Network Station Manager Version 2

Basic Problem Determination

Network Station Education
IBM Network Computer Division
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Objectives/Contents

- Using the Advanced Diagnostics session
- Displaying messages
- Retreiving messages remotely
- Executing commands remotely
- Working with the Boot Monitor Service Aids

Notes

The topic of this presentation is problem determination (PD) on the IBM Network Station.

The objective of this presentation is to provide some insight into the tools and techniques that can be used to do problem determination with version 2 release 1(V2R1).

For anyone who was familiar with V1R3, this is an area that must be relearned since just about everything is different from the previous release.

This should be considered as an introduction only as we are just beginning to understand some of the tools and to get familiar with the new ways to access some of the critical information for PD.

We will take a quick look at how to look at how to use the Advanced Diagnostics session, how to display messages, what are some of the shortcut keys, how to access a station remotely, highlight a few useful commands, and take a look at the service aids menu from the boot monitor.

Problem Determination Tools

- **Two main Tools**
  - Boot Monitor Service Aids
  - Advanced Diagnostic (Command line)
- **Boot Monitor Service Aids Menu**
  - More extensive than V1R3 boot monitor
  - Use for problems prior to getting operational
- **Advanced Diagnostic is a command line interface**
  - Unix environment
  - All functions done through commands
  - Requires some Unix knowledge
  - Command Line replaces V1R3 console
  - More versatile

Notes

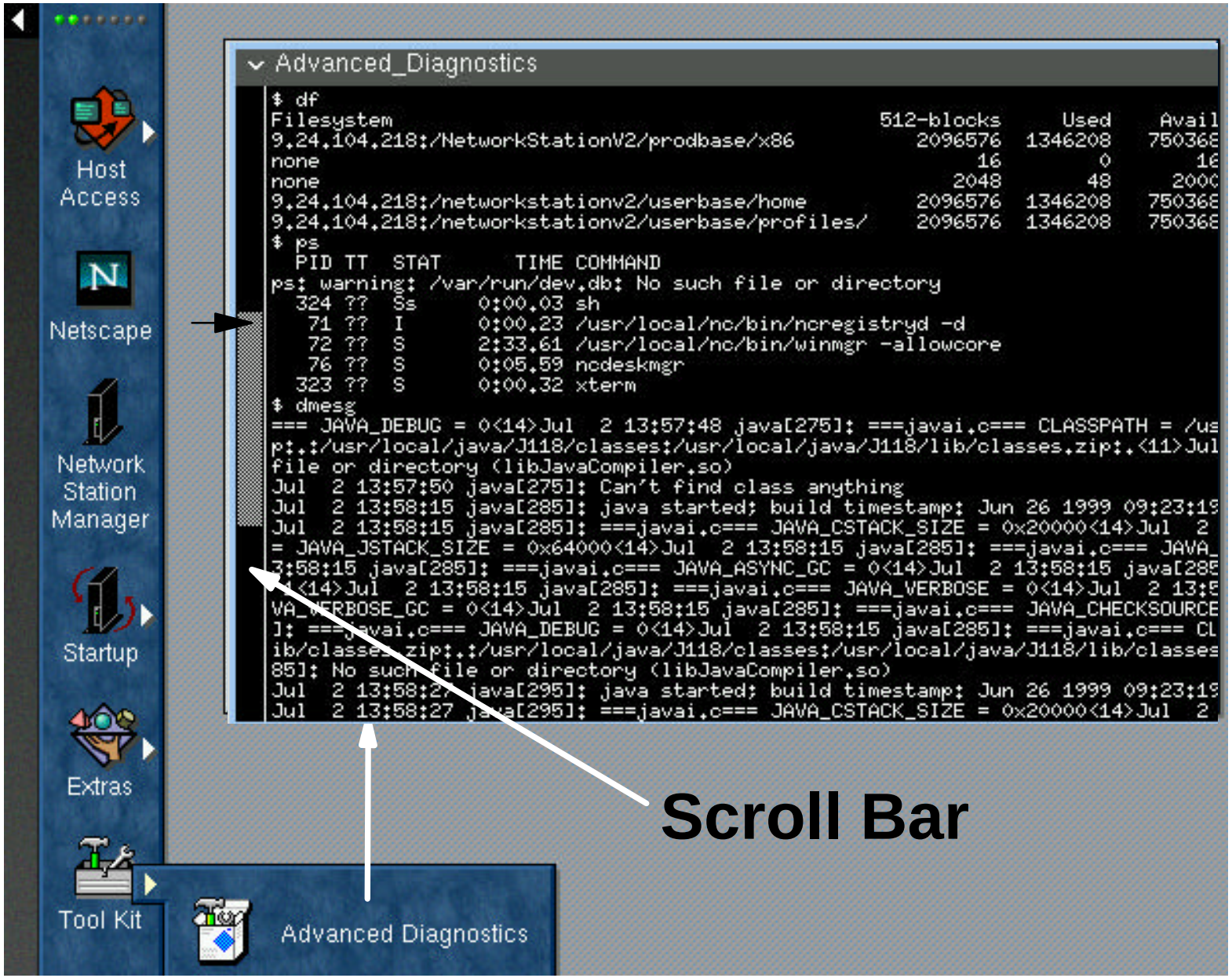
There are two main tools for doing problem determination in V2R1.

While the station is not yet under the control of the kernel but still in the boot process, the Boot Monitor Service Aids menu is used to do problem determination. It contains a lot more functions that the V1R3 boot monitor had and allows all the basic functions that are needed to isolate a problem. For example, you can display the ARP cache, and the routing table, and ping, and display the last 20 packets sent and received, and display DHCP responses, and so on.

After the station is operational and under the control of the kernel, the Advanced Diagnostic window becomes the primary problem determination tool by allowing the administrator to issue a variety of commands. This is a lot more extensive than what was available in the previous release since there was no command line facility.

Most of the commands are Unix commands, so if you are already Unix knowledgeable, these will be familiar to you. Otherwise, there may be a slight learning curve for some users, although many of the network related commands such as netstat for example are fairly similar to those that would be used on many other platforms.

Advanced Diagnostics - Messages



Notes

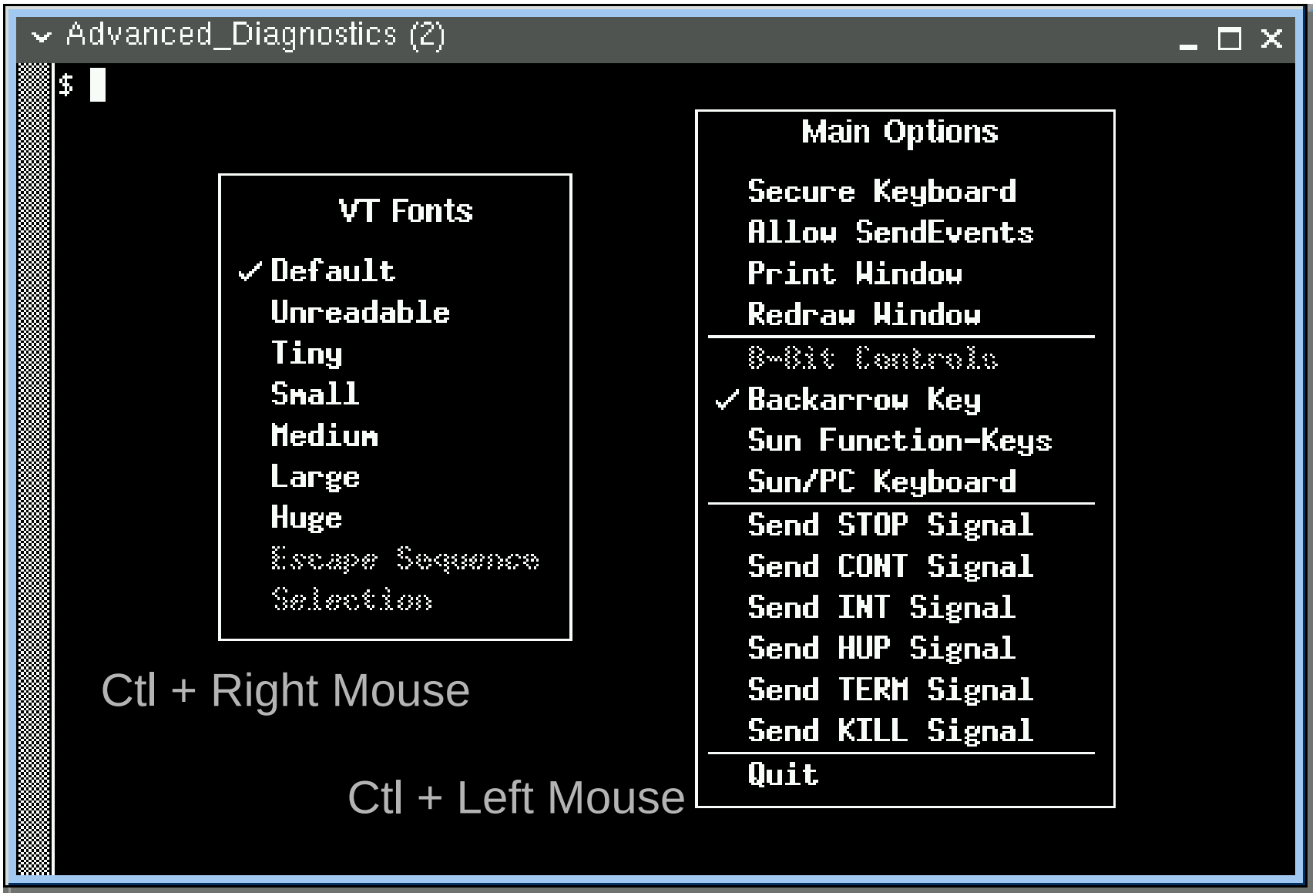
A click on the Toolkit icon on the launchbar and then Advanced Diagnostics brings up an xterm session where all the commands can be issued by the administrator.

In this example we used the df (display filesystem) command to see the mount points and the ps command to display some of the active processes, and then the dmesg command to display messages.

By default, the number of lines held is 1000 and so there is a need to be able to scroll to see previous messages.

This is easy using the scroll bar located on the left of the window. The easiest method to scroll seems to be to put the cursor on the scroll bar at the junction of the black and white areas (where we have put a small black arrow in this diagram) and to drag the bar while holding BOTH the left and right mouse buttons.

Xterm Session Options



Notes

There are other useful operational tips on the use of the Advanced Diagnostics window.

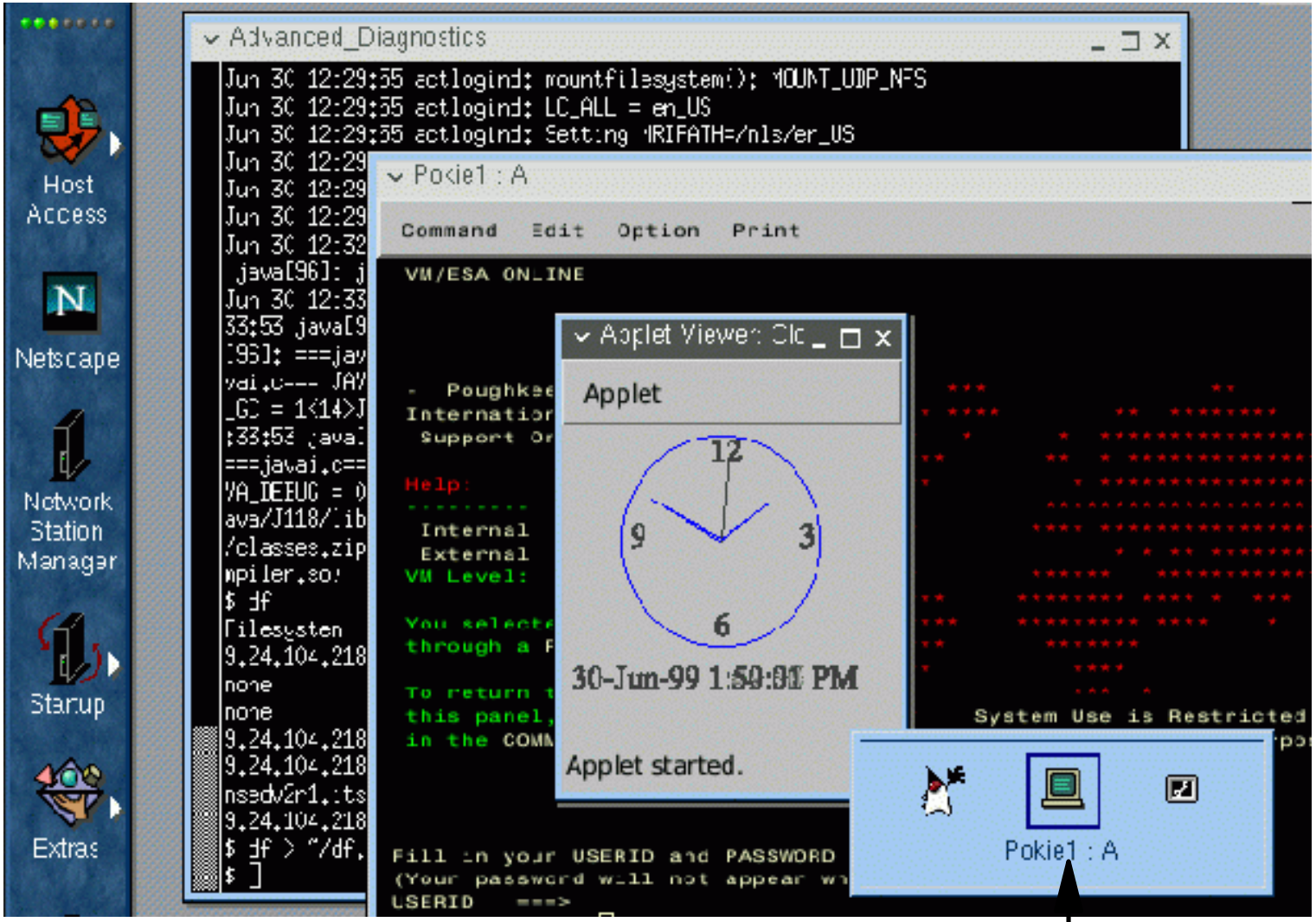
For example, this chart shows two menus that can be displayed from the advanced diagnostic window using the Control-Right Mouse and the Control-Left mouse button key sequences.

You can also use the left and right mouse buttons to copy and paste within the same window. Drag to select (a character, a word, multiple words) and hit the right mouse to copy the selected string to the command line.

If you issue a long command, and do not want to retype it, you can copy and paste it.

You can also recall commands on the command line by issuing the "set -o vi" or "set -o emacs" command, after which the use of the up and down arrows lets you scroll through previous message. You are then into the vi editor or emacs editor environment to make changes to those recalled commands, and we find that those editing commands are not always intuitive unless you are proficient at using vi . If that's a problem for you, use the copy/paste and then modify your command before hitting enter.

Using Alt-Tab to switch windows



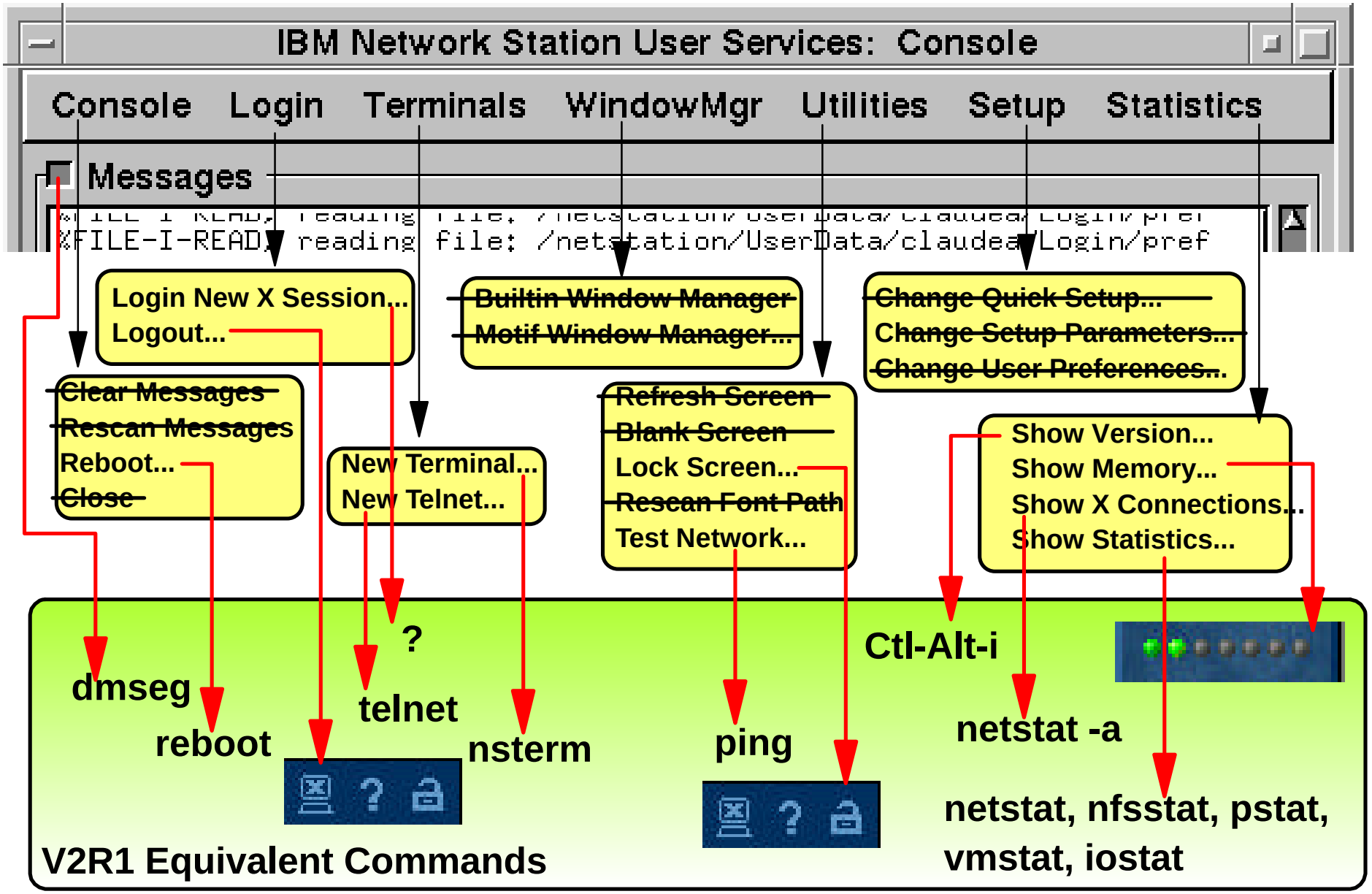
Alt-Tab

Notes

The Alt-Tab keyboard shortcut displays a list of opened windows from which you can choose one to become the active window.

This is now identical to the Microsoft Windows Alt-Tab operation where, while holding Tab, the first tab displays all opened windows as an icon in a small window, with one pre-selected, and each subsequent tab selects another icon. Releasing the Alt key makes the selected window the active one.

V1R3 Console vs V2R1 Commands



Notes

This diagram summarizes the differences between the functions provided through the V1R3 Console facilities and the way to get similar functions through the V2R1 command line.

At the top is the V1R3 console with each pulldown expanded to show the available functions.

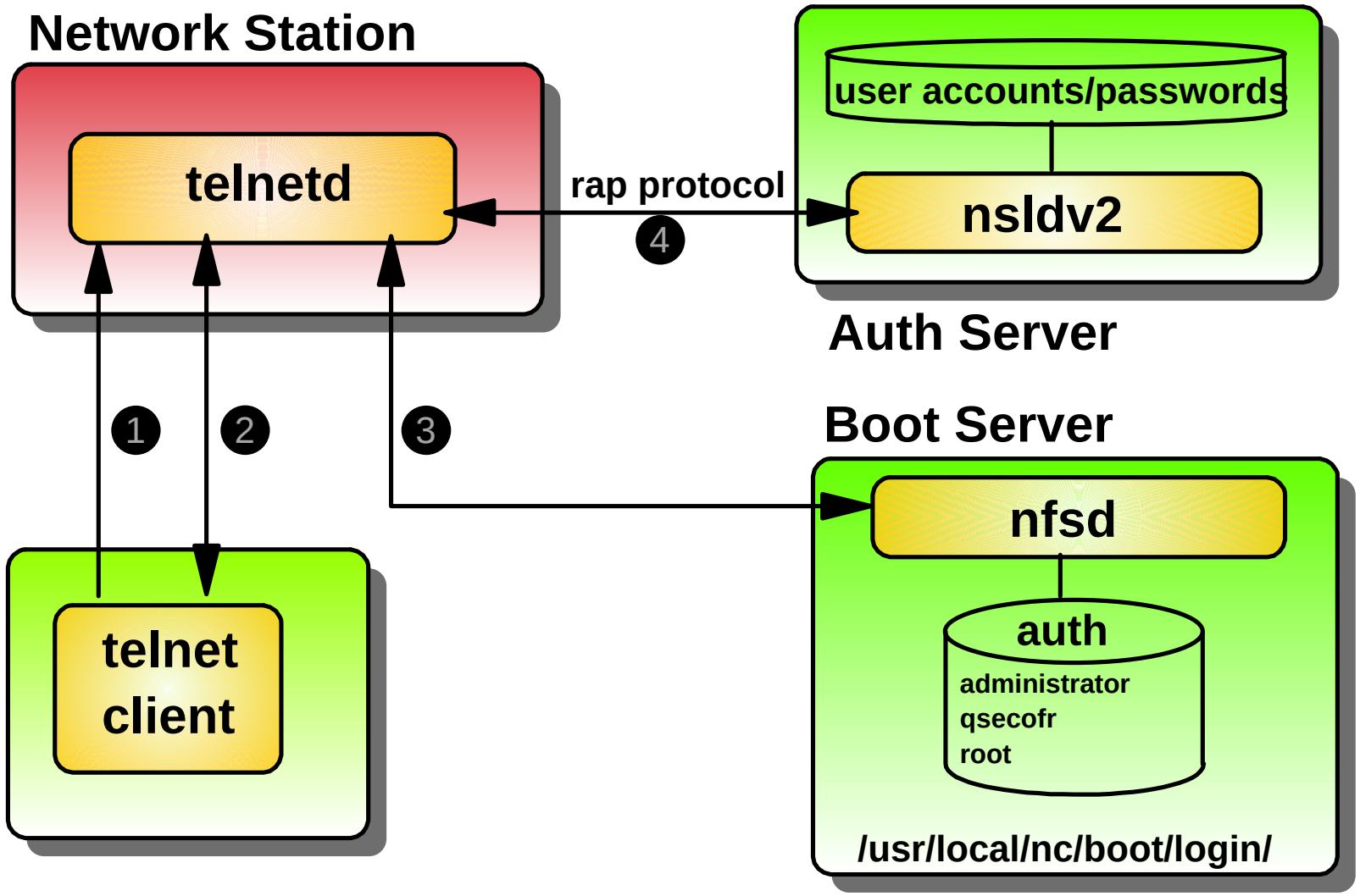
The functions that are either not applicable or not available in V2R1 have been indicated with a horizontal bar through it.

Others have an arrow pointing to the command to issue on the V2R1 command line to get either an identical or similar function.

In the case of the Screen lock and the Logout, it is not a command but a click on an icon located at the bottom of the launchbar, and the memory function is located at the top of the launchbar (if enabled).

In general, there is additional flexibility provided in V2R1 through a variety of commands that were not available in V1R3.

Remote telnet into the Network Station



Notes

This diagram illustrates the process that takes place when an administrator wants to telnet into a Network Station to do problem determination.

From any telnet client, telnet into the station(1). The telnetd daemon should be running as it is automatically started from the .profile file. Telenetd asks the client for user name and password(2).

Telnetd then accesses, using nfs, the auth file (3) located at /usr/local/nc/boot/login to verify that the userid is present in that file. By default, the qsecofr, administrator and root userids are present in the auth file, but you can add others.
(Note: If you add users, make sure that you use an editor which only puts line feeds at the end of the line and not carriage return/line feed. In Windows NT, we use the PFE editor available free on the Web.)

If the user is present in the auth file, the telnetd daemon then uses the rap protocol to contact the auth server (4) and verify the validity of this user, just as if this user was logging in to the Network Station. So the user must have a user account on the server and be part of the NSMUser group. If the user is valid and the password is correct, access is granted.

At that point, certain commands may be restricted. To get full access as if using the advanced diagnostic session on the station itself, comment out the RPATH statement in the .profile file that reads RPATH=/usr/diag.

Note that you can telnet into the station even before a user has logged in.

Note also that if an administrator password (unit-global-password) is set on this station (through the NSM configuration), then the telnetd daemon does not ask for userid and password, but only for the password, which is this case is the administrator password. Here again however, only a restricted access is permitted unless the RPATH statement is commented out of the .profile file.

Useful Commands

- Ping -r host # pings a host showing also the route
- Netstat -r # Displays the IP routing table
- traceroute host # traces a route to a host
- netstat -a # display active connections
- df # display file system
- ps aux # display active processes
- set # display all current environment variables
- echo $variable name # display the setting of an env. variable
- lpr or nclpr # sends a print job to a remote printer

Notes

Here are a few common commands used in every day life for doing problem determination and displaying the status of resources.

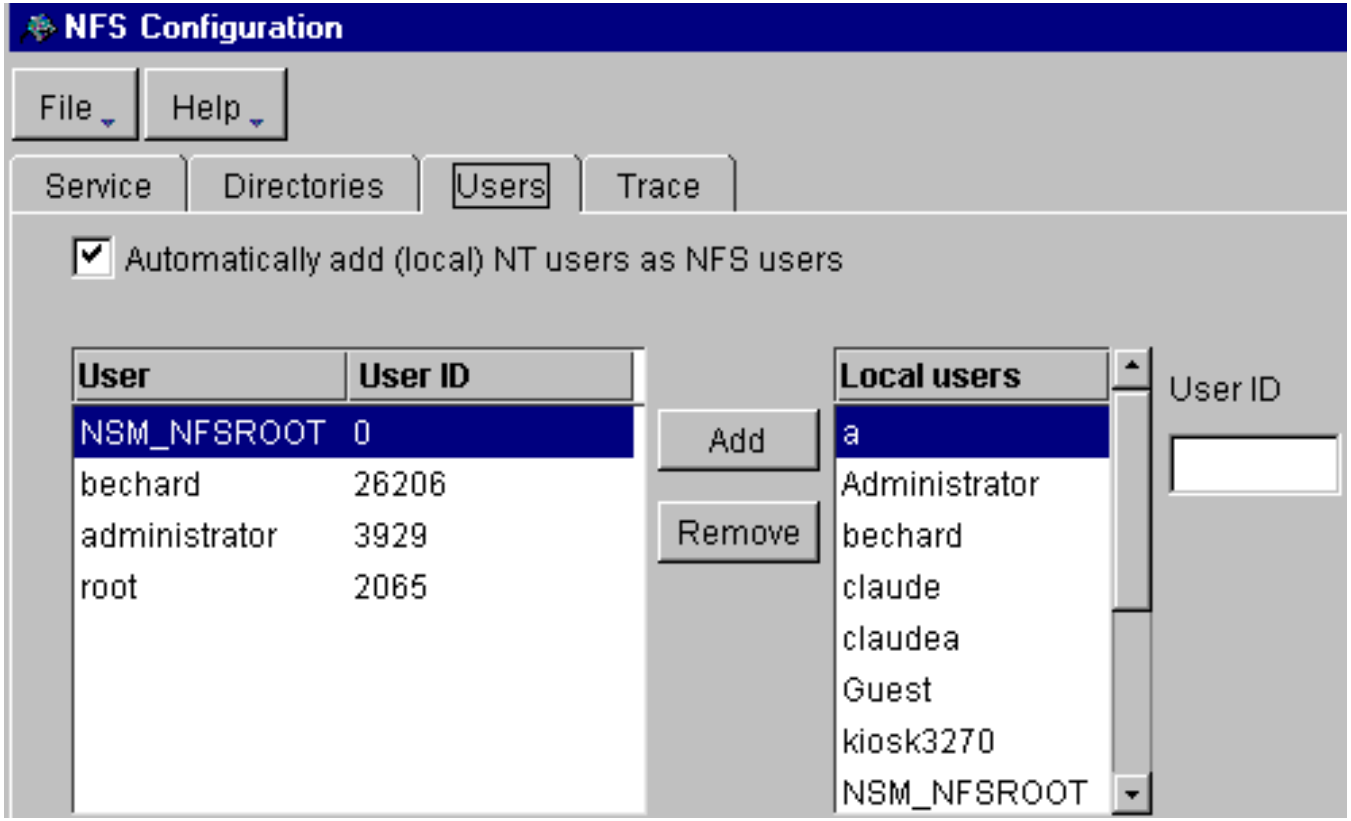
Many of these have other options and settings that can be used but we cannot here list all of these options.

Most command have a -help parameter that will at least list the available options, although these are often listed without any explanations as to what they mean.

Since most available commands are Unix commands, you might be able to find some documentation in the many available publications on Unix.

Remote Reboot

- **To cause a reboot of the station, the reboot command is used**
- **The reboot command is restricted to users with a NFS UID of 0**
  - On Microsoft Windows NT, this means the NSM_NFSROOT user
  - NSM_NFSROOT must also be made part of the auth file to be able to telnet in



Notes

To be able to reboot a Network Station remotely, one must be able to issue the reboot command on the command line.

However, this reboot command can only be issued by a user whose NFS UID is zero.

Since the only user defined with a UID of 0 in Windows NT is NSM_NFSROOT, this is the user name that must be used when logging on remotely to the Network Station.

This also means that this user name (NSM_NFSROOT) must be made part of the auth file in order to be able to remotely log in to the station.

Only one user name in NFS can have a UID of 0, and this cannot be administrator since NSM_NFSROOT already is UID 0.

Shown in the bottom panel if the eNOD NFS server configuration panel showing the defined NFS users and their UID.

Service Aids Menu

Menu70

IBM Network Station
Service Aids

Change firmware support
Change local MAC address
Change fast boot setting
Change retry settings
Change NS boot themes setting

Load factory defaults

Use cursor keys to select task.

Enter=Continue F10=Reboot IBM Network Station F12=Cancel

Notes

When the boot monitor is started on the Network Station and the ESC key is used, the main menu of the boot monitor is displayed.

On the main menu is an entry called Service Aids. Choosing this entry displays the panel shown in this chart.

Actually, this is only a small portion of the real Service Aid menu because the bulk of it is hidden. To gain access to the rest of the Service Aids, use Ctrl-F9 from this panel.

Service Aids Main Hidden Menu (CTRL-F9)

Main Menu

1. Memory Test
2. Dump PCI Configuration Registers to serial port
3. Cache Control
4. Video test
5. Test all
6. I/O (serial and parallel)
7. Toggle auto test
8. Configuration menu
9. Misc menu
0. Exit

Notes

This is the main menu that you get when using Crtl-F9 from the main Service Aids menu.

This is only a partial menu as nearly each item on this menu expands into further menus.

There are too many items for us to describe here, so we suggest that you explore this on your own.

We do want to point out however that the way to get to the network items is to choose the 9. Misc option, and on the following panel, choose the Network entry.

Service Aids Network Menus

MENU 1

1.Print ARP cache
2.Print routing table
3.Print boot configuration
4.Print card statistics
5.Print network statistics
6.Packet log
7.Bootp vendor specific/DHCP options
8.DHCP responses
9.More network menus=>MENU 2
0.Exit

MENU 2

1.Print Ethernet EEPROM data
2.Display/set EThernet Auto Negotiate/Speed/duplex
3.Ping command
4.Duplicate network packets
5.Host command
6.Display/set TRN auto selection/speed selection
7.Display subnet broadcast information
8.Display subnet broadcast bitmap
9.More network menus=>MENU 3
0.Exit

MENU 3

1.RPL Server discover
2.Display/set boot protocol
3.TFTP subnet boot protocol retry count
4.TFTP retry and delay values
5.NFS retry and delay values
6.Menu interruption (Alt PF9)
0.Exit

Notes

These are the three network menus available from the first Network option.

There are a lot more tools and facilities here than were available in the V1R3 boot monitor.

Those are probably the main items that you would use to do problem determination if there is a problem for the station to connect over the network to a boot server.

Notice in particular the items we highlighted in red:

- The packet logs allows to see the last 20 or so packets that were issued or received so that one can see the latest activity
- The Ping command can be used to see if a destination can be successfully reached
- The DHCP responses can display the DHCP frame activity when attempting to use a DHCP server

Where to Find Additional Information

- **SG24-5844 NSM V2R1 redbook**
  - PD chapter and Appendices
- **Advanced Information on the Network Station home Web site**

Notes

The best source of additional information at this time is the draft redbook on this CD SG24-5844 - NSM V2R1. It contains a small PD chapter but also some appendices with a list of commands and other useful information such as shortcut keys.

We have also listed in Appendix a table that identifies what function was available in V1R3 and what is the equivalent function in V2R1.

You might also look into the Advanced User Information document on the web which should evolve over time to include additional useful information.