



# Deploying the F5 ARX with Northern Storage Suite

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# Deploying the F5 ARX with Northern Storage Suite

Welcome to the F5 ARX - Northern Storage Suite deployment guide. This guide provides step by step procedures on deploying the Adaptive Resource Switch (ARX) with Northern Storage Suite Quota management application.

The F5 ARX file virtualization platform decouples file access from physical file location within Network Attached Storage (NAS) environments. The ARX platform automates file migration to the appropriate tier of storage without affecting data access, thus minimizing backup and recovery windows.

Northern Storage Suite (NSS) is a server-based application capable of monitoring and controlling growth of file shares. The file system quota capability of the solution is the focus of this deployment guide. The architecture of this quota functionality involves NSS tracking file system usage via CIFS Notifications for directories. When the quota is exceeded, NSS changes the file access permissions to remove write capabilities. Once file quota usage is changed or the user modifies their quota, the lock is removed.

For more information on the ARX system, see <http://www.f5.com/products/arx-series/>

## Prerequisites and configuration notes

The following are prerequisites and configuration notes for this deployment:

- ◆ ARX is configured for network access and the initial switch interview has been completed.
- ◆ The ARX contains a simple configuration with a Managed Volume and a Virtual CIFS service.
- ◆ Windows Storage Servers are installed and configured as ARX Tier 1 and Tier 2 file systems.
- ◆ Northern Storage Suite application is installed on an additional server with an initial configuration and licensing for Quota management.
- ◆ *Optional:* An SMTP reflector or email server needs to be available for quota notifications to be sent to the Domain Users.
- ◆ This document is based on the fact that the Microsoft Active Directory Domain is preconfigured and the F5 Secure Agent is installed. If you are using a version later than 5.1.6, installing the Secure Agent is no longer a dependency.
- ◆ An Active Director Domain User is required. This user needs to be a member of the Local backup Operator group for each external filer.
- ◆ An NFS Export with root access is available as an ARX Metadata store.

- ◆ The ARX platform is deployed in redundant pairs. The secondary switch is a Hot Standby switch. Redundant switch configuration procedures should be followed in order to deploy a high available configuration. See the ARX documentation for more information.

## Product versions and revision history

Product and versions tested for this deployment guide:

Product Tested	Version Tested
Microsoft Windows 2008 Storage Server	v6.0.6001
Northern Storage Suite	v8
F5 ARX Switch Firmware	5.1.6
F5 ARX Hardware	2000, 4000

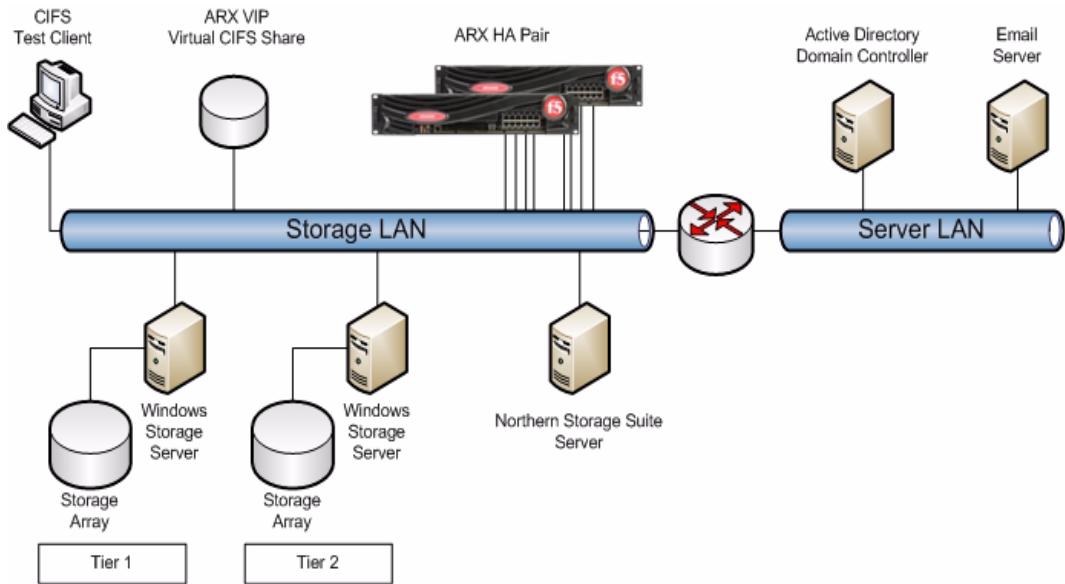
Document Version	Description
1.0	New deployment guide

## Configuration example

In the diagram on the following page, we show basic connectivity between clients, ARX, CIFS Client and the Northern Software Suite (NSS) server.

The network configuration defined in the lab used an ARX with 4 Gigabit Ethernet links configured into a LACP bundle between the ARX and the core switch. The Active Directory (AD) Primary Domain Controller and Email Server are on a different subnet than the Windows storage servers.

The ARX is configured with at least a single managed volume with two external filer shares in a two tier file tiering policy. The AD Domain User created as the ARX Proxy User is assigned local Backup Operator group for the Windows Server. An additional server is used as the Northern Storage Suite Server and performs the Quota Management functions.



*Figure 1 Logical configuration example*

## Configuring the ARX

In this section, we configure the ARX to allow CIFS notifications for sub-directory changes to be sent to the NSS Server. By default the ARX does not support allowing subscriptions to recursive sub-directory change notifications. However, there is a configurable attribute to override this default behavior.

This guide assumes the ARX is already configured with a Managed Volume with at least a 2 tier storage policy and a Virtual CIFS service is created and available. See the ARX documentation or other ARX deployment guides at <http://www.f5.com/solutions/resources/deployment-guides.view.products.arx.html> for assistance in building a 2 tier storage solution with ARX.

The ARX configuration changes are made to accommodate NSS Quota enforcement. NSS accesses the ARX Virtual CIFS Share and monitors directory changes.

## Modifying the ARX CIFS notification settings

The first task is to change a default configuration setting on the ARX in order to interoperate with NSS. In this procedure, we enable the *cifs notify-change-mode use-subtree-flag* on the ARX Managed Volume using the command line.

### To modify the ARX CIFS notification settings

1. Log onto the ARX with an SSH client.
2. At the prompt, type **enable** to enable privilege access.
3. Type **global** to enter global config mode.
4. Navigate to the Namespace and Managed Volume. In our example the namespace name is **Dell**, and the managed volume is **/vol**, so we type:

```
arx1000-2(gbl)# namespace Dell volume /vol
```

5. Enable the CIFS Notification attribute to allow sub-directory recursive notifications to be sent. The **use-subtree-flag** honors the client's setting of the 'watch subtree' argument. This is the method that NSS uses to be notified of directory changes and to trigger NSS to recalculate free space and usage, and enforce the quota if the thresholds are exceeded. Use the following command:

```
arx1000-2(gbl-ns-vol[Dell~/vol])# cifs notify-change-mode use-subtree-flag
```

Now the managed volume is configured with the required change for NSS to receive directory change notifications. The next task is to configure NSS to manage user based quotas for a home directory environment.

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# Configuring the Northern Storage Suite

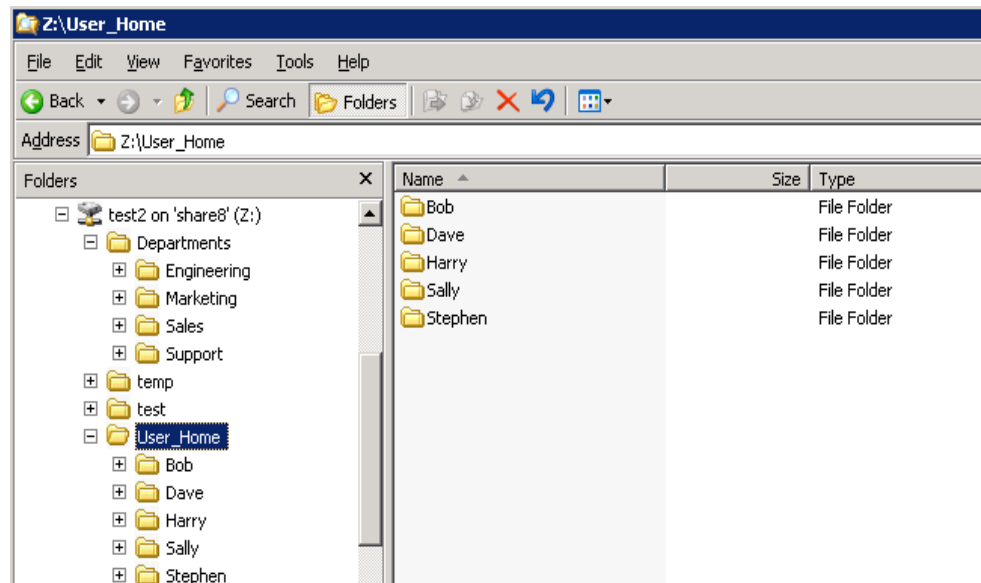
In this section, we configure NSS for a quota management configuration. The NSS application needs to be installed and properly licensed for Quota Management.

## Preparing the Storage Path location

Access to the ARX Virtual Service CIFS share is required. The first task is to map a drive letter to the ARX Virtual Service CIFS share.

### To map a drive for the Virtual Service CIFS share

1. From the Windows client, open **My Computer**.
2. From the **Tools** menu, click **Map Network Drive**. The Map Network Drive wizard opens.
3. From the **Drive** list, select an unused Drive letter.
4. In the **Folder** box, type the Virtual Service FQDN and export path. In our example, we type `\\dell.siterequest.com\test`.
5. Click the **Connect using a different user name** link. Specify the Domain User with the proper access rights. In our example, we use the Proxy User credentials.
6. Click the **Finish** button. The drive is now mapped and can be explored. In our example, the following screen displays the file contents of the virtual service export.



*Figure 2 Managed Volume share contents*

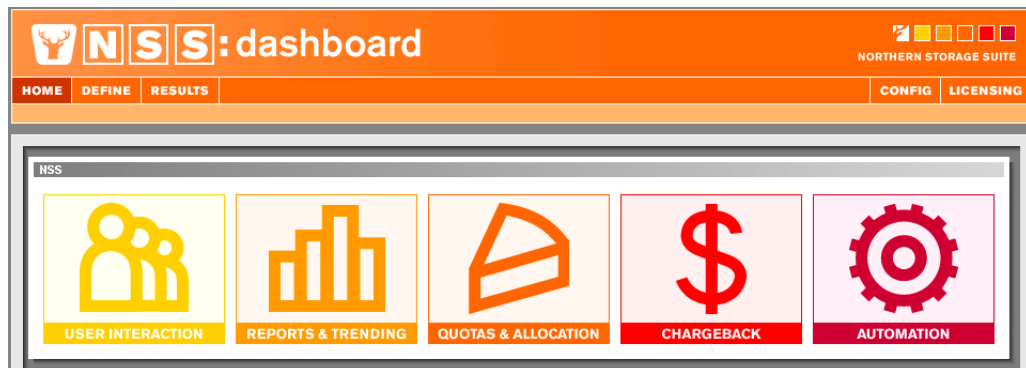
In this example, there are four root level directories. For demonstration purposes, several files were copied into the User's home directories and Department directories.

## Configuring the Northern Storage Suite Quota server

In this section, we configure the Northern Storage Suite Quota server. The Quota server is the component that monitors the network path, calculates the amount of used space per quota, and performs locking and unlocking of the directory tree when quotas are violated or remediated. In our example, the Quota server is the same server as the NSS server.

### To configure the Quota server

1. Open the NSS application (from the Windows Start menu --> Program Files --> NORTHERN -> Storage Suite -> Northern Storage Suite).  
The main dashboard opens.



*Figure 3 Northern Storage Suite Dashboard*

2. Click the **Quotas and Allocation** icon on the dashboard. This loads the Quota Management interface.
3. From the left navigation pane, click **File System Quotas** to review the file system quota configuration. The list of configured quotas is open, and the server managing the quota, director path, quota size and usage displays (see Figure 4, on page 6).

The quota attributes can be changed and reviewed by right-clicking to select a quota and then left-clicking and then choosing **Modify**. In the next section we create a new quota.

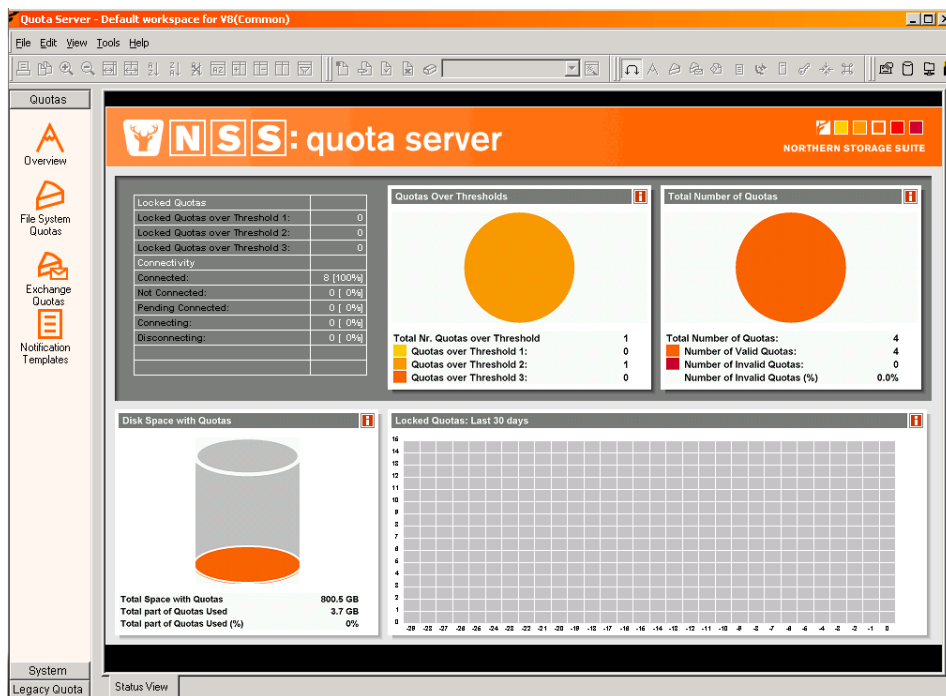


Figure 4 Quota Server Display Pane

## Creating a new Quota and configuring the Quota policy

Quotas or disk quotas are slices of your disk or, in other words, hard drive resources. When you set quotas on your disks or folders you are limiting how large an object is allowed to grow. Disk quotas are used to control disk growth so a server's storage capacity isn't reached unexpectedly, which could cause the server to crash.

In different situations or environments, you may need to use different kinds of disk quotas to prevent a particular object from growing out of control. For that purpose, the Quota Server provides several different types of quotas.

A remote quota can be set on remote SMB/CIFS compatible shares. This means that it is possible to set quotas on remote servers or devices without installing Quota Server on the remote device. This is especially useful for controlling storage on NAS devices in Windows networks.

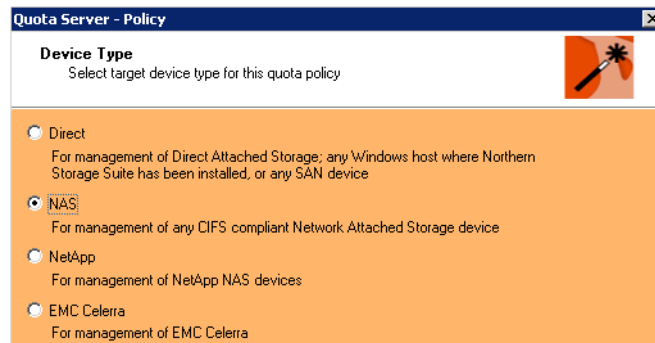
In order to use remote quotas, it is necessary to have at least one Quota Server installation in your network. This server can then manage quotas for remote Windows file shares.

### ◆ Important

*The Quota Server service managing remote quotas must be configured with a domain account that has administrative permissions for all the shares that it is configured to control.*

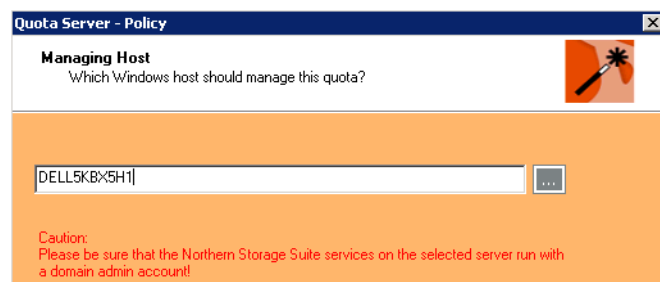
### To create a new quota

1. From the Quota Management Interface, right-click in the center pane and then select **New**. The welcome screen for a new quota opens.
2. Click **Next**. The Quota Server Policy dialog opens.
3. Click **Add Quota** and then click **Next**.
4. On the Device Type page, click **NAS** and then click **Next**.



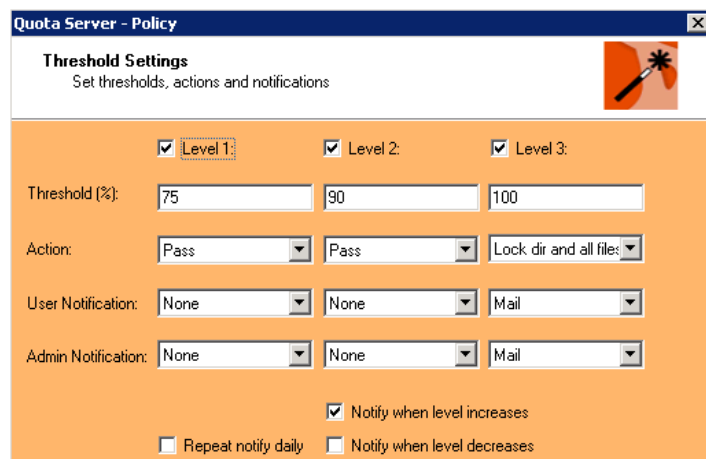
*Figure 5 NAS Device type*

5. On the Quota Type page, select a type. The quota type is how the Quota management server is going to behave for the new quota. In our example we are demonstrating a real time quota enforcement model, so we select **Object**. Click **Next** to continue.
6. On the Managing Host page, specify the Managing Host. Multiple Management hosts are supported by NSS.



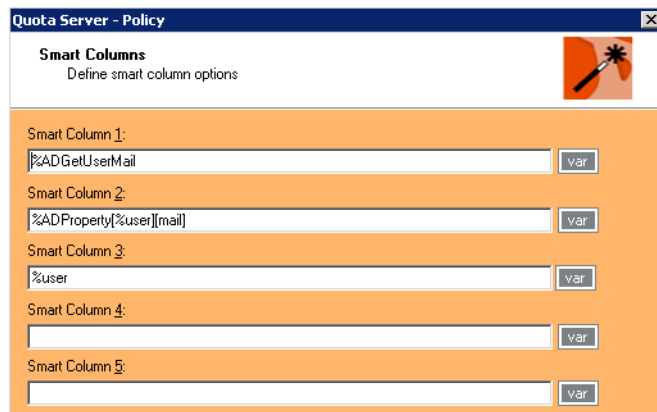
*Figure 6 Quota server managing host*

7. On the Object Path Settings page, type the appropriate path, and then click the **Add** button. This page is the Directory Share that is presented by the ARX Virtual CIFS Service. In our example the path is **\\dell.siterequest.com\test2\User\_Home**. Click the **Next** button.
8. On the General Quota Settings page, set the appropriate Quota size. In our example, we typed **200M** and selected **Bytes** from the list. Click the **Enable** box, and then click **Next**.
9. On the Threshold Settings page, set the appropriate Thresholds for each of the three levels. Our examples are shown in Figure 7.



*Figure 7 Threshold Settings*

10. On the Notifications Settings page, set the appropriate user and administrator values. These values determine the email addresses that the notifications are sent to when quota thresholds are exceeded. For **User Settings**, use the following syntax: **%user@<domain>**. Replace <domain> with your domain name. In our example, we type **%user@siterequest.com**. and **admin@siterequest.com** as the administrator address. Click **Next** to continue.
11. On the Smart Columns page, add the appropriate columns. Smart columns are a programmatic way to send notifications based on user details. You can browse the available variables by clicking the **var** button. In our examples are shown in Figure 8, on page 9. Click **Next** to continue.



*Figure 8 Smart Column configuration*

12. Review the new quota configuration displayed in the list. Click **Apply** to create the Quota.

This completes the quota creation. Continue with the following section to verify the configuration is operating properly.

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## Verifying the Storage Quota

In this section, we verify the configuration is operating properly. We use a test client to access the ARX Virtual Service. Files are copied to the Quota enforced directory trees. The Quota threshold will be exceeded and the quota lock will be verified. The quota will then be modified to raise the quota and release the lock. More files will be copied and the new quota enforced. The quota will be user self mitigated by removing files that exceed the quota and the NSS server will release the lock.

The directory ACL is modified to disallow file create and modify; because the ARX performs directory stripping, modification to the directory ACL will be applied to all of the backend filers containing the directory. When the quota has been mitigated the directory ACL is modified again and the same operation is performed.

## Mapping a Network Drive

In this section, we create a sub-directory on the ARX Managed Volume. In order to create the directory, access to the ARX Virtual Service CIFS share is required. The first task is to map a network to the Virtual Service CIFS share (This is the same directory tree we mapped a drive to from the NSS server).

### To map a network drive

1. From the Windows client, open **My Computer**.
2. From the **Tools** menu, click **Map Network Drive**.  
The Map Network Drive wizard opens.
3. From the **Drive** list, select an unused Drive letter.
4. In the **Folder** box, type the Virtual Service FQDN and export path.  
In our example, we type `\\dell.siterequest.com/test`.
5. Click the **Connect using a different user name** link. Specify the Domain User with the proper access rights. In our example, we use a user with Active Directory user credentials.
6. Click the **Finish** button. The drive is now mapped and can be explored. In our example, the following screen displays the file contents of the virtual service export.

## Adding files to exhaust the allotted Quota

The quota was created to block files from being added to the network share once the quota has been reached. The last file that is created which exceeds the quota enforced value will be committed and then the directory is locked. The user has the ability to remove files in order to release the quota lock.

The quota in our example is 200MB. Copy enough file content into a subdirectory (in our example `User_Home\Bob`) and exceed the quota.

Once the quota is exceeded, an error message dialog is presented when add it on all files are attempted. In the next two sections we show the quota exhaustion mitigation tasks.

## User based Quota exhaustion mitigation

Once the quota is exceeded, the directory tree is locked. Users can no longer create or modify files in the directory or its sub-directories. This can be shown by opening the properties of the directory. The properties report creating files is not allowed. The access control lists are modified dynamically by the NSS Quota application. If email notifications were configured, open the email application and observe the notification message from the Quota server.

In order to release the directory lock, delete enough file contents so the consumed space is less than the quota size (200MB in our example).

Alternatively, the administrator could raise the quota value, and the lock is automatically released. The next section demonstrates how to modify the managed quota using the NSS administrative interfaces.

## Administrative based Quota exhaustion mitigation

In this section, we show how to use the NSS Quota management interface to increase the quota value and release the lock.

### To mitigate the quota as an administrator

1. Make sure the quota is exhausted, and review the email notification.
2. From the Quota Management Interface, ensure the Usage bar in the File System Quotas tab also shows the quota is exceeded by displaying the usage meter in Red.
3. Right-click the quota and select **Modify**. The Basic Quota Settings dialog opens to the Basic Quota settings page.
4. In the Size box, type a new size with ample space, modifying the setting in the list if necessary. In our example, the Quota was initially set to 200MB. We now type **450M** in the box. Click **Finish**.

Once complete, the Quota Size field reports 450MB, the Usage Meter should no longer report Red, and the file directory has been unlocked.

## Conclusion

This deployment guide demonstrated a way to integrate F5 ARX platform with Windows Storage Server and Northern Storage Suite for managing and enforcing file system quotas. The deployment enables quotas to be managed that are ARX Virtual CIFS Services.

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Quotas thresholds can be managed by the end user, as well as the storage administrator. Quota threshold monitoring and enforcement occurs in real time and external to the ARX. For more information on configuring the F5 ARX, refer to the documentation, available on Ask F5.