



DEPLOYMENT GUIDE

DEPLOYING THE F5 ARX WITH THE NEC NV7400 STORAGE ARRAY

Version: 1.2

Deploying the F5 ARX with the NEC NV7400 Storage Array

Welcome to the F5 - NEC NV7400 Storage array deployment guide. This guide provides step by step procedures on deploying the Adaptive Resource Switch (ARX) with NEC NV7400 storage array.

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.

The NEC Storage NV series is a Network Attached Storage (NAS) product that connects to a network and enables file access via the network. It supports file access protocols, which enables files located in different operating systems to be shared. NEC NV Series supports file access protocols CIFS and NFS. This enables files to be shared between different operating systems using a common file access method with a common file access protocol. Centralized control of data maintenance or other processing is also possible by storing shared data together.

The NEC Storage NV series is a high-performance file server with high functionality, high extensibility, and high availability, and provides various functions to facilitate its operations.

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

For more information on the NEC NV7400 (in Japanese), see <http://www.nec.co.jp/products/istorage/product/nas/nv7400/index.shtml>

Prerequisites and configuration notes

The following are prerequisites and configuration notes for this deployment:

- ◆ For Managed Volumes the following CIFS features are **not** supported:
 - *Named Streams*
A named stream (or Alternate Data Stream) is a hidden file with meta-information about the main file, such as a summary description or a thumb-nail graphic. If any back-end-CIFS filer does not support named streams, you must disable the feature for its namespace volume.
 - *Unicode On-Disk*
A volume that supports unicode on disk can support file names with any of the multi-byte characters (such as Korean or Japanese characters) supported by the Unicode character set. If any back-end-CIFS filer does not support Unicode file names on disk, you must disable the feature for its namespace volume.

- *Compression*

A volume that supports compressed files allows its clients to compress its files and preserves the file compression for policy migrations and shadow copies. If any back-end-CIFS filer does not support compressed files, you must disable the feature for its namespace volume.
- *Spare files*

Some applications create *holes* in files with no data (that is, all zeros); a volume that supports sparse files like these does not use any disk space for those holes. If any back-end-CIFS filer does not support sparse files, you must disable the feature for its namespace volume.
- ◆ The following features of the ARX are **not** supported:
 - *Multiprotocol access (NFS & CIFS)*

If all the back-end shares support both NFS and CIFS, you can configure a *multi-protocol namespace*. Clients can access the same files from either a CIFS or an NFS client. The namespace can be backed by a heterogeneous mix of multi-protocol filers, possibly from multiple vendors. The switch passes client requests to these filers, and passes filer responses back to the clients. File attributes, such as file ownership and permission settings, are managed by each filer. Each filer also manages its file and directory naming; if a name is legal in NFS but illegal in CIFS, each filer creates a filer-generated name (FGN) for its CIFS clients. Different vendors use different conventions for attribute conversions and FGNS, so that a CIFS-side name and/or ACLs at one filer may be different at another filer.
 - *ARX Direct Volumes for NFS*

A *direct* volume is a collection of mount points into its back-end storage. It does not import files and directories, does not keep metadata, and does not support policies.
The direct volume is useful for quickly aggregating storage into a single mount point.
 - *ARX Virtual snapshot support*

A *snapshot* is an exact copy of a managed volume at a single point-in-time. You can create regularly-scheduled snapshots in a managed volume, and you can limit the CIFS clients who can access those snapshots.
 - *CIFS filer subshares*

A managed volume that supports CIFS can optionally support subshares and their share-level ACLs. A subshare is a CIFS share below the root of the volume. This capability is not supported by the NEC NV7400.
 - *Kerberos Authentication*

You can configure the namespace to authenticate its clients with Kerberos instead of (or in addition to) NTLM. The NEC NV7400 filer does not support Kerberos authentication. The user must configure NTLM authentication. Microsoft Vista requires Kerberos authentication. MS Vista clients are not supported.

- ◆ The default value of NFS Max Read/Write size is 8192 in the ARX configuration. To improve performance, we strongly recommend you adjust this value higher (for example 32768). Use the **nfs-param** command to change the NFS read size or write size between the current volume and its back-end shares. See the ARX documentation for specific details on configuring this setting.
- ◆ This deployment guide assumes a Microsoft Active Directory environment is properly configured and the included the Secure Agent Software installed. This agent has a password which will be needed during NTLM Authentication Server configuration.
- ◆ When the NEC NV7400 is deployed in a multi-homed network topology it may respond to network traffic with an IP address other than the one the client initiated the request to. This causes the ARX internal firewall to reject the response packets. This behavior has been identified when the NV7400 has multiple Default Gateway IP addresses: one address is for management traffic and the second for service (client) traffic. The ARX has a configuration parameter to allow for this behavior. This parameter is the secondary IP address configurable option for the External Filer definitions. This is not an issue if the ARX and NV7400 are on the same service IP network. This may also be remedied by modifying routing table settings in NV7400, though it was not tried in our testing.
- ◆ The ARX must be deployed in a High Availability pair. The HA configuration details are well documented in the ARX Configuration Manual. Refer to **The CLI Network Management Guide** and the section *Adding a Redundant Switch* for more details.

Product Tested	Version Tested
NEC NV7400	6.1.313E
Linux Kernel Derivation	2.4.17
NFS	NEC proprietary implementation based on XFS
CIFS	Based on Samba 3.0.1 NEC proprietary Persistent ACLs codebase
F5 Acopia ARX	3.2.0, 3.2.1, and 4.0.1

Configuration example

The traffic flow for file access described in this deployment guide follows several unique paths. The first path is the front end traffic which is from the client to ARX virtual IP accessing managed volumes file shares. The second path is the backend traffic from the ARX to NEC NV7400 filer. We discuss the backend filer connectivity first.

The ARX utilizes a special user called the *proxy-user*. This user has the Backup Operator credentials for accessing the NEC filer over CIFS. For NFS access, the ARX uses root permissions. The NEC filer must allow root level access to the file exports. In turn, the ARX establishes connectivity to the backend file shares/exports and manages clients requests as a proxy to the physical volumes. The ARX already has a metadata map of all the backend files and directories and which physical filer they are located on. The ARX maintains this file in real time as files and directories are read, written, deleted, or migrated.

On the front end, clients access the Virtualized Filers via virtual IP addresses hosted by the ARX. The client accessing these virtualized resources treat the connection as if they were connecting to an actual file server. Access rights are proxied to the backend filers and enforced by the ARX. When a client requests to read a file, the ARX accepts the requests and performs a metadata lookup for the file. In turn, the ARX locates the file on one of the backend filers and presents it to the client. The client has no idea which physical filer the file was served from, nor does it need to know. When the client creates a new file, the ARX locates the proper backend filer the file should be written to by applying the policy and creates a metadata entry for the file and writes the file to the backend. This same process occurs whether the file protocol is CIFS or NFS.

On a periodic basis the ARX inventories its metadata and locates files that need to migrate to other storage locations. As files age and an age policy is applied to a volume, files are moved between backend filers. This is all transparent to the clients, they are unaware the file migrated to other platforms.

See the configuration diagram example on the following page.

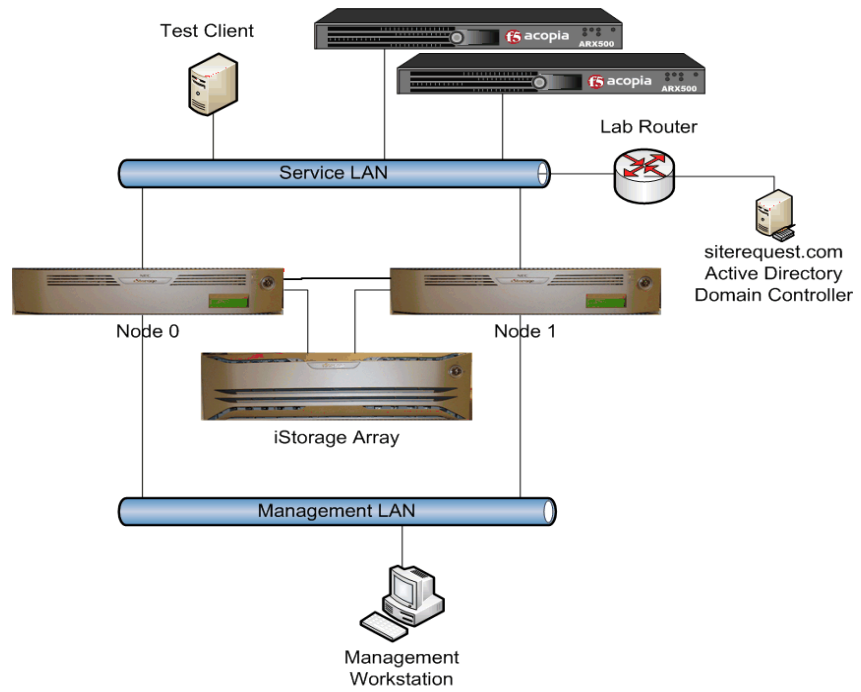


Figure 1 Logical configuration example

Configuring the NEC NV7400

Typically, the NEC NV7400 storage array has already been configured according to customer requirements by an NEC engineer or an affiliate. This section outlines key attributes of the NEC configuration. These values are referenced when the ARX is configured. The CIFS Shares and NFS Exports can be queried using ARX CLI commands. The NEC configuration shown here is another way to determine the CIFS shares and NFS Exports.

Logging into the NV7400

The NV7400 has two user interfaces. The first is a limited command line interface, the second is a Graphical User Interface (GUI). In this deployment guide, we use the GUI, which is accessed using a web browser. The web server is listening on port **8585**. The default user name is *nsadmin* with no password. There is only one *nsadmin* user allowed to be logged in at a time.

The NEC NV7400 is deployed in a clustered configuration. Each filer has a unique management IP address as well as a common shared floating IP address. In order to manage the cluster, login using the floating IP address.

To log of the NV7400

1. From a web browser, go to **http://<floating ip address>:8585**
2. In the **Username** box, type **nsadmin**
3. In the Password box, type the appropriate password. There is no password by default.

Viewing NFS exports

In this section we review the NEC configuration for the NFS exports. These export names are used later when the ARX is configured. These exports will be added to the ARX NFS Managed Volume.

Conversely, you could choose to use the ARX to probe the external filer's exports and shares. The probe results would match these NEC settings.

◆ Note

In our example, NEC Node NV0 is hosting the NFS Exports. Ensure that Node NV0 is selected in the node selection on the top pane in order to view the NFS exports.

To view existing NFS Exports

1. From the navigation page, click the blue **Manage** tab.
2. Under **File Share**, click **NFS**.
The Exports tab of the NFS page opens. In our example, the NEC node nv0 is hosting the NFS exports (see Figure 2).

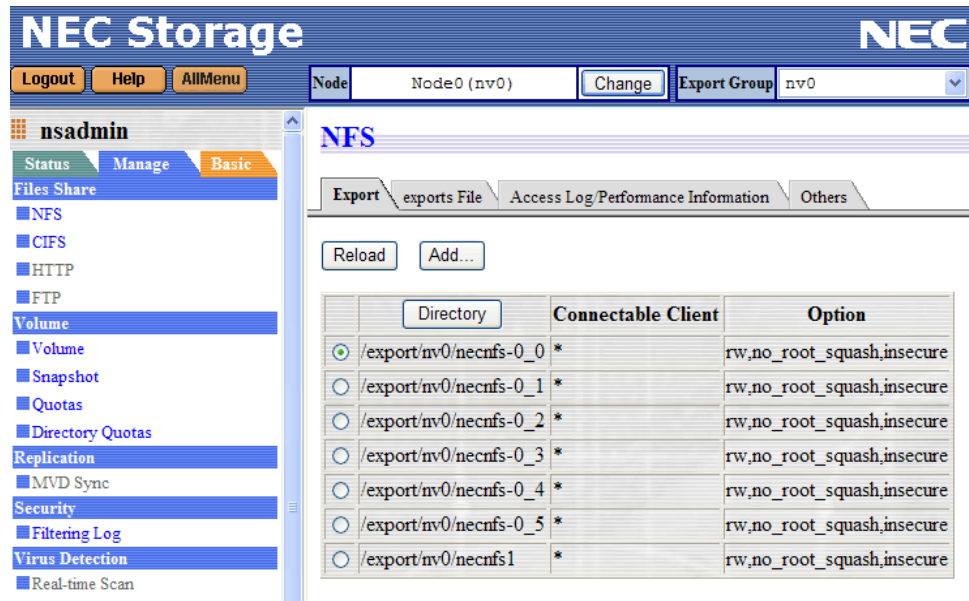


Figure 2 Viewing the NFS Exports on the NEC NV7400

Viewing CIFS shares

If the NEC NV7400 has not been defined within Active Directory, the GUI prompts the user to join the domain. See *Defining the Active Directory Domain*.

In our example, NEC Node NV1 is hosting the CIFS Shares. Ensure that Node NV1 is selected in the node selection on the top pane in order to view the CIFS Shares.

To view existing CIFS Shares

1. From the navigation page, click the blue **Manage** tab.
2. Under **File Share**, click **CIFS**.
The Shares tab of the CIFS page opens, and the Shares are displayed. In our example, the NEC **node nv1** is hosting the CIFS shares.

Configuring root level access for the ARX

The next step is to configure root level access for the ARX on the NV7400. To allow the ARX root level access to NV, perform the following procedure:

To configure root level access for the ARX

1. From the navigation page, click the **Manage** tab.
2. Under **File Share**, click **NFS**.
3. Perform one of the following:
If you are creating a new export, click the **Add** button in the **Export** tab. The Add Export page opens.

If you are modifying an existing export, click the **Modify** button in the **Export** tab. The Modify Export Settings page opens.
4. From the Add Export page or the Modify Export Settings page, do the following:
 - a) In the **Connectable Client** box, type the proxy IP address of the ARX.
 - b) From the **User Mapping** section, select **No Map(no_map)**.
 - c) From the **Squashed Users** section, select **None(no_root_squash)**.
 - d) Click the **Add** button.
 - e) Repeat these steps for each proxy IP addresses of ARX.
5. Click the **Submit** button.

Defining the Active Directory Domain

If you have not already defined the Active Directory Domain, you are prompted to do so before you can view the CIFS shares. In our example, the Domain Controller was not on the same IP network as the NV7400. This required us to specify the AD parameters manually.

To define the Active Directory Domain Controller

1. From the navigation page, click the blue **Manage** tab.
2. Under **File Share**, click **CIFS**.
Because the Domain Controller is not yet defined, you are prompted to configure the Domain Controller parameters, and the Domain Controller Setup screen opens.
3. From the **User Database Type** list, select **ADS Domain**.
4. In the **Domain** box, type the NetBIOS (not FQDN) domain name. In our example, we type **siterequest**.
5. In the **Computer Name** box, type the name of the computer. In our example, we type **NV1**.
6. In the **DNS Domain Name** box, type the DNS domain name to which the Active Directory server belongs. In our example, we select **siterequest.com**.

7. In the **Domain Controller** section:
 - a) Click the **Manual Setting** option button. In the box, type the fully qualified domain name (FQDN) of the controller. In our example, we type **siterequestads01.acme.com**.
 - b) Make sure the **Join to domain** box is checked.
 - c) In the **User** box, type the name of the user. In our example, we type **Administrator**.
 - d) In the **Password** box, type the administrator password.
8. Click the **Set Windows Domain** button (see Figure 3).
9. To view the Active Directory Domain, you can click the Domain Controller Connection tab from the CIFS File Share page.

❖ Windows Domain

Set Windows Domain.

User Database Type	ADS Domain <input type="button" value="Select"/>
Domain	SITEREQUEST <small>[Please specify NetBIOS (not FQDN) domain name.]</small>
Computer Name	NV1
DNS Domain Name	siterequest.com <small>[Please specify the DNS domain name to which ActiveDirectory server belongs.]</small>
Domain Controller	<input type="radio"/> Automatic Setting <input checked="" type="radio"/> Manual Setting (Set the same servers to [Key Distribution Center]) <input type="text" value="siterequestads01.siterequest.com"/> <small>[Please specify FQDN. When selecting the multiple input, please separate them by space. The max number is 3.]</small> <input checked="" type="checkbox"/> Join to domain User <input type="text" value="Administrator"/> Password <input type="password" value="••••••"/>
Key Distribution Center	acmeads01.acme.com (optional) <small>[Please specify FQDN. When selecting the multiple input, please separate them by space. The max number is 3.]</small>

Figure 3 Configuring the Domain Controller settings

Enabling direct hosting

Direct hosting is used when the ARX device connects to the NEC NV series.

To enable the direct hosting feature

1. From the navigation page, click the **Manage** tab.
2. Under **File Share**, click **CIFS**, and then click the **Others** tab.

3. In the **Direct Hosting** section, check the **Use** box.
4. Click the **Submit** button.

For CIFS, the ARX also needs root level access, or access to all directories and files. This is done as follows. A built-in group called NV Backup Operators, a local group in NV, is enabled. Then a user in the Windows domain is included as the member of the group. When ARX accesses NV, this user should be used. Part of the procedure requires command line interface. There are several ways to use command line interface.

For details, refer to the following NEC document:

NEC Storage NV Series Software Command Reference

Chapter 2 - Account and Execution Forms

Chapter 3:Section 3.3 - Setting Security

The following example assumes that RSH is used. (Note that NV should have been configured to allow RSH access. If SSH has been installed on your PC, you can also use it instead of RSH.)

To allow a domain user access to all files in an export group

1. Create a local user database by typing the following command (starting from **rsh**) on a PC in the management LAN:

```
C:\rsh nv-server -l nsadmin lldb add sampledb
```

In this example, **sampledb** is the name of the database, and **nv-server** is the host name or IP address of NV management port.

Note: There are other ways to use CLI commands such as **lldb**. For details, consult NEC Storage NV Series Software Command Reference.)

2. Add the group NV Backup Operators to the local user database using the following command:

```
C:\rsh nv-server -l nsadmin lldb groupadd sampledb "NV Backup Operators"
```

3. Add a user in the domain to the group using the following command:

```
C:\rsh nv-server -l nsadmin lldb useradd sampledb ARXUSR -g 'NV Backup Operators'
```

In the above example, **ARXUSR** is the name of the user to be added. Note that the user name should be typed using upper case letters.

4. Specify this local user database as the **Client User Database** using the following steps:
 - a) From the navigation page, click the **Manage** tab.
 - b) Under **User Mapping**, click **Client User Database**.

-
- c) In the **Windows Client User Database** section, click the **Add** button.
 - d) On the Windows Client User Database page, from the **Domain Type** list, select **Passwd Domain** and click the **Select** button.
 - e) In the **Domain** section, type the name of the domain to which the NV belongs.
 - f) From the **Computer Name** section, type the computer name of the NEC NV7400.
 - g) Click the **Submit** button.

Configuring the ARX device

In this section of the deployment guide, we configure the F5 Acopia ARX device. In our configuration example, we create two Namespaces on the ARX. Each namespace will support a single protocol, and each namespace will have a single volume created. Two CIFS shares from NEC will be added to the CIFS Volume. Two NFS Exports will be added to the NFS volume. Multi-Protocol volumes are not currently supported.

Metadata for the managed volumes are located on the NEC NV7400 via an NFS version 3 TCP export. We define two global servers, each offering access to a single managed volume each. The global servers have unique IP addresses. The clients accesses the Managed volume via the Global Servers.

Most of following sections contains both Configuration utility (GUI) and command line procedures; choose the most familiar method.

Entering Global Configuration mode

Many of the following commands use the ARX Global Configuration mode. Use the following procedure every time you are instructed to enter Global Configuration mode.

To enter the ARX Global Configuration view

1. Log in to the command line.
2. Enable privileged mode by typing the following command:

```
enable
```

3. Enter global mode by typing the following command:

```
global
```

The prompt appears similar to the following example:

```
[hostname] (gbl) #
```

Defining the NTLM Authentication Server

The first task on the ARX device is to define the NTLM Authentication server. The name of the server is referenced later when you define the namespace.

If you already have an NTLM authentication server defined, you can reuse it as long as it is the same AD Domain Controller the NEC is associated to.

◆ Note

The Secure Agent Software password is required for this step. The Secure Agent Software needs to be installed on the Active Directory Server.

To add a NTLM Authentication Server from the Configuration utility

1. In the navigation pane, expand **Authentication**, and then click **NTLM Auth. Servers**.
2. Click the **Add** button.
3. In the **Name** box, type a name for this server. In our example, we type **siterequest**.
4. In the IP Address box, type the IP address of the NTLM server. In our example, we type **10.60.122.10**.
5. In the **Windows Domain** box, type the name of the Windows Domain. In our example, we type **siterequest**.
6. In the **Secure Agent Password** and **Confirm Secure Agent Password** boxes, carefully type the password.
7. In the **Agent Port** box, leave the default port of **25805**.
8. Click the **OK** button.

Add NTLM Authentication Server

NTLM Auth. Server Name	siterequest
IP Address	10.60.122.10
Windows Domain	admin
Secure Agent Password	*****
Confirm Secure Agent Password	*****
Agent Port	25805

OK Cancel

Figure 4 Adding the NTLM authentication server

To add a NTLM Authentication Server from the command line

1. Enter Global Configuration mode. See *Entering Global Configuration mode*, on page 12 for instructions.
2. At a prompt, use the following command syntax to create a new NTLM server:
ntlm-auth-server <name>

In our example, we type
ntlm-auth-server siterequest

Type **Yes** when prompted to create the server.
3. At the prompt, type **password** to specify the password for the server.
Carefully type the password at the **Password** and **Validate Password** prompts.

4. Use the following syntax to specify the IP address of the server:
ip address <ip address>
In our example, we type
ip address 10.60.112.10
5. Use the following syntax to specify the Domain Name of the server
windows-domain <domain name>
In our example, we type
windows-domain siterequest
6. Type **Exit** to finish the NTLM server configuration.

Defining the proxy user

The proxy user entry is utilized by the ARX to gain access to the external filer CIFS shares. The attributes associated to the proxy-user are: Proxy-user name, Active Directory username, password, and Windows Domain.

To create a proxy user from the Configuration utility

1. In the navigation pane, expand **Authentication**, and then click **CIFS Proxy Users**.
2. Click the **Add** button.
3. In the **Proxy Username** box, type the Proxy username. In our example, we type **siterequest**.
4. In the **Proxy User Account** box, type the Proxy user account. In our example, we type **admin**.
5. In the **Proxy User Account Password** and **Confirm Proxy User Account Password** boxes, carefully type the password.
6. In the **Windows Domain** box, type the name of the Windows Domain. In our example, we type **siterequest**.
7. Click the **OK** button.

Add CIFS Proxy User	
Proxy Username	siterequest
Proxy User Account	admin
Proxy User Account Password	•••••
Confirm Proxy User Account Password	•••••
Windows Domain	siterequest

Figure 5 Adding a CIFS Proxy user

To create a proxy user from the command line

1. Enter Global Configuration mode. See *Entering Global Configuration mode*, on page 12 for instructions.
2. At a prompt, use the following command syntax:
proxy-user <name>

In our example, we type
proxy-user siterequest
3. Specify the Active Directory user name using the following syntax:
user <user name>

In our example, we type
user siterequestuser002

At the **Password** and **Validate Password** prompts, carefully type the password.
4. Use the following syntax to specify the Windows Domain of the server: **windows-domain <domain name>**

In our example, we type
windows-domain siterequest
5. Type **Exit** return to the top level Global Configuration location.

Defining the External Filers

For simplicity in our configuration, the NEC NV7400 is deployed as a clustered pair, and the two filer heads will each own one protocol: NFS or CIFS. Each will be the backup to the other filer. Specifically node NV0 is hosting NFS exports and node NV1 is hosting CIFS exports. In case of a node failure the surviving node takes over the role of the failed node as well as its IP address.

NEC has two directories that need to be ignored by the ARX and not managed: **.Snap** and **.psid_it**.

Defining the NFS filer

The NEC NV7400 NFS integration identified that in some instances NEC will respond to NFS queries with a secondary IP address on the filer. In order to allow this return traffic to be properly recognized by the ARX we configure a secondary IP address.

To create a NFS filer from the Configuration utility

1. From the navigation pane, click **File Servers**.
2. Click the **Add** button. The Add File Server screen opens.
3. In the **Name** box, type a name for this File Server. In our example, we type **necnfs**.

4. In the **Primary IP Address** box, type the primary IP address. In our example, we type **10.51.105.13**
5. In the **Secondary IP Address** box, type the secondary IP address, and click the **Add** button. In our example, this is the Management IP address of the NEC, and we type **10.59.105.13**.
6. In the **Description** box, you can optionally type a description. In our example, we type **NEC NV7400 NFS Filer node NV0**.
7. In the **Ignore Directories (optional)** box, type **.Snap** and **.psid_lt**, each followed by the **Add** button.
8. Click the **OK** button (see Figure 6).

Add File Server

Name	necnfs
Primary IP Address	10.51.105.13
Secondary IP Address	10.59.105.13 <input type="button" value="Remove"/>
	<input type="button" value="Add"/>
CIFS Port	445
Supports Snapshots	<input type="checkbox"/> This file server supports snapshots.
File Server Type:	Network Appliance
Management IP Address (optional):	
Management Protocol:	SSH
Management Proxy User (optional):	acme
NFS TCP Connections	1
Description (optional)	NEC NV7400 NFS Filer node NV0
Ignore Directories (optional)	.Snap .psid_lt <input type="button" value="Remove"/>
	<input type="button" value="Add"/>
Common examples: EMC: .etc, lost+found, .ckpt* Network Appliance: .snapshot, ~snapshot BlueArc: .snapshot, ~snapshot	
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

Figure 6 Creating a new File Server

To create a NFS filer from the command line

1. Enter Global Configuration mode. See *Entering Global Configuration mode*, on page 12 for instructions.

-
2. At a prompt, use the following command syntax to create a new external filer:
external-filer <name>
In our example, we type
external-filer necnfs
Type **Yes** when prompted to create the server.
 3. Use the following syntax to specify the IP address of the filer:
ip address <ip address>
In our example, we type
ip address 10.51.105.13
 4. Use the following syntax to specify the secondary IP address of the filer:
ip address <ip address> secondary
In our example, we type
ip address 10.59.105.13 secondary
 5. Use the following syntax to specify each directory to be ignored:
ignore-directory <name>
In our example, we type
ignore-directory .Snap
ignore-directory .psid_lt
 6. Type **Exit** to finish the File Server configuration.

Defining the CIFS filer

Now we create the CIFS File Server.

To create an external filer from the Configuration utility

1. From the navigation pane, click **File Servers**.
2. Click the **Add** button. The Add File Server screen opens.
3. In the **Name** box, type a name for this File Server. In our example, we type **necnfs**.
4. In the **Primary IP Address** box, type the primary IP address. In our example, we type **10.51.105.14**
5. In the **CIFS Port** box, make sure the port is **445**.
6. In the **Description** box, you can optionally type a description. In our example, we type **NEC NV7400 CIFS Filer node NV1**.
7. In the **Ignore Directories (optional)** box, type **.Snap** and **.psid_lt**, each followed by the **Add** button.
8. Click the **OK** button.

To create an external filer from the command line

1. Enter Global Configuration mode. See *Entering Global Configuration mode*, on page 12 for instructions.
2. At a prompt, use the following command syntax to create a new external filer:

external-filer <name>

In our example, we type

```
external-filer neccifs
```

Type **Yes** when prompted to create the server.

3. Use the following syntax to specify the IP address of the filer:
ip address <ip address>

In our example, we type

```
ip address 10.51.105.14
```

4. Use the following syntax to specify each directory to be ignored:
ignore-directory <name>

In our example, we type

```
ignore-directory .Snap  
ignore-directory .psid_1t
```

5. Type **Exit** to finish the File Server configuration.

Determining External Filer Shares and Exports

External Filer shares and exports can be displayed on the ARX command line using the `show exports` command. The following examples will show how to query the external filer for its CIFS shares and NFS Exports.

The following procedures show you how to view the available shares and exports.

To show the available NFS Exports from the command line

1. Login to the ARX command line.
2. Enable Privileges by typing **enable**.
Important: If you are in Global mode, you need to first type **exit**.
3. To show the external filer exports, use the following syntax:
show exports external-filer <filer name>

In our example, we type

```
show exports external-filer necnfs
```

See Figure 7 for example output. In this example the ARX has located 6 NFS Exports are available on the external filer. The exports **necnfs-0_4** and **necnfs-0_5** are used in the NFS managed volume.

```

arx500-1# show exports external-filer necnfs
Export probe of filer "necnfs" at 10.51.105.13

Connectivity:

  Slot.Proc  Proxy Address    Ping (size: result)
  -----
  1.2        172.30.72.7     64: Success  2000: Success
8820: Success
% INFO: Filer 10.51.105.13 does not support CIFS or is
unreachable.

CIFS Credentials: [anonymous]

Capabilities:
  NFS
  Port Mapper    TCP/111, UDP/111
  Mount Daemon  V1 TCP/61001, V1 UDP/61001, V2 TCP/61001,
V2 UDP/61001, V3 TCP/61001, V3 UDP/61001
  Server        V2 TCP/2049, V2 UDP/2049, V3 TCP/2049, V3
UDP/2049

Shares:
  NFS
  Path (Owner)                                     Access (Status)
  -----
  /export/nv0/necnfs-0_0                          *
(Mounted, rsize=32768, wsize=32768)
  /export/nv0/necnfs-0_1                          *
(Mounted, rsize=32768, wsize=32768)
  /export/nv0/necnfs-0_2                          *
(Mounted, rsize=32768, wsize=32768)
  /export/nv0/necnfs-0_3                          *
(Mounted, rsize=32768, wsize=32768)
  /export/nv0/necnfs-0_4                          *
(Mounted, rsize=32768, wsize=32768)
  /export/nv0/necnfs-0_5                          *
(Mounted, rsize=32768, wsize=32768)
  /export/nv0/necnfs1                             *
(Mounted, rsize=32768, wsize=32768)

Time:
  NFS
  Filer's time is the same as the switch's time.

```

Figure 7 Example output from the `show exports external-filer` command

To show the available CIFS Exports

1. Login to the ARX command line.
2. Enable Privileges by typing **enable**.
Important: If you are in Global mode, you need to first type **exit**.

3. To show the CIFS exports, use the following syntax:
show exports external-filer <filer name> proxy-user <username>

In our example, we type

```
show exports external-filer neccifs proxy-user
siterequestuser001
```

Defining the ARX NFS Namespace and Volume

The ARX uses the namespace to collect common file systems together and present them to client systems.

In this example we create two namespaces, one for NFS and one for CIFS. Within these namespaces, we create one volume in each namespace and include the exports or shares from the external filers into these volumes to be managed.

Each namespace needs its own metadata store. This is via CIFS or NFS. We recommend it is on an NFS mount.

The metadata store is used by the ARX to store filename and a reference to the external filer that each file is located on. In this example we will use the NFS export **/export/nv0/necnfs1** on the NEC NV7400 for the metadata store.

To create a Namespace and specify the metadata store from the command line

1. Enter Global Configuration mode. See *Entering Global Configuration mode*, on page 12 for instructions.
2. Use the following syntax to create a new namespace:
namespace <name>

In our example, we type

```
namespace nec_nfs
```


Type **Yes** when prompted.
3. Specify the protocol to be supported using the following command:
protocol nfs3tcp
4. Use the following syntax to create a new volume:
volume <volume location>

In our example, we type

```
volume /nec_nfs_vol
```


Type **Yes** when prompted.
5. Use the following syntax to specify the metadata share location:
metadata share <external filer> <protocol> <mount point>

In our example, we type:

```
metadata share necnfs nfs3tcp /export/nv0/necnfs1
```

-
6. Use the following command to specify the **modify** and **reimport-modify** attributes:

```
modify
```

Type **Yes** when prompted.

```
reimport-modify
```

Adding the external filer NFS exports into the managed volume

We have two NFS Exports we add to the managed volume. Each will be added separately and enabled.

To add the external filer NFS exports to the managed volume from the command line

1. Use the following syntax to create a new share:

```
share <name>
```

In our example, we type

```
share nec4
```

Type **Yes** when prompted.

2. Use the following syntax to specify the NFS Export on the NEC NV7400 to be added to the volume:

```
filer <filer name> nfs <volume>
```

In our example, we type

```
filer necnfs nfs /export/nv0/necnfs-0_4
```

Type **Yes** when prompted.

3. Use the following commands to ensure the share does not rename files or directories on import:

```
no import rename-directories
```

```
no import rename-files
```

4. Use the following command to enable the share entry:

```
enable
```

5. Exit to the volume command line level by typing **exit**.

6. Repeat this entire procedure for the second NFS export (nec5 in our example).

Defining the CIFS namespace and volume

In this section, we define the CIFS namespace and volume. The procedures are similar to the NFS section you just finished, but is specific to CIFS.

To create the CIFS Namespace from the command line

1. Enter Global Configuration mode. See *Entering Global Configuration mode*, on page 12 for instructions.
2. Use the following syntax to create a new namespace:
namespace <name>. In our example, we type
namespace nec_cifs
Type **Yes** when prompted.
3. Specify the protocol to be supported using the following command:
protocol cifs
4. Specify the NTLM Authentication server using the following syntax:
ntlm-auth-server <server name>
In our example, we type
ntlm-auth-server siterequest
5. Specify the Proxy user using the following syntax:
proxy-user <user name>
In our example, we type
proxy-user siterequest
6. Use the following syntax to create a new volume:
volume <volume location>
In our example, we type
volume /nec_cifs_vol
Type **Yes** when prompted.
7. Use the following syntax to specify the metadata share location:
metadata share <share name> <protocol> <volume>
In our example, we type:
metadata share necnfs nfs3tcp /export/nv0/necnfs1
8. Use the following command to specify the **modify** and **reimport-modify** attributes:
modify
Type **Yes** when prompted.
reimport-modify
9. Use the following commands to specify the supported and unsupported CIFS attributes (each is a separate command):
no compressed-files
no named-streams
persistent-acls
no sparse-files
no unicode-on-disk
cifs path-cache

Add the External Filer Shares into the CIFS namespace

Similar to the NFS exports, we have two CIFS Shares we will add to the managed volume you just created. Each is added and enabled separately.

To add the external filer shares to the CIFS namespace

1. Use the following syntax to create a new share:

share <name>

In our example, we type

share nec4cifs

Type **Yes** when prompted.

2. Use the following syntax to specify the CIFS Shares on the NEC NV7400 to be added to the volume:

filer <filer name> cifs <volume>

In our example, we type

filer neccifs cifs NECCIFS_4

Type **Yes** when prompted.

3. Use the following commands to ensure the share does not rename files or directories on import:

no import rename-directories

no import rename-files

4. Use the following command to enable the share entry:

enable

5. Exit by typing **exit**.

6. Repeat this entire procedure for the second CIFS export (nec5cifs in our example).

Creating Global Servers and Export the Managed Volumes for NFS and CIFS

In this section, we define the two Global Server IP addresses and associated VLANs. Once the Global Servers are defined, we can associate the Managed Volumes to be exported via the Global Servers respectively.

To create a Global Server for NFS on the ARX system

1. Enter Global Configuration mode. See *Entering Global Configuration mode*, on page 12 for instructions.

2. Use the following syntax to create a new global server:

global server <name>

In our example, we type

global server necnfs_vip

Type **Yes** when prompted.

3. Use the following syntax to specify the virtual server attributes:
**virtual server <hostname of the switch> <free ip address>
<mask> vlan <vlan id>**

In our example, we type

```
virtual server arx500-1 172.30.72.32 255.255.255.192 vlan  
301
```

4. Use the following command to enable the virtual server:
enable
5. Exit to the global level by typing the **exit** command two times.

Exporting the virtualized file systems

The next step is to associate the Managed Volumes to the Global Servers.

To associate the NFS Managed Volume to a Global Server from the command line

1. Enter Global Configuration mode. See *Entering Global Configuration mode*, on page 12 for instructions.
2. Use the following syntax to enter the NFS managed volume:
nfs <global server name>

In our example, we type

```
nfs necnfs_vip
```

3. Use the following syntax to associate the export:
**export <namespace name> <volume name> as <share
point/global server name>**

In our example, we type

```
export nec_nfs /nec_nfs_vol as nec_nfs_vip
```

4. Use the following command to enable the export:
enable
5. Exit by typing **exit**.

Creating the CIFS Global Service and Exporting virtualized file systems

This section will demonstrate how to create the Global Server and associate the CIFS Managed Volume, this time using the GUI.

To create the global server and associate the managed volume from the GUI.

1. From the navigation pane, click **Virtual Services**.
The Virtual Service Summary page opens.
2. Click the **Add** button. The Add Virtual Service Wizard is opens.
3. From the **Namespace** list, select the namespace you created in *Defining the CIFS namespace and volume*, on page 21. In our example, we select **nec_cifs**.
4. Click the **Create a new virtual service (VIP) button**.
 - a) In the Virtual service DNS name box, type the DNS name for the virtual service. In our example, we type **vip172-4.pme-ds.f5.com**.
 - b) In the IP Address box, type the IP address of the VIP. In our example, we type **172.30.72.33**.
 - c) In the Subnet Mask box, type the appropriate subnet mask. In our example, we type **255.255.255.192**.
 - d) From the VLAN ID list, select the appropriate VLAN ID. In our example, we select **301**.

This wizard creates either a new virtual service (virtual IP address) or adds a new export to an existing virtual service. Select a namespace and whether to add a new service or add an export to an existing service.

Namespace:

Add export(s) to an existing virtual service (VIP)

Virtual service DNS name:

IP Address:

Create a new virtual service (VIP)

Virtual service DNS name:

IP Address:

Subnet Mask:

VLAN ID:

[Enable Virtual Service](#)

Enable the virtual service when finished

Figure 8 Creating a new Virtual Service

5. Click the **Next** button.
6. In the Windows Domain Name box, type the Windows domain name. In our example, we type **siterequest**.

7. The other settings on this screen are optional, configure as appropriate for your deployment. In our example, we leave the rest of the settings at the default level.
8. Click the **Next** button. The Virtual Service Exports screen opens.
9. In the Export Name box, type a name for the Export. In our example, we type **nec_cifs_vip**.
10. Configure the other options as applicable for your configuration, and then click the **Add Export** button.
11. Click the **Next** button.
12. Review the attributes and confirm the creation of the Virtual Service by clicking **Finish**.

The VIP Summary page will now show all the vips and status.

Accessing the virtualized file systems from network hosts

The virtualized file systems are now available to network clients to mount. This section demonstrates how to connect to the virtualized file systems from a Windows (CIFS) and a Linux (NFS) Client.

To mount the NFS export from a Linux client from the command line

1. Login into the Linux host and gain root privileges
2. Use the following syntax to create a directory entry to which you will mount the export:

```
mkdir <directory name>
```

In our example, we type

```
mkdir /mnt/vip172-3
```

3. Change directory permissions using the following command:

```
chmod 777 /mnt/vip172-3
```

4. Use the following syntax to mount the virtual server:

```
mount -t nfs <ip address:vip name> <directory>
```

In our example, we type

```
mount -t nfs 172.30.72.32:nec_nfs_vip /mnt/vip172-3
```

5. Verify the mount with the using the following syntax:

```
df -k <mount>
```

In our example, we type

```
df -k /mnt/vip172-3
```

-
- Next we perform some commands so you can ensure you have the proper permissions and view the directory and see the file exists. Run the following commands, using files and directories specific to your configuration:

a) `touch /mnt/vip172-3/foo.txt`

b) `ls -alrt /mnt/vip172-3/`

You should see a response similar to the following:

```
total 16
drwxrwxrwx 10 root  root  4096 Aug 29 16:45 ..
-rw-r--r--  1 nfsnobody nfsnobody  0 Aug 29 16:52 foo.txt
drwxrwxrwx  2 root  root   8192 Aug 29 16:52 .
```

c) `chmod 666 /mnt/vip172-3/foo.txt`

d) `ls -alrt /mnt/vip172-3/`

You should see a response similar to the following:

```
total 16
drwxrwxrwx 10 root  root  4096 Aug 29 16:45 ..
-rw-rw-rw-  1 nfsnobody nfsnobody  0 Aug 29 16:52 foo.txt
drwxrwxrwx  2 root  root   8192 Aug 29 16:52 .
```

- Unmount the NFS export using the following command:

```
umount /mnt/vip172-3/
```

Mounting the CIFS share from a Window XP client

The final procedure shows you how to mount a CIFS share from a Microsoft Windows XP client.

To mount the CIFS share from a Microsoft Windows XP Client

- From the XP client, open **My Computer**.
- From the **Tools** menu, click **Map Network Drive**. The Map Network Drive wizard opens.
- In the **Folder** box, type the VIP and Share name.
- If the client's current user name is different than the Active Directory user name, click the **Connect using a different user name link**. Specify the user credentials, and then click **OK**.
- Click the **Finish** button. The drive is now mapped.

We recommend that you copy a file onto the mapped drive to verify the appropriate write permissions.

This completes the configuration.