

# StorageGRID<sup>®</sup> 9.0

## Siemens Integration Guide

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Part number: 215-06838\_A0  
July 2012

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# MagicStore PACS Integration

## Integrating the grid with Siemens MagicStore PACS

### Intended Audience

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This guide describes how to integrate the existing NetApp® StorageGRID® (StorageGRID) system with a Siemens MagicStore PACS or Siemens *syngo*. This guide is intended for anyone responsible for installing or configuring a StorageGRID deployment with a Siemens MagicStore or *syngo* system. If you are using this guide, it is assumed that you have a good understanding of StorageGRID software and of the software installation procedures as described in the *Installation Guide* and integration procedures as described in the *Administrator Guide*. A fairly high level of computer literacy is assumed, including knowledge of Linux/Unix.

### Overview

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#### MagicStore Integration

Siemens MagicStore treats the StorageGRID system as a “Deep Archive” for long-term storage of closed exams. Once an exam has been marked as complete, MagicStore compiles all images in an exam into a single .tar archive file. MagicStore then copies this file to a Gateway Node using the Unix remote shell and remote copy commands.

Within the StorageGRID system, each primary Gateway Node runs a service that authenticates remote shell logins (rsh) and remote copy (rcp) commands from MagicStore.

The file system on the Gateway Node is mirrored to each Gateway Node server in its replication group, and the archive file is sent for permanent storage to a Storage Node.

Once a day, the Long Term Manager (LTM) on MagicStore queries the StorageGRID system to check if studies saved to the grid have been moved to permanent storage. If the acknowledgement program on the Gateway Node confirms that the files have been archived, the LTM deletes the copy of the exam in short term storage on MagicStore.

MagicStore never moves, renames, or deletes a study that has been saved to the StorageGRID system. If the study is updated by the MagicStore PACS after it has been saved to the StorageGRID system, MagicStore creates a new archive .tar file with the same name as the original study, and writes the updated copy to the same location on the managed file system of the Gateway Node.

## Integration Procedure

To integrate a Siemens MagicStore PACS with the StorageGRID system, you must install the custom “Siemens RSH Responder” package on each Gateway Node integrated with MagicStore. The Siemens RSH Responder enables remote shell connections and remote copy commands between MagicStore and the Gateway Node, and responds to queries from MagicStore as to the archive status of exams saved to the grid.

### Procedure

1. Run the `config_nfs.rb` script to capture information that the StorageGRID system uses to authenticate the remote shell and remote copy commands from MagicStore. For more information, see [“Create NFS File Shares” on page 7](#).
2. Install and start the Siemens RSH Responder program on each Gateway Node. For more information, see [“Install the RSH Responder” on page 8](#).
3. Configure MagicStore with authentication credentials for the Gateway Node server. For more information, see [“Configure MagicStore” on page 9](#).
4. Verify that MagicStore can archive and retrieve from the grid. For more information, see [“Verify the Integration” on page 10](#).
5. Document the integration to MagicStore in grid specific documentation.

---

## Assumptions

- MagicStore PACS is correctly installed
- MagicStore PACS is operating correctly
- MagicStore PACS is being integrated with an existing StorageGRID deployment.

## Prerequisites

- Passwords.txt file
- Configuration.txt file
- List of NFS clients provided in grid specific documentation
- StorageGRID 9.0.0 Software CD
- If available, StorageGRID Service Pack CD
- *Administrator Guide*

---

# Integrate MagicStore PACS With the Grid

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## Create NFS File Shares

The StorageGRID system uses the information captured by the NFS configuration utility (`config_nfs.rb`) to create the directory used by MagicStore to store files.

Follow the instructions in the *Administrator Guide* for creating an NFS file share on the primary and secondary Gateway Nodes for use by NFS clients.

The list of NFS clients in grid specific documentation includes the IP address of the MagicStore server and the directory name of the MagicStore NFS file share.

In general, the directory name is the MagicStore server name. Confirm the directory name against the config file on the MagicStore Server. Enter the server name when prompted for the directory name by the NFS configuration utility. The MagicStore writes to this directory using the path: `/archive/<MagicStore_Server_Name>`.

The next step is to install the RSH Responder as described below.

---

## Install the RSH Responder

The Siemens RSH Responder must be installed on each Gateway Node server in the replication group that is integrated with the Siemens MagicStore PACS.

---

**NOTE** Start with the primary Gateway Node (the main primary Gateway Node in a High Availability Gateway Cluster (HAGC)).

---

1. At the Gateway Node server, press **<Alt>+<F1>** to access a command shell and log in as root using the password listed in the Passwords.txt file.
2. Insert the StorageGRID Service Pack CD, if available. Otherwise, insert the StorageGRID 9.0.0 Software CD.
3. To mount the CD and install the package containing the RSH Responder. Enter:

```
mount /cdrom
/cdrom/swupdate/smart-cdrom-install.rb bycast-siemens
umount /cdrom
```

---

**NOTE** If the Siemens RSH Responder has already been installed, an error message is displayed.

---

4. Remove the CD from the server.
5. Ensure that the FSG service is running:
  - a. Press **<Alt>+<F7>** to return to the Server Manager interface.
  - b. Verify that the File System Gateway (FSG) service has a status of Running.
  - c. Press **<Alt>+<F1>** to return to the command shell.
6. If this server is a part of a High Availability Gateway Cluster (HAGC), repeat steps 1 to 5 for the supplementary primary Gateway Node.

---

**NOTE** You need to install the `bycast-siemens` package on all primary Gateway Nodes in a cluster prior to running the script `fsgrshdinstall.rb`. This is to ensure that heartbeat does not try to manage the service until it is installed on all Gateway Nodes in the cluster.

---



7. Configure the FSG service on the Gateway Node to start and stop the RSH Responder. Enter:

```
cd /usr/local/fsg
./fsgrshdinstall.rb
```

**NOTE** If this is a HAGC, run the script on both the main primary and the supplementary primary Gateway Node servers.

8. Use the NMS MI to verify that the RSH Responder service is running.
  - a. In the NMS MI, go to the **primary Gateway Node ► FSG ► Client Services**.
  - b. On the Overview tab, ensure that the Siemens RSH Responder service has a status of Running.

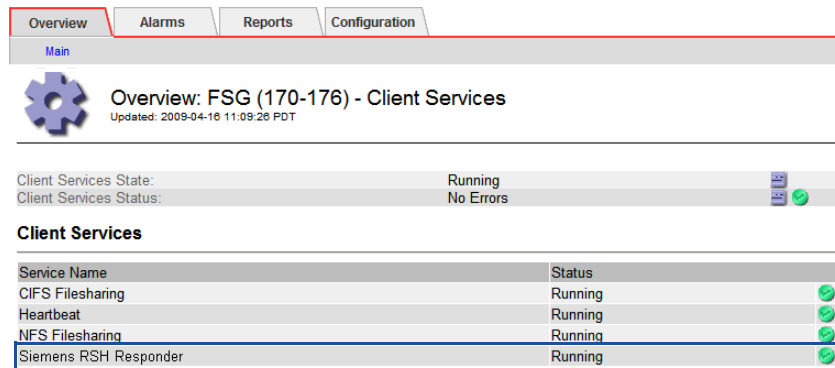


Figure 1: FSG – Client Services

**NOTE** Client file sharing services do not run on the standby primary FSG in an HAGC. The services will appear as “Stopped” in the Client Services section of the standby primary FSG ► Client Services ► Overview ► main page.

9. Repeat steps 1 to 8 for the secondary Gateway Node(s) in the replication group.

## Configure MagicStore

The next step is to configure MagicStore with authentication credentials for the Gateway Node server.

1. Consult the Configuration.txt file for the value of the external (customer) IP address of the primary Gateway Node server.

2. Set the archive host of MagicStore to be the external IP address of the primary Gateway Node server.

For more information, see MagicStore PACS documentation.

## Verify the Integration

Ensure that the MagicStore PACS can archive and retrieve files to and from the StorageGRID system.

**NOTE** The following instructions give general guidance on how to test archiving and retrieval from within MagicStore. For complete information, consult MagicStore documentation.

1. From a MagicView workstation, create a test folder.
2. Sign off on the folder, and then send it to MagicStore.

MagicStore is commonly configured to archive files throughout the day. If your MagicStore is configured in this way, the test folder is immediately sent for archiving on grid. Consult the MagicStore documentation for instructions on changing the time at which MagicStore archives files.

3. On the MagicStore server that hosts the IMS database, locate the EFID of the most recently saved file. (The EFID is the unique identifier of the exam folder.) From a Solaris command shell, enter:

```
su ms
grep saved <path_to_log> | tail -1
```

For example:

```
#: su ms
#: grep saved /home/sn_root/error/ltn.log | tail -1

2005.09.08 13:47:02.71:
001SM1DC732005090821013171 (45 obj, 14229 kB/s)
```

In the above example, the EFID of the exam is:

```
001SM1DC732005090821013171
```

4. From the command shell of the Gateway Node, check to see if an archive file named for this EFID has been saved. Depending upon the configuration of MagicStore, it is saved to one of the following directories:

```
/fsg/<MagicStore_Server_Name>/YYYY/MM/DD/EFID.tar
```

— or —

---

```
/fsg/<MagicStore_Server_Name>/YYYY/MM/EFID.tar
```

where YYYY = year, MM=month, and DD=day that the exam was captured.

## Test retrieval from MagicStore

1. Force MagicStore to check that the folder was saved to archive: (For full instructions, consult your MagicStore documentation.)
  - a. From the service account of the MagicStore application, check that the folder you just saved is “Saved but not Confirmed”.  
Select **Utilities ► Ltm ► List unconfirmed folders**, and enter an appropriate date range. The EFID of the folder is listed. Exit the service application.
  - b. Force MagicStore to perform a check on the folder and confirm that it has been archived:
    - Temporarily set the LTM check time to be 30 minutes in the future and the buffer time to be zero. (On the MagicStore server, enter `su ms` and then enter `cfg_editor` to start the ISA Configuration editor. Use this editor to change the settings, and then exit the editor. From the Solaris command shell, kill the `dba` process, then confirm that it has automatically restarted.)
    - Restart MagicStore, and wait for the LTM check to be performed.  
When the check is performed, a confirmation message appears in the application message window.
  - c. Verify that the folder is no longer listed as “Saved but not Confirmed” as described in step **1a**.
2. Remove the test folder from the MagicStore cache. From the service account of the MagicStore application, select **Utilities ► Repair/Clear ► Clear Store**.
3. Go to a MagicView workstation and query for the test folder. Its status should be listed as *nearline*, indicating that the folder is not available from the MagicStore cache.
4. Retrieve and open the test folder. You should not see error messages in MagicView or MagicStore.
5. From MagicView, query for the test folder again. The status of the folder is now listed as *online*, indicating that the folder has been retrieved to MagicStore.

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## Disable the MagicStore Integration

---

To prevent MagicStore from reading or writing archive files to the StorageGRID system, you need to:

1. Disable the NFS Integration and then remove the RSH Responder.  
Follow the instructions in the *Administrator Guide* to disable an NFS file share using `config_nfs.rb`.
2. Remove the RSH Responder. For more information, see [“Remove the RSH Responder”](#) below.

### Remove the RSH Responder

Once you have disabled the NFS integration, follow these instructions to remove the RSH Responder. Once the RSH Responder has been removed, the integration between MagicStore and the StorageGRID system is disabled.

1. Start with the primary Gateway Node (or main primary Gateway Node in an HAGC).
2. Ensure that the FSG service is running:
  - a. Go to the Server Manager console of the server.
  - b. Verify that the File System Gateway (FSG) service has the status Running.
3. At the Gateway Node server, press **<Alt>+<F1>** to access a command shell and log in as root using the password listed in the `Passwords.txt` file.
4. Remove the Siemens RSH Responder from the FSG resources file.  
Enter:

```
cd /usr/local/fsg
./fsgrshdremove.rb
```
5. Remove the package from the server. Enter:

```
smart remove bycast-siemens
```
6. Repeat steps 2 to 5 for each Gateway Node in the replication group.

---

## Re-enable the Integration

1. Re-enable the disabled file share on each Gateway Node:
  - a. Run `config_nfs.rb`.
  - b. Select the enable option and enter the MagicStore share name from the list of disabled shares.
2. Re-install the RSH Responder.



# *syngo* Integration

## Integrating StorageGRID software with Siemens *syngo* Imaging

### Overview

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#### Siemens *syngo* Imaging

The Siemens *syngo* Imaging PACS system periodically archives images for long term storage (LTS). The PACS also uses the LTS to store a daily backup of its database. Images and backups are stored by writing them into the archive and backup NFS mount points provided by the StorageGRID system.

If you convert from MagicStore to *syngo*, you must keep the RSH responder package on the Gateway Node. The RSH responder is required to enable access to legacy data originally stored using MagicStore.

#### StorageGRID System

The architecture of a StorageGRID archive consists of:

- A Gateway Node, providing cached file system access to archived objects
- Two or more Storage Nodes, providing a disk based object store
- An optional Archive Node, providing long term storage on removable media (usually tape)

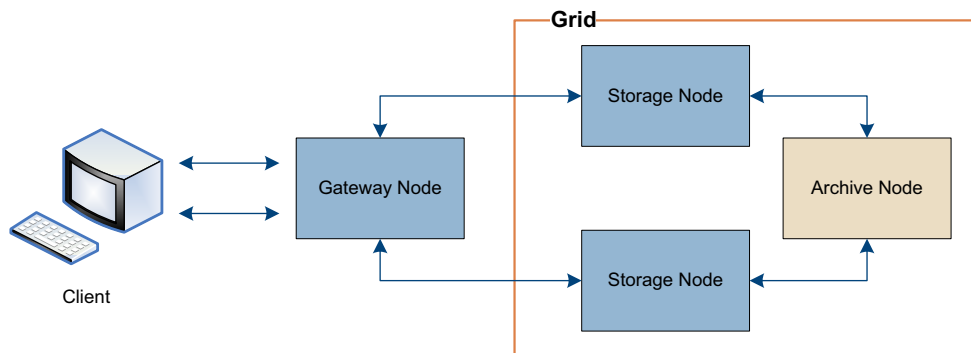


Figure 2: StorageGRID Archive

The application stores files to be archived or backed up to the Gateway Node through an NFS mount. The Gateway Node saves a copy locally in its FSG cache, creates a storage object containing the file, and submits the object to the Storage Nodes for long term storage. Information Lifecycle Management (ILM) rules ensure that copies of the object exist on at least two Storage Nodes.

When the FSG cache on the Gateway Node reaches capacity, files are swapped out to make room for new ones. A swapped-out file retains its directory entry and file system metadata. From the point of view of an application, there is no distinction between a file that is resident in the FSG cache and a swapped-out file.

When an application accesses a file through the NFS mount on the Gateway Node, the file content is served from the FSG cache. If the file content was previously swapped out, the content is first retrieved from a Storage Node.

In a grid containing an Archive Node, ILM rules control the migration of stored objects to archive media. Typically, a copy of an object is placed on the Archive Node after a period of time has elapsed since the associated file was first ingested via the Gateway Node. At this time, one or both of the disk copies may be removed from the Storage Nodes.

When an application accesses a swapped-out file that has a copy of its content object on a Storage Node, the retrieval latency is negligible. However, if the object only exists on an Archive Node, the latency may be significant, since the content object has to be retrieved from removable media first, and then streamed to the FSG cache.



## Security Partitions

Siemens *syngo* Imaging PACS cannot be integrated with a StorageGRID system that has security partitions enabled. To check if security partitions are enabled for a grid, in the NMS Management Interface (MI), go to **Grid Management ► Grid Configuration ► Overview ► Main** and look in the Grid Options table. For more information on security partitions, see the *StorageGRID API Reference*.

## StorageGRID Storage Adapter Implementation

The *syngo* Imaging application can archive images directly to an NFS mounted archive. In order to obtain detailed information about the archival status of files, it calls a vendor-specific storage adapter through a defined interface.

The StorageGRID storage adapter responds to the *syngo* application's status queries, using the StorageGRID API query interface and an ssh connection to the Gateway Node to obtain status information about archived files.

## Physical Connection

To link the *syngo* Data Manager (SDM) with StorageGRID, connect the *syngo* internal ethernet switch to the StorageGRID customer access ethernet switch.

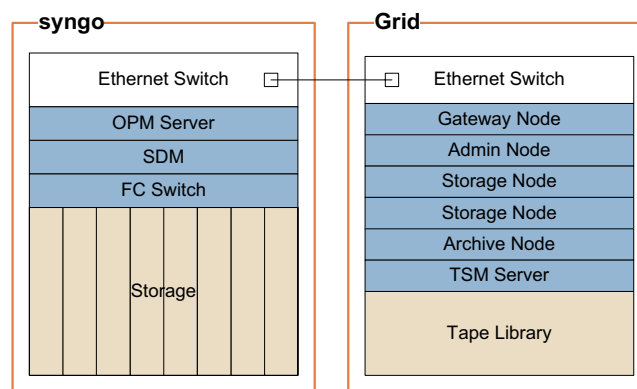


Figure 3: Physical Connection to the Grid

## Prerequisites

- Passwords.txt file
- If installing StorageGRID software, all related materials. For more information, see the *Installation Guide*.

- StorageGRID storage adapter software installation CD
- *Administrator Guide*

## Integrate *syngo* Imaging With the Grid

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To integrate a Siemens *syngo* Imaging PACS with the StorageGRID system, you must complete the following procedures:

1. Install StorageGRID software and start grid services. For more information, see [“Install the StorageGRID System”](#) on page 19.
2. Install the StorageGRID storage adapter on the Siemens *syngo* SDM. For more information, see [“Install StorageGRID Adapter on syngo SDM”](#) on page 19.
3. Modify grid settings to manage *syngo* backup files. For more information, see [“Modify Grid Settings to Manage syngo Backup Files”](#) on page 20.
4. Configure HTTP access to the Grid. See [“Configure HTTP Access to the Grid”](#) on page 20.
5. Restart the *syngo* SDM and perform additional configuration on the *syngo* system. For more information, see [“Restart and Configure syngo SDM”](#) on page 23.

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**NOTE** Additional configuration is required on the *syngo* system to enable it to interoperate with StorageGRID. Contact Siemens support for assistance.

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6. Configure e-mail notifications. For more information, see [“Configure E-mail Notifications”](#) on page 24.
7. Verify the integration. For more information, see [“Verify the Integration”](#).

## Paths and File Names

### Storage Adapter

The StorageGRID storage adapter is installed at `/opt/sdm/grid` on the *syngo* SDM.

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## Log Files

Log files are saved to:

`/opt/sdm/grid/logs`

## syngo SDM NFS Mount Points

The *syngo* SDM NFS mount points for the StorageGRID system are:

`/data/mnt/archive`

`/data/mnt/backup`

The following symlinks are available for NFS mount points:

`/archive`

`/backup`

## Install the StorageGRID System

This section is for reference only. StorageGRID installation is usually performed by the LTS vendor.

If you are integrating *syngo* Imaging with a new StorageGRID deployment, follow the instructions in the *Installation Guide* to install StorageGRID software, start grid services, and perform the steps described in the “Verify Client and Grid Integration” chapter before beginning the procedure described in this guide.

Alternatively, you may be integrating *syngo* Imaging with an existing StorageGRID deployment. This procedure does not interfere with the operation of a running grid. If you are adding *syngo* integration to an existing grid, document the change in grid specific documentation.

## Install StorageGRID Adapter on syngo SDM

1. Create NFS file shares on the StorageGRID system’s primary and secondary Gateway Nodes.
2. Install the StorageGRID storage adapter on *syngo*.

### Create NFS Shares

- Create two NFS file shares on the primary and secondary Gateway Nodes. These two shares must be named `archive` and `backup`. For more information on creating NFS file shares, see the *Administrator Guide*.

## Install StorageGRID Storage Adapter on syngo

1. On the *syngo* SDM, log in as root.

2. At the *syngo* SDM command prompt or GUI, mount the StorageGRID storage adapter software installation CD and note the mount point: `<cd-mountpoint>`
3. Install the StorageGRID storage adapter software. Enter:  
`<cd-mountpoint>/install.sh`  
The StorageGRID storage adapter software installs on the *syngo* SDM.
4. Set up the software and follow prompts. Enter:  
`/opt/sdm/grid/setup.rb`
5. Generate an ssh keypair for the sdm user. Enter (and then follow prompts):  
`su - sdm`  
`/opt/sdm/grid/configure-ssh.rb`
6. On the *syngo* SDM, activate the StorageGRID adapter. Enter:  
`/opt/sdm/grid/activate-adapter.sh`

---

**NOTE** It may take several seconds to complete the activation process. Ignore any warnings or errors that may occur during the activation process.

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## Modify Grid Settings to Manage *syngo* Backup Files

You must configure the grid to ensure that the FSG cache and LDR object stores do not run out of space while storing the large *syngo* backup files. For more information on tuning the grid for object size, see the *Administrator Guide*.

## Configure HTTP Access to the Grid

1. Create a profile for the *syngo* adapter on the StorageGRID system. See “[Create a Profile on the StorageGRID System](#)” below.
2. Assign an IP range to the profile that you created for the *syngo* adapter. See “[Assign an IP Range](#)” on page 21.
3. Assign the IP range to a link cost group in the grid. See “[Assign IP Address to a Link Cost Group](#)” on page 22.

### Create a Profile on the StorageGRID System



You must create a profile that outlines the activities *syngo* is permitted to perform on the StorageGRID system. HTTP access to grid content takes place in a “namespace”. A namespace is a logical division,

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within which all file names are unique. In brief, specific activities over HTTP are dependent on the namespace in which content is exchanged. For *syngo* integration, configure the following namespaces:

- /CDMI and /UUID – permits ingestion, retrieval, and deletion of content
- /GRID – supports queries about grid nodes or services by a custom developed client application

## Procedure

1. Log in to the NMS MI using the Vendor account.
2. Go to **Grid Management ▶ HTTP Management ▶ Permissions ▶ Configuration ▶ Main**.
3. For each namespace, create an HTTP profile for *syngo*:
  - a. In the HTTP /CDMI and UUID Namespaces table, click **Insert**  or **Edit**  (if this is the first entry).

---

**NOTE** The HTTP /CBID Namespace is deprecated in favour of HTTP /CDMI and UUID Namespaces.

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- b. Enter a value for **Profile Name**.
- c. Select all available activities: **Modify/Create, Read, Query, Delete,** and/or **Last Access Time**.
- d. After updating namespaces, click **Apply Changes**.

## Assign an IP Range

You must now associate the profile you created above to an IP range that includes the *syngo* SDM.

1. In the NMS MI, go to **Grid Management ▶ HTTP Management ▶ Clients ▶ Configuration ▶ Main**.

Configuration: HTTP Management - Clients  
Updated: 2011-11-22 17:10:38 PST

HTTP Entities (0 - 0 of 0)

Description	IP Range	Profile Name	Client Name	Actions
syngo_http	192.68.170.30	syngo_HTTP		

Show 10 Records Per Page Refresh Previous » Next

Apply Changes

Figure 4: Configuring Access to Link Cost Groups

2. In the HTTP Entities table, click **Insert** .
3. Enter a value for **Description**.  
The IP range name can be anything meaningful; it is not referenced elsewhere in the configuration.
4. Enter a value for **IP Range**. Use the *syngo* SDM IP address or a range of SDM IP addresses permitted to access the grid.  
If specifying a range, use one of the following formats:
  - Hyphenated list of IP addresses (e.g. 192.168.130.0-192.168.130.64)
  - Range of IP addresses specified using CIDR notation (e.g. 192.168.130.0/27)
5. Select a **Profile Name**.  
Select the profile created above.
6. Click **Apply Changes**.

### Assign IP Address to a Link Cost Group

Associate the IP address range of the *syngo* SDM to a link cost group within the grid.

1. In the NMS MI, go to **Grid Management ► Grid Configuration ► Link Cost Groups ► Configuration ► Main**.

Overview Configuration

Main

**Configuration: Grid Configuration - Link Cost Groups**  
Updated: 2008-10-14 12:47:13 PDT

Group Names (1 - 2 of 2)

Group ID	Group Name	Actions
10	Group 10	
20	Group 20	

Show 10 Records Per Page Refresh Previous « 1 » Next

Client Group IP Ranges (1 - 10 of 0)

IP Range Name	IP Range	Group ID	Actions
syngo SDM	192.168.170.30/8	10	

Show 10 Records Per Page Refresh Previous « » Next

Link Costs

Link Source	Link Destination		Actions
	10	20	
<input type="text"/>			

Apply Changes

Figure 5: Assigning a Link Cost Group

- In the Client Group IP Ranges table, click **Insert** (or **Edit** if this is the first entry).
  - Enter a value for **IP Range Name**. This name can be anything meaningful; it is not referenced elsewhere in the configuration.
  - Enter a value for **IP Range**. This value must be the same syngo IP address or range that you added in “Assign an IP Range” above.
  - Select the **Group ID**.
- The group ID identifies a link cost group within the grid. Select the link cost group of the grid servers that are physically or logically “closest” to the *syngo* SDM. For example, if the SDM is located at the Data Center of a DC+DR grid, select the group ID associated with the Data Center.
- Click **Apply Changes**.

## Restart and Configure *syngo* SDM

Restart the *syngo* SDM. Restarting activates the NFS shares and LTS configuration.

---

**NOTE** Configuration settings are preserved when restarting and do not need to be explicitly saved.

---

Other configuration changes are required on the *syngo* system for it to interoperate with StorageGRID. Consult a Siemens support technician for assistance.

## Configure E-mail Notifications

Configure e-mail notifications for the Admin Node. Use the *syngo* SDM administrator's e-mail address as the destination for notifications. For more information, see the *Administrator Guide*.

## Verify the Integration

---

Ensure that the integration of Siemens *syngo* Imaging PACS system with the StorageGRID system has completed successfully.

## Verify SSH Connection

1. On the *syngo* SDM, log in as root.
2. Enter: `su - sdm`
3. Enter:

```
cd /opt/sdm/grid
./inittest.sh
ruby ./testssh.rb
```

The expected output is a UUID, for example:

```
9243EAD9-9B9C-4210-A3A3-5D1D08C84189
```

## Verify HTTP Connection

1. On the *syngo* SDM, log in as root.
2. Enter: `su - sdm`



**3. Enter:**

```
cd /opt/sdm/grid
./inittest.sh
ruby ./testhttp.rb
```

The expected output is a list of Node IDs and Node Types, and a list of Adapter status messages, for example:

```
Nid= 13010115 Type= CMS
Nid= 20020133 Type= FSG
..
```

## Verify the Storage Adapter

1. On the *syngo* SDM, log in as root.

2. Enter: `su - sdm`

3. Enter:

```
cd /opt/sdm/grid
./inittest.sh
./testadapter.sh
```

The expected output is:

```
startArchive
SUCCESS

checkArchive
ARCHIVED

getFileStatus
ONLINE

dearchive
SUCCESS

checkStorage
SUCCESS

checkFillLevel
CheckFillLevel results:
  Total capacity: <total_capacity> bytes (about <total_capacity> GiB)
  Remaining space: <remaining_space> bytes (about <remaining_space> GiB)
  Used:           <percentage_used> %
```

## Maintenance

---

### Reconfigure Adapter on SDM

If in the course of operations the Gateway Node is reinstalled, remove all known hosts and run the `configure-ssh.rb` command.

1. On the *syngo* SDM, log in as root.
2. Remove known hosts. Enter:  

```
su - sdm  
rm ~/.ssh/known_hosts
```
3. Run the `configure-ssh.rb` command. Enter:  

```
su - sdm  
/opt/sdm/grid/configure-ssh.rb
```

### Gateway Node Failovers

After a Gateway Node failover, run the `setup` and `configure-ssh` commands on the *syngo* SDM.

1. On the *syngo* SDM, log in as root.
2. Set up the software and follow the prompts. Enter:  

```
/opt/sdm/grid/setup.rb
```
3. Run the `configure-ssh.rb` command. Enter:  

```
su - sdm  
/opt/sdm/grid/configure-ssh.rb
```