore and then discarded when the restore is completed.

For each Remote DS-VDR restore activity:

- The DS-System establishes the connection to the Remote DS-VDR service on port 4406 and sends the required configuration parameters, encryption keys, files, and other metadata information generated from the Remote DS-VDR configuration of the backup.

- The Remote DS-VDR service interacts with the virtualization server and creates a virtual machine and disks based on the metadata information.
- The Remote DS-VDR service decrypts and decompresses the data before saving it on disks to reduce the processing load on the DS-System.
- When manually triggering a Remote DS-VDR restore, you can select from the available backup generations stored on the DS-System.
- For VMware vCenter Server backups, the virtual machine is restored under a unique name that consists of the prefix “RVDR”, the name of the source virtual machine, and the backup session time stamp of the restored generation.
- For Microsoft Hyper-V Server backups, the virtual machine is restored with its original name. No time stamp is added.
- Depending on the Remote DS-VDR configuration, the restored virtual machine can be powered on or left powered off after a successful restore. If you select the Power On option, a full restore is always performed.

In the event of an actual disaster, the disaster copy virtual machine should only be manually powered on through the virtualization server. After it is powered on, the operating system present in the disaster copy will modify its disk and incremental virtual machine restores will no longer be possible after this point.

IMPORTANT: If you need to test the disaster copy, clone the disaster virtual machine to another location and use that copy for testing. If the disaster copy has already been used for testing purposes and a disaster occurs, the disaster copy might have already been altered during testing and is no longer be suitable as a disaster copy.

9.7.1 Configuring a Remote DS-VDR server

You can configure the DS-System to use multiple Remote DS-VDR services. However, you must have at least one Remote DS-VDR service running and accessible from the DS-System via port 4406. If you are using a firewall, port 4406 must be configured to allow TCP/IP connections on both the DS-System and the Remote DS-VDR service.

NOTE: Microsoft Hyper-V Server backups require a Remote DS-VDR service running on Windows.

To configure a Remote DS-VDR server:

1. On the **DS-VDR** menu, click **Remote DS-VDR Servers**.
2. In the **Remote DS-VDR Servers** dialog box, do one of the following:
   - To add a Remote DS-VDR server, click **Add**.
   - To modify a Remote DS-VDR server, select the server, and then click **Modify**.

   NOTE: To delete a Remote DS-VDR server, select the server, and then click **Remove**.

3. In the **Add / Modify DS-VDR Server Info** dialog box, do the following:
   a) In the **Name** box, type a name for the Remote DS-VDR server.
   b) In the **Address** box, type the IP address of the Remote DS-VDR server.
   c) In the **Port** box, enter the port number the Remote DS-VDR service uses to communicate with the DS-System.

      NOTE: Do not change the port number unless you have a specific requirement to do so.

   d) In the **Description** box, type a description for the Remote DS-VDR server.
   e) In the **Type** box, select whether the Remote DS-VDR server will be running on a **Windows** or **Linux** computer.
   f) Click **OK**.
4. Click **OK**.

9.7.2 Configuring a virtualization server

A virtualization server is the target destination where the backed up virtual machine is restored. You must have at least one virtualization server configured and running for the DS-System to perform a Remote DS-VDR restore. You can configure the DS-System to use multiple virtualization servers.

IMPORTANT: The target virtualization server must be the same type as the backup (Hyper-V to Hyper-V or VMware to VMware).

To configure a virtualization server:

1. On the **DS-VDR** menu, click **Virtualization Servers**, and then do one of the following:
   - To add a virtualization server, click **Add**.
   - To modify a virtualization server, select the server, and then click **Modify**.

   NOTE: To delete a virtualization server, select the server, and then click **Remove**.

2. In the **Add / Modify Virtualization Server** dialog box, do the following:
   a) In the **IP address** box, type the IP address of the virtualization server.
   b) In the **User name** box, type the name of a user with administrator level permissions on the target virtualization server. The DS- System uses these credentials to access the virtualization server.
   c) In the **Password** box, type the password of the user.
   d) In the **Type** box, select whether the virtualization server is a **VMware vCenter Server** or **Microsoft Hyper-V Server**.
   e) Click **OK**.
3. Click **OK**.

9.7.3 Configuring a backup for Remote DS-VDR

After you have configured the DS-System with at least one Remote DS-VDR server and one target virtualization server, you can configure a backup for Remote DS-VDR.

NOTE: This procedure is applicable only for Microsoft Hyper-V Server and VMware vCenter Server backups. Each backup configured and licensed for Remote DS-VDR reduces the Remote DS-VDR count allocated to the DS-System by 1.

You can schedule a Remote DS-VDR or trigger it to automatically restore to a standby virtualization server so the latest backed up version is running and ready for use. When you configure a backup for Remote DS-VDR restore, you must assign it to a schedule.

To configure a backup for Remote DS-V DR:

1. On the **DS-VDR** menu, click **Remote DS-VDR Global**.

   NOTE: Ensure the Remote DS-VDR is running. For Microsoft Hyper-V Server, you must select a Remote DS-VDR server that is running on Windows.

   ---

2. In the **Licensed** column, select the check box beside the backup you want to configure, and then click **Configure**.
3. On the **Method and Tools** page, do the following:
   a) Under **Restore Type**, select the type of restore. Your options are as follows:
      - **Full** – Creates the target virtual machine, then the disk(s), and then restores all the data.
      - **Incremental** – Restores only incremental changes to the target virtual machine after the first restore.

      NOTE: If you selected Incremental, you must ensure the source backup is not configured with the Backup Virtual Machine Memory option. If this option is enabled, an incremental restore of the virtual machine will fail with a disk error. For more information on configuring a VMware vCenter Server backup, see the *DS-Client User Guide*.

      ---

   b) Under **Remote DS-VDR**, select the IP address of the Remote DS-VDR service that will perform the restore.
   c) For VMware vCenter Server backups, under **vCenter / Host / Datacenter**, select the target where the virtual machines in the backup will be restored.

d) For Microsoft Hyper-V Server backups, under **Virtualization Server**, select the target where the virtual machines in the backup will be restored.

e) Click **Next**.

4. On the **Location of the virtual machine(s) for a Remote DS-VDR Restore** page, do the following:

a) For VMware vCenter Server backups, in the **Host** box, select a target host where the corresponding virtual machine will be restored.

b) Beside the **Folder** box, click **[...]**, and then select the target folder on the VMware vCenter Server or Microsoft Hyper-V Server where the corresponding virtual machine will be restored.

IMPORTANT: Ensure there is enough space in the target destination.

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c) For VMware vCenter Server backups, beside the **Datastore** box, click **[...]**, and then select the datastore of the host where the restored virtual machine will be saved.

d) To reset all the virtual machines to use the global settings, click **Clear Overrides**.

NOTE: Settings configured in the **Global** section apply to all virtual machines in the list by default, unless they are individually configured with overrides. Settings configured for individual virtual machines override the **Global** defaults.

---

e) Click **Next**.

5. On the **Remote DS-VDR Options** page, under **Set Restoration Time**, select the frequency and time at which you want to perform the Remote DS-VDR restore.

6. Under **Options**, do the following:

a) To restore the virtual machine using the SAN Transport mode, select the **Use SAN with all disk types** check box beside the corresponding virtual machine.

b) To start the virtual machine after a successful restore to the Remote DS-VDR target location, select the **Power On** check box beside the corresponding virtual machine.

NOTE: If you select the **Power On** option, a full restore is always performed.

---

c) To prioritize the powering on of multiple virtual machines, select the **Priority Order** check box, and then enter the priority level for the corresponding virtual machine.

d) In the **Power on delay between priority levels (seconds)** box, enter the time interval in seconds between the powering on of virtual machines at different priority levels.

7. Click **Finish**.

9.7.4 Performing on-demand Remote DS-VDR restores

You can perform an on-demand Remote DS-VDR restore at any time.

To perform on-demand Remote DS-VDR restores:

1. On the **DS-VDR** menu, click **Remote DS-VDR Global**.
2. Select the backup you want to restore, and then click **Restore**.
3. In the **Remote DS-VDR Restore** dialog box, do the following:

   a) For N+1 DS-Systems, in the **N+1 ID to Perform Activity** box, select the node that will perform the restore.

   b) In the **Generation** box, select the generation you want to restore. By default, the latest generation is selected.

   c) Select one of the following restore options:

   - **All virtual machines** - Restores all virtual machines, including virtual machines that might not contain all their virtual disks or have virtual disks with errors.
   - **Only valid virtual machines** - Restores only virtual machines that have all their virtual disks without any errors.

   NOTE: If a virtual machine is not restored or is restored with a disk count that does not match the original configuration, a message is displayed in the Event Log.

   d) Click **Restore**.

4. Click **Close**.

9.7.5 Preventing full restore when a virtual machine configuration has changed (VMware vCenter Server)

Before initiating a restore of a VMware vCenter Server backup, the Remote DS-VDR service compares the backup generation to be restored to the previous restore point.

If the Remote DS-VDR service detects changes to one or multiple virtual machine configuration parameters since the previous restore point, the DS-Operator generates an error message with a list of the parameter(s) that have changed. The Remote DS-VDR service then forces a full virtual machine restore.

To prevent a full restore from occurring due to changed virtual machine configuration parameters, you must modify the **VADPCfgIgnoreList** and **VADPCfgDevIgnoreList** advanced configuration parameters.

NOTE: For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

To prevent full restore when a virtual machine configuration has changed:

1. On the **Logs** menu, click **Event Log**.
2. In the **Event Log Viewer**, select the error message that lists the virtual machine configuration parameter(s) that have changed.
3. Copy and save the description of the error message.
4. On the **Setup** menu, click **Advanced Configuration**.
5. In the **Advanced Configuration** dialog box, do the following:
   a) Select **VADPCfgIgnoreList**, and then click **Edit**.
   b) Select **VADPCfgDevIgnoreList**, and then click **Edit**.
   c) In the **Value** field, add the regular expression(s) that represents the virtual machine configuration parameter(s) that need to be ignored, and then click **OK**.

9.7.6 Updating the Remote DS-VDR configuration file

You can update the Remote DS-VDR configuration file (dsvdr.cfg*)* on the server where the Remote DS-VDR service is installed in the following folders:

- **Windows**

  `C:\Program Files\CloudBackup\Remote DS-VDR\dsvdr.cfg`

- **Linux**

  `/opt/CloudBackup/Remote_DS-VDR/etc/dsvdr.cfg`

IMPORTANT: If you update the configuration file, you must restart the Remote DS-VDR service or daemon for the changes to take effect.

The Remote DS-VDR configuration file contains the following parameters:

Parameter	Description
Port	Port the Remote DS-VDR Tool service listens on for DS-System connections. • Default is 4406 • Do not change this unless there is a specific requirement to do so.
MaxRestore	Maximum number of concurrent virtual machine restores allowed. • Default is 5. Changing this value can significantly impact performance. • Typically, one thread takes approximately 1-2 GB of RAM.
LogLevel	Varies the amount and type of logging information inside the /tmp/vdr.out log file. Valid values: • **none** = (Default) No information is logged. • **error** = Logs errors. • **debug** = Logs detailed messages for debugging. • **warning** = Logs warnings. • **info** = Logs information messages. • **trace** = Logs all of the above.
LogFilter	Specifies a filter in Perl regular expression format. A regex search operation is performed and only matching lines are printed. • Default is . (dot, meaning log all)
SoapDebug	Generates detailed logging of the communication between the Remote DS-VDR server and virtualization server. Logs typically go to /tmp/soap_sent.log, /tmp/soap_recv.log and /tmp/soap_test.log. • Valid values: On or Off • Default is Off.

Table 3 Remote DS-VDR configuration parameters

9.8 DS-System Replication

You need at least two DS-Systems to replicate backup data from one DS-System to another. A FullFeatured DS-System can replicate backup data one way to a replication DS-System. Two FullFeatured DS-Systems can replicate shared backup data to each other.

You can add as many DS-Systems as you want to a DS-System replication group. Each DS-System retains a copy of the shared backup data. Logs and DS-Client configuration settings are not replicated. By default, DS-Systems in a replication group communicate with one another on port 4409.

NOTE: You can change the DS-System group communication port by updating the **GrpPort** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

When a DS-System replication group is configured and replicating data, the corrective capabilities are multidirectional, which means any data loss on one DS-System can be corrected with the data from another. When a DS-Client connects to a replication DS-System, it can continue to restore data as if it were connecting to the primary (production) DS-System. The only condition is the replication DS-System must be up-to-date with the production DS-System data. For more information, see Section 9.8.9, “Clearing the replication flag”, on page 197.

Since each DS-System is responsible for managing its own backup data, the task of optimizing what data is stored is completed by each replication DS-System. To maximize the speed of the replication process, DS-Systems in a replication group send one master generation of a backed up file and then only deltas. As a result, each DS-System that receives replicated data may encounter long delta chains, which can create a performance issue when performing a restore. By default, the DS-System schedules and runs a delta chain optimization task once a day. For more information, see Section 2.8, “Configuring the delta chain settings”, on page 56.

Since some backup files can be very large, replication has the capability to resume at the block-level from failed transmissions of replicated data. Block-level resume is performed for files that are over 10 MB in stored size in the DS-System online storage. Block-level resume allows the replication to continue from the last successful file block transmitted to the replication DS-System.

The protected size always remains the same for the data of each replicated DS-Client. However, replication tries to optimize on transmission time and storage, which can result in the stored size being significantly different between the primary and replication DS-Systems. As a result, an invoice generated in DS-Billing for a replication DS-System might show different storage numbers than an invoice generated for the primary DS-System. Some possible reasons are as follows:

- Library files are replicated from a primary DS-System to a replication DS-System as libraries are inserted in the DS-System database of the replication DS-System so that future files with the same content will link to them. The invoices in DS-Billing for the primary DS-System are calculated by adding a library amount once for each DS-Client that links to that library. If only some of the DS-Clients are replicated from the primary DS-System, those differences will show up in the invoiced amount.
- Incremental forever replication is performed from the primary DS-System. Only the first generation of a file that qualifies for master/delta processing is replicated as a master generation (including all data blocks). Incremental generations are replicated as delta generations. In certain scenarios, the primary DS-System might store more master generations for the same file than the replication DS-System. Those differences will show up in the invoiced stored size amount. All new DS-System installations will ignore recycled delta generations when calculating the stored size. You can configure this behavior separately for each DS-System in the replication group using the **ExcludeRecycleDelta** advanced configuration parameter. For more information, see Section 2.4, “Configuring the advanced settings”, on page 29.

If you need to recover a large amount of data, a replication DS-System allows you to use the replica of the production DS-System to be physically sent to the remote location as follows:

1. Ship the replication DS-System to the remote restore location.
2. Connect the replication DS-System to the remote restore LAN with the fastest possible connection speeds.
3. On each DS-Client, change the IP address to the replication DS-System.
4. Restore at LAN speed.

9.8.1 Enabling DS-System replication

You can enable the replication feature on each DS-System that will be part of the DS-System replication group. You must configure at least two DS-Systems.

To enable DS-System replication:

1. On the **Setup** menu, click **Advanced Configuration**.
2. Select the **DSSysGroup** parameter and click **Edit**.
3. In the value box, enter the value 1, and then click **OK**.

NOTE: The **GrpSerialCode**, **GrpPort**, and **GrpEncrypt** parameters must be the same for all DS-Systems in the same replication group.

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4. Restart the DS-System service. Repeat steps 1-3 on each DS-System that will be part of the replication group.

9.8.2 Performing the initial DS-System replication

Each replication DS-System must receive a copy of the initial backup data by doing one of the following:

- You can allow replication to occur automatically from the production DS-System over the WAN, which requires no action other than importing the initial backup data.
- You can perform the initial backup to all the DS-Systems in the replication group. When completed, you can perform a backup immediately. Incremental forever backups can run immediately after the initial backup has been imported to the production DS-System. You must wait until the initial backup has been imported to all the replication DS-Systems before sharing the DS-Clients for replication.

To perform the initial DS-System replication:

1. Perform an initial backup of the data to removable media that can be shipped to both the production and replication DS-Systems.

   NOTE: The DS-Client account must exist on the production DS-System and all replication DS-Systems.

2. Unshare the DS-Client on all DS-Systems (production and replication). This will prevent any replication processes from being triggered for the DS-Client.
3. Run the initial backup import process from the removable media to the production DS-System.

   NOTE: After this import is complete, the DS-Client can immediately perform backups to the production DS-System.

4. Run the initial backup import process from the same removable media to the replication DS-System(s).
5. When the import is finished, share the DS-Client again for replication on all DS-Systems.
6. On the production DS-System, perform a replication check on the imported backups.

   NOTE: If the initial backup was successfully imported to all DS-Systems, no replication data is sent or received.

9.8.3 Configuring a DS-System replication group

Each DS-System in a replication group must know the IP address of the other DS-Systems in the group. This configuration can be performed once from a single DS-Operator connected to any of the DS-Systems.

To configure a DS-System replication group:

1. On the **Setup** menu, point to **DS-System Group**, and then click **Configuration**.
2. In the **DS-System group configurations** dialog box, do one of the following:
   - To add DS-System, click **Add**.
   - To modify a DS-System, select the IP address of the DS-System, and then click **Modify**.

   NOTE: To delete a DS-System, select the IP address of the DS-System, and then click **Delete**.
3. In the **Add/Modify** DS-System address dialog box, do one of the following:
   - To add a single DS-System, select **Single System**, and then enter the IP address of the DS-System.
   - To add an N+1 DS-System, select **N+1 System**, and then click **Add**. In the **New DS-System address** dialog box, select **Single IP** or **IP Range**, type the required IP address, and then click **OK**.

   NOTE: When configuring a DS-System group for the first time, select the **Local DS-System** option and enter the IP address of the DS-System that is currently connected to the DS-Operator. Then continue with configuring other DS-Systems.
4. Select the replication bandwidth of the DS-System. Your options are as follows:
   - **Unlimited** – The backup or restore bandwidth is not limited to any value.
   - **Limited to ... KB/sec** – The backup or restore bandwidth is limited to the specified value.
   - **Scheduled** – You can adjust the bandwidth throttle as per a schedule. For more information, see Section 3.1, “Configuring a customer account”, on page 79.
5. Click **OK**. Continue until you have completed the list of DS-Systems in the replication group.
6. Click **Apply**.

9.8.4 Sharing a customer or DS-Client account

After you have configured the DS-System replication group, you can enable replication at the individual DS-Client level. When you share a customer account, its DS-Client accounts are also shared. Replication is performed only on shared DS-Clients.

NOTE: If you try to share a customer or DS-Client account whose number already exists in the DS-System replication group, an error message will appear. You must change the corresponding duplicate number. For more information, see Section 9.8.8, “Renaming a customer or DS-Client account”, on page 196.

To share a customer or DS-Client account:

1. On the source DS-System, under **Customers**, select the customer account you want to share for replication.
2. On the **Customer** menu, click **Share Customer**. The shared customer account is created on the other DS-Systems in the replication group.
3. On the source DS-System under **Customers**, select the DS-Client account you want to share for replication.
4. On the **DS-Client** menu, click **Share DS-Client**. The shared DS-Client account is created on the other DS-Systems in the replication group.

NOTE: Each replicated customer or DS-Client account is assigned the default profile and storage settings of the associated DS-System.

The shared DS-Client data is automatically replicated to the other DS-Systems in the replication group based on the replication configuration of the source DS-System. For more information, see Section 9.8.1, “Enabling DS-System replication”, on page 191.

To perform DS-System replication immediately, do the following:

1. On the source DS-System, under **Customers**, right-click a DS-Client, and then click **Check Replication**.
2. When the system prompts you to confirm, click **Yes**. The Replication DS-System begins to receive the replicated backup data.

   Replication at this stage will take some time, because all the shared online data must be replicated to each of the other DS-Systems in the replication group.

To share multiple customer or DS-Client accounts:

1. On the **Setup** menu, point to **DS-System Group**, and then click **Share Customers** or **Share DS-Clients**.
2. Select the customer or DS-Client accounts you want to share, and then click **Share**.
3. Check the Activity Log for any errors.

9.8.5 Checking DS-System replication

You can check DS-System replication for multiple shared DS-Clients.

To check replication for multiple DS-Clients:

1. On the **Setup** menu, point to **DS-System Group,** and then click **Check Replications**.
2. Select a DS-Client and then click **Check**. This moves the backups from the selected DS-Clients to the front of the replication request queue.

9.8.6 Viewing the replication status

You can view the replication status for backups from multiple shared DS-Clients.

To view the replication status of multiple DS-Clients:

1. On the **Setup** menu, point to **DS-System Group**, and then click **Replication Status**.
2. Select the DS-Clients whose replication status you want to view, and then click **Check**.
3. Click **Close**.

9.8.7 Unsharing a customer or DS-Client account

You can unshare customer and DS-Client accounts so they are excluded from the replication process.

To unshare a customer or a DS-Client account:

1. On the **Setup** menu, point to **DS-System Group**, and then click **Unshare Customers** or **Unshare DS-Clients**.
2. Select the customers or DS-Client accounts you want to unshare, and then click **Unshare**.

9.8.8 Renaming a customer or DS-Client account

Since each customer and DS-Client must have a unique account number, you might need to rename an account if you are using FullFeatured DS-Systems for multidirectional replication. Otherwise, you will get an error if you try to share a customer or DS-Client with the same account number to a DS-System replication group.

IMPORTANT: If you change the customer or DS-Client account number, the corresponding DS-Client cannot connect to the DS-System until its configuration settings are updated with the new account number.

To rename a customer account:

1. Under **Customers**, right-click the customer account you want to rename, and then click **Rename Customer**.
2. In the **New Account #** box, type a new customer account number, and then click **OK**.

NOTE: All DS-Clients associated with the customer account will receive an error message indicating they must change the DS-Client configuration to the new account.

To rename a DS-Client account:

1. Under **Customers**, right-click the DS-Client account you want to rename, and then click **Rename DS-Client**.
2. When the system prompts you to confirm, click **Yes**.

NOTE: The DS-Client will receive an error message indicating the customer must change their DS-Client configuration to the new account.

The DS-Client is automatically renumbered, which may take some time because the path on the storage location(s) must be changed.

9.8.9 Clearing the replication flag

You might need to clear the replication flag on a replication DS-System when a primary DS-System has not finished sending all the data from a replication session. During this period, the backup is not accessible on the replication DS-System.

If the primary DS-System fails during this period, and there are backups that have not finished replicating to the replication DS-System, the DS-System will reject new backup activities. Once the primary DS-System is back online, it will complete the replication process.

Any affected backups will not be immediately accessible. For these backups, you have the option of clearing the replication flag.

To clear the replication flag:

- On the Replication DS-System, under **Customers**, right-click the backup for which you want to clear the replication flag, and then click **Clear Replication Flag**.

Clearing the replication flag allows the DS-Client to connect to the replication DS-System. Any data from the last unfinished replication session will be removed when the DS-Client connects and synchronizes with the replication DS-System.

9.8.10 Switching from replication to production

In a disaster recovery scenario when you lose your production DS-System, you can switch the replication DS-System to a production DS-System so your DS-Clients can continue to backup and restore data without interruption.

When using a Capacity License Management (CLM) license, if the secondary sites are running replication DS-Systems, you must obtain an emergency software license for the production license ID to enable the replication DS-Systems to accept backup data from DS-Clients.

When using a Recovery License Model (RLM) license, you must change the DS-System license type to FullFeatured to accept backup data from DS-Clients.

You can preconfigure the DS-Clients with the alternate IP address of the replication DS-System or update the DS-Clients with the secondary DS-System connection information automatically. For more information, see Section 4.11, “Sending DS-System IP configuration updates to DS-Clients”, on page 101.

To switch from a replication to production DS-System:

1. Ensure the production DS-System IP address can be maintained. If not, ensure the DS-Clients have the IP address of the replication DS-System configured as a secondary DS-System connection.
2. On the DS-License Server, change the DS-System type from **Replication** to **FullFeatured** and allocate the same license capacities. For more information, see the *DS-License Server User Guide*.

If the DS-License Server does not have enough license capacity available for allocation, you can disable the old production DS-System license, which will immediately free its allocated license storage capacity.

9.9 VM replication

The VM replication feature can be licensed from a DS-License Server RLM so the DS-System can enable replication for its associated DS-Clients to allow for the creation of VM replication sets.

When the replication set is run, the source DS-Client instructs the source VMware vCenter Server to snapshot the selected virtual machines. The source DS-Client then sends the replication data to the destination DS-Client which creates the replication virtual machine on the target VMware vCenter. A VM replication set does not send any data to the DS-System.

NOTE: VM replication is based on the number of replicated virtual machines or the native capacity of the virtual machines. The source DS-Client must have sufficient VM replication capacity to cover the size of its VM replication sets.

9.9.1 Configuring a VM replication group

When configuring a VM replication group, you must add at least two DS-Clients. You must define each DS-Client as a source DS-Client and point to the IP addresses of the other destination DS-Clients in the replication group. This allows for the reverse transmission of data on failback. For more information, see the *DS-Client User Guide*.

IMPORTANT: After you have modified the VM replication port settings for multiple DS-Clients, you must stop and restart the DS-Client service on each affected computer one at a time. Wait until the DS-Client service has successfully restarted on one computer before you stop and restart the DS-Client service on another.

To configure a VM replication group:

1. On the **VM Replication** menu, click **VM Replication Groups**.
2. In the **VM Replication Groups** dialog box, do one of the following:
   - To add a VM replication group, click **Add**.

- To modify a VM replication group, select he group, and then click **Edit**.

NOTE: To delete a VM replication group, select the group, and then click **Delete**.

3. In the **Add/Edit VM Replication Group** dialog box, do the following:
   a) Select a source DS-Client.
   b) To configure a list of destination DS-Clients, click **Destination**.
   c) Click **Add**. Type the IP address and port number of the destination DS-Client, and then click **OK**.

   NOTE: To delete a destination DS-Client, select the DS-Client, and then click **Delete**.

   d) To save the replication group, click **OK**.
   e) Repeat this step for each of the DS-Clients in the replication group.

   NOTE: If the IP address of the destination DS-Client changes after replication has been performed, you must configure a new replication group.

4. To export a VM replication group configuration to an XML file, click **Export**. Select a name and destination for the file, and then click **Save**.
5. To import a VM replication group configuration from an XML file, click **Import**. Select the file, and then click **Open**.
6. Click **Close**.
7. Allocate the VM replication capacity and VM replication count to the DS-Client.