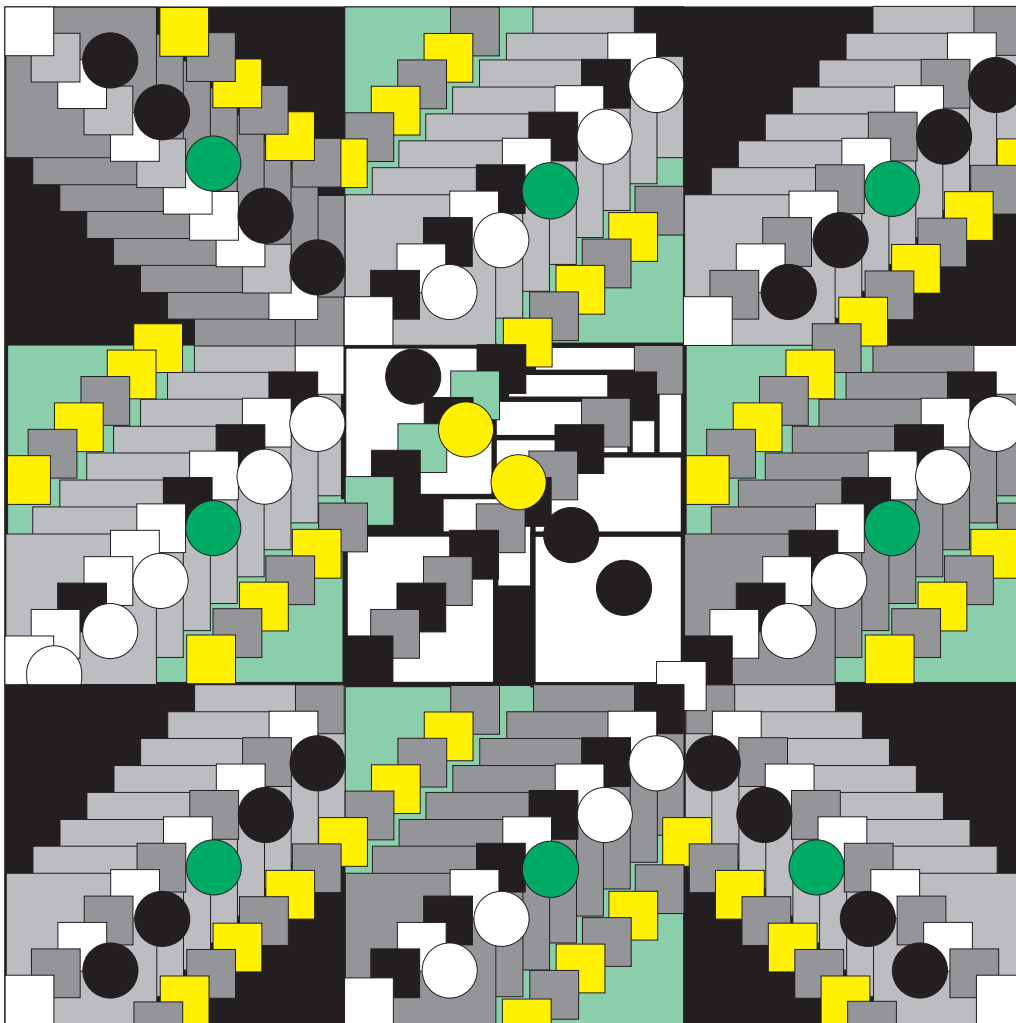




# Installation Guide





Nways 2220 Switch Manager  
Version 1.1



# Installation Guide

**Note!**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page vii.

**Second Edition (February 1999)**

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---

## About This Manual

This manual explains how to install and customize the Nways\* 2220 Switch Manager on a network management workstation.

---

## About the Switch Manager

The Nways 2220 Switch Manager manages the IBM 2220 Nways Switches in a Networking BroadBand Service (NBBS\*) network.

Many models and types of RISC System/6000 may be used as network management stations, and there is a wide range of possible software configurations for them.

---

## Not Included in This Manual

Not included in this manual are details of hardware and software that must be installed as a prerequisite to installation of the NSM. In particular, this book does **not** include:

- Installation of the prerequisite hardware in the network management RISC System/6000 station
- Installation of the prerequisite software, such as NetView for AIX or TMN 2.2
- Installation of a NetView client.

---

## How This Manual is Organized

The manual is organized so that the tasks are in the same order as you would perform them. This manual includes the following chapters, and appendixes:

- “Before You Begin” on page 1, describes all the hardware and software prerequisites for the network management station and includes detailed information about client/server environment.
- “Before Installing the NSM” on page 5, lists the tasks to perform on the network management station before installing the NSM components.
- “Installing the NSM” on page 7, explains how to install the NSM software.
- “Customizing the NSM” on page 13, explains how to customize the network management station for each NSM component.
- “Specific Considerations” on page 25, includes more information about installation and about NSM components.
- Appendix A, “NSM CD ROM Image” on page 27, lists all the software files included in the NSM package.
- Appendix B, “Troubleshooting” on page 29, describes how to handle problems that may arise while setting up or starting the network management station running the NSM.

A glossary that includes a list of abbreviations and a bibliography are provided at the end of this manual.

---

## Prerequisite Knowledge

As a prerequisite to installing the NSM software you must be familiar with:

- RISC System/6000\*
- AIX\* operating system
- NetView\* for AIX client/server concepts
- Network administration procedures.

---

## Where to Find More Information

For a complete list of the customer and service information manuals, refer to “Bibliography” on page 47.

---

## Terminology

Throughout this manual, the Nways 2220 Switch Manager is referred to as *NSM*.

---

## Before You Begin

Before installing the NSM on your system:

- Determine the number of network management stations you need, according to the size and characteristics of your network.
- Make sure that the hardware and software prerequisites described in this chapter are met.

The NSM supports the client/server environment. If you wish to use it, see page 3 for detailed information.

Two manuals that provide supplementary information to the procedures described in this installation guide are:

- *2220 Nways BroadBand Switch Planning Guide*, GA33-0293-04
- *NetView for AIX Installation and Configuration*, SC31-8163.

You may find it helpful to have them at hand while reading through this manual.

---

## Determining the Number of Stations You Need

There must be at least one network management station in your network. Depending on the size and characteristics of your network or administrative organization, you may need to use more than one network management station.

The NSM software can be installed on several network management stations. You must install at least one NSM server, and can install several clients.

The NSM manages a number of objects and each resource defined in an Nways 2220 Switch corresponds to one or more objects registered in the `ovw` database. The *2220 Nways BroadBand Switch Planning Guide* describes the number of objects generated by each resource defined in an Nways 2220 Switch. This guide also provides a table defining the RISC System/6000 station you need according to the number of objects to be managed.

---

## Hardware Prerequisites

The *2220 Nways BroadBand Switch Planning Guide* provides a table that defines the required hardware configuration according to the resources managed and the number of operators.

The minimum hardware configuration required for the server network management station is a RISC System/6000 POWERstation\* or POWERsystem with:

- A minimum 128 MB of RAM is needed to manage a small network (fewer than 3 nodes) but at least 256 MB is recommended. More RAM must be added as the number of nodes to be managed is increased.
- Approximately 64 MB minimum of additional RAM is required for additional operators, depending on the number of maps manipulated.
- Minimum disk space: 2 GB.

- Additional disk space required: More than 1 GB for accounting file (used for billing applications).
- Installation of a 10 MB Ethernet network adapter that is connected to one of the Nways Switches.

**Note:** Refer to the product installation documentation for detailed instructions on how to install the preceding devices or adapters.

Your system must include a CD ROM drive in order to install the NSM software.

Each additional client runs on an additional RISC System/6000. For information on how to configure a client, see the *NetView for AIX Installation and Configuration* manual.

---

## Software Prerequisites

Table 1 displays the software platforms supported on your network management station.

**Note:** Although not a prerequisite, you should be using Netview V4.1, with PTF V451880.

IBM AIX Operating System:	Network Management Application		
		IBM TME 10** NetView for AIX (5697-NVW) with TME 10 Distributed Monitoring (5697-EMN)	Version 4 Release 1
			IBM TMN/6000 Version 2 Release 2 (5799-QLN)
Version 4 Release 2.1	YES	YES	YES
Version 4 Release 3	YES	YES	NO

To use the web browser interface provided by the Nways Enterprise Manager, you need Lotus Domino Go WebServer 4.6.1 on the server station. This is included in the AIX 4.2 bonus pack, together with Netscape V3.1.

**Compatibility:** The Nways 2220 Switch Manager (NSM) manages IBM 2220 Nways BroadBand Switches running Nways Switch Control Program Version 1 Release 5.0 (5622-388) or Version 2 Release 2 (5765-C71) or Version 2 Release 3 (5765-C71).

For the software prerequisites of each additional **client** network management station that runs on a separate RISC System/6000 workstation, refer to the *NetView for AIX Installation and Configuration* manual, SC31–8163, or the *TMN/6000 General Information* manual, GT01–0458.

---

## Client/Server Considerations

NSM applications support the client/server environment of NetView for AIX. NSM distributes the graphical user interface and the processes (memory and CPU processing) to the client machines in the network.

NSM contains:

- *Servers* or *daemons* (hardware server, topology server, and so on).

Servers are *background processes* that run continuously to update information on the objects in the ovw database that reflects the MIB (Management Information Base) of the agent. They are responsible for discovery and receive CMIP (Common Management Information Protocol) notifications from agents each time there is a MIB update (attribute value change, status change, creation, deletion).

- *Clients* or *applications* (hardware client, topology client, and so on).

Clients are *foreground processes* running only when the NetView for AIX end user interface is running. They are responsible for:

- Building the graphical user interface in a given map.
- Dynamically updating the graphical user interface on server request.
- Implementing operator requests:
  - For certain requests such as actions on an agent object (creation, update, activation, and so on), the CMIP request is sent to the agent and the client receives the CMIP response.
  - For other operator requests (such as network refresh topology), the client sends a message to the server, which executes the request.

If you plan to use the client-server features of NSM, use the same client-server relationship that you use for the NetView for AIX workstations in your network. An NSM client must be installed on a NetView client, and an NSM server on the NetView server.

**Note:** Do not install the server code on a client station, because:

- The ovw database resides on the server machine.
- The maps can be stored locally on client machines, or they can reside on the server machine and the maps created on clients will be stored through NFS on the server. You can configure a client to use local or NFS mounted maps by selecting **Configure** → **Add/Change Server** from the clients in the NetView for AIX SMIT screen. Refer to the NetView for AIX documentation for more information.





---

## Before Installing the NSM

This chapter describes the tasks that you must perform before installing the NSM.

- If you install the NSM in a client-server environment, it is assumed that the NetView for AIX server and clients are already installed and configured (refer to the *NetView for AIX Installation and Configuration* manual SC31–8163).
- To schedule and perform installation and migration tasks, ask your IBM marketing representative for the document *2220 Network Release 5, Installation and Migration Guide*.

Before installing the NSM for the NBBS network resources that you want to manage, perform the appropriate tasks described in this chapter.

---

## Removing Previous Release of NSM

**Important:** It is not necessary to remove previously installed IBM Nways Broadband Switch Manager software of the following releases: Release 4 (shipped with NEM Release 1), Release 5 (shipped with NEM Release 2), Release 6 (shipped with NEM 3.0), and Release 7 (shipped with NSM V1).

If you have an IBM Nways Broadband Switch Manager Release 1, Release 2, or Release 3 already installed, you must remove it before installing the new NSM level.

Before removing the previous release of NSM, ask your IBM marketing representative to provide you with the document *2220 Version 2.2 Network Installation and Migration* that explains how to upgrade:

- Your network management station
- Change control server
- Nways Switch configurations.

To remove a downlevel of NSM, follow these steps:

1. Log in as root
2. Access the installation program by entering **smit**.
3. Select **Software Installation and Maintenance**.
4. Select **Software Maintenance and Utilities**.
5. Select **Remove Installed Software**. When the Remove Installed Software dialog box is displayed, select one of the following software files and specify **No** in the PREVIEW only entry field (otherwise the remove operation will not occur).
  - **NBBS.base.obj** for a server network management station
  - **NBBS.Client.base.obj** for a client network management station.
6. Perform a **Shutdown**

---

## Checking and Setting Environment Variables

To check and set the environment variables defined in the `/etc/environment` file, perform the following steps from the network management station console:

1. Log in as root
2. Edit the file `/etc/environment`
3. If the paths `/usr/OV/bin` and `/usr/OV/bin/AHAQ` are not already defined, add them to the `PATH:` statement.
4. For example, if the statement is currently:  
`PATH=/usr/bin:/usr/OV/bin`  
modify it to:  
`PATH=/usr/bin:/usr/OV/bin:/usr/OV/bin/AHAQ`
5. Save the file `/etc/environment`
6. Type `shutdown -r` and press **Enter** to reboot the RISC System/6000.  
This will save the new values as the defaults.

# Installing the NSM

This chapter describes how to install NSM on a network management station.

**Note:** Throughout this chapter *Network Management Station* is referred to as the *NMS*.

The IBM Nways 2220 Switch Manager is distributed on CD ROM.

Use the roadmap in Table 2 to quickly locate:

- Installation process to use
- List of software files to install on the appropriate network management station
- Checking procedure after installation.

*Table 2. Roadmap For Installing NSM*

To Install NSM on:		For the installation procedure, go to:	For the software files to install, go to:	For the installation checking procedure, go to:
A Single Network Management Station	Combined Client/Server	"Installing NSM on a Client/Server NMS" on page 8	Table 3 on page 11	"Checking the Installation" on page 12
Separate Network Management Stations:	Server	"Installing NSM on a Client/Server NMS" on page 8	Table 3 on page 11	
	Client	"Installing NSM on a Client NMS" on page 10	Table 3 on page 11	

---

## Installing NSM on a Client/Server NMS

This section describes the procedure to install the NSM using SMIT. SMIT has facilities that provide menus and on-line help to guide you through the installation procedure.

To install NSM on a **client/server network management station** (NMS), follow these steps:

1. Ensure that you have enough free disk space (see “Hardware Prerequisites” on page 1).
2. Stop (exit) any existing version of NSM that may be running.
3. Insert the CD ROM.
4. Open an aixterm window.
5. Log in as root.

If NetView security services are running, you must turn them off in one of the following ways:

- Log in as admin and set security off for the user root
  - Ask your NetView administrator to set the security off.
6. Access the installation program by entering **smit**.
  7. Select **Software Installation and Maintenance**.
  8. Select **Install and Update Software**.
  9. If you are using:
    - AIX Version 4.1.5, do the following:
      - a. Select **Install and Update Selectable Software (Custom Install)**.
      - b. Select **Install Software Products at Latest Level**.
      - c. Select **Install New Software Products at Latest Level**.

The **Install New Software Products at Latest Level** dialog box is displayed.

- AIX Version 4.2 or above, select **Install and Update from LATEST Available Software**.
- The **Install and Update from LATEST Available Software** dialog box is displayed.
10. Select the **List** button next to the INPUT device / directory for software field. A list of input devices is displayed. Select **CD ROM drive** from the list and then select **OK**.

### Notes:

- a. The input device you selected is displayed in the INPUT device / directory for software entry field (for example /dev/cd0).
- b. SMIT might not recognize the input device if you installed the device after starting AIX on the station. To add the device to your configuration:
  - 1) Return to the SMIT System Management menu.
  - 2) Select **Devices**.

3) Select **Install/Configure Devices Added After IPL**.

11. In the dialog box displayed, select the **List** button next to the SOFTWARE to install field.

The system then reads the CD ROM.

12. Select the appropriate software files listed in Table 3 on page 11:

13. Use the **List** option to set the following values in the remaining entry fields:

PREVIEW only? (install operation will not occur)	no
COMMIT software updates?	yes
SAVE replaced files?	no
ALTERNATE save directory?	—
AUTOMATICALLY install requisite software?	yes
EXTEND file systems if space needed?	yes
OVERWRITE same or newer versions?	no
VERIFY install and check file sizes?	no
DETAILED output?	no

14. Select **OK** to confirm and continue the installation.

The appropriate software files are loaded into the system.

15. When the installation is completed, select **Done** to close :

- The **Install New Software Products at Latest Level** menu, for AIX Version 4.1.5
- The **Install and Update from LATEST Available Software** menu, for AIX Version 4.2.

and then select **Exit SMIT** from the Exit pull-down menu.

The SMIT window is closed and the NSM is now installed on your network management station.

---

## Installing NSM on a Client NMS

To install the NSM on a **client network management station** (NMS), follow these steps:

1. Refer to the *NetView for AIX Installation and Configuration* manual:
  - Read the detailed instructions on how to install the NetView for AIX client code, either remotely (from the server to the client) or locally (at the client).  
**Note:** If you install the client locally, you must:
    - a. Configure the server to give a client access.
    - b. Configure the client to access the server.
  - Refer to “*Using SMIT to install Client,*” to install NSM on your client network management station.
2. Select the software files listed in 11.
3. Refer to “Customizing the NSM” on page 13, and perform the tasks that are necessary before running applications on your client network management station.

---

## Files to Install on the NMS

To install NSM, select the software files listed in Table 3.

<b>Configuration</b>	<b>Software Files to Install</b>
Single Client/Server NMS	NBBSM.base.obj and NBBSM.tmnsf_rte.obj only if your network management application is IBM TME 10 NetView for AIX
Server only NMS	NBBSM.base.obj and NBBSM.tmnsf_rte.obj only if your network management application is IBM TME 10 NetView for AIX
Client only NMS	NBBSM.Client.base.obj and NBBSM.Client.tmnsf_rte.obj only if your network management application is IBM TME 10 NetView for AIX

---

## Checking the Installation

To verify that NSM has been properly installed, do the following from the network management station:

- Using SMIT, check the installation of the NSM as follows:

1. Open an aixterm window.
2. Access the verification program by entering **smit**.
3. Select **Problem Determination**.
4. Select **Verify Software Requisites and Installations**.

The **Verify Software Requisites and Installations** dialog box is displayed.

5. In the SOFTWARE name field, enter the SOFTWARE file names to verify, or click on the List... box and check that the relevant file is in the displayed list. The possible entries are shown below:

<b>SOFTWARE name</b>	<b>Nways 2220 Switch Manager component</b>
NBBSM.Client.base.obj	NSM Client
NBBSM.Client.tmsf_rte.obj	NSM Client (TMN Runtime)
NBBSM.base.obj	NSM Server+Client
NBBSM.tmsf_rte.obj	NSM Server+Client (TMN Runtime)

6. Press **OK** to complete the verification procedure.
  7. When the status is OK, select **Exit SMIT** from the Exit pull-down menu.  
The SMIT window is closed.
- Look at the `smit.log` file for a listing of the installation steps, and check that no installation errors have been logged.

During the installation of NSM, the installation and configuration steps are logged in the `smit.log` file. This file is saved under the home directory (`$HOME/smit.log`) of the user who is performing the installation.



---

## Customizing the NSM

This chapter describes the procedures for customizing network management stations after NSM has been installed and before applications are started.

---

### Routing Table Considerations

The TCP/IP protocol in the network management station maintains routing tables containing information about the path to every reachable destination in the NBBS network. These tables are periodically refreshed by TCP/IP to dynamically take into account the configuration changes in the network. The refresh period is automatically set to one minute when installing NSM.

If your network management station is attached through a router to the management access Nways Switch, you must set a refresh period of one minute in the router. Refer to the appropriate router documentation to set the correct value for the refresh period.

The default value for the AIX Address Resolution Protocol (ARP) timer before the installation of NSM is 20 minutes. If you want to restore the default timer on your network management station, type the following command in root mode:

```
no -o arpt_killc=20
```

---

### Internet Connection Server Configuration

To use the web browser interface, provided by the Nways 2220 Switch Manager, you must install Lotus Domino Go WebServer 4.6.1 on the server. See "Software Prerequisites" on page 2. If the Internet Connection was installed before you installed NSM, you do not need to configure it. If Lotus Domino Go WebServer has not been installed, you must install and configure it as follows:

1. Install the Lotus Domino Go WebServer, by following the installation procedure in the documentation that comes with the product.
2. Log in as root.
3. Type the following commands:

```
cd /usr/OV/install/AHAQ
configure_nsm_web_applications
```

To return to your previous configuration, use the following command:

```
cd /usr/OV/install/AHAQ
desinstall_nsm_web_applications
```

---

## Customizing the NSM

After you have installed the NSM, you need to customize the network management station configuration files according to your network configuration (see “Defining the Nways Switches (ab\_netdef.txt file)”).

## Configuring TCP/IP Communication

You must define all IP addresses of the server and clients network management stations that you have installed by using the Attached IP Host Configuration window of the Nways Switch Configuration Tool Version 2 (NCT2).

For more information about using this NCT2 configuration window and how to configure the IP addresses for the network management stations, refer to the on-line help of the NCT2 window.

## Defining the Nways Switches (ab\_netdef.txt file)

You must define all the Nways Switches of the NBBS network managed by the network management station by editing the following file:

```
/usr/0V/install/AHAQ/ab_netdef.txt
```

To avoid a long discovery process, you should only register in this file the Nways Switches that are *actually* running in your network. Add new Nways Switches as you set them up.

In a client-server environment, only one ab\_netdef.txt file is defined on the server station.

**Note:** You must also enter the name of any subnets in this file. For more information, refer to “Installing SubNets Icons” on page 15.

The format of this file is:

192.12.97.65	SomewhereNwaysSwitch.EtcIncNetwork.Worldwide.
192.12.97.67	OtherplaceNwaysSwitch.EtcIncNetwork.Worldwide.

Diagram illustrating the mapping of the file format to components:

- The first column (IP addresses) is labeled "Nways Switch (NAS) IP Address".
- The second column (Network names) is labeled "Nways Switch Name".
- The domain part of the second column is labeled "Domain Name".
- The network part of the second column is labeled "NBBS Network Name".

where:

- *Nways Switch IP address* is defined for the NAS of this Nways Switch by the NCT2 in the configuration.
- *Nways Switch name* and *network name* are defined in the configuration according to your naming convention.
- *Domain name* is defined in your configuration.

**Notes:**

1. If you have several network management server stations in your NBBS network, the `/usr/0V/install/AHAQ/ab_netdef.txt` file must be changed in each of them.
2. A dot (.) is mandatory at the end of each record.
3. The default filename and directory of the `ab_netdef.txt` file can be changed by editing the file `/usr/0V/lrf/AHAQTS.lrf` as described in the following section.

## Installing SubNets Icons

To take advantage of the Integrated Topology function in NSM, you must install the SubNets icons on the map in NetView. The SubNets icons contain any additional subnetworks and/or subnets. Clicking a SubNet icon displays the subnetworks, and the devices that you have attached to the node at that level of the network hierarchy.

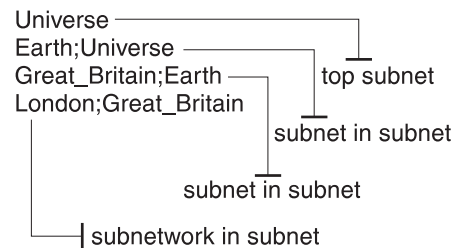
To install the SubNets icons simply requires customizing two .txt files that are pre-packaged with the NSM product. The names of the .txt files are as follows:

- `subnets.txt`
- `subnet_devices.txt`

When you install NSM, these two files are automatically loaded into the following directory: `/usr/0V/install/AHAQ/`.

The `subnets.txt` file allows you to define the subnets hierarchy.

The format of the `subnets.txt` file is as follows:



Where:

- Subnet name is followed by the parent name (for example, `Earth;Universe`).
- The subnetwork name is followed by the subnet name (for example, `London;Great_Britain`).

For a further example, see the format description at the beginning of the `subnets.txt` file in `/usr/0V/install/AHAQ/`.

### Subnet name:

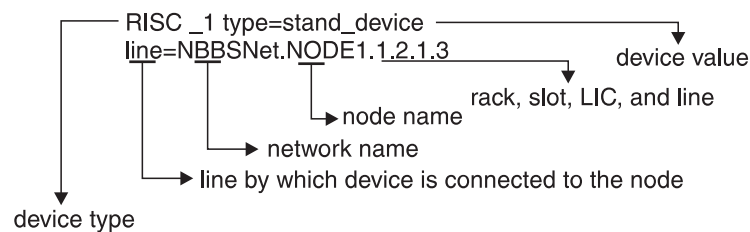
You must also enter the name of the subnetwork into the `ab_netdef.txt` file. For example:

```
192.12.97.68 SomewhereNwaysSwitch.EtcIncNetwork.Worldwide.SubnetworkName
```

Where `SubnetworkName` is the name of the subnet in which the Nways Switch is located. For more information, see “Defining the Nways Switches (`ab_netdef.txt` file)” on page 14.

The `subnet_devices.txt` file allows you to define the devices that are attached to each node of your network.

The format of the `subnet_devices.txt` file is as follows:



You can enter a value for the type of device from the following list:

- mf: Mainframe
- ws: Workstation
- cr: Repeater
- cm: Multi-port connector
- mm: Modem
- nn: Network
- ninet: Internet network
- nx25: X25 network
- nbus: Bus network
- nip: IP network
- nstar: Star network
- ntoken: Token-Ring network
- nfddi: FDDI network
- router: Standalone Router
- int\_router: Integrated router
- switch: Standalone Switch
- int\_switch: Integrated switch
- atm\_int\_switch: ATM integrated switch
- eth\_int\_switch: Ethernet integrated switch
- tr\_int\_switch: Token-Ring integrated switch
- atm\_stand\_switch: ATM standalone switch
- eth\_stand\_switch: Ethernet standalone switch
- tr\_stand\_switch: Token-Ring standalone switch
- stand\_device: Standalone device
- int\_device: Integrated device
- dp: PABX

For a further example, see the format description at the beginning of the `subnet_devices.txt` file in `/usr/OV/install/AHAQ/`.

**Notes:**

1. For more information about the icons, read the *Nways 2220 Switch Manager User's Guide*.
2. **Adding NSM as a device:** You can also add the NSM program as a device on your map by replacing `line=` with `node=` followed by `NetworkName.Nodename` in the `subnet_devices.txt`.

## Customizing Registration Files and Timers

This section lists the timer values in the registration file, and describes the procedure to change them when the NSM is running.

### Timer Values in Registration File

The Registration file on the server station is: `/usr/OV/1rf/AHAQTS.1rf`

You may customize NSM timers in this file. The timer values are in seconds, and the default values are given in parentheses.

**Important:** For the timers `l`, `s`, `L`, `S`, the following rule must be **respected**:

$$l < s < L < S$$

- h `(/usr/OV/install/AHAQ/ab_netdef.txt)`. Full name of the path for the `ab_netdef.txt` file.
- L `(1800)`. Delay between two liveness checks of all the discovered Nways Switches.
- l `(120)`. Delay in answering a liveness check message. Topology discovery resumes if the Nways Switches do not answer on time.
- s `(240)`. Time allowed for discovery of Nways Switches. Topology discovery stops when this time has elapsed, even if all Nways Switches have not yet been discovered. Increase the value when the number of Nways Switches increases.
- S `(3600)`. Delay between two topology discoveries. Topology discovery resumes (after the delay) until all Nways Switches listed in `ab_netdef.txt` have been discovered.
- T `(86400)`. Delay between two clock-settings sent by the NSM to the agents. Setting the `-T` parameter to `-1` disables the sending of any clock-settings by NSM. If you have several NSMs, only one of them should set the clock, and the `-T` parameter will have to be set to `-1` in all the other NSMs. The default value is `86400 s` (24 hours).

### Changing Timer Values

If you want to change certain timer values when the NSM is running, follow these steps:

1. Change the current directory to the directory where the file is located by specifying:  
`/usr/OV/1rf`
2. Edit the file containing the timer you want to change.

3. Change the timer value.
  4. Save the file.
  5. Type the command:  

```
/usr/0V/bin/ovdelobj AHAQTS.lrf
```

Then press **Enter**.
  6. Type the command:  

```
/usr/0V/bin/ovaddobj AHAQTS.lrf
```

Then press **Enter**.
  7. Stop the daemon by typing:  

```
/usr/0V/bin/ovstop AHAQTS
```

Then press **Enter**.
  8. Restart the daemon by typing:  

```
/usr/0V/bin/ovstart AHAQTS
```

Then press **Enter**.
- The NSM takes into account the new timer value.

## Definition of Management Information Package

The installation of the NSM component replaces the DMI (Definition of Management Information) OM Package shipped with the NetView for AIX product.

If you have any other CMIP management applications which are using the DMI package, you **must** recompile these applications. Otherwise they will not run correctly.

Make sure that you include the new `/usr/0V/include/omp_dmi.h` file when you recompile.

## Client-Server Environment

To correctly update topology and hardware when all your network management stations are configured, NSM should operate in a *read/write* map. By default, the default map is open.

A map can only be open in *read/write* mode by one user. Other users access it in *read only* mode. This is true on the server across clients (for NFS-mounted maps), and within clients (for multiple users on a single client). To put a map in *read/write* mode on your station, you can do one of the following:

- Create a new map using **File** → **New Map** from the main menu of NetView for AIX.
- Use the `-map` option when starting NetView for AIX as follows:

```
nv6000 -map myMap
```

This option creates a specific map when you start NetView for AIX. It is named myMAP.

# Netview Security Services

## Access Control

NSM software uses the security features provided by NetView for AIX.

The security features for the NSM applications are implemented as follows:

- Each application has a Security Registration File (SRF) controlling access to resources such as Menubar menustrings, Context Menu menustrings, Tools window items, and user command lines.
- Three groups of operators are defined :
  - **grpbasic**: operators of this group are allowed to manage all the logical and physical resources.
    - They can display their configuration, use actions like activate, deactivate, lock, unlock.
    - They are authorized to do connection monitoring and to use the Performance application.
    - They can use Event Desk, MIB Browser, and Event Filter Editor (TMN6000).
    - **They are not allowed** to modify the existing configuration (using modify, create or delete) or to ask for a NAS re-IPL.
    - **They cannot use** the Accounting application.
  - **grpconf**: same definition as grpbasic group of operators with authorization to modify the configuration and to ask for NAS re-IPL.
  - **grpacct**: same definition as grpbasic group of operators with authorization to use the Accounting application.
- Three operator profiles are also available:
  - **opbasic** belonging to the grpbasic group.
  - **opconf** belonging to the grpconf group.
  - **opacct** belonging to the grpacct group.

The security administrator can add, modify, or delete the groups and profiles using the security functions of NetView (`/usr/0V/bin/nvsec_admin` command).

The groups delivered with NSM can be used as examples by administrators to define new groups according to their needs.

It is recommended that you add new groups instead of modifying the default NSM groups, because when you upgrade the software, the user-defined Security Registration Files (SRF) can easily be saved and restored.

**You must customize each SRF for all the groups that are actually used by the security** on your system. Use the `nvsec_admin` command to update the SRF for each application.

## Audit Log

The Audit Trail feature implemented in the NSM uses the audit functions of NetView for AIX. Operations of the network management process are recorded in audit logs.

The audit logs are managed by the NetView for AIX audit process. Network activities are logged once the audit options of Netview have been configured and activated.

To configure the audit options, enter the command `/usr/0V/bin/nvsec_admin` to go to the main Security Administration panel and select **Options**→**Global Settings** from the menu bar to open the Global Setting panel. By default, the 3 categories of audit files are activated.

The audit logs are ASCII flat files. You can easily look at the contents of these files using standard editors and utilities. Alternatively, you can use the Netview reporting facility by selecting **Options**→**Audit Report** from the menu bar of the Netview Security Administration panel. Then select **File**→**Open** from the Netview Security Audit panel to select an audit log from the list. The default is:

```
/usr/0V/1og/sec_audit_1og
```

The Audit Trail feature of NSM logs configuration and monitoring commands such as:

- Display, create, modify, delete any object in the network.
- Activate, deactivate, lock, unlock any trunk, adapter, LIC or line.
- IPL the node.
- Perform TCPIP function for a node.
- Refresh or reset topology of a node/network.
- Start or stop performance monitoring for a resource.
- Handle accounting commands.

Note that no information is logged when displaying:

- A specific hardware submap
- A list of resources (ATM, X.25)
- General X.25 parameters
- CMIP status of a resource.

For each user request, an audit trail record is created in the audit log. If a user request generates two CMIP requests, two audit records are created in the audit log.

The audit log consists of audit records. Each audit record contains the following information:

- Time stamp
- User name
- Machine identifier
- Application identifier



- Request type
- Resource identifier
- Result of operation.

The **time stamp**, **user name**, and **machine identifier** are standard information generated by the Netview audit trail process.

The **application identifier** corresponds to the application that is running. This identifier is the name of the software module followed by the type of the application. For example: AHAQH - HARDWARE or AHAQT - TOPOLOGY.

The **request type** is the operation that has been requested.

The **resource identifier** is:

- For a hardware application, the Distinguish Name (DN) without the Object Information (OI). For example, for a line, the identifier is:

```
network.node.rack.adapter.LIC.slot[.LCB].line
```

You can display the Distinguish Name of a resource by using the **TOOLS**→**display Object information** option from the NSM application menu bar, on the root submap of NetView for AIX.

- For a software application, the sequence of elements describing the related object. For example, for an X.25 subscriber, the identifier is:

```
Subscriber :xxx, X.25 Network Interface :yyy, node :zzz
```

The **result of operation** is the result of the request. It can be:

- OK when the request ends normally.
- An error message, when an error occurred during processing of the request.
- TIME OUT, when no response is received from the agent.

---

## Accessing the Readme Files

Once you have installed NSM, and **before starting** any application, do not forget to read the **readme** file which contains important information about using the product, and describes any known problems. The readme file is located in `/usr/lpp/NBBSM/readme`

---

## Waiting for Topology Discovery

The clear NSM topology feature was implemented to prevent complete ovw database cleanup during the installation of the NSM. This feature allows you to install the NSM while keeping other information related to other products in the ovw database.

During installation, a program is run to find and mark as *deleted* all objects that are related to NSM. These objects are in fact deleted when the end-user interface is started.

After installation, during program start-up, there is a phase of synchronization where the NSM icons remain displayed in the screen. Please **wait for the complete start up** of the product (about 2 minutes). Start-up is completed when the dialog box informing you that there is no NBBS network available is displayed.

If you are running in a client-server environment, only the default map of NetView will have been updated by the clear NSM topology feature. If you have created a read/write map on a client, you should delete it using **File** → **Delete Map**, then create a new map using **File** → **New Map** to get an updated map on the client station.

**Note:** Inconsistencies such as duplicate hardware objects may appear if you do not create a new map in the environment described above.

---

## Starting the Nways 2220 Switch Manager

To start NSM, perform the following steps from the network management station:

1. In an aixterm window, type:

```
cd /usr/OV/install/AHAQ
```

Then press **Enter**.

2. Depending on the station you are running:

- On a server (or server with client) station, type:

```
nv6000
```

Then press **Enter**.

- On a client station, type:

```
nv6000 -map myMAP
```

Then press **Enter**.

**Note:** myMAP is a name you choose for the map that you are starting.

This starts the NSM.

---

## Accessing On-Line Documentation

Access to on-line User's Guides is provided using the Netscape web browser. Select **Help** → **IBM Nways Switch Manager** from the menu bar of the NetView user interface. Two menu items are available:

- Alarm Description for the 2220 Nways BroadBand Switch
- Nways Switch Manager User's Guide.

Selecting either of these books open a Netscape web browser containing the selected book.

See "Internet Connection Server Configuration" on page 13 for information on configuring the web server.

---

## Specific Considerations

This chapter describes various tasks concerned with running and managing your machines:

- Adding a new Nways Switch
- Verifying TCP/IP communication
- Communicating with the support center.

---

## Adding a New Nways Switch

When adding a new Nways Switch to your 2220 Network, it must be known by the network management station.

Once the new Nways Switch administration station (NAS) is connected to your network, follow these steps:

1. Define the new Nways Switch in the NSM by editing the `ab_netdef.txt` file as explained in "Defining the Nways Switches (`ab_netdef.txt` file)" on page 14.
2. To take into account any resource changes, and refresh the topology accordingly, use the **Refresh Topology** option of the **Nways Switch** menu. For further information, refer to "Rediscovering the Topology of Your Network" in the *On-line IBM Nways Switch Manager User's Guide*.

---

## Verifying TCP/IP Communication

This section describes how to verify the connection of the RISC System/6000 to the IP network. To verify that the server network management station is connected to the management access Nways Switch, follow these steps:

1. Ask your network administrator for the Nways Switch administration station (NAS) TCP/IP address of the management access Nways Switch.
2. Using the `ping` command, check that TCP/IP is running on the network management station.

The syntax of the command is:

```
ping IP_Address
```

For example, if the IP address to ping is 128.1.30.129, type:

```
ping 128.1.30.129
```

Then press **Enter**.

`ping` is a simple TCP/IP application which sends out a datagram to a specified destination and waits for it to come back. The following message should be displayed:

```
PING 128.1.30.129: 56 data bytes
64 bytes from 128.1.30.129: icmp_seq=0. time=7. ms
64 bytes from 128.1.30.129: icmp_seq=1. time=6. ms
64 bytes from 128.1.30.129: icmp_seq=2. time=7. ms
64 bytes from 128.1.30.129: icmp_seq=3. time=11. ms
64 bytes from 128.1.30.129: icmp_seq=4. time=6. ms
64 bytes from 128.1.30.129: icmp_seq=5. time=10. ms
64 bytes from 128.1.30.129: icmp_seq=6. time=6. ms

----128.1.30.129 PING Statistics----
7 packets transmitted, 7 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 6/7/11
```

**Note:** Press Ctrl+C to stop the application.

This display means that your network management station runs TCP/IP correctly. If all transmitted packets are lost, refer to Appendix B, Troubleshooting.

**Note:** A directly attached network management station must run RIP in the passive (listening) mode, and the routers, when used, must filter any propagation of broadcast traffic.

---

## Communicating with the Support Center

When a problem occurs in your network, the IBM support center will try to find a solution and, if necessary, provide a fix. To speed up the availability of the fix, IBM can connect to your network management station through a dial connection using TCP/IP and transfer files by using the file transfer protocol (FTP) application.

If you wish to authorize IBM to connect to your network management station, you have to define a specific network management station user. To do so, perform the following steps from the network management station:

1. Open an aixterm window.
2. Login as root
3. Type smit and press **Enter**.
4. Select **Security & Users**.
5. Select **Users**.
6. Select **Add a User**.
7. Enter a User NAME, a UserID or any other parameters you want for this user.
8. Select **OK** to complete the procedure.
9. When the status is OK, select **Exit SMIT** from the Exit pull-down menu.

You will need to give the UserID and the associated password to IBM.

---

## Appendix A. NSM CD ROM Image

As displayed in the CD ROM image in Table 4, the NSM package includes the following components:

1.6.0.4030	NBBSM	ALL NBBSM
	Nways Switch Manager Client only for AIX	NBBSM.Client.base.obj
	Nways Switch Manager Client only for AIX (runtime)	NBBSM.Client.tmsf_rte.obj
	Nways Switch Manager Server+Client for AIX	NBBSM.base.obj
	Nways Switch Manager Server+Client for AIX (runtime)	NBBSM.tmsf_rte.obj





---

## Appendix B. Troubleshooting

This appendix provides information to help you to solve problems you may encounter while setting up, preparing, or installing NSM.

If you encounter a problem, do the following:

1. Look through this appendix to see if the problem you are experiencing is documented.
2. Perform the suggested action.
3. If your problem is not addressed in this chapter, or if it persists, contact your IBM representative for additional assistance.

---

### NSM Installation Errors

This section describes the actions to take for problems that you might have during the installation of NSM software.

---

**When starting the Nways 2220 Switch Manager, a message, such as paging space low, is displayed on the network management station.**

---

**Possible Cause of Error:** The paging space, which depends on the amount of RAM available on the network management station, is not sufficient.

**Suggested Action:**

1. Refer to the *2220 Nways BroadBand Switch Planning Guide*, GA33-0293-04 to determine if the amount of RAM memory fits the number of Nways Switches and their configurations.
2. Use `smit` to adjust the paging space if necessary.
3. If needed, type `nv6000` and press **Enter** to restart the Nways 2220 Switch Manager.

---

**OVW fields are unknown.**

---

**Possible Cause of Error:** The `ovw` database does not have all the field definitions.

**Suggested Action:**

1. Type `nv6000_smit clear_topology_db` and press **Enter** to clear the database.
2. Type `nv6000 -fields` and press **Enter**.
3. Type `ovstart` and press **Enter**.

---

**The NAS and the network management station cannot communicate with each other.**

---

**Possible Cause of Error:** The local TCP/IP is not configured or the station is not connected to the IP network.

**Suggested Action:**

1. Check that the Ethernet cable is connected to the network socket.
2. Check the local TCP/IP configuration, using `smit` for the network management station and the Nways Switch configuration application for a NAS.

---

**The gateway node is green but one or more nodes are blue, or all nodes are blue in the NetView for AIX window.**

---

**Possible Cause of Error:** The NetView for AIX CMIP messages are sent via the User Datagram Protocol (UDP) instead of TCP, or they are sent to the interface of another adapter.

**Suggested Action:**

1. Find the TCP/IP address of the Ethernet adapter on the network management station.  
For example:  
128.1.64.253
2. To start the IP trace, type:  
iptrace -a -i en0 -s 128.1.64.253 -b ipfilename  
Then press **Enter**.
3. To format the trace, type:  
ipreport ipfilename > ipfilename.rep  
Then press **Enter**.
4. Edit the ipfilename.rep file.
  - If there are no records in the file, do the following:
    - a. Type:  
hostname  
  
Then press **Enter** to display the host name of the network management station.  
For example: ken.b1.ibm.com
    - b. Type:  
host ken.b1.ibm.com  
  
Then press **Enter** to display the TCP/IP address of the network management station. For example 128.1.64.253
    - c. If the TCP/IP address is not correct, edit the file /etc/hosts and set the correct value.
    - d. Type /usr/0V/service/reset\_ci and press **Enter** to set NetView for AIX for 128 addresses.
    - e. Type /usr/0V/install/AHAQ/browser\_ors and press **Enter**.
    - f. Type /usr/0V/install/AHAQ/browser\_ld\_ors and press **Enter**.
  - If there are records in the file, do the following:
    - a. Type:  
ovstop  
  
Then press **Enter** to stop all the NetView for AIX daemons.
    - b. Type:  
export CMOT\_TCP\_QOS="TCP"  
  
Then press **Enter** to set NetView for AIX to use only TCP/IP.
    - c. Type:  
ovstart  
  
Then press **Enter** to start all the NetView for AIX daemons.
    - d. Edit the file \$HOME/.kshrc
    - e. Add the following statement to the file:  
export CMOT\_TCP\_QOS="TCP"

f. Save the file \$HOME/.kshrc

---

**One or more nodes are blue in the NetView for AIX window.**

---

**Possible Cause of Error:** The Nways 2220 Switch Manager was not able to discover all the nodes of your network.

**Suggested Action:** There are several possible causes for this problem. Perform the following procedures.

1. Check the ab\_netdef.txt file:

a. Edit the file /usr/OV/install/AHAQ/ab\_netdef.txt

The file shows certain records, for example:

```
128.1.64.129 nway1.mynet.inc.com
128.1.64.131 nway2.mynet.inc.com
128.1.64.143 nway3.mynet.inc.com
```

where:

- 128.1.64.129 is the TCP/IP address as defined in the NCT2,
- nway1 is the NBBS node name, not the TCP/IP symbolic name,
- mynet is the NBBS network name,
- inc.com is the optional NBBS domain name.

These parameters are those defined in the NCT2.

b. Check the syntax and modify the parameters if necessary.

c. Save the file /usr/OV/install/AHAQ/ab\_netdef.txt

2. Check the TCP/IP settings of the network management station:

a. Type:

```
hostname
```

Then press **Enter**.

The host name is displayed, for example tom.site.ibm.com or tom.site if there is no NBBS domain defined.

b. Type:

```
host tom.site.ibm.com
```

Then press **Enter**.

The TCP/IP address is displayed, for example 128.11.22.33

c. Check that this TCP/IP address is the one defined through the NCT2. If not, perform the following steps:

1) Edit the file /etc/hosts

The file shows certain records, for example:

```
9.100.35.100 nway1.net.inc.com
128.5.21.111 nway1.net.inc.com
128.9.63.220 nway2.net.inc.com
```

where:

- 9.100.35.100 is the TCP/IP address as defined in the NCT2.
- nway1.net.inc.com is the hostname (TCP/IP symbolic name).

You cannot have two different TCP/IP addresses related to the same host name. In the example above, you should change the host name of the second record.

- 2) If your installation supports the network information service (NIS), perform the following steps:
    - a) Type `smit NIS` and press **Enter**.
    - b) Select **Start/Stop Configured NIS Daemons**
    - c) Select the client daemon **ypbind** and press **Enter** to stop the daemon.
  - 3) Type `/usr/0V/service/reset_ci` and press **Enter** to reinitialize the NetView for AIX daemon with the correct TCP/IP address.
  - 4) Type `/usr/0V/install/AHAQ/browser_ors` and press **Enter**.
  - 5) Type `/usr/0V/install/AHAQ/browser_ld_ors` and press **Enter**.
  - 6) Set the TCP/IP address used by the event forwarding discriminator (EFD) in the node agent. For example, type:
 

```
hostid 128.11.22.33
```

Then press **Enter**.
3. Check the NAS. The cause of the problem may be that the NAS is not answering the discovery process.
- Check the TCP/IP routes defined for the blue nodes in the NAS. In a NAS window, type:
- ```
netstat -r
```
- Then press **Enter**.
- Certain records should be displayed; for example:
- ```
default      172.22.20.1  0  0  U  -1  s10
172.22.20.2  172.22.20.1  0  0  U  -1  s10
128.1.0.0    128.1.0.129  20 4002 U -1  lan0
```
- Verify that the default is the address of the NID adapter.
4. Check that NetView for AIX uses TCP/IP.
    - a. Edit the file `/etc/environment` and add the following statements:
 

```
CMOT_TCP_QOS="TCP"
NVMSAPI_DB_TYPE=shlib
NVMSAPI_DB_DIRECTORY= usr/TMN/shlib
```
    - b. Save the file `/etc/environment`
    - c. Reboot the RISC System/6000.
- When you restart the NSM, NetView for AIX will restart.

---

## Solving Day-to-Day Operations Problems

This section describes the actions to take for problems you might have while operating the NSM.

### Function Errors

---

#### No notifications are sent from a NAS to the NSM.

---

**Possible Cause of Error:** The TCP/IP address of the network management station is not set correctly in the Event Forward Discriminator (EFD) object of the NAS.

**Suggested Action:**

1. Type hostname and press **Enter** to display the host name of the network management station, for example ken.b1.ibm.com
2. Type:  
host ken.b1.ibm.com  
Then press **Enter** to display the TCP/IP address of the network management station. For example 128.1.64.253
3. Type /usr/0V/service/reset\_ci and press **Enter** to set NetView for AIX for 128 addresses.
4. Type /usr/0V/install/AHAQ/browser\_ors and press **Enter**.
5. Type /usr/0V/install/AHAQ/browser\_ld\_ors and press **Enter**.

---

#### Problems managing both NBBS and non-NBBS networks.

---

**Possible Cause of Error:** The NetView for AIX must be set with the Ethernet address. If not, the discovery process cannot work.

**Suggested Action:** Type:

```
ovorsutil -d
```

Then press **Enter**.

The Ethernet address should be displayed in the **ems\_sieve\_agent** field. If not, define a TCP/IP route on the network management station by using the TCP/IP configuration in smitty.

---

#### The event desk shows all alarms twice.

---

**Possible Cause of Error:** You manually activated the alarm filters, and the topology discovery process also created Event Forward Discriminator (EFD) filters.

**Suggested Action:** You only need to activate EMS filters through the CMIP event desk. For more information, refer to the on-line DynaText *Nways 2220 Switch Manager User's Guide*.

---

#### The NetView for AIX window disappears without any action from the user.

---

**Possible Cause of Error:** The paging space, which depends on the amount of RAM available on the network management station, is not sufficient.

**Suggested Action:**

1. Refer to the *2220 Nways BroadBand Switch Planning Guide*, GA33-0293-04 to determine if there is enough RAM memory for the number of Nways Switches and their configurations.
2. Use smitty to adjust the paging space if necessary.

3. On an aixterm window, type `ovstop` and press **Enter** to stop the NSM.
4. Type `ovstart` and press **Enter**.
5. Type `nv6000` and press **Enter** to restart the NSM.

---

**A window “Time-out when activating filter...” is displayed when starting.**

---

**Possible Cause of Error:** The NSM was not able to create an Event Forwarding Discriminator (EFD) filter on one or more nodes. It could be that communication with the Nways Switch administration station (NAS) is not possible (link down, NAS rebooting, and so on).

**Suggested Action:**

Retry to create the EFD when the communication with the NAS is up again.

---

**A Pop-up Window “Agent Connection Error” is displayed.**

---

**Possible Cause of Error:**

The ISDN application is not functional (records are not registered in the `ors` database).

**Suggested Action:** To register records, do the following:

1. Type `/usr/0V/service/reset_ci` and press **Enter**.
2. Type `/usr/0V/install/AHAQ/browser_ors` and press **Enter**.
3. Type `/usr/0V/install/AHAQ/browser_ld_ors` and press **Enter**.

---

**The CMIP Browser Application is not Functional**

---

**Possible Cause of Error:** Records are not registered in the `ors` database.

**Suggested Action:**

To register records, do the following:

1. Type `/usr/0V/service/reset_ci` and press **Enter**.
2. Type `/usr/0V/install/AHAQ/browser_ors` and press **Enter**.
3. Type `/usr/0V/install/AHAQ/browser_ld_ors` and press **Enter**.

## Communication Errors from NetView for AIX

If communication errors from NetView for AIX are not displayed on the network management station, check the following files to see if any errors occurred before you perform any of the procedures in this section:

- `/usr/0V/log/nett1.TRC0`
- `/usr/0V/log/nett1.LOG0`

---

**Communication Error 1.**

---

**Possible Cause of Error:** A request is sent to a NAS association and a timer expired before the answer is received.

**Suggested Action:**

This is a transient error.

1. Check the remote application.
2. Perform the request again.

---

### Communication Error 6.

---

**Possible Cause of Error:** The XMP process cannot find the destination address.

**Suggested Action:**

1. Type `ovorsutil -d` and press **Enter**.
2. The display shows information used by NetView for AIX. Look for the **Target host** and **Host name** fields, which indicates your host name; for example: `tom.site.ibm.com`.
3. If these fields are not correct, type:  

```
host tom.site.ibm.com
```

Then press **Enter**.
4. Your host name and TCP/IP address are displayed. For example:  
`tom.site.ibm.com=128.11.22.33`
5. If the TCP/IP address is not correct, edit the file `/etc/hosts` and set the correct value.
6. Type `hostid 128.11.22.33` and press **Enter**.
7. Type `/usr/0V/service/reset_ci` and press **Enter**.
8. Type `/usr/0V/install/AHAQ/browser_ors` and press **Enter**.
9. Type `/usr/0V/install/AHAQ/browser_ld_ors` and press **Enter**.

---

### Communication Error 21.

---

**Possible Cause of Error:** A request sent to a NAS has failed.

**Suggested Action:**

1. Use the `ping` command to verify the TCP/IP communication with the NAS station.
2. Check that the network management station can communicate with the NAS. To do so, from the Network Submap select the node icon corresponding to the NAS that failed, and select **Nways Switch** → **TCP/IP Function**. The communication is complete when the TCP/IP Communication window is displayed.
3. Check that the Management Services Framework (MSF) stack is started on the NAS.

---

### Communication Error 34.

---

**Possible Cause of Error:** A request or an event report cannot be sent to a remote application in a NAS because no association is defined.

**Suggested Action:**

1. Use the `ping` command to verify that the network management station can communicate with the NAS.
2. Check that the network management station can communicate with the NAS. To do so, from the Network Submap select the node icon corresponding to the NAS that failed, and select **Nways Switch** → **TCP/IP Function**. The communication is complete when the TCP/IP Communication window is displayed.
3. Check that the MSF stack is started on the NAS.
4. Check that the NAS TCP/IP address is correctly defined in the network management station. Refer to "Defining the Nways Switches (ab\_netdef.txt file)" on page 14.





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# Glossary

The following are the abbreviations and technical terms used in the 2220 Nways Switch library.

**2220.** The IBM 2220 Nways BroadBand Switch (also called Nways Switch) is a fast packet switch enabling high-speed communications over a broadband network. It implements the functions of the IBM Networking BroadBand Services (NBBS) architecture.

**2220-300.** 2220 Nways Switch Model 300.

**2220-500.** 2220 Nways Switch Model 500.

**2220-501.** 2220 Nways Switch Model 501.

**2220 NSM.** 2220 Nways Switch Manager

**AAL.** ATM adaptation layer.

**ABR.** Availability bit rate. A best effort service with a minimum bit rate and a maximum cell loss value.

**ac.** Alternating current.

**access services.** Functions that are performed by a port adapter of the IBM 2220 Nways BroadBand Switch to:

- Support the attachment of external user devices through port lines
- Prepare user data packets
- Control the input traffic on port lines
- Manage line protocols.

**active remote connector (ARC).** A connector that supplies the electrical and physical interfaces between a line interface coupler type 511 (LIC511) in an Nways Switch subrack and data circuit-terminating equipment (DCE) or data terminal equipment (DTE). ARCs are housed in line connection boxes (LCBs).

**adapter.** An Nways Switch module that can be used, depending on its hardware type and the code that it runs, as:

- Control point adapter
- Port adapter
- Trunk adapter
- Voice server adapter.

A trunk or port adapter is associated with a line interface coupler (LIC). A voice server adapter can be associated with a voice server extension (VSE).

**ADPCM.** Adaptive differential pulse code modulation.

**AIS.** Alarm indicator signal.

**AIX.** Advanced Interactive Executive.

**alarm and power control (APC).** In an Nways Switch, a module that connects the NAS, reports alarms, and controls the power supplies.

**Alert Manager.** An application that processes the SNA alerts received from IBM 3746s operating in IP mode.

**AMI.** Alternate mark inversion.

**ANSI.** American National Standards Institute.

**APC.** Alarm and power control (module).

**AR.** Access rate.

**ARC.** Active remote connector.

**asynchronous transfer mode (ATM).** A high-speed, connection-oriented switching and multiplexing protocol that transmits different types of traffic (voice, video, and data) simultaneously.

**ATM.** Asynchronous transfer mode.

**ATMA<sub>n</sub>.** ATM adapter type n (module).

**ATM adaptation layer (AAL).** In ATM devices, a set of protocols that adapt non-ATM devices to an ATM network. There are several classes of ATM adaptation layers which represent the main traffic types (for example, data, voice, and video).

**ATM network interface.** A logical resource generated by the Nways Switch Control Program to provide access services to a physical ATM port or trunk line. An ATM network interface sets up and maintains predefined ATM virtual connections.

**AT&T.** American Telephone & Telegraph (Company).

**B8ZS.** Bipolar eight-zero substitution.

**Bc.** Burst committed.

**Be.** Burst in excess.

**bearer service profile (BSP).** A set of parameters that defines a type of ISDN traffic (speech, audio, data, or video). One BSP is associated with each ISDN numbering plan table.

**BECN.** Backward explicit congestion notification.

**B-ICI.** Broadband inter-carrier interface.

**BMI.** Byte multiplexer interface.

**BNC.** Bayonet Niell-Concelman.

**bps.** Bit per second.

**bridge.** A functional unit that interconnects two local area networks. A bridge works at the data link level (layer 2) of the OSI reference model.

**broadband network.** A network that uses a large frequency band to transport different kinds of traffic (such as coded voice, video, and data) at the same time.

**BS.** Bearer services.

**BSC.** Binary synchronous communication.

**BSP.** Bearer service profile.

**BT.** Burst tolerance.

**bursty.** Refers to transmission at variable bit rate where the time between data transmissions is not always the same.

**CAC.** Connection admission control.

**CAS.** Channel associated signaling.

**CBR.** Constant bit rate.

**CCS.** (1) Common channel signaling (2) Change control server (also called CC server).

**CDB.** Configuration database.

**CDV.** Cell delay variation.

**CDVT.** Cell delay variation tolerance.

**cell loss priority (CLP).** A priority bit in the ATM cell header. When set, it indicates that the cell can be discarded during traffic congestion.

**centralized configuration database.** A database prepared with the Nways Switch Configuration Tool Version 2 (NCT2) on a configuration station. It stores the parameters of a 2220 network.

**CES.** Circuit emulation services.

**change control server (CCS or CC server).** A station that runs the IBM NetView Distribution Manager for AIX to store the Nways Switch Control Program and to manage code changes.

**CIR.** Committed information rate.

**circuit emulation services (CES).** An access service that emulates a leased line. It transports information

with a constant bit rate at the source and destination. The traffic can be PCM voice, video, fax, multimedia, or real-time synchronous data (such as BSC).

**CLIP.** Calling line identification presentation.

**CLIR.** Calling line identification restriction.

**CLK.** Clock (module).

**CLKRD.** Clock redrive (module).

**clock module (CLK).** A module of the 2220 Model 300 or 500 that transmits clock signals to the line interface couplers (LICs). It is optional and can have a backup.

**clock redrive (CLKRD).** A module of the 2220 Model 501 that drives the signals from the Model 500 clock module to the adapters of the Model 501. The clock redrive is optional and can have a backup.

**clock references.** In an Nways Switch, the software function that controls the transmission of clock signals to the LICs where they are used for bit synchronization.

**CLP.** Cell loss priority.

**CMIP.** Common management information protocol.

**CMIS.** Common management information services.

**CMOT.** CMIP over TCP/IP.

**CNM.** Communication network management.

**code file.** A named set of records stored as a unit in a change control server. An Nways Switch code file can include data or internal code.

**COLP.** Connected line identification presentation.

**COLR.** Connected line identification restriction.

**configuration station.** See Nways Switch configuration station.

**control point (CP).** In an Nways Switch, a logical resource that provides network control functions. It can have a backup.

**CP.** Control point.

**CPA.** Control point adapter (module).

**CPE.** Customer premises equipment.

**CP spanning tree.** In a 2220 network, a distribution tree that connects the Nways Switch control points through trunk lines.

The CP spanning tree supplies a very fast and efficient way to multicast control messages such as network topology data.

**CRC.** Cyclic redundancy check.

**CSU.** Channel access unit.

**CTD.** Cell transfer delay.

**data circuit-terminating equipment (DCE).** An equipment installed on a user premises that provides all the functions required to establish, maintain, and terminate a connection, and to do the signal conversion and coding between a data terminal equipment (DTE) and a line. A DCE can be separate piece of equipment or part of other equipment.

**data terminal equipment (DTE).** That part of a data station that serves as data source, data sink, or both, and provides the data communication control function depending on the type of protocol used.

**dB.** Decibel.

**dBm.** Decibel based on 1 milliwatt.

**DC48.** Dc power input type -48V

**dc.** Direct current.

**DCD.** Dc distribution (module).

**DCE.** Data circuit-terminating equipment.

**DDI.** Direct dialing-in.

**DE.** Discard eligibility.

**decibel (dB).** (1) One tenth of a bel. (2) A unit that expresses the ratio of two power levels on a logarithmic scale. (3) A unit for measuring relative power. The number of decibels is 10 times the logarithm (base 10) of the ratio of the measured power levels; if the measured levels are voltages (across the same or equal resistance), the number of decibels is 20 times the log of the ratio.

**decibel based on 1 milliwatt (dBm).** A unit of absolute power measurement that is scaled such that 0 dBm equals 1 milliwatt.

**dialog box.** On the screen of a station, an area with entry fields and push buttons. (Also called dialog.)

**DLCI.** Data link connection identifier.

**DNPT.** Destination numbering plan table.

**DSP.** Digital service processor.

**DSU.** Data service unit.

**DTE.** Data terminal equipment.

**DTMF.** Dual-tone modulation frequency.

**DTR.** Data terminal ready.

**dummy module.** In an Nways Switch, a cover inserted in the place of a module to ensure correct air cooling inside a logic subrack. During normal operation, the dummy modules must not be removed.

**E1 standard.** A European standard for TDM digital transmission service at 2.048 Mbps.

**E3 standard.** A European standard for TDM digital transmission service at 34.368 Mbps. An E3 line can transport up to 16 E1 circuits.

**E&M.** Earth & mark.

**ECMA.** European Computers Manufacturers Association.

**EIA.** Electronics Industries Association.

**equivalent capacity.** The minimum amount of bandwidth needed by a connection to ensure that the packet loss ratio is below a specified threshold.

**ESF.** Extended status flags.

**ETS.** European telecommunication standard.

**FANB.** Fan box.

**FAT.** File allocation table.

**fax.** Document received from a facsimile machine. Synonym for telecopy.

**FCS.** Frame check sequence.

**FDDI.** Fiber Distributed Data Interface.

**FE1.** Fractional E1.

**FECN.** Forward explicit congestion notification.

**FEP.** Front-end processor.

**fiber.** Synonym for optical fiber.

**fiber budget.** The optical power loss as result of the number of connections in the optical fiber link subtracted from the working budget. The loss as a result of connections includes connector loss and splice loss. The fiber budget is expressed in decibels.

**Fiber Distributed Data Interface (FDDI).** A U.S. standard for 100 Mbps token-ring LANs using optical fiber cables over distances of several kilometers.

**fiber optic cable.** Synonym for optical fiber.

**FR.** Frame relay.

**FRAD.** Frame-relay access device.

**frame relay (FR).** A connection-oriented protocol to transport data frames over a fast packet-network with guaranteed end-to-end quality of service.

**FRFH.** Frame-relay frame handler.

**front-end processor (FEP).** A processor, such as the IBM 3745, 3746 Model 900 or 950, or 3174, that relieves a main frame from communication control tasks.

**FRTE.** Frame-relay terminal equipment.

**FRU.** Field replaceable unit.

**FT1.** Fractional T1.

**FTP.** File transfer protocol.

**Gbps.** Gigabit per second (10 to the power of 9 bits per second).

**GCRA.** Generic cell rate algorithm.

**GFP.** Generic function protocol.

**GFT.** Generic function transport.

**GSM.** Group special mobile.

**GUI.** Graphical user interface.

**HDB3.** High-density bipolar 3.

**HDLC.** High-level data link control.

**high-level data link control (HDLC).** A data network protocol.

**hot pluggable.** Refers to a hardware component that can be installed or removed without disturbing the operation of any other resource that is not connected to, or dependent, on this component.

**HPFS.** High-performance file system.

**HPRI.** High priority.

**HSA<sub>n</sub>.** High-speed adapter type n (module).

**HSDS.** High-speed digital services.

**HSSI.** High-speed serial interface.

**hub (intelligent).** A wiring concentrator, such as the IBM 8260, that supplies bridging and routing functions for LANs with different cables and protocols.

**hunt group.** See X.25 hunt group.

**IDNX.** Integrated Digital Network Exchange.

**IE.** Information element.

**ILMI.** Interim local management interface.

**IMU.** Inverse multiplexing unit

**Integrated Digital Network Exchange (IDNX).** A processor integrating voice, data, and image applications. It also manages transmission resources and connects to multiplexers and network management support systems. It permits integration of equipment from different vendors.

**integrated services digital network (ISDN).** A digital end-to-end public or private network that supports multiple services including, but not limited to, voice and data.

**IP.** Internet Protocol.

**IP gateway adapter.** In an Nways Switch, a port adapter that routes the IP control between the NAS and the network management station.

**ISDN.** Integrated services digital network.

**ISDN network interface.** A logical resource generated by the Nways Switch Control Program to provide access services to a physical ISDN or QSIG port line. An ISDN network interface sets up and maintains connections between calling ISDN terminal equipments and called terminal equipments attached through other Nways Switches.

**ISO.** International Organization for Standardization.

**isochronous.** Refers to transmission at a constant bit rate where there is a clock relationship between source and destination. The bit rates are the same on the destination and source.

**ITU-T.** International Telecommunication Union - Telecommunication (replaces CCITT).

**jitter.** Undesirable variations in the transmission delay of a digital signal. Also called cell delay variation (CDV).

**KB.** Kilobyte (storage capacity, 1024 bytes).

**kbps.** Kilobit per second (1000 bits per second).

**LAN.** Local area network.

**LAPB.** Link access procedure for B-channel.

**LAPD.** Link access procedure for D-channel.

**LCB.** Line connection box.

**LCBB.** Line connection box, base (LCEB and LCPB).

**LCBE.** Line connection box, expansion (LCEE and LCPE).

**LCEB.** Line connection enclosure, base.

**LCEE.** Line connection enclosure, expansion.

**LCPB.** Line connection power, base.

**LCPE.** Line connection power, expansion.

**LCR.** Least cost routing.

**LED.** Light-emitting diode.

**LICn.** Line interface coupler type n (module).

**line.** In a 2220 network, any physical medium, such as a telephone wire, microwave beam, or optical fiber, that transmits information. A line can be a trunk line or a port line.

**line connection box (LCB).** A metallic box that:

- Multiplexes up to 15 low-speed lines. There can be up to four LCBs per LIC type 511 for a total of 60 lines (two LCBs and 30 lines per LIC connector).
- Reduces cable lengths between Nways Switch and DCE or DTE locations.

An LCB fits in a standard 19-inch rack. Each one houses up to 15 active remote connectors (ARCs).

**line interface coupler (LIC).** In an Nways Switch, a module that physically attaches trunk or port lines. Each line interface coupler is associated with a trunk or port adapter, and supports specific line interfaces.

**LIV.** Link integrity verification.

**LMI.** Local management interface.

**local area network (LAN).** A computer network located on a user premises in a limited geographical area.

**logical port.** (Also called NBBS port.) A logical resource generated by the Nways Switch Control Program to provide access services to a physical port line (or channel of a TDM port line) using HDLC, FR, or CES protocol. A logical port sets up and maintains its predefined connections.

**logical trunk.** (Also called NBBS trunk.) A logical resource generated by the Nways Switch Control Program to provide transport services to a physical trunk line (or channel of a TDM trunk line). A logical trunk is mainly responsible for optimizing bandwidth and maintaining the CP spanning tree.

**LSAn.** Low-speed adapter type n (module).

**MA/SR.** Multi-access/sub-rate.

**management access.** Refers to an Nways Switch that connects a network management station or a change control server to a 2220 network through its service bus, which is a dedicated Ethernet LAN.

**MB.** Megabyte (storage capacity, 1 048 576 bytes).

**Mbps.** Megabit per second (10 to the power of 6 bits per second).

**MBS.** Maximum burst size.

**MLT.** Multiple logical trunks.

**module.** In an Nways Switch, a hardware unit plugged in a slot of the logic subrack. It houses, for example, an adapter, a line interface coupler, or a voice server extension. All modules are hot pluggable.

**ms.** Millisecond (1/1000 second).

**NAS.** Nways Switch administration station.

**NBBS.** Networking BroadBand Services (architecture).

**NBBS architecture.** See Networking BroadBand Services.

**NBBS connection.** See potential connection and virtual connection.

**NBBS network.** A network built with IBM 2220 Nways BroadBand Switches and conforming to the IBM Networking BroadBand Services (NBBS) architecture.

**NBBS port.** See logical port.

**NBBS trunk.** See logical trunk.

**NCT2.** Nways Switch Configuration Tool Version 2.

**NDPS.** Non-disruptive path switching.

**NEM.** Nways Enterprise Manager (see 2220 Nways Switch Manager).

**network control.** Functions that are performed by an Nways Switch control point to:

- Allocate and control the Nways Switch resources
- Provide topology and directory services

- Select routes
- Control congestion.

**network management station (NMS).** A station that runs IBM NetView for AIX and the 2220 Nways Switch Manager. It is used to manage network topology, accounting, performance, configuration, and error reporting.

**network node interface (NNI).** An interface between nodes in a communication network.

**Network Support Center (NSC).** A location from which IBM remotely supports 2220 networks.

**Networking BroadBand Services (NBBS).** An IBM architecture for high-speed networking that complements ATM standards and provides access services, transport services, and network control to user traffic.

**NIC.** Network Information Center.

**NMS.** Network management station.

**NNI.** Network node interface.

**NPT.** Numbering plan table.

**NR.** Non-reserved.

**NRT.** Non-real-time.

**NRZI.** Non-return-to-zero inverted recording.

**NRZ-1.** Non-return-to-zero change-on-ones recording.

**NSAP.** Network service address point.

**NSC.** Network Support Center.

**NSM.** (See 2220 Nways Switch Manager)

**NVDM.** NetView Distribution Manager for AIX.

**NTT.** Nippon Telegraph & Telephone (Corporation).

**numbering plan table (NPT).** A set of parameters, organized in origin NPT and destination NPT, that defines a type of called ISDN numbers. A numbering plan table is associated with each ISDN network interface.

**Nways 2220 Switch Manager (2220 Switch Manager).** An IBM licensed program that runs under NetView for AIX to manage the 2220 Nways Switch operation and configuration from a network management station. It replaces the Nways Enterprise Manager (NEM) which is no longer available.

**Nways BroadBand Switch.** Synonym for 2220 Nways BroadBand Switch.

**Nways Enterprise Manager (NEM).** An IBM licensed program that was used under NetView for AIX in a network management station to manage Nways Switches, routers, and bridges in a 2220 network (see 2220 Nways Switch Manager).

**Nways Switch.** Synonym for 2220 Nways BroadBand Switch.

**Nways Switch administration station (NAS).** A station attached to each 2220 to run the Control Program, and control and service the Nways Switch locally.

**Nways Switch configuration station.** A mandatory OS/2 or AIX station that runs a stand-alone version of the Nways Switch Configuration Tool Version 2 (NCT2) and stores the centralized configuration database of the NBBS network. An OS/2 station can be used as a remote user console.

**Nways Switch Configuration Tool Version 2 (NCT2).** A component of the Nways Switch Control Program that is used to configure physical and logical resources. It is also used in stand-alone version under OS/2 or AIX .

**Nways Switch Control Program.** The IBM licensed program that runs in the NAS and adapters of the 2220 Nways Switch. It includes a CMIP agent to work with the 2220 Switch Manager.

**Nways 2220 Switch Manager for AIX.** (See Nways 2220 Switch Manager)

**Nways Switch Resource Control.** A component of the Nways Switch Control Program. It is used from the NAS of an Nways Switch or from a remote user console to control resources and configuration files.

**OAM.** Operation, administration, and maintenance.

**OC3.** Optical carrier level 3.

**ONPT.** Origin numbering plan table.

**operation, administration, and maintenance (OAM).** A group of functions coded in specific ATM cells to handle alarms and loopback tests on ATM connections.

**optical fiber.** In fiber optics technology, a wave guide that propagates optical signals from light-generating transmitters to light-detecting receivers.

**OSI.** Open systems interconnection.

**packet loss ratio.** The probability that a packet will not reach its destination or not reach it in a specified time. It is obtained by dividing the number of packets lost in transmission by the total number transmitted.

**packet transfer mode (PTM).** The native transfer mode of the NBBS architecture. PTM divides the traffic into packets of variable length.

**PBX.** Private branch exchange.

**PCM.** Pulse code modulation.

**PCR.** Peak cell rate.

**PDH.** Plesiochronous digital hierarchy.

**permanent virtual circuit (PVC).** A virtual circuit that has a logical channel permanently assigned to it at each item of data terminal equipment. It is activated by a program or by a network operator request.

**plesiochronous.** Refers to transmission at a nominal bit rate where the source and destination are controlled by different clocks. The bit rates are nearly the same.

**PLP.** Packet layer protocol.

**PNP.** Private numbering plan.

**port.** See logical port.

**port adapter.** In an Nways Switch, a module that provides access services to one or more port lines. Each port adapter is associated with a line interface coupler (LIC).

**port line.** A communication line that connects a device on user premises to an Nways Switch and serves as a port to the 2220 network. Port lines have different protocols and interfaces.

**position.** When configuring an Nways Switch, the position parameter indicates the line attachment number on the LIC module (1 to 8, depending on the LIC type).

**potential connection.** A predefined connection through a 2220 network between two HDLC, CES, or frame-relay devices.

**PPP.** Point-to-point protocol.

**PRA.** Primary Rate Access.

**private branch exchange (PBX).** A switching system located on a user premises that relays inside lines (extensions) and provides access to the public telephone network.

**PRS.** Primary reference source.

**PSDN.** Packet switched data network.

**PSN.** Public switched network.

**PSTN.** Public switched telephone network.

**PTF.** Program temporary fix.

**PTM.** Packet transfer mode.

**PTNX.** Private telecommunications network exchange.

**pulse code modulation (PCM).** A standard adopted for the digitalization of analog voice signals. In PCM, voice is sampled at a rate of 8 kHz and each sample is coded in an 8-bit frame.

**PVC.** Permanent virtual circuit.

**Q signaling (QSIG).** An international standard for signaling procedures in private telecommunication networks. It applies to the PBX-to-Nways Switch interface, which is called the Q reference point.

**QoS.** Quality of service.

**QSIG.** Q signaling.

**quality of service (QoS).** In a 2220 network, a set of parameters that guarantees the characteristics of a connection, mainly its end-to-end delay, delay variation, and packet loss tolerance.

**RABM.** Router and Bridge Manager.

**rack.** A metallic structure, with a standard 19-inch width, that houses the hardware elements of an Nways Switch, that is, logic subrack with modules, fan boxes, and power units.

When configuring an Nways Switch, the rack parameter indicates the 2220 Model (rack A is the Model 300 or 500, and rack B is the Model 501).

**RDI.** Remote defect indication.

**real-time processing.** Refers to the manipulations of data that are required, or generated, by certain process while the process is in operation. Usually, the results influence the process and, perhaps, related processes.

**remote user console.** A station running OS/2, TCP/IP, and Nways Switch Resource Control. It can be connected to the NAS of an Nways Switch to remotely control and service it.

**resource.** In an Nways Switch, a hardware element or a logical entity created by the Control Program. Adapters, modules, and line attachments are examples of physical resources. Control points, logical trunks, logical ports, and network interfaces are examples of logical resources.

**resource profile.** A record of the characteristics of an Nways Switch resource. It includes (for example) the part number or module name, the change level, and the name and phone number of the person to contact when a problem occurs.

**RETAIN.** Remote Technical Assistance Information Network

**RIP.** Route Information Protocol.

**router.** An attaching device that connects two LAN segments of the same or different architectures. It can also be connected to a wide area network. A router works at the network level (layer 3) of the OSI reference model by determining the best paths for network traffic flows.

**Router And Bridge Manager.** An application that provides distributed management for routers such as the IBM 2210 or 2216, bridges such as the IBM 8229, and communication controllers such as the IBM 3746 in IP mode.

**RS.** Recommended specification.

**RSF.** Remote support facility.

**RSN.** Receive sequence number.

**RT.** Real-time.

**RVX.** RS/EIA-232, V.24/V.35, X.21.

**s.** Second.

**SCR.** Sustainable cell rate.

**SDH.** Synchronous digital hierarchy.

**SDLC.** Synchronous data link control.

**SDT.** Structured data transfer.

**serial line internet protocol (SLIP).** A TCP/IP protocol used on a point-to-point connection between two IP hosts over a serial line (for example, an RS/EIA-232 connection to a modem over a telephone line).

**SLA.** Serial link architecture.

**SLIP.** Serial line internet protocol.

**slot.** When configuring an Nways Switch, the slot parameter indicates the module location (1 to 12) in the logic subrack.

**SNA.** Systems Network Architecture.

**SNMP.** Simple Network Management Protocol.

**SONET.** Synchronous optical network.

**spanning tree.** See CP spanning tree.

**SRC.** System reference code.

**SSN.** Send sequence number.

**station.** A microcomputer that is connected to a host or a network and at which a user can run applications.

**STM-1.** Synchronous transport module type 1.

**STS-3c.** Synchronous transport signal type 3 concatenated.

**SUB.** Subaddress.

**subrack.** A metallic structure installed in an Nways Switch rack. A logic subrack holds modules. A power subrack holds power supply components.

**SVC.** Switched virtual circuit.

**SW.** Switch (module).

**switch module (SW).** A module of the 2220 Model 300 or 500 that interconnects the adapters through an ATM cell switch. It can have a backup.

**switch redrive (SWRD).** A module of the 2220 Model 501 that drives the signals from the switch module in the Model 500 to the adapters of the Model 501. It can have a backup.

**SWRD.** switch redrive (module)

**switched virtual circuit (SVC).** A connection set up from a calling address to a called address following a call establishment protocol. It is released when a clear request signal is received.

**synchronous digital hierarchy (SDH).** A international recommendation for the internal operation of carrier optical networks.

**synchronous optical network (SONET).** A U.S. standard for transmitting digital information over optical interfaces. It is closely related to the international recommendation for synchronous digital hierarchy (SDH).

**T1 standard.** A TDM digital transmission service with a basic rate of 1.544 Mbps. Also called DS-1.

**T3 standard.** A TDM digital transmission service with a basic rate of 44.736 Mbps. A T3 line can transport up to 28 T1 circuits. Also called DS-3.

**TCPA.** Trunk and control point adapter.

**TCP/IP.** Transmission Control Protocol/ Internet Protocol.

**TDM.** Time division multiplexing.

**TE.** Terminal equipment.



**Telnet.** In TCP/IP, an application protocol that allows a user at one site to access a remote system as if the display station were locally attached. Telnet uses the Transmission Control Protocol (TCP) as the underlying protocol.

**time division multiplexing (TDM).** The process of breaking the bandwidth on a communication line into a number of channels, possibly of different size.

**TME.** Tivoli Management Environment.

**TMN.** Telecommunication Management Network.

**TPA.** Trunk or port adapter.

**Transmission Control Protocol/ Internet Protocol (TCP/IP).** A set of communication protocols that support peer-to-peer connections over both local and wide area networks.

**transport services.** Functions that are performed by a trunk adapter of an Nways Switch to:

- Support the attachment of trunk lines
- Maximize bandwidth utilization
- Guarantee the quality of service of a connection
- Transfer packets between Nways Switches
- Manage logical queues and schedule transmission.

**trunk.** See logical trunk.

**trunk adapter.** In an Nways Switch, a module that provides transport services to one or more trunk lines. Each trunk adapter is associated with a line interface coupler (LIC).

**trunk line.** In a 2220 network, a high-speed line connecting two Nways Switches. It can be, for example, a copper cable, optical fiber, or radio wave guide and can be leased from telecommunication companies.

**UBR.** Unspecified bit rate. A best effort service with no quality commitment.

**UNI.** User network interface.

**UPC.** Usage parameter control.

**URL.** Uniform resource locator.

**user network interface (UNI).** A standardized interface between a user and a communication network.

**UTC.** Universal time, coordinated.

**UUS.** User-user signaling.

**VBR.** Variable bit rate.

**VC.** Virtual channel.

**VCC.** Virtual channel connection.

**VCI.** Virtual channel identifier.

**VCN.** Virtual circuit number.

**virtual channel (VC).** In ATM, a unidirectional route between two ATM devices. Virtual channels always come in pairs, one in each direction. They follow virtual paths.

**virtual channel connection (VCC).** In ATM, a unidirectional connection established over a virtual channel. Virtual channel connections always come in pairs, one VCC in each direction.

**virtual channel identifier (VCI).** In ATM, the unique numeric tag that identifies every channel. It is defined by a 16-bit field in the ATM cell header.

**virtual connection.** In frame relay, the return path of an FR potential connection.

**virtual path (VP).** In ATM, a group of virtual channels that are switched together as one unit. (Also called VC service.)

**virtual path connection (VPC).** In ATM, a connection established over a virtual path. Virtual path connections always come in pairs, one VPC in each direction. (Also called VP service.)

**virtual path identifier (VPI).** In ATM, an 8-bit field in the ATM cell header that indicates the virtual path over which the cell is to be routed.

**voice server adapter (VSA).** In an Nways Switch, a module that supplies additional voice functions to voice connections operating in pulse code modulation at 64 kbps. It can attach a voice server extension (VSE).

**voice server extension (VSE).** In an Nways Switch, a module associated with a voice server adapter (VSA) to supply voice functions to an extended number of PCM voice connections.

**VP.** Virtual path.

**VPC.** Virtual path connection.

**VPD.** Vital product data.

**VPI.** Virtual path identifier.

**VPN.** Virtual private network.

**VSA.** Voice server adapter (module).

**VSEn.** Voice server extension type n (module).

**WAN.** Wide area network.

**wide area network (WAN).** A network that provides communication services to a large geographic area. It can use or provide public communication facilities.

**window.** On the screen of a station, an area with a title bar, a menu bar, and scroll bars.

**X.25 hunt group.** A group of X.25 network interfaces associated with one common subscriber address. If an interface is busy, the connection searches (hunts) for the other interfaces of the group until a free one is found.

**X.25 network interface.** A logical resource generated by the Nways Switch Control Program to provide access services to a physical X.25 port line. An X.25 network interface sets up and maintains connections between calling X.25 subscribers and called subscribers attached to other Nways Switches.

**X.25 Recommendation.** An international standard for the interface between data terminal equipments and packet-switched networks.

**X.25 subscriber.** An X.25 end-user connected to an X.25 network interface through a DTE. A subscriber is defined by an address and a logical name.

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## Bibliography

This section lists prerequisite and related publications.

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### Nways Switch Publications

- *2220 Nways BroadBand Switch At a Glance, an Overview*, GA33-0292
- *2220 Nways BroadBand Switch Planning Guide*, GA33-0293
- *2220 Nways BroadBand Switch Configuration Guide*, GA33-0474
- *2220 Nways BroadBand Switch Physical Lines Interface Specifications, External Cable References*, GA33-0379
- *2220 Nways BroadBand Switch Frame Relay Interface Specifications*, GA33-0374
- *2220 Nways BroadBand Switch HDLC Interface Specifications*, GA33-0375
- *2220 Nways BroadBand Switch CES Interface Specifications*, GA33-0376
- *2220 Nways BroadBand Switch ATM Interface Specifications*, GA33-0378
- *2220 Nways BroadBand Switch X.25 Interface Specifications*, GA33-0413
- *2220 Nways BroadBand Switch ISDN Interface Specifications*, GA33-0447
- *How to use the NAS*, online tutorial<sup>1</sup>

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### Nways 2220 Switch Manager Publications

- *IBM Nways 2220 Switch Manager for AIX Installation Guide*, SH11-3088
- *IBM Nways 2220 Switch Manager for AIX: Performance Monitoring and Accounting*, GA33-0366
- *IBM Nways 2220 Switch Manager User's Guide*, online manual<sup>2</sup>

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### TME 10 NetView for AIX Version 5 Publications

- *NetView for AIX Installation and Configuration*, SC31-8163
- *NetView for AIX V4R1 User's Guide*, SC31-8158

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### TMN 2.2 Publications

- *TMN 2.2 General Information*, GT01-0458
- *TMN 2.2 Agent User's Guide* SC31-8157

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<sup>1</sup> Online documentation delivered with the 2220 Nways Switch Control Program.

<sup>2</sup> Online documentation delivered with the Nways 2220 Switch Manager product.

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## OSI System Management Standards for CMIP

OSI stands for Open Systems Interconnection

### OSI Management Framework and Overview

- *OSI Basic Reference Model Part 4: Management Framework* ISO 7498-4
- *Systems Management Overview* ISO 10040

### CMIP/CMIS

- *Common Management Information Service Definition* ISO 9595

### Systems-Management Functions

- *Part 1: Object Management Function*, ISO 10164-1
- *Part 2: State Management Function*, ISO 10164-2
- *Part 3: Attributes for Representing Relationships* ISO 10164-3
- *Part 4: Alarm Reporting Function*, ISO 10164-4
- *Part 5: Event Report Management Function*, ISO 10164-5
- *Part 9: Objects and Attributes for Access Control* ISO 10164-9
- *Accounting Management*, SC 21 N 4971
- *OSI Software Management*, SC 21 N 6040
- *General Relationship Model*, SC 21 N 6041
- *Performance Management*, SC 21 N 6306

### Management Information Model

- *Part 1: Management Information Model*, ISO 10165-1
- *Part 2: Definition of Management Information*, ISO 10165-2
- *Part 5: Generic Managed Information*, ISO 10165-5

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