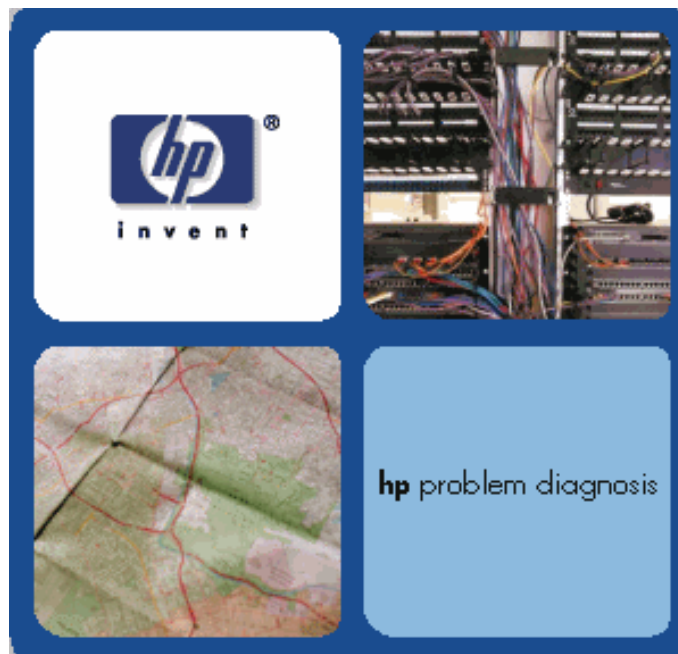# HP OpenView Problem Diagnosis

Concepts Guide

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Table of Contents

Overview of HP OpenView Problem Diagnosis

HP OpenView Problem Diagnosis is a powerful, automated IP network path analysis tool that presents end-to-end path information clearly and concisely. Furthermore, Problem Diagnosis lets you see detailed information from nodes and devices in a particular path, and can be launched from other OpenView products (like NNM, Service Navigator, and Vantage Point applications).

HP OpenView Problem Diagnosis gives NOC and Service Desk (IP Network Operators & Engineers) tools for fast problem diagnosis and resolution in IP-based networks. In particular, Problem Diagnosis offers:

- **NetPath**: A probe-based path tool that finds and monitors the paths between itself and any reachable node that it is configured to test. A NetPath probe collects data over time, and generates statistical and usage data about the paths it monitors.
- **ShowPath**: A path finder that leverages Network Node Manager functionality and topology data to determine the active path between two nodes in the NNM discovery domain.
- **Integration** with HP OpenView NNM, Vantage Point Operations, and Vantage Point Windows.

Major Components

Problem Diagnosis has three primary components:

- **The Web-based Graphical User Interface —** The graphical user interface (GUI) for Problem Diagnosis is a Java applet that interacts with the Problem Diagnosis server to present path information. Like all applets, it needs no installation because it runs in the context of a Web browser. This means a web browser launches whenever you use Problem Diagnosis; Problem Diagnosis then opens its own windows for you to work in.

  The Problem Diagnosis GUI is simple to use and presents data in easy-to-understand ways.

- **The Problem Diagnosis Server —** The Problem Diagnosis server is the heart of the system, the intelligence behind Problem Diagnosis functionality. It assimilates information and responds to requests from a user running the Problem Diagnosis GUI applet.

  The Problem Diagnosis server gets its topology data from NNM, from Problem Diagnosis NetPath probes, and other HP OpenView applications.

  Based on the topology data it mines from these sources, it can present several alternative ways to examine the path(s) between nodes.

The Problem Diagnosis server has two key components:

- The **Jakarta Tomcat** web server from the Apache Software Foundation. The Problem Diagnosis server is based on Java "servlet" technology, and the Jakarta Tomcat web server provides this supporting infrastructure for Problem Diagnosis.

- The **Problem Diagnosis** server itself, which runs under the umbrella of the Jakarta Tomcat web server.

- **The NetPath Probe(s)** — The Problem Diagnosis NetPath probes are key suppliers of data to the Problem Diagnosis system. NetPath probes are independent Java applications that can reside anywhere. There is no limit to the number of probes you can install, or the number of paths a probe can monitor. Likewise, a probe can be used by more than one Problem Diagnosis server.

  A probe collects information about paths between itself and any desired target. It uses a technique similar to the familiar traceroute utility, and runs periodically to test the route to the target(s) it is configured for. On each run, it collects data about the route:

  - Devices along the route

  - Lag time between devices

  - New routes to the target

  When you request probe data, the Problem Diagnosis server contacts the probe for current data, so that you see the freshest information.

On the right is a diagram of how NetPath works. The user (the one in the wizard's hat) uses a web-browser to access one of the two servers (`Warner` or `Columbia`). By requesting a NetPath trek with a particular probe (say, `Moe`), it's possible to investigate the current path between `Moe` and any of its target nodes (`Router B` or `Host C`), and to get a detailed history of the paths that have been used between `Moe` and those nodes.
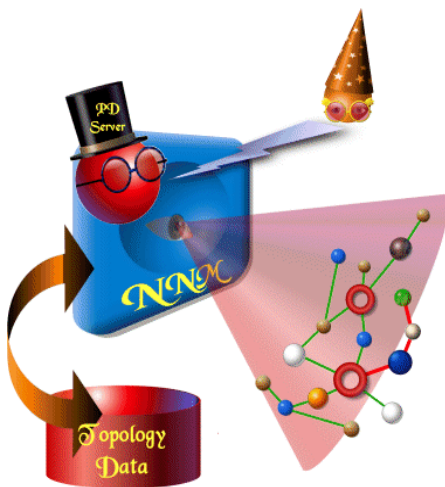
On the left is a diagram of how ShowPath works. The user (again in the wizard's hat) again uses a web-browser to access the Problem Diagnosis server. This server resides on a host running NNM (version 6.2 or later), which discovers and monitors the network, and the Problem Diagnosis server can draw network information from NNM. When requesting a ShowPath trek, the Problem Diagnosis user can name two nodes that exist in the NNM management domain, and investigate the current path between them.
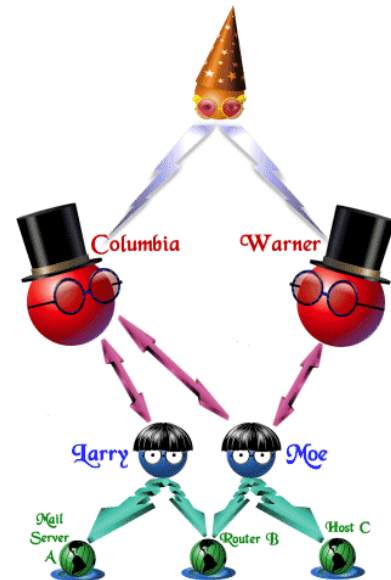
Visual Differences You May See

In this help system, all screen captures were taken from Windows, using a Java 1.3 plug-in. Keep in mind that if you use different platform or a different version of the Java plug-in, there will be minor differences between your screens and the sample screens in the help. The samples below illustrate the same applet under different conditions.

- After you press [GO], the button is disabled ([GO]) until the results of your request are available. Depending on the Java plug-in and the platform you are using, you may or may *not* see a "Busy" cursor (something like ⧖ or ⌚) to indicate that your request is being serviced. If the "Busy" cursor does not appear, you should assume that Problem Diagnosis is working, and will shortly return the results of your request.

- The UNIX® Java plug-ins put the "Java Applet" notification banner above the content; Windows Java plug-ins put it below the content.

- Java plug-ins prior to version 1.3 highlight the "Java Applet" notification banner with a bright color, whereas later plug-ins do not use a highlight color.

- Fonts are different between the various operating systems and Java implementations.

- Certain terms are slightly different, depending on the platform. For example, the facility for tracing IP routes is named `traceroute` on UNIX®, and `tracert` on Windows. Generally speaking, your familiarity with the world of computer networking will make these terms obvious.

On HP-UX, Java plug-in version 1.2.2_08
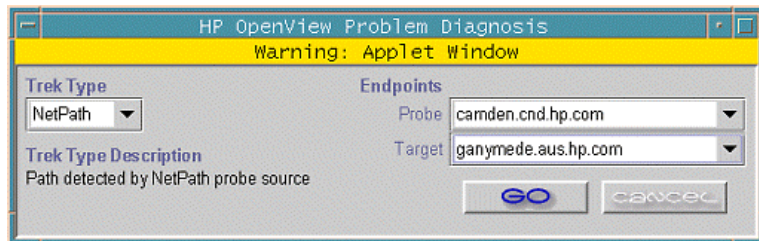
On Windows, Java plug-in version 1.3
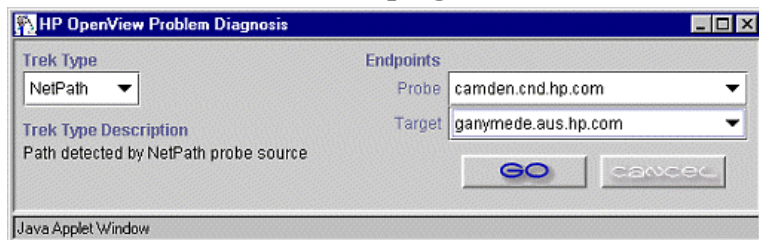
Operations Summary and Tour

Problem Diagnosis Operation Summary

Once installed and configured, Problem Diagnosis is very simple to operate. Follow these steps:

1. Start the Problem Diagnosis server.
2. NetPath probes start automatically. It may take a few minutes before the Problem Diagnosis server has access to all NetPath probes.
3. Launch Problem Diagnosis in one of two ways:
   - from your web browser, by entering the URL for your Problem Diagnosis server .
   - from HP OpenView Network Node Manager , which launches your web-browser automatically.

Either way, the Problem Diagnosis applet starts running.

See Web-based User Interface Technical Requirements on page 68 for important information about your web browser and Java!

Tour of the Problem Diagnosis User Interface

There is a difference in the way Problem Diagnosis starts up, depending on how you launch it:

- When you start from your web browser, the Problem Diagnosis main window opens. Here, you choose the Trek Type and Trek Endpoints you want:
  - This is the main window set to run a NetPath trek. The endpoints for NetPath treks are configured into the probe.
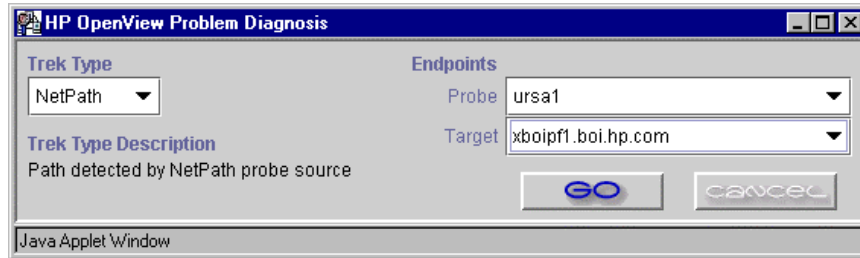
- This is the main window set to run a ShowPath trek. The endpoints for ShowPath treks are either entered directly or selected in the NNM interface.
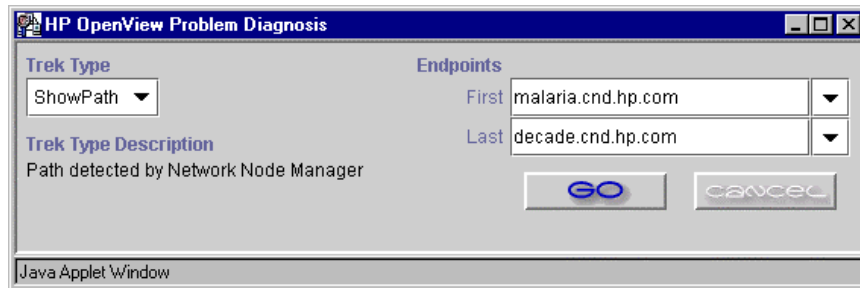
Then you click the **GO** button to proceed. At this point, the **GO** button is disabled (**GO**) while you wait—there is considerable background activity, so be patient for the results of the trek to come in. (You can **CANCEL** at any time if you change your mind.) The result depends on the trek type you selected:

- A ShowPath trek detects the current path between the endpoints, and opens the ShowPath Details window to the ShowPath Map of that path. It displays a map of the path between the endpoints.

- For NetPath treks, you get a table listing the known paths between the two endpoints. This table is appended to the bottom of the main window, like this. You can then double-click on one of the paths to open the NetPath Details window, with the NetPath Map of the selected path.

- When you launch Problem Diagnosis from NNM, you skip over the Problem Diagnosis main window, and go directly to the ShowPath Map displaying the path between the nodes chosen in NNM.

About NetPath and ShowPath

Problem Diagnosis has two primary sources of path data (and so two types of "treks")

NetPath Probe

With NetPath, you see path maps and tables based on topology data supplied by Problem Diagnosis NetPath probes. NetPath probes can reside anywhere in the network, and can be configured to collect path information to anyplace else in the network.

ShowPath and NNM

With ShowPath, you see network maps and tables based on topology data supplied by Network Node Manager (NNM). The Problem Diagnosis server and NNM must reside on the same system. Problem Diagnosis and NNM must be configured to communicate (see Integrating Problem Diagnosis with Network Node Manager on page 38), and NNM must be running for ShowPath to work.

When you use Problem Diagnosis, you have a choice of which data source to use. Both generate path information, but in somewhat different ways. Each has its advantages and limitations; the features of one tend to be absent in the other. This table summarizes the differences between ShowPath and NetPath.

	Can	**Can *Not***

ShowPath	**+** Show the current path between any two endpoints that are
	  A) both in the NNM topology, and
	  B) both up and reachable via SNMP
	  C) neither one a hub nor a bridge
	+ Show all interfaces between hops
	+ Show IP-layer 2 devices (switches, hubs, etc., but reliability varies)
	+ Show status of hops
		- Show path utilization statistics
		- Show current ping rates along path
		- Show baseline of ping rates

NetPath	**+** Show a path from where the probe resides to any reachable destination (firewalls can make some hosts unreachable) **+** Show path utilization statistics **+** Show current ping rates **+** Show baseline of ping rates **+** Send events to subscribers (like HP OpenView VPO and/or VPW) if a path becomes unreachable, path changes, etc. **+** Show status of hops using ping **NOTE:** Once NetPath has determined path data, the destination does not have to be currently up (or reachable) to see the historical path(s)	**-** Show a path from any arbitrary two endpoints **-** Show outbound interfaces (from `ping`'s perspective) except on the probe's host **-** Show IP-layer 2 devices (switches, hubs, bridges, etc.)

Deploying NetPath Probes

In a default installation, a NetPath probe is assigned to serve a single Problem Diagnosis server.

However, a NetPath probe can be used by multiple Problem Diagnosis servers. In this illustration, the probe named `Daedalus` is used by both servers (`Minotaur` and `Aeolus`).

Conversely, a Problem Diagnosis server can use multiple NetPath probes. In this illustration, the Problem Diagnosis server named `Aeolus` uses two probes: `Daedalus` and `Icarus`.
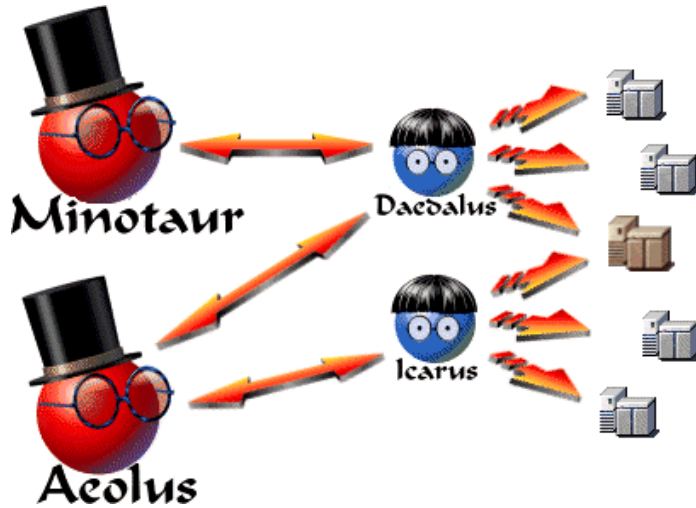
To accomplish either (or both) of these deployment choices requires some custom configuration. See Linking the Server to a NetPath Probe on page 26 or Linking the NetPath Probe to a Server on page 33.

Notice, too, that a host (like the middle, brown one in this illustration) can be the target of more than one probe.

And of course you can use any server by merely entering its URL in your web-browser. See Starting the User Interface on page 24 for details.

Partial Paths: NetPath

A "Partial Path" from NetPath deserves special consideration. When NetPath runs a trace against a configured target, several things can happen:

- If the destination is not reachable from the NetPath probe, a partial path is all that can be found. The trace inevitably reaches a point where time-outs recur, because a device that is expected to respond never does. NetPath translate each time-out into a `TIMED_OUT` symbol on the NetPath map, like the one shown here. If the final symbol on a NetPath map is a `TIMED_OUT` symbol (frequently preceded by other `TIMED_OUT` symbols), it means the destination could not be reached. There is a parallel series of `TIMED_OUT` entries in the NetPath Path Detail panel, for exactly the same reasons.

- One of the routers on the path may be down, too busy to respond, or configured to silently drop expired packets. In any of these cases, the NetPath probe waits for a response, and when one does not arrive in time, it marks that device as `TIMED_OUT`. It is entirely possible that the device is working properly, and that the next hop in the trace succeeds. This is *not* a partial path.

- If the maximum time-to-live is set too low (see NetPath Probe Configuration on page 52), the trace may time out before reaching the destination. This is a partial path, in that it does not include the destination. No errors are necessary for this to occur, however, and the destination may still be reachable if the time-to-live is increased.

Partial Paths: ShowPath

When you request ShowPath to present a path between two known devices, it is entirely possible that there is currently no connectivity between them.

The behavior of ShowPath in this case is fairly predictable:

1. It announces that the path it found is not a full path between the requested endpoints.
2. It then presents as much of the path as is possible. The final node on the path is not the requested endpoint node, but rather the last node that could be reached in the path.

Limitations and Oddities

Known Limitations

These are the limitations and special behaviors in this release of Problem Diagnosis. Categories include:

- General notes
- Install notes
- ShowPath notes
- NetPath notes
- CLASSPATH conflict

General Notes

- This release of Problem Diagnosis is supported under English, Japanese, and German.
- In some circumstances, the Problem Diagnosis server triggers a stack trace (visible in the Java console and/or the server error log) when the browser is exited. The exception is non-fatal, and is ignored. The operation of the server is not affected.

Sometimes a DNS name resolves to multiple hosts, as in the case of a web farm. To improve performance, web farms and similar scenarios distribute incoming requests to one of an array of hosts, always choosing the least-busy host. For example, the DNS name of `www.yahoo.com` does not refer to just one host. At this writing, `www.yahoo.com` resolves to at lease eight different IP addresses. The final host (the one that is assigned to respond to your query) responds with its IP address, and *not* the generic DNS name. In a case like this, the map and tables that Problem Diagnosis displays include the DNS name or IP address of the final host, which is not necessarily the name you selected for the target. This kind of name discrepancy can also occur if the target name is aliased.

- **Windows systems only:** If HP OpenView VPIS is also installed on the same system as NNM, and if it was installed before NNM, you may have problems with the Problem Diagnosis/NNM integration. A symptom of this confict is an error message similar to this (depending on your JRE):

  The procedure entry point `??1List@@UAE@XZ` could not be located in the dynamic link library `ovutil.dll`.

To solve this problem follow these steps:

Windows NT:

1. Right-click on the `My Computer` desktop icon, and choose the `Properties` menu item.

2. Click on the `Environment` tab.

3. Find the System Variable named `Path`, and edit its Value so that the NNM `bin` directory (e.g. `C:\Program Files\HP OpenView\nnm\bin`) comes *before* the VPIS `bin` directory (e.g. `C:\rpmtools\bin`).

4. Click `Apply`, then `Close`.

Windows 2000:

1. Right-click on the `My Computer` desktop icon, and choose the `Properties` menu item.

2. Click on the `Advanced` tab.

3. Click on the `Environment Variables` button.

4. Find the System Variable named `Path`, and edit its Value so that the NNM `bin` directory (e.g., `C:\Program Files\HP OpenView\nnm\bin`) comes *before* the VPIS `bin` directory (e.g., `C:\rpmtools\bin`).

5. Click `Apply`, then `Close`.

Install Notes

- You must have a Java 1.2 or later Java Runtime Environment (JRE) in the `PATH` on your system. The JRE must be an international version if you are operating in a non-English environment. If not, the installer may abort without any message, or it may send a message to `STDOUT` stating that no JRE could be found.

- The installer can not use the JRE from Symantec. You must have a different JRE in the `PATH` ahead of the Symantec JRE.

- **Windows only:** You can not install one component (server or probe) and then later install the other. If you want to install both components on one system, use the `Custom` button on the installer to install both components at once. If you *must* install one component after the other, first uninstall the existing component (your data and configuration will be saved), and then install both components simultaneously.

ShowPath Notes

- Neither endpoint of a ShowPath trek can be a Layer 2 device, as defined by NNM. That is, neither endpoint can have its NNM `isHub` or `isBridge` object attribute set `TRUE`. NNM must also have SNMP access to both.

- Node names must be fully qualified (i.e., `grinch.cnd.hp.com`, not just `grinch`).

- In order for ShowPath to find a path that crosses router boundaries, the underlying NNM *must* have SNMP access to every router in the path. Therefore, it is very helpful to Problem Diagnosis if NNM has SNMP access to every router in the domain it manages.

- An inaccuracy occurs when the `ovwid` attribute of an object is zero, or when it does not support SNMP communication. In these situations, Problem Diagnosis assumes its device type to be HOST, which is not always true.

- Sometimes Problem Diagnosis cannot obtain any ShowPath information on the path whose starting and ending nodes have been specified. When this happens, an error message is displayed in the GUI which lists one of several possible causes:

  - Network Node Manager is not running.

  - Our attempt to programmatically load the activeRoute library (`libactiveRoute.sl` on HP-UX, `libactiveRoute.so` on Solaris, or `activeroute.dll` on Windows) failed.

  - `nnmPath` returns null, meaning that no ShowPath data was available from Network Node Manager.

  - The specified starting node does not respond to SNMP queries.

  - ShowPath could not open the NNM database.

NetPath Notes

- When you first install a probe, the associated server should be running. If it is not, *and* if it is not started within an hour of the probe's installation, then it may take up to an hour after the server *is* started for it to establish communications with the probe. You can eliminate this lag by stopping and restarting the probe after starting the server.

- A default gateway must be permanently configured for any system that hosts a NetPath probe. If the default gateway is not set, you will see routing loop error messages when no such loop necessarily exists (click the `Trek Error Log` button for details).

- A NetPath trek whose endpoints are the same device (e.g., `rantrave.diatribe.com` to `rantrave.diatribe.com`) has unpredictable results. Don't do that.

- **Windows only:** The NetPath probe depends on the `tracert.exe` and `ping.exe` that are part of the Windows distribution (*<system_directory>*/`system32`). Other versions of these utilities are like to cause errors in the NetPath probe.

- **Windows only:** On some systems, running the NetPath probe as a service has been seen to cause the screen-saver to stop working. This can be a security hazard if the computer will not lock when unattended. If this happens, you may want to run the probe in "stand-alone" mode rather than as a service.

To remove the NetPath probe from the Windows services (or add it back), use these menu items:

- `Start->Programs->HP OpenView->Problem Diagnosis->Probe->Remove from Services`
- `Start->Programs->HP OpenView->Problem Diagnosis->Probe->Add to Services`

To run the NetPath probe in stand-alone mode, issue the following commands from a command window prompt (steps assume the default installation directory):

1. `C:`
2. `cd /<Program Files>/HP OpenView/pd/netpath/bin`
3. `npprobe.bat -runnosrv`

- **HP-UX only:** Occasionally when you start the probe configuration applet, the window does not open correctly. It displays only a title bar and the "Applet Window" warning message. If this happens, just drag the corner to enlarge the window; the content will be displayed correctly.

CLASSPATH Conflict

- In some situations, your system's Java `CLASSPATH` environment variable can cause problems starting or running any Java-based interface in Problem Diagnosis. Typical symptoms of this are:

  - The Problem Diagnosis application window fails to launch, and the browser status line reads "`Applet not inited`".
  - Netscape gives errors when you try to raise the "Online Help", and the navigation panel in the help window is blank.

If you see these symptoms (or other unexplained failures in the Java interfaces), you should run Problem Diagnosis under a shell with an empty `CLASSPATH`, as follows:

UNIX®:
1. Open a new terminal window.
2. Type: `export CLASSPATH=""`
3. Type: `netscape &`
4. Start Problem Diagnosis from the resulting browser as usual.

Windows:
1. Open a command window (`Start->Programs->Command Prompt`).
2. Type the following command: `set CLASSPATH=""`
3. Start Problem Diagnosis by launching your browser *from this command window!* Under default installations, the commands to launch Netscape and Internet Explorer are:

   - Netscape: `"C:\Program Files\Netscape\ Communicator\Program\netscape.exe"`
   - Internet Explorer: `"C:\Program Files\Plus!\ Microsoft Internet\iexplore.exe"`

See also Mozilla Home Setting on page 17 for a similar issue.

Mozilla Home Setting

- On UNIX systems there are conditions under which the Problem Diagnosis applets and/or Online Help will not launch correctly in Netscape. If you have trouble of this kind, follow these steps:

  1. Exit from Netscape.

  2. Enter: `export MOZILLA_HOME=`*<Netscape_Installation_Directory>*

  3. Restart Netscape.

  4. Restart Problem Diagnosis.

- See also CLASSPATH Conflict above for a similar issue.

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Java Oddities

As you may already be aware, Java is still maturing as a technology. During this process of maturation, there remain some minor instabilities or, more generously put, "quirks" that you may want to be aware of. Below are some examples. With the exception of the CLASSPATH conflict issue, the workarounds are very simple.

- The following can occur on Windows platforms whose Display settings have "Show window contents while dragging" turned on: Suppose you are using NetPath. If you drag the Main window after pressing the GO button—but before the path list appears—the resulting path list is obscured. It is actually present, but you have to drag the bottom border of the window down to see it. This only seems to occur if you have turned on the "Show window contents while dragging" display option in your Windows configuration. If this Java quirk is too annoying, turn off this Windows option.

- The GO and CANCEL buttons in the Main window may randomly change colors. This seems to occur commonly when another window overlays the left side of the Main window and bisects the GO button vertically. This problem has only been seen on Windows systems, and the culprit is actually the video display driver. If you switch to another Display/Settings/Color Palette value, the problem should disappear. In one case, using the "16777216 Colors" setting caused the problem, but switching to the "65536 Colors" setting solved it.

- After you press GO, the button is disabled (GO) until the results of your request are available. Depending on the Java plug-in and the platform you are using, you may or may *not* see a "Busy" cursor (something like ⌛or 🕐) during this period to indicate that your request is being serviced. If the "Busy" cursor does not appear, you should assume that Problem Diagnosis is working, and will shortly return the results of your request.

- **HP-UX only:** Occasionally when you start the probe configuration applet, the window does not start correctly. It displays only a title bar and the "Applet Window" warning message. If this happens, just drag the corner to enlarge the window; the content will be displayed correctly.

- As noted under Known Limitations — and repeated here because it is a Java quirk — in some situations, your system's Java CLASSPATH environment variable can cause problems starting or running any Java-based interface in Problem Diagnosis. Typical symptoms of this are:

  - The Problem Diagnosis application window fails to launch, and the browser status line reads "Applet not inited."

  - Netscape gives errors when you try to raise the "Online Help," and the navigation panel in the help window is blank.

If you see these symptoms (or other unexplained failures in the Java interfaces), you should run Problem Diagnosis under a shell with an empty CLASSPATH, as follows:

UNIX®:

1. Open a new terminal window.

2. Type: `export CLASSPATH=""`

3. Type: `netscape &`

4. Start Problem Diagnosis from the resulting browser as usual.

Windows:

1. Open a command window (`Start->Programs->Command Prompt`).

2. Type the following command: `set CLASSPATH=""`

3. Start Problem Diagnosis by launching your browser *from this command window!* Under default installations, the commands to launch Netscape and Internet Explorer are:

   - Netscape: `"C:\Program Files\Netscape\Communicator \Program\netscape.exe"`

   - Internet Explorer: `"C:\Program Files\Plus!\Microsoft Internet\iexplore.exe"`

Problem Diagnosis Tasks

Installing Problem Diagnosis

Installing Problem Diagnosis Software

License Upgrade Note: There are different instructions if you are upgrading to a permanent license after using an evaluation copy of Problem Diagnosis.

There are two separate installations to perform:

- Installing the Problem Diagnosis Server, which happens once on the host system for the Problem Diagnosis server.

- Installing the Problem Diagnosis NetPath probe(s), which happens on every system that hosts a probe.

> **Important!** To run Problem Diagnosis, *your system must be up-to-date with regard to the Java run-time environment (JRE), Java browser plug-ins, and* (for UNIX® users) *system patches*. Check the technical requirements of the Problem Diagnosis server and web-based user interface, as well as the requirements of the NetPath probe before installing this product. For details, see "Server Technical Requirements" on page 66.
>
> **Windows Note:** You can not install one component (server or probe) and then later install the other. If you want to install both components on one system, use the `Custom` button on the installer to install both components at once. If you *must* install one component after the other, first uninstall the existing component (your data and configuration will be saved), and then install both components simultaneously.

NOTE: Because the Problem Diagnosis user interface is a Java applet, it is not installed on the client system. Instead, the applet downloads from the Problem Diagnosis server.

Installing the Problem Diagnosis Server

An automated installation package in the Problem Diagnosis distribution guides you through the installation process on the HP-UX, Sun Solaris, or Microsoft Windows system that will host the Problem Diagnosis server:

UNIX®:
1. Mount the CD-ROM drive, insert the Problem Diagnosis CD-ROM, and `cd` to it.
2. Enter: `sh install.bin`
3. Follow the on-screen instructions. Choosing a "`Custom`" installation installs the Problem Diagnosis server and NetPath probe in one pass.

Windows:
1. Insert the Problem Diagnosis CD-ROM in the CD-ROM drive.
2. Double-click on the `MyComputer` desktop icon, then double-click on the drive-letter representing your CD-ROM drive.

3. Double-click on the `Setup.exe` icon.

4. Select a language.

5. Follow the on-screen instructions. Choosing a "`Custom`" installs the Problem Diagnosis server and NetPath probe in one pass.

Be sure to choose the JRE you want to use; no default JRE is chosen (even if you have only one). If you have not installed a Java Runtime Environment or Java Plug-in, the installation will not proceed. See Installed Files on page 62 for details.

The server uses ports 9085 and 9086 to communicate with the NetPath probes. HP recommends you accept this default if at all possible. Any probe accessed by a server that uses a non-default port must be configured to accommodate this, and its data will not be available to any server that uses another (such as the default) port.

If you *must* configure the Problem Diagnosis server to use a different port, follow the special instructions in the appendix *Configuring the Server Port*.

Installing Probes

An automated installation package in the Problem Diagnosis distribution guides you through the installation process on the HP-UX, Sun Solaris, or Microsoft Windows system of your choosing. Consider installing NetPath probes in key locations in the network, where they can monitor crucial paths.

During installation you assign the probe to a Problem Diagnosis server by providing the following information about the server:

- DNS name

- IP address

- HTTP port. This is the port that the Problem Diagnosis server (which you have just identified) uses. The default is `9085`, and HP recommends that you accept this default. If you *must* configure the Problem Diagnosis server to use a different port, follow the special instructions in the appendix "Configuring the Server Port". See also the online help, which may have the most current instructions.

The NetPath probe starts immediately, and is configured to run automatically at startup.

Disabling the Probe

You can disable an installed probe, so that it does not run automatically at system startup.

UNIX®

To disable the NetPath probe automatic startup, follow these steps:

HP-UX:
1. Enter: `cd /opt/OV/pd/netpath/bin`

2. Enter: `./npprobe.sh -stop`

3. Enter: `mv /sbin/rc3.d/S750Netpath` *<savedRCfile>*

Solaris:
1. Enter: `cd /opt/OV/pd/netpath/bin`

2. Enter: `./npprobe.sh -stop`

3. Enter: `mv /etc/rc3.d/S750Netpath` *<savedRCfile>*

After these steps, the NetPath probe will *not* automatically start on system startup.

Windows

The NetPath probe is installed as a Windows service. Use this menu item to disable the NetPath probe automatic startup:

- `Start->Program Files->HP OpenView->Problem Diagnosis->Probe->Remove from Services`

After this, the NetPath probe will not automatically start on system startup. Note that this does *not* stop an already running probe.

Removing the probe from the Windows services does *not* remove the software from the system, and you can restore the probe's automatic startup using this command:

- `Start->Program Files->HP OpenView->Problem Diagnosis->Probe->Add to Services`

See Installed Files on page 62 for details about the results of probe installation.

Uninstalling Problem Diagnosis Software

You can easily remove Problem Diagnosis components from a system (the server and probe at once). The method you use depends on your platform (UNIX® or a Windows system).

UNIX®:	Enter: `/opt/OV/pd/bin/Uninstall.sh`
Windows (NT and 2000):	1. Click on `Start->Programs->HP OpenView->Problem Diagnosis->PD Server - Stop`
	2. Click on `Start->Programs->HP OpenView->Problem Diagnosis->Uninstall Problem Diagnosis`

> **IMPORTANT**: The above removes all Problem Diagnosis components. You cannot remove the probe and keep the server, or remove the server and keep the probe. You can, however, disable probe functionality and keep the server active. There is actually no need to remove the probe or its data (which together occupy under a megabyte of storage).

To disable the probe, follow these steps:

Platform	Instructions
HP-UX	1. Enter: `cd /opt/OV/pd/netpath/bin` 2. Enter: `./npprobe.sh -stop` 3. Enter: `mv /sbin/rc3.d/S750Netpath` *<savedRCfile>* You can later restore the probe: a. Enter: `mv` *<savedRCfile>* `/sbin/rc3.d/S750Netpath>` b. Enter: `cd /opt/OV/pd/netpath/bin` c. Enter: `./npprobe.sh -start`
Solaris	1. Enter: `cd /opt/OV/pd/netpath/bin` 2. Enter: `./npprobe.sh -stop` 3. Enter: `mv /etc/rc3.d/S750Netpath` *<savedRCfile>* You can later restore the probe: a. Enter: `mv` *<savedRCfile>* `/etc/rc3.d/S750Netpath` b. Enter: `cd /opt/OV/pd/netpath/bin` c. Enter: `./npprobe.sh -start`

Platform	Instructions
Windows NT	1. Click on the `Start->Settings->Control Panel` menu item. 2. In the Control Panel window, double-click on the `Services` icon. 3. Select the NetPath service, and click on the `Stop` button. 4. Click on `Start->Programs->HP OpenView->Problem Diagnosis->Probe->Remove from Services` You can later restore the probe: a. Click on `Start->Programs->HP OpenView->Problem Diagnosis->Probe->Add to Services` b. Reboot, or use the Control Panel as above to start the probe.
Windows 2000	1. Right-click on the `My Computer` desktop icon, and choose the `Manage` menu item. 2. In the navigator pane, double-click on `Services and Applications` 3. Double-click on `Services` 4. In the details pane, select the NetPath service, and click on the `Stop` button in the applet tool bar. 5. Click on `Start->Programs->HP OpenView->Problem Diagnosis->Probe->Remove from Services` You can later restore the probe: a. Click on `Start->Programs->HP OpenView->Problem Diagnosis->Probe->Add to Services` b. Reboot, or use the `My Computer - Manage` utility as above to start the probe.

Upgrading to a Permanent License

If you have been using an evaluation copy of Problem Diagnosis, you can easily upgrade to a full, permanent license. First, purchase a licensed copy of Problem Diagnosis. Then, with the media you receive, do the following (all steps assume you used the default installation directory; if not, modify the instructions as needed):

UNIX®:

1. Mount the CD-ROM drive, and insert the Problem Diagnosis media.

2. Enter: `cp /UpgradeLicense/license.dat /opt/OV/pd/conf/license.dat`

Windows:

1. Insert the Problem Diagnosis media in the CD-ROM drive.

2. Copy the license file from the CD-ROM `\UpgradeLicense\license.dat` to its correct directory `C:/Program Files/HP OpenView/pd/conf/license.dat` using the Windows Explorer, or from a command window prompt, enter the following (quotes required):
   `copy \UpgradeLicense\license.dat "C:/Program Files/HP OpenView/pd/conf/license.dat"`

Starting the User Interface

Once installed and configured, Problem Diagnosis is very simple to operate. Follow these steps:

1. Start the Problem Diagnosis server that you will connect with, if it isn't already running.

2. Start all NetPath probes for that server, if they aren't already running. It may take a few minutes before Problem Diagnosis has access to all NetPath probes.

3. Access the Problem Diagnosis web-based user interface manually as follows:

   a. Bring up a Netscape (4.72 or later) or Internet Explorer (5.0 or later) browser window.

   b. Enter the following URL: `http://[Problem Diagnosis server]:[port]/` For example: `http://robot.cnd.hp.com:9085/`

4. You can also launch Problem Diagnosis from NNM (HP OpenView Network Node Manager).

> **Note:** See Web-based User Interface Technical Requirements on page 68 to ensure that your system is able to run the Problem Diagnosis applets.

See also CLASSPATH Conflict on page 16.

Server Tasks

Starting and Stopping the Server

The commands for starting and stopping the Problem Diagnosis server differ slightly according to the platform (Windows or UNIX®) it is on.

On Windows Systems

- To *start* the Problem Diagnosis server, click on `Start->Programs-> HP OpenView->Problem Diagnosis->PD Server - Start`

- To *stop* the Problem Diagnosis server, click on `Start->Programs-> HP OpenView->Problem Diagnosis->PD Server - Stop`

On UNIX® Systems

- To *start* the Problem Diagnosis server, enter `/usr/local/bin/ovpdstart`

- To *stop* the Problem Diagnosis server, enter `/usr/local/bin/ovpdstop`

UNIX® note: The first time the Jakarta Tomcat web server is started, several files are created. Because these files are used during subsequent startups, their ownership and access permissions determine who can run the server. For example, if the web server is first started under the `root` login, only users with `root` -level privilege can start it later. Any attempt to start the server by a user with lesser privileges generates file access violations.

Permissions on the following files determine who can start the Problem Diagnosis server:

- `/opt/OV/pd/app-server/conf/tomcat-apache.conf`
- `/opt/OV/pd/app-server/conf/iis_redirect.reg-auto`
- `/opt/OV/pd/app-server/conf/obj.conf-auto`
- `/opt/OV/pd/app-server/conf/mod_jk.conf-auto`
- `/opt/OV/pd/app-server/conf/uriworkermap.properties-auto`
- `/opt/OV/pd/app-server/logs/jasper.log`
- `/opt/OV/pd/app-server/logs/servlet.log`
- `/opt/OV/pd/app-server/logs/tomcat.log`
- `/opt/OV/pd/app-server/webapps/zephyr/conf/probeList.xml`

To solve start-up privilege problems, you have two choices:

- You can delete these files, and then restart the Problem Diagnosis server as a user that has the desired privilege. The server will then recreate these files with that user's permissions. It can take up to an hour for the server to resynchronize with its probes.

- You can change the file ownership and/or permissions to achieve the desired privilege. This approach is probably better if you have manually linked the server to additional probes.


Linking the Server to a NetPath Probe

As you install a NetPath probe (like `Icarus` in this illustration), you assign it to a Problem Diagnosis server (like `Aeolus` in this illustration). The two transparently establish the configuration necessary to communicate, and `Icarus` automatically shows up in the NetPath probe list on `Aeolus`.
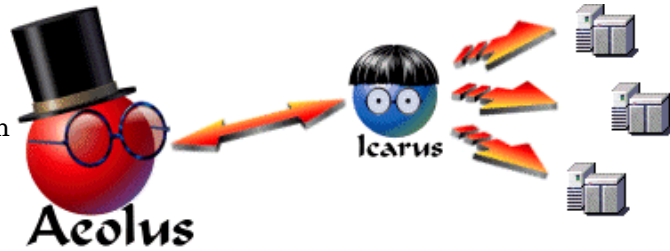
However, a Problem Diagnosis server can get path data from *any* NetPath probe, providing the server is configured to know about the probe, as shown below.

There are two ways to establish communications between a server (like `Aeolus`) and a probe (named, let's say, `Daedalus`) that was *not* initially assigned to that server.

- You can add the probe (`Daedalus`) to the list of probes the server (`Aeolus`) knows of. This method is most useful when you want a server to know about several probes that it could draw data from; that is, when you have one server that will use many probes. This is the method described below.
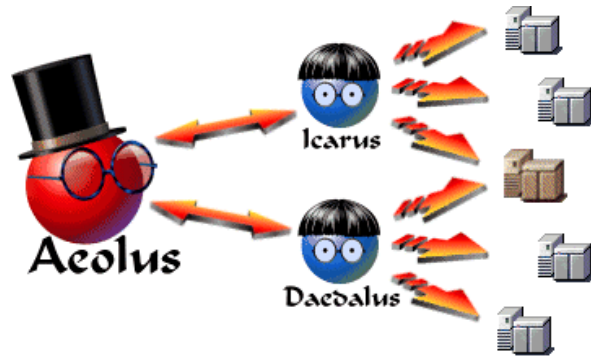
- Alternatively, you can configure the probe (on `Daedalus`) to notify the server (`Aeolus`) of its existence, and let the server reconfigure itself. This method is most useful when you want a probe to know about several servers that it provides data to; that is, when you have one probe to be used by many servers. This approach is covered in Linking the NetPath Probe to a Server on page 33.

Procedure

There are two steps to configure the server like `Aeolus` to contact a probe like `Daedalus` which was assigned to a different server when it was installed:

1. Manually edit the probe-list XML file, which defines which probe(s) the server can use. This file is located as follows (assuming a default installation):

   UNIX: `/opt/OV/pd/app-server/webapps/zephyr/conf/probeList.xml`

   Windows: `C:\<Program Files>\HP OpenView\pd\app-server\webapps\zephyr\conf\probeList.xml`

   You can edit this XML file even if you have no experience with XML, but it requires accuracy; mistakes in the probe-list XML file can cause the Problem Diagnosis server to not work correctly with NetPath treks. **HP strongly recommends that you make a backup copy of the probe-list XML file before editing, so that you can easily recover if necessary.** (If you have no such file on your system, see "Missing Probe-list XML File" on 28.):

   The probe-list XML file on `Aeolus` initially looks like this:

   ```
   <?xml version= "1.0" standalone="yes" ?>
   <!DOCTYPE CfaProbeConfig>
   <CfaProbeConfig>
     <ProbeList>
         <Probe>
           <Source> Icarus.naucrates.com </Source>
           <Port> 9876 </Port>
         </Probe>
     </ProbeList>
   </CfaProbeConfig>_
   ```

   The four lines in bold text create a "Probe Definition", which identifies `Icarus` as hosting a probe that the `Aeolus` server can use. You can use more probes by adding additional Probe Definitions. Probe Definitions *must* fall between the `<ProbeList>` and `</ProbeList>` tags, and they **can not** overlap.

   The port must be the port used by the server. The default is `9876`; if this does not work, check the probe's `npprobe.conf` file to see what port it is configured to use.

   In the example file above, you can add access to another probe (`Daedalus`) by inserting the following lines in the probe-list XML file on `Aeolus`:

   ```
   <Probe>
     <Source> Daedalus.naucrates.com </Source>
     <Port> 9876 </Port>
   </Probe>
   ```

The resulting file looks like this:

```
<?xml version= "1.0" standalone="yes" ?>
<!DOCTYPE CfaProbeConfig>
<CfaProbeConfig>
   <ProbeList>
      <Probe>
          <Source> Icarus.naucrates.com </Source>
          <Port> 9876 </Port>
      </Probe>
      <Probe>
          <Source> Daedalus.naucrates.com </Source>
          <Port> 9876 </Port>
      </Probe>
   </ProbeList>
</CfaProbeConfig>_
```

2. After saving the probe-list XML file, stop and restart the `Aeolus` server to activate the changes. Allow several minutes for the probe and server to synchronize.

When you access `Aeolus` and select a trek type of NetPath, you can now choose to use either `Icarus` or `Daedalus` as the probe.
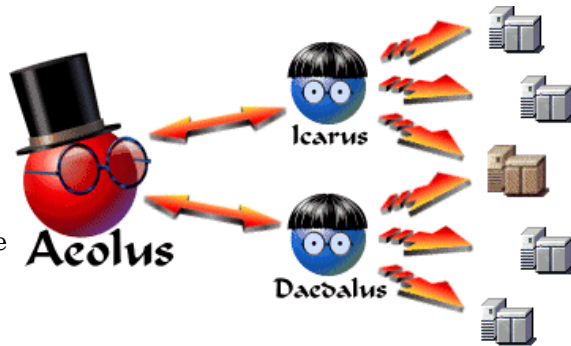
Missing Probe-list XML File

The probe-list XML file is created when a probe is installed and assigned to the server. Until that happens, there is no probe-list XML file.

If you create the file yourself, be sure to include all the non-bold lines from the first example on this page, as well as the desired Probe Definition, as described in this topic.

Add New Popup Actions

You may want to extend the functionality of Problem Diagnosis by creating additional actions for users to invoke on selected devices.

The `action.xml` File

The Problem Diagnosis `action.xml` file contains command information used in creating a right-click popup menu for each device in a map or table. You may need to modify this file so that it contains valid settings for your system, or to add additional actions to the popup menu. By default, the file resides in:

  UNIX: `/opt/OV/pd/app-server/webapps/zephyr/conf`

  Windows: `C:\<Program Files>\HP OpenView\pd\app-server\webapps\zephyr\conf`

Each entry in the `action.xml` file looks similar to this:

```
<Action>
<Command>netstat</Command>
<Arguments> -a</Arguments>
<PostArguments> </PostArguments>
<Path>/bin/</Path>
<Timeout> 0 </Timeout>
</Action>
```

Here are some simple guidelines for modifying the `action.xml` file:

- `<Command>` contains the name of a command that will appear in the Problem Diagnosis right-click menu. This command, with its arguments and path information, is executed when the corresponding selection is made in the right-click menu. Command results are displayed in Problem Diagnosis dialog boxes. You can add any command you want to the Problem Diagnosis right-click menu.

- `<Arguments>` contains arguments that *precede* the host name that is the target of the command specified for this action. This field should be left empty if no arguments are required.

- `<PostArguments>` contains arguments that *follow* the host name that is the target of the command specified for this action. This field should be left empty if no arguments are required. `<PostArguments>` is especially useful on HP-UX systems.

- `<Path>` contains the correct path to the command executable on your system. E.g., in the sample above, `netstat` resides in `</bin>`. Don't forget to include a trailing "/" (e.g. `/bin/`) when providing path information. Leave this field empty if the path to the command executable is already in your PATH.

- `<Timeout>` contains the time, in milliseconds, within which the command must return a result. If the time elapses without a result, the Problem Diagnosis server cancels the command. However, setting this value to 0 tells the Problem Diagnosis server to wait indefinitely.

IMPORTANT: If, after editing the `action.xml` file (or any of the XML files), your changes are not reflected in the Problem Diagnosis right-click menu, clear the browser's cache and shut down the browser. Then, restart it, and launch Problem Diagnosis again.

If your changes *still* don't appear, one of the servers on your network may be caching a copy of the old XML file. To circumvent this, clear the browser cache again, disable the proxy server setting on your browser, and then close the browser window. Then, restart it, and launch Problem Diagnosis again. After a successful initiation, remember to re-enable the proxy server setting on your browser.

Probe Tasks

Starting and Stopping the Probe

Note: If you are running an HP OpenView VantagePoint product (VP Operations or VP Windows), ignore this topic. The VantagePoint software controls starting and stopping the NetPath probe (which is managed as a sub-agent).

The commands for starting and stopping the probe differ according to the platform (Unix, Windows NT, or Windows 2000) it is on.

On Unix Platforms

NOTE: The `npprobe.sh` command must run *inside* the NetPath probe's `bin` directory.

To start the NetPath probe, execute the following commands:

1. `cd /opt/OV/pd/netpath/bin`
2. `./npprobe.sh -start [-debug]` The `-debug` option turns on debug output. This generates a large amount of log output, and should only be used to troubleshoot a known problem.

To stop the NetPath probe, execute the following commands:

1. `cd /opt/OV/pd/netpath/bin`
2. `./npprobe.sh -stop`

Warning: Do not force termination of the NetPath Java process (`kill -9`); doing so may cause irrevocable corruption of the probe data.

On Windows NT Platforms

The NetPath probe is installed as a service, which runs automatically at system startup. (See **Windows Services Note** below.)

To manually stop or start the NetPath probe service:

1. Click on the `Start->Settings->Control Panel` menu item.
2. In the Control Panel window, double-click on the `Services` icon.
3. Select the NetPath service, and click on the `Start` button or `Stop` button, as desired.

Warning: Do not use the Windows Task Manager to terminate the NetPath Java process! Doing so may cause irrevocable corruption of probe data.

On Windows 2000 Platforms

The NetPath probe is installed as a service, which runs automatically at system startup. (See **Windows Services Note** below.)

To manually stop or start the NetPath probe service:

1. Right-click on the `My Computer` desktop icon, and choose the `Manage` menu item.
2. In the navigator pane, double-click on `Services and Applications`
3. Double-click on `Services`
4. In the details pane, select the NetPath service, and click on the `Start` button or `Stop` button, as desired, in the applet tool bar.

Warning: Do not use the Windows Task Manager to terminate the NetPath Java process! Doing so may cause irrevocable corruption of probe data.

Windows Services Note

On some systems, running the NetPath probe as a service has been seen to cause the screen-saver to stop working. This can be a security hazard if the computer will not lock when unattended. If this happens, you may want to run the probe in "stand-alone" mode rather than as a service.

To remove the NetPath probe from the Windows services (or add it back), use these menu items:

- `Start->Programs->HP OpenView->Problem Diagnosis->Probe->Remove from Services`
- `Start->Programs->HP OpenView->Problem Diagnosis->Probe->Add to Services`

To run the NetPath probe in stand-alone mode, issue the following commands from a command window prompt (steps assume the default installation directory, and quotes are required):

1. `C:>`
2. `cd "/<Program Files>/HP OpenView/pd/netpath/bin"`
3. `npprobe.bat -runnosrv`

Configuring a Probe

Starting the Probe Configuration Utility

HP OpenView Problem Diagnosis includes a web-based probe configuration utility. To configure a probe, first start the probe configuration utility as follows:

1. Start the NetPath probe to be configured, and also a Problem Diagnosis server that uses this probe. These components must both be running before you can proceed.

2. Bring up a Java-enabled Netscape (4.72 or later) or Internet Explorer (5.0 or later) browser (See Web-based User Interface Technical Requirements on page 68).

3. Enter the following URL: `http://`*`<Problem Diagnosis server>`*`:`*`<port#>`*`/ProbeConfig.html` (For example: `http://robot.cnd.hp.com:9085/ProbeConfig.html`).

Using the Probe Configuration Utility

To set probe targets and collection parameters, use the probe configuration utility as follows:

1. In the "Select Probe" list, choose the location of the NetPath probe you want to configure. If the list is empty, no probes have been installed.

2. The "Domain ID" text is used to distinguish between duplicate IP addresses. You can leave the default ID in this box or create a unique one of your own for this domain.

3. Use the "Add" button to create an entry in the targets list. Double-click on the "target" field and edit it to contain the fully-qualified name of a destination node. NetPath will trace the paths to this node. Edit other fields in the entry as necessary; see the Probe Configuration Options table.

4. After adding all desired targets, click `Apply` or `OK`. Both buttons record your changes; `OK` closes the window, `Apply` keeps it open.

See NetPath Probe Configuration on page 52.

Linking the NetPath Probe to a Server

As you install a NetPath probe (like `Daedalus` in this illustration), you assign it to a Problem Diagnosis server (like `Minotaur` in this illustration). The two transparently establish the configuration necessary to communicate, and `Daedalus` automatically shows up in the NetPath probe list on `Minotaur`.

However, a NetPath probe can provide *any* Problem Diagnosis server with path data, if the server knows about the probe, as shown below.

There are two ways to establish communications between a server (named, let's say, `Aeolus`) and a probe that was *not* initially assigned to that server (like `Daedalus`).

- You can configure the probe (on `Daedalus`) to notify the server (`Aeolus`) of its existence, and let the server reconfigure itself. This method is most useful when you want a probe to know about several servers that it could send data to; that is, when you have one probe to be used by many servers. This is the method described below.
- Alternatively, you can manually add the probe (`Daedalus`) to the list of probes that the server keeps (on `Aeolus`). This method is most useful when you want a server to know about several probes that it could draw data from; that is, when you have one server that needs to use many probes. This approach is covered in Linking the Server to a NetPath Probe on page 26.
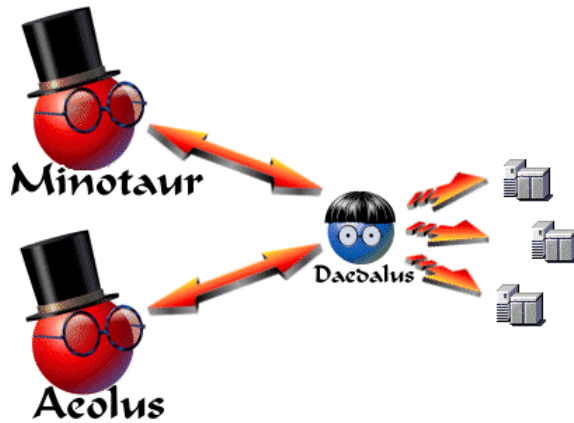
Procedure

There are two steps to make a probe like `Daedalus` (which was assigned to the server `Minotaur` when it was installed) notify another server (like `Aeolus`) of its existence:

1. Manually edit the probe configuration file (on `Daedalus`), which names the server it should notify when it initializes. The probe configuration file is located as follows:

   UNIX: `/opt/OV/pd/netpath/config/npprobe.conf`

   Windows: `C:\<Program Files>\HP OpenView\pd\netpath\config\npprobe.conf`

   Editing this file requires accuracy, because mistakes in the probe configuration file can cause the NetPath probe to not work correctly. **HP strongly recommends that you make a backup copy of the probe configuration file before editing, so that you can easily recover if necessary.**

   The uncommented part of the probe configuration file on `Daedalus` looks like this (assuming a Windows host):

   ```
   ARCHIVE_PATH=C:\Program Files\HP OpenView\pd\netpath\archive\
   BIN_PATH=C:\Program Files\HP OpenView\pd\netpath\bin\
   DATA_PATH=C:\Program Files\HP OpenView\pd\netpath\data\
   LOG_FILE=C:\Program Files\HP OpenView\pd\netpath\log\npprobe.log
   DOMAIN_ID=netpath
   TRACE_TRIES=2
   TRACE_WAIT=2
   PING_TRIES=2
   PING_WAIT=1
   MAX_MESSAGES=20
   SERVER=Minotaur.naucrates.com
   SERVER_IP=12.12.121.212
   SERVER_PORT=9085
   SNMP_COMMUNITIES=public
   Destination=webfarm.naucrates.com|1|60|0|161|||1|_
   ```

   The two lines in bold text identify the `Minotaur` server, which was the server specified when the `Daedalus` probe was installed. When the probe initializes, it notifies the server specified here of its existence. If necessary, the server adds `Daedalus` to its list of known probes.

   You can have the `Daedalus` probe notify *additional* servers (like `Aeolus`) of its presence as follows:

   Change the bolded lines in the `Daedalus` probe configuration file to identify another server. In the example file above, we can notify another Problem Diagnosis server (`Aeolus`) that `Daedalus` exists by changing the bolded lines in the probe configuration file on `Daedalus` to give the hostname and IP address of the `Aeolus` server, as follows:

   ```
   SERVER=Aeolus.naucrates.com
   SERVER_IP=12.12.112.121
   ```

Important: You modify the *existing* lines; do not add any additional lines! The resulting file looks like this (again, on a Windows host):

```
ARCHIVE_PATH=C:\Program Files\HP OpenView\pd\netpath\archive\
BIN_PATH=C:\Program Files\HP OpenView\pd\netpath\bin\
DATA_PATH=C:\Program Files\HP OpenView\pd\netpath\data\
LOG_FILE=C:\Program Files\HP OpenView\pd\netpath\log\npprobe.log
DOMAIN_ID=netpath
TRACE_TRIES=2
TRACE_WAIT=2
PING_TRIES=2
PING_WAIT=1
MAX_MESSAGES=20
SERVER=Aeolus.naucrates.com
SERVER_IP=12.12.112.121
SERVER_PORT=9085
SNMP_COMMUNITIES=public
Destination=webfarm.naucrates.com|1|60|0|161|||1|_
```

Important: A probe can only communicate with servers that use the port defined by that probe (9085 in this example). If you change the port used by a server, you have to reconfigure each probe that the server uses (via the SERVER_PORT definition in npprobe.conf) to use the new port,

2. After saving the changes, stop and restart the NetPath probe. This causes the probe to synchronize with its server. Because Aeolus has no previous knowledge of the probe on Daedalus, it adds Daedalus to its probeList.xml file (which is described in Linking the Server to a NetPath Probe on page 26). Once the Daedalus probe is added to the list of known probes on a server (like Aeolus), it remains on that list even if you repeat this process to add it to yet another server.
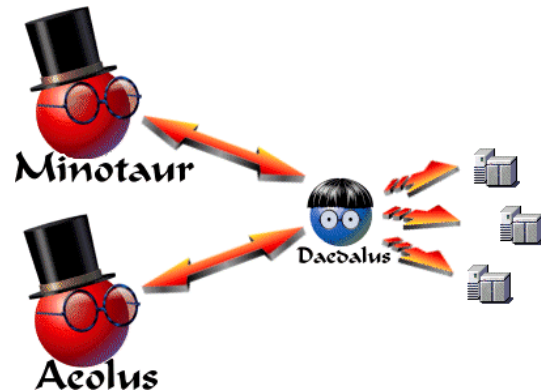
Allow a few minutes for the probe and server to synchronize.

At this point, both of the servers (Aeolus and Minotaur) can use the Daedalus probe to show path data.

Troubleshooting a Probe

Messages and errors from the probe are logged to
<PD_install_directory>/`netpath/log/npprobe.log`, which is always available for examination.

There is another optional step you can take should you encounter unexplained behavior or data from a NetPath probe.

Stand-alone Testing of Probe Function

If the web-based user interface is unable to contact the probe, or appears to display incorrect data, you need to verify the output at the probe system. You do this by issuing a command that simulates a request from the Problem Diagnosis user interface applet. The XML output of this request is dumped to standard out and can be quite large, so you should redirect the output to a file. The commands for this, including the redirect, are:

UNIX:
1. Enter: `cd /opt/OV/pd/netpath/bin`
2. Enter: `./npprobe.sh -stop`
3. Enter : `npprobe.sh -client -d {`*destination_name*`} > /tmp/dest.out`

Windows NT:
1. Click on the `Start->Settings->Control Panel` menu item.
2. In the Control Panel window, double-click on the `Services` icon.
3. Select the NetPath service, and click on the `Stop` button.
4. Click on the `Close` button.
5. In a command window, enter the following commands at a prompt (quotes required):
   a. `C:`
   b. `cd "/Program Files/HP OpenView/pd/netpath/bin"`
   c. `npprobe.bat -client -runnosrv -d {`*destination_name*`} > C:\temp\dest.out`

Windows 2000:
1. Right-click on the `My Computer` desktop icon, and choose the `Manage` menu item.
2. In the navigator pane, double-click on `Services and Applications`
3. Double-click on Service>
4. In the details pane, select the NetPath service, and click on the `Stop` button in the applet tool bar.
5. In a command window, enter the following commands at a prompt (quotes required):
   a. `C:`
   b. `cd "/Program Files/HP OpenView/pd/netpath/bin"`
   c. `npprobe.bat -client -runnosrv -d {`*destination_name*`} > C:\temp\dest.out`

If the probe responds properly by writing an XML data file, the issue resides in either the Problem Diagnosis server or the user interface applet. Otherwise, there may be a problem with the probe software; contact your product support representative.

If you run the NetPath probe manually, as just described, you may see an error code at the end of output lines, with the following meanings:

Code	Meaning
!N	Network unreachable
!H	Host unreachable
!P	Protocol unreachable

See also NetPath Notes on page 15.

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Integrating with HP OpenView

Integrating Problem Diagnosis with Network Node Manager

Problem Diagnosis can be integrated with HP OpenView Network Node Manager to provide instant access to path information. After integration, Problem Diagnosis has access to NNM's topology data via the "ShowPath" feature, and NNM users can easily launch Problem Diagnosis as part of a troubleshooting effort.

The "ShowPath" feature draws network maps using topology data supplied by Network Node Manager (NNM). The Problem Diagnosis server and NNM must reside on the same system, and NNM must be running for ShowPath to work.

You have to install the integration files into NNM before ShowPath is available in the NNM interface. See also ShowPath Notes on page 15.

Using Problem Diagnosis from the NNM User Interface

You can integrate HP OpenView Problem Diagnosis into the Network Node Manager user interface. This lets you launch Problem Diagnosis from NNM in two ways:

- Select two nodes on an NNM submap, open the "`Tools`" menu, and click the `Problem Diagnosis->OV PD ShowPath` menu item. Problem Diagnosis launches with ShowPath already displaying the path between the selected nodes.

  Neither endpoint of a ShowPath trek can be a hub or a bridge. Also, NNM *must* have SNMP access to both endpoints.

- From an Alarms Browser, select an alarm. Then open the `Actions` menu, and click the `Problem Diagnosis` menu item. Problem Diagnosis starts ShowPath, displaying the path between your NNM station and the source node listed in the selected alarm.

Note: Every time you launch Problem Diagnosis from NNM, a new instance of your browser starts running. This can result in many redundant copies of the browser running simultaneously. To avoid this, close the Problem Diagnosis applet and its host browser before launching Problem Diagnosis again.

Activating NNM Integration

Note: Remember that the Problem Diagnosis server and NNM must reside on the same host!

To integrate Problem Diagnosis into the NNM user interface, follow the steps below.

1. Find the Problem Diagnosis configuration and registration files in the Problem Diagnosis `newconfig` directory (assuming you used the default directory for installation):

    UNIX®:   `/opt/OV/pd/newconfig`

    Windows: `C:\<Program Files>\HP OpenView\pd\newconfig`

    Copy the following files to their correct directories, as follows (assuming NNM is installed in the default location):

    UNIX®:   `/etc/opt/OV/share/registration/C/ovprobdiag.reg`
    `/etc/opt/OV/share/conf/ovprobdiag.conf`
    `/opt/OV/bin/ovpdUIlaunch.ovpl`

    Windows: `C:\<Program Files>\HP`
    `OpenView\nnm\registration\C\ovprobdiag.reg`
    `C:\Program Files\HP OpenView\nnm\conf\ovprobdiag.conf`
    `C:\Program Files\HP OpenView\nnm\bin\ovpdUIlaunch.ovpl`

    Copy the respective files to their proper directories, renaming them as needed, as shown in the examples below:

    UNIX®:   `ovprobdiag.reg`
    `/etc/opt/OV/share/registration/C/ovprobdiag.reg`

    `ovprobdiag_ja_euc.reg`
    `/etc/opt/OV/share/registration/ja_JP.eucJP/ovprobdiag.reg`
    `(HPUX)`
    `/etc/opt/OV/share/registration/japanese/ovprobdiag.reg`
    `(Solaris)`

    `ovprobdiag_ja_sjis.reg`
    `/etc/opt/OV/share/registration/ja_JP.SJIS/ovprobdiag.reg`
    `(HPUX)`
    `/etc/opt/OV/share/registration/ja_JP.PCK/ovprobdiag.reg`
    `(Solaris)`

    `/etc/opt/OV/share/conf/ovprobdiag.conf`
    `/opt/OV/bin/ovpdUIlaunch.ovpl`

    Windows: `ovprobdiag_en.reg`
    `C:\Program Files\HP OpenView\nnm\registration\C\ovprobdiag.reg`

    `ovprobdiag_ja_sjis.reg`
    `C:\Program Files\HP`
    `OpenView\nnm\registration\Japanese_Japan.932\ovprobdiag.reg`

    `C:\Program Files\HP OpenView\nnm\conf\ovprobdiag.conf`
    `C:\Program Files\HP OpenView\nnm\bin\ovpdUIlaunch.ovpl`

    After installing `ovpdUIlaunch.ovpl` on UNIX® systems, ensure that permissions on it are `555`, and set the owner to `bin:bin`

2. In the `ovprobdiag.conf` file, find the line that begins with "`OVPD_SERVER1=`". Modify it to reference the fully qualified name of your Problem Diagnosis server system, including the Problem Diagnosis server port number (the default port is 9085). For example: `OVPD_SERVER1=grinch.hp.com:9085`

3. Stop and restart NNM to update the application registration files:

    UNIX®:   Enter these commands:

        1. `ovstop`

        2. `ovstart`

    Windows: From a command window, enter the commands given above for UNIX®, or:

        1. `Start->Program Files->HP OpenView->Network Node Manager Admin->NNM Services - Stop`

        2. `Start->Program Files->HP OpenView->Network Node Manager Admin->NNM Services - Start`

Problem Diagnosis Windows

Problem Diagnosis Windows

Main Dialog

Problem Diagnosis displays this dialog when you launch it from the server URL:
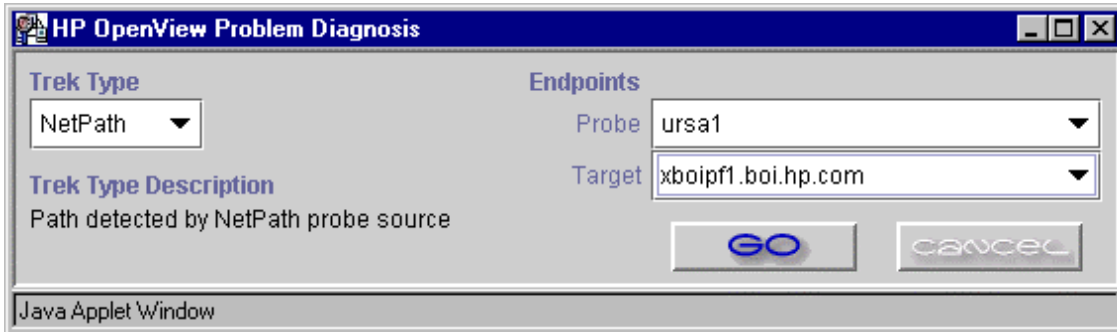
From this window, you select:

- The Trek Type you want to use:

- The Endpoints of the path you want to see:
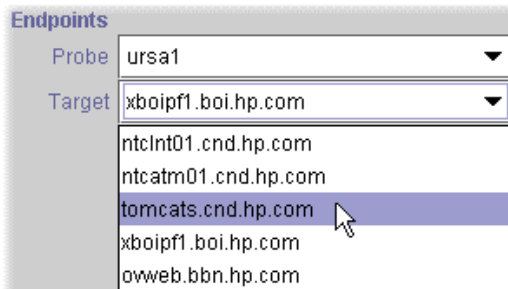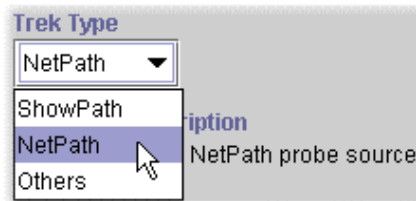
After these selections, click the GO button. (If you change your mind, use the CANCEL button) The result depends on the trek type you selected:

- For NetPath treks, you get a list of the known paths between the two endpoints (see below), appended in a table to the bottom of the main window. (See NetPath Map on page 45 for more information). You can then double-click on one of the paths to open the NetPath Details dialog window, with the NetPath Map of the selected path.
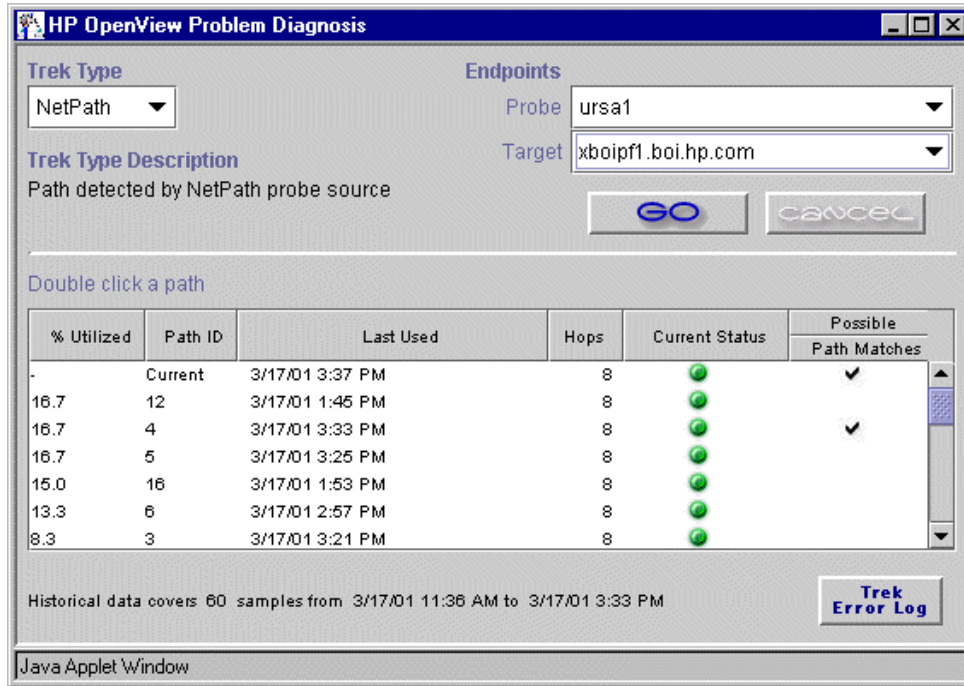
- A ShowPath trek detects the current path between the endpoints, and opens the ShowPath Details window to the ShowPath Map of that path. It displays a map of the path between the endpoints.

NetPath Path List

The path list is appended to the main window when you click on ![GO] with a NetPath trek. You can double-click on a path to launch a NetPath-specific path window. You can get special information about the `Current` path. See NetPath Path Detail on page 46 for details.

Entries in the table are as follows:

Item	Description
`%Utilized`	The percentage of probe attempts that find the given path
`Path ID`	A numeric identifier for the path, assigned when the path is first found
`Last Used`	Indicates when the probe last found the path in use
`Hops`	Number of devices between the probe and target
`Current Status`	The status of all the elements on the path taken as a whole. Note that this is the *present* status, determined at the moment the button is pressed. Possible values are:

Symbol	Description
	Normal: All nodes in the path are known and responding to `ping`.
	Critical/Down: At least one known node in the path is not responding to `ping`.
	Unknown: At least one device in this path is "unknown". Unknown has special meaning in the NetPath path list. An "unknown" device is known to exist in the path, and is known to be functional. However, the device did not respond to NetPath with its identity, and so it can not be pinged to determine its status.

Item	Description
`Possible Path Matches`	Problem Diagnosis attempts to find, among all the known paths, those paths that are most like the `Current` path. If there is a perfect match, that path gets a checkmark in this column. Sometimes there is more than one possible match (suppose the current path contains an unknown device which could be any of several known devices). In such cases, every path that could potentially match the current path is marked. If no pre-existing path resembles the `Current` path, no other paths are marked.

NetPath Dialogs

NetPath Map
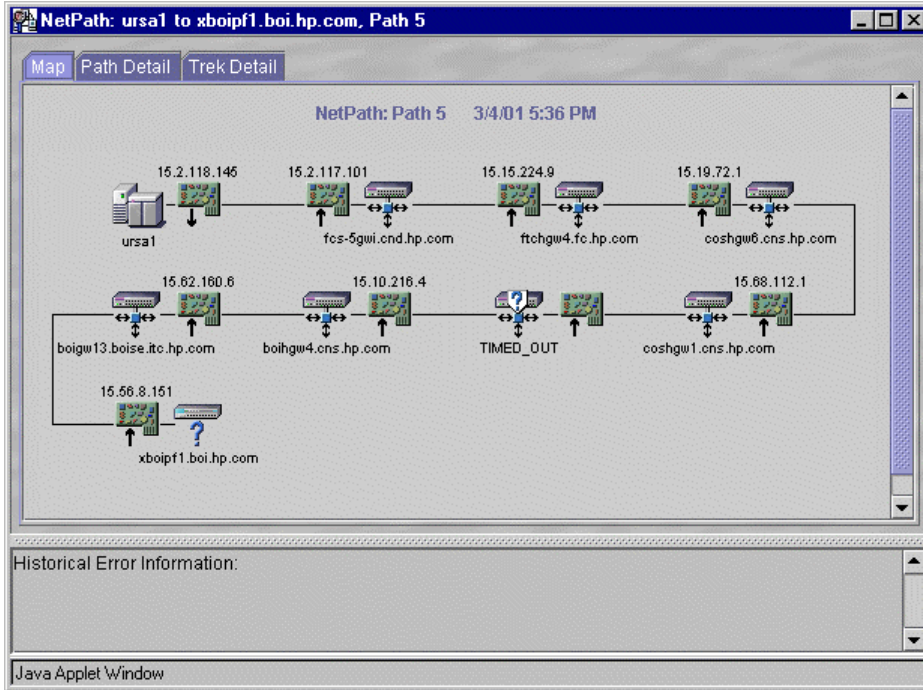
This map shows the path between two nodes as determined by NetPath. Notice the following:

- The interfaces in the path are the "inbound" interfaces on each device, that is, the interfaces that the ping packets arrive at on each device. The sole exception is the inclusion of the "outbound" interface on the NetPath probe's host.

- Status is shown for each device on the path (Symbol Legend).

- You may see a `TIMED_OUT` label on one or more devices. A `TIMED_OUT` device is known to exist at this point in the path, and is known to be functional. However, the device did not respond to NetPath when it was found, so neither its identity nor its status can ever be determined. If you see several `TIMED_OUT` symbols at the end of the path, you may be seeing a "partial path", which is explained in Partial Paths: NetPath.

- If you hover the mouse over a device or interface and right-click, you get a pop-up menu of useful tools (an SNMP device query, `ping`, and `traceroute`) that you can run against the object, as shown here:

Depending on how your Problem Diagnosis server is configured, you may have additional choices in this menu.

NetPath Path Detail

This table lists details about each hop along the path between two nodes as determined by NetPath. Note that for all nodes except the first (the probe host) the interface listed is the one on that device which received the ping from NetPath. On the first node, the interface listed is the one that sent the pings.

The Current Path is treated specially compared to all other paths.

If you click on an entry to select it, you can then right-click on a device or interface to get a pop-up menu with various troubleshooting tools on it, as shown here. Depending on how your Problem Diagnosis server is configured, you may have additional choices in this menu.

The table entries are as follows:

Item	Description
Hop	A simple identifier for a device on the path
Device Name	The DNS name (or IP address, if a name is not available) of the device. If the type of device can be determined, it is denoted by the symbol (See Symbol Legend on page 61). Devices that timed out bear the name TIMED_OUT (see "Unknown" status, below.)
Interface	The interface on the device which received the ping from the NetPath probe. For the first node only (the probe host), it is the interface which *sent* the pings.
Current: Element Status	The current status of the device. This is the *present* status, evaluated by NetPath when the ![GO] button is pressed. Possible values are:

Symbol	Description
🟢	**Normal:** The interface is currently responding to ping.
🔴	**Critical/Down:** The interface is not currently responding to ping.
🔵	**Unknown**: The status of the device at this hop in the path is unknown. A device with "unknown" status is known to exist at this point in the path, and is known to be functional. However, the device did not respond to NetPath with its identity when this path was discovered, and so it can not be pinged to determine its current status. (Its anonymity means a device of this type always has the name TIMED_OUT.)

Item	Description
`Historical Response Times (ms)`	Response time measures how fast the `ping` response returns when this particular device is `pinged`. Note the following:

- Response time includes the cumulative response times of intermediate devices.
- The data set includes only the latest "n" samples, where "n" is the maximum number of samples configured for this target.
- Devices with Unknown status (which also bear the name `TIMED_OUT`) have null (`*`) response times.

Maximum and average response times may tend to drift upward on devices that are near capacity, or suffering other problems.

This column is subdivided as follows:

`Last`	The most recent response time recorded
`Min`	The fastest response time in the data set
`Max`	The slowest response time in the data set
`Avg`	The average response time across all records in the data set
`Threshold`	The "threshold" response time is calculated to be three standard deviations (Poisson distribution) above the median response time. If current performance exceeds the Threshold value, there is a high probability that a problem exists on this device.

NetPath Path Detail (Current Path)

				Current Response Times (ms)							
Hop	Device Name	Interface	Status	#1	#2	#3	#4	#5	Min	Max	Avg
Probe	ursa1	15.2.118.145	●	-	-	-	-	-	-	-	-
1	fcs-5gwi.cnd.hp.com	15.2.117.101	●	10	10	10	-	-	10	10	10.0
2	ftchgw4.fc.hp.com	15.6.241.153	●	10	10	10	-	-	10	10	10.0
3	coshgw6.cns.hp.com	15.19.72.1	●	10	10	16	-	-	10	16	12.0
4	coshgw1.cns.hp.com	15.13.48.1	●	10	10	16	-	-	10	16	12.0
5	172.17.192.90	172.17.192.90	●	16	31	31	-	-	16	31	26.0
6	boihgw4.cns.hp.com	15.10.216.4	●	15	32	15	-	-	15	32	20.7
7	15.62.161.5	15.62.161.5	●	15	32	31	-	-	15	32	26.0
8	xboipf1.boi.hp.com	15.56.8.151	●	16	31	31	-	-	16	31	26.0

NetPath: ursa1 to xboipf1.boi.hp.com, Current Path — Map / Path Detail / Trek Detail — NetPath: Current Path 3/15/01 10:37 AM — Historical Error Information: — Java Applet Window

When you double-click the path whose Path ID is `Current` on the NetPath Path List, and then open the Path Detail tab, you get a special presentation, unique to the Current Path. Other paths (other than `Current`) get a different presentation.

The table entries are as follows:

Item	Description
Hop	A simple identifier for a device on the path
Device Name	The DNS name (or IP address, if a name is not available) of the device. If the type of device can be determined, it is denoted by the symbol (See Symbol Legend on page 61.)
Interface	The interface on the device which received the ping from the NetPath probe. For the first (Probe) node only, it is the interface which *sent* the pings.
Status	The current status of the device. This is the *present* status, evaluated by NetPath when the GO button is pressed. Possible values are:

Symbol	Description
🟢	**Normal:** The interface is no responding to pings.
🔴	**Critical/Down:** The interface is not responding to ping.
🔵	**Unknown**: The device at this hop in the path is "unknown". Unknown has special meaning in the NetPath Path Detail panel. An "unknown" device is known to exist at this point in the path, and is known to be functional. However, the device did not respond to NetPath with its identity when this path was discovered, and so it can not be pinged to determine its status.

Current Response Time (ms)	Response time measures how fast a ping response returns when this particular device is pinged. Note that it includes the cumulative response times of intermediate devices. This column is subdivided as follows:
#1 through #5	When you click GO, NetPath issues a series of pings against each device in the path. These columns tabulate the results of those pings. UNIX®-based probes issue a series of five pings, while Windows-based probes issue a series of three. So if columns #4 and #5 contain a hyphen (-), the probe is on a Windows host.
Min	The fastest response time of the series
Max	The slowest response time of the series
Avg	The average response time across the series

NetPath Trek Detail
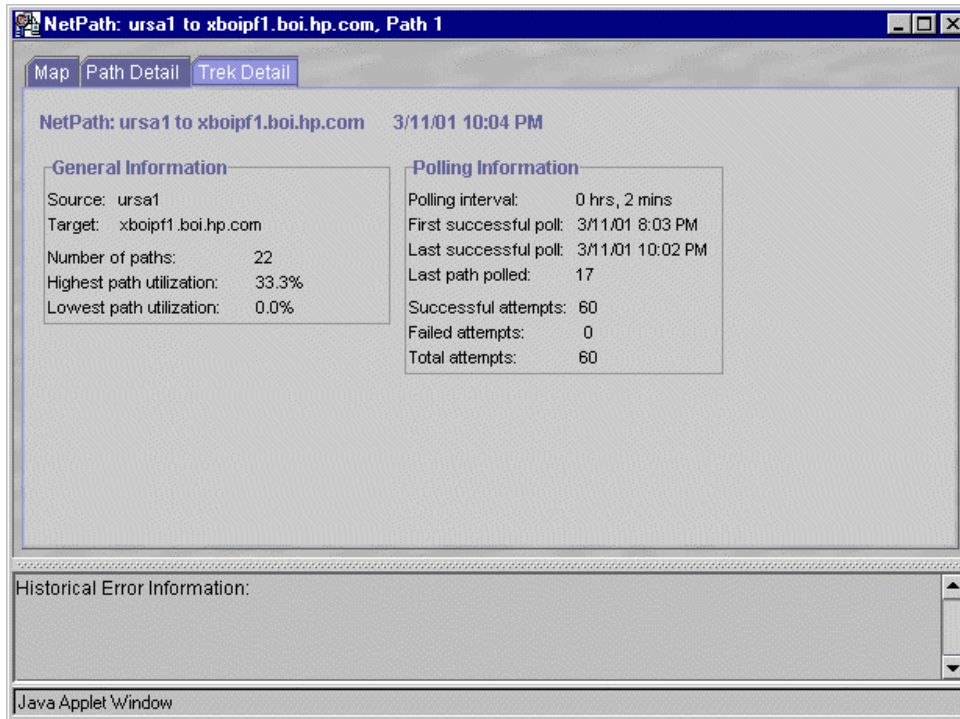
The NetPath Trek Detail panel presents general and statistical information about what the probe has learned about paths between itself and the current target. Most of the fields are self-explanatory.

The NetPath probe adjusts the `Polling interval` upward if each probe attempt takes too long to finish, so that it does not get behind in polling.

The `Last path polled` entry gives the `Path ID` number of the path that was most recently tested.

NetPath Probe Configuration

You configure a NetPath probe using this window:

To set probe targets and collection parameters, proceed as follows:

1. From the "Select Probe" list, choose the location of the NetPath probe you want to configure. If the list is empty, the server has no probes configured for it. (See Linking the Server to a NetPath Probe on page 26 for more information.)

2. The "Domain ID" text is used to distinguish between duplicate IP addresses. You can leave the default ID in this box or create a unique one of your own for this domain; see the Configuration Options table below for details.

3. Use the "Add" button to create an entry in the list. Double click on the `Target` field and edit it to contain the fully-qualified name of a destination node. NetPath will trace the paths to this node. Edit other fields in the entry as necessary; see the Configuration Options table below for details.

4. After adding all desired targets, click `Apply` or `OK`. Both buttons record your changes; `OK` closes the window, `Apply` keeps it open.

To delete probe targets, select one or more rows, and click `Delete`.

This table of NetPath Probe Configuration options gives the meaning of each field:

Name	Description	Default
Select Probe	A drop-down list of probes that have been installed. Select the one you want to configure.	First in list
Domain ID	Provides a way to distinguish between duplicate IP addresses across different VPNs. For example, a probe in one VPN might be given the domain ID "VPN_ONE", and a second probe in a different VPN might be given the domain ID "VPN_TWO". If the two probes return the same IP address for a hop, you can distinguish where the hop exists by the domain ID.	netpath
Trace: Attempts (1-5)	Specifies how many times to attempt to trace a path to a destination. The trace quits after the first success, e.g. if this value is five and the first attempt is successful, no further action is taken. Otherwise, the probe keeps trying up to five times.	2
Trace: Wait (sec)	Specifies how long to wait (in seconds) for a response from any hop along the path to the target.	2
Status Ping: Attempts (1-5)	Specifies how many times to attempt to ping a hop in the *most utilized* path to determine whether it is currently up or down. Quits after first success.	2
Status Ping: Wait (sec)	Specifies how long to wait (in seconds) for a ping response	1
Target	Specifies the DNS name or IP address of a target you want the probe to trace paths to.	none
Trace interval (min)	Specifies how often (in minutes) an attempt to trace the path should be initiated. The probe automatically increases this time if it determines that the interval is too small.	1
Max. Sample	Specifies the total number of samples to keep for each path to the target.	60
SNMP	A flag that turns SNMP queries on or off. **NOTE:** If the SNMP community name is not "public", the probe's configuration file (/opt/OV/pd/netpath/config/npprobe.conf) must be edited manually to include the non-default community name(s). See documentation within that file for details.	off
SNMP Port	Specifies the SNMP port to use in talking to this device (if the SNMP flag is on).	161

Name	Description	Default

`Trace Option`	`Trace Options` **are for probes hosted on Unix systems only; must be left blank on a Windows system. For additional option details, see the** `traceroute` **reference (man) page.**
	
	Specifies options to NetPath trace; individual options can *contain* no whitespace, but different options must be *separated* by whitespace. **Note that all options are case-sensitive ("**`-p`**" is not the same as "**`-P`**")!**
	
	The potential options are as follows:
	
	`-Tx`, where "x" is `A`, `F`, `P`, `S`, `U`, or `R` — **UNIX® only**:This lets you perform a TCP-based traceroute using the following TCP flags:
	
	`A ACK`
	
	`F FIN`
	
	`P PUSH`
	
	`S SYN`
	
	`U URG`
	
	`R RST`
	
	You can enter any combination of these flags. The "-TS" flag is typically used, to spoof establishing a TCP connection. TCP-based tracerouting can be useful for crossing firewalls which allow TCP traffic out if it originates from a particular IP address (where the probe is running) going to a specified destination. As long as the firewall allows ICMP time exceeded (`ICMP_TIMXCEED`) messages in (going to the IP address where the probe resides), the probe is able to trace paths outside the LAN.
	
	`-p`*[source port], [destination port]* — Sets the source and destination ports. For example, -p1234,20 specifies a source port of 1234, and a destination port of 20. For UDP-based traceroutes the ports are normally randomly selected. For TCP-based traceroutes the default source port is 57777 and the default destination port is 23 (the telnet port).
	
	`-I` — Performs an ICMP-based traceroute, instead of the default UDP-based traceroute.
	
	`-m` [max ttl] — Sets the maximum number of hops allowed in trying to reach the destination. The default is 30.
		see specific option

`DNS Lookup`	Turns reverse DNS lookup for intermediate devices on or off. Having DNS Lookup on can result in slower performance in certain environments, but the path results will include the names of intermediate devices, as well as their IP addresses. Turning DNS Lookup off may speed up performance, but the path results will show *only* the IP addresses of intermediate devices, and *not* their names.	`on`

Clicking the column headings in the table sorts the table on values in that column.

ShowPath Dialogs

ShowPath Map
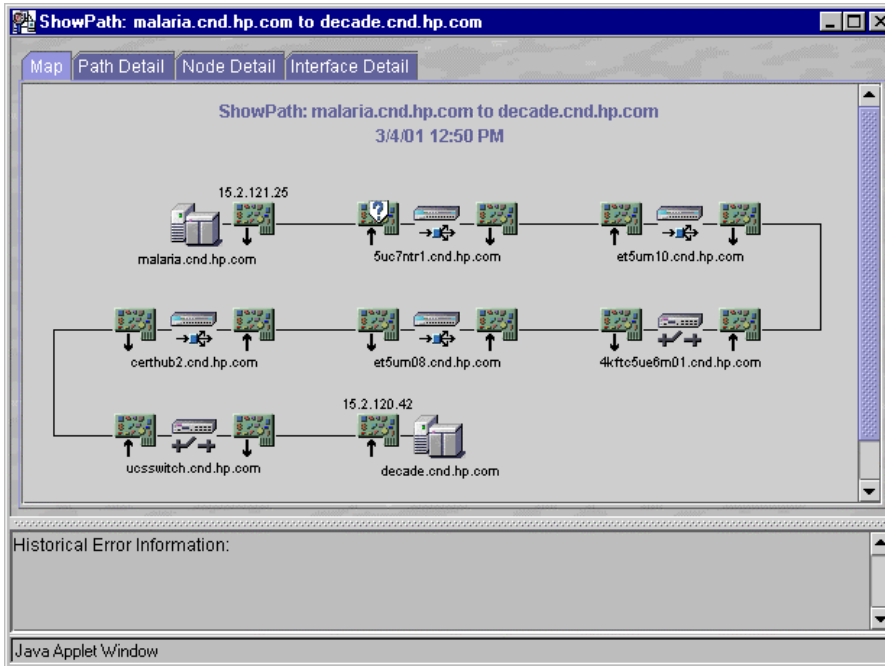
This map shows each device in the currently active path between two nodes as determined by ShowPath. The interfaces shown on each device are exactly the interfaces used in the path between devices. Notice the following:

- Status is shown for each interface on the path (Symbol Legend), but not for each node as an entity.

- You can launch troubleshooting tools from this view.

  If you hover the mouse over a device and right-click, you get a pop-up menu of useful tools (an SNMP device query, ping, and traceroute) that you can run against the device, as shown here. Depending on how your Problem Diagnosis server is configured, you may have additional choices in this menu.

ShowPath Path Detail

This table lists details about each device in the currently active path between two nodes as determined by ShowPath. The interfaces listed on each device are exactly the interfaces used in the path between devices.

If you click on an entry to select it, you can then right-click to get a pop-up menu with various troubleshooting tools on it, as shown here. Depending on how your Problem Diagnosis server is configured, you may have additional choices in this menu.

The table entries are as follows:

Item	Description
Index	A simple identifier for a device on the path
Device Name	The DNS name of the device, if it can be determined. If the type of device can be determined, it is denoted by the appropriate symbol. (See Symbol Legend on page 61.)
Incoming/Outgoing Interface IP	The IP address (if one exists) of the interface on the device which received/sent the ping from the NetPath probe. The notation "(shared)" indicates the interface is a port on a shared interface.
Incoming/Outgoing Interface Status	The status of the interface. Possible values are Normal ( ), Critical/Down ( ), Disabled ( ), and Unknown ( ). Note that this status is determined by NNM in its last status poll.
Incoming/Outgoing Interface Last Change	Indicates when the interface status last changed. The notation "0 (unset)" indicates that there has been no change in status since the interface was first discovered.

ShowPath Node Detail

This table lists details about each node on the path between the two endpoints.

If you click on an entry to select it, you can then right-click to get a pop-up menu with various troubleshooting tools on it, as shown here. Depending on how your Problem Diagnosis server is configured, you may have additional choices in this menu.

Note: Most of the important values for each node are determined by an SNMP query made by NNM. NNM must have SNMP access to the device for the value to have meaning.

The table entries are as follows:

Item	Description
Index	A simple identifier for a device on the path
Node Name	The DNS name of the device, if it can be determined. The type of device is denoted by the appropriate symbol. (See Symbol Legend on page 61.)
NNM SNMP Address	The IP Address of the device.
Vendor	The vendor (manufacturer) of the device.
SNMP Sys Name	The value of the SNMP MIB-2 "sysName" attribute.

ShowPath Interface Detail

This table lists details about each interface on the currently active path between the two endpoints.

If you click on an entry to select it, you can then right-click to get a pop-up menu with various troubleshooting tools on it, as shown here. Depending on how your Problem Diagnosis server is configured, you may have additional choices in this menu.

The table entries are as follows:

Item	Description
Index	A simple identifier for a device on the path
Interface Name	The DNS name of the device, if it can be determined. The type of device is denoted by the appropriate symbol. (See Symbol Legend on page 61.)
NNM Label	This value is taken from the NNM map database, and is the same label that is displayed for this interface on an NNM submap.
Subnet Mask	The subnet mask applied to an IP interface to determine its subnet. Interfaces without an IP address are denoted with a dash (-).
MAC Address	The Media Access Control (MAC) address of the interface. Many interfaces (such as the ports on a hub) do not have a MAC address, and are denoted "none".
Status: Current	The present status, as determined by NNM on its last status poll. Possible values are Normal ( ), Critical/Down ( ), Disabled ( ), and Unknown ( ).
Status: Last Change	Indicates when the interface status last changed. The notation "0 (unset)" indicates that there has been no change in status since the interface was first discovered.

Symbol Legend

Status Symbols

A status symbol indicates the status of the device at the time the table or map was generated. In maps, a status symbol overlays a device symbol to indicate the device status.

Status symbols (in Tables):

Critical/Down

Administratively Disabled

Status Unknown

Normal

Status symbols (on Maps):

Critical/Down

Administratively Disabled

Status Unknown

Device Symbols

Device symbols are used in both maps and tables to indicate the type of the device (if known).

Device Symbols

Host

Router

Switch

Hub

Device Unknown

Interface (outbound)

Interface (inbound)

Appendix A: Installed Files

Installed Files

Installing the Problem Diagnosis server or probe places several files on your system. Because the Problem Diagnosis GUI is a Java applet, it installs no files.

Server Files

When you install the HP OpenView Problem Diagnosis server, two major components are placed on your system:

- The **Jakarta Tomcat web server**, which provides the supporting infrastructure for Problem Diagnosis. Note the following:

    - The Jakarta Tomcat web server is installed in:

        UNIX: `/opt/OV/pd/app-server`

        Windows: `C:\Program Files\HP OpenView\pd\app-server` and runs on IP port 9085 (If you must change this port number, see these special instructions).

    - Log files for the web server are in

        UNIX: `/opt/OV/pd/app-server/logs`

        Windows: `C:\ProgramFiles\HP OpenView\pd\app-server\logs` The `tomcat.log` file contains web server messages.

- The **Problem Diagnosis server**, which runs under the umbrella of the Jakarta Tomcat web server. Note that the default Problem Diagnosis server log files are:

    UNIX: `/opt/OV/pd/app-server/logs/servlet.log`

    Windows: `C:\Program Files\HP OpenView\pd\app-server\logs\servlet.log`

Probe Files

Installing a NetPath probe places a number of files on the system, listed in the table below. In this table, the <netpathRoot> should be interpreted as (assuming a default installation):

UNIX®:   `/opt/OV/pd/netpath`

Windows: `C:\<Program Files>\HP OpenView\pd\netpath`

This table also uses the UNIX® convention for directory delimiters except where noted; Windows users should replace "/" with "\".

Proble Files	Description
`<netpathRoot>/bin/cfaUtil.jar`	utility Java classes
`<netpathRoot>/bin/netpathUtil.jar`	more utility Java classes
`<netpathRoot>/bin/jmgmt.jar`	SNMP Java classes
`<netpathRoot>/bin/npprobe.jar`	the NetPath probe Java classes
`<netpathRoot>/bin/netpath` **(UNIX® only)**	the NetPath executable; it must be owned by root and have permissions of `-r-sr-xr-x` (e.g., `chmod 4555 netpath`)
`<netpathRoot>/bin/npprobe.sh` **(UNIX® only)**	a convenience script for starting and stopping the probe
`<netpathRoot>\bin\netpath.exe` **(Windows only)**	a wrapper that lets the NetPath probe run as a Windows service.
`<netpathRoot>\bin\npprobe.bat` **(Windows only)**	a convenience script for adding and removing the probe from Windows services
`<netpathRoot>/config/npprobe.conf`	the probe configuration file; must not be moved.
`<netpathRoot>/config/UpdateNppconfig`	script for updating `npprobe.conf` at installation time
`<netpathRoot>/log/`	directory for log files
`<netpathRoot>/data/`	directory for data files
`<netpathRoot>/archive`	directory for archive data

Appendix B: Configuring the Server Port

Configuring the Server Port

Why would you do this?

Ports 9085 and 9086 are used by the Problem Diagnosis server to communicate internally (9086), and with NetPath probes (9085). If other software has already taken either of these ports, the port(s) used by the server must be changed. In the case of port 9085, probes must be reconfigured to reflect changes to the server.

Note: HP recommends you make port changes *only if absolutely necessary!*

To Change from Port 9085 to Another Port

Note: Any probe accessed by a server that does not use port 9085 must be reconfigured to accommodate this, and its data will not be available to any server that uses another (such as the default) port.

Follow this procedure:

1. Shut down the Problem Diagnosis server and all probes that are assigned to that server.

2. Edit the following two Problem Diagnosis server files, look for "`9085`" and replace this number with a port number that is not used by any other networking software. Note that Windows users need to use backslash (\) instead of slash (/) in the file paths below.

   - *<Install_directory>*`/app-server/conf/server.xml`
   - *<Install_directory>*`/app-server/conf/test-tomcat.xml`

3. For all relevant NetPath probes (the ones this server communicates with), edit the probes' configuration files to reflect the new server port number. Edit *<Install_directory>*`/netpath/config/npprobe.conf` and replace "`9085`" with the same port number that was used above.

4. Restart the server, and restart all reconfigured probes.

To Change from Port 9086 to Another Port

Follow this procedure:

1. Shut down the Problem Diagnosis server.

2. Edit the following files, look for "`9086`" and replace this number with a port number that is not used by any other networking software.

   - *<Install_directory>*/`app-server/conf/tomcat.conf`
   - *<Install_directory>*/`app-server/conf/tomcat.properties`
   - *<Install_directory>*/`app-server/conf/workers.properties`
   - *<Install_directory>*/`app-server/conf/wrapper.properties`
   - *<Install_directory>*/`app-server/conf/server.xml`

3. Restart the server.

Appendix C: Technical Requirements

Problem Diagnosis Technical Requirements

Server Technical Requirements

The Problem Diagnosis server runs under any of the following operating systems:

- Hewlett-Packard HP-UX 11.0
- Sun Solaris versions 2.6, 2.7, and 2.8
- Microsoft Windows (NT 4.0 & 2000)

Java Run-time Environment (JRE)

To run the Problem Diagnosis server, the default version of the Java Runtime Environment (JRE) for the system must be version 1.2.2 or higher. Use the command `java -version` to determine the current default Java version.

Java 1.2.2. Users Note: For security reasons, HP recommends that the JRE be at least version 1.2.2.07.

The path to the default version of `java.exe` must appear in the PATH environment variable *before* the path to any other `java.exe` versions on your system.

To obtain and install a compatible JRE, follow these steps:

Platform	Instructions
HP-UX	For an HP-UX-compatible version of Java, see the HP-UX Software Downloads for Java (http://www.unix.hp.com/java/java2/sdkrte/downloads/index.html) page. **You must use version 1.2.2_08 or above.** Lower versions are not supported. **Note:** System patches are required to support the JRE. See the HP-UX Patch Information page (http://www.unixsolutions.hp.com/products/java/patches.html) for a current list.
Solaris	For a Solaris-compatible version of Java, follow the links from Sun's JRE for Solaris (http://www.sun.com/software/solaris/jre/download.html) page. **Note:** System patches are required to support the JRE. They are available from the Solaris JRE download page, for convenient download at the same time as the JRE itself.
Windows	For a Windows-compatible version of the JRE, see JavaSoft's JRE for Windows (http://java.sun.com/j2se/) download page.

NetPath Probe Technical Requirements

The Problem Diagnosis NetPath probe runs under any of the following operating systems:

- Hewlett-Packard HP-UX 11.0
- Sun Solaris versions 2.6, 2.7, and 2.8
- Microsoft Windows (NT 4.0 & 2000)

In Windows environments, the NetPath probe runs as a service (See the "Windows Only" comment in the NetPath section of the Known Limitations topic on page 13).

Web-based User Interface Technical Requirements

Any computer that has a compatible browser with a compatible Java plug-in can run the Problem Diagnosis Java-based user interface. Supported browsers in this release include:

- Netscape Navigator, version 4.72 and above
- Microsoft Internet Explorer, version 5.0 and above

Java Plug-ins for the Browser

For Problem Diagnosis to function properly, your browser needs to have a Java plug-in installed (version 1.2.2 or higher). If a compatible plug-in is not installed, you may be prompted to install it and then pointed to a web page where the plug-in is available.

Java 1.2.2 Users Note: For security reasons, HP recommends that the Java plug-in be at least version 1.2.2_07 on Solaris and Windows. HP-UX users must use version 1.2.2_08.

Platform	Instructions
Windows *and* **Solaris**	Sun's Java plug-in page (http://java.sun.com/products/plugin/index.html) has plug-ins for Windows and Solaris systems. (The 1.2.2 releases are on the Previous Releases page; if you have trouble, go to Sun's plug-in FAQ page (http://java.sun.com/products/plugin/1.2/plugin.faq.html) for additional information.) **Note:** A number of patches must be installed to support the Java plug-in on Solaris. Go to Sun's patch page (http://www.sun.com/solaris/netscape/jpis/usersguide_java_plugin.html#require) for details. **Solaris 2.7 Note**: On this platform, Netscape does not recognize the Java 1.2.2 plug-in after it has been installed. To work around this problem, you must create a symbolic link from the directory where Netscape looks for its plug-ins to the directory where the Java 1.2.2 plug-in is installed. Follow these steps: 1. `cd ~/.netscape` 2. `ln -s /opt/NSCPcom/plugins plugins` (assumes you installed the plug-in in the default directory) 3. Start Netscape, and choose the Help/About Plug-ins menu option. 4. Confirm that the plug-in is now recognized by the browser. **Solaris 2.8 Note**: Solaris 2.8 comes with a version of Netscape that includes the Java 1.2.1_04c plug-in. Until Sun releases upgraded Java plug-ins for this platform, you must use the Java plug-in that comes with the browser.

Platform	Instructions
HP-UX	Plug-ins for HP-UX are available at http://www.unix.hp.com/java/java2/jpi/downloads/index.html. **You must use version 1.2.2_08 or above.** Lower versions are not supported. **Note**: A number of system patches must be installed to support the Java plug-in. Go to http://www.unix.hp.com/java/infolibrary/patches.html for a current list. **Note:** You must create and set an environment variable called `JAVA_FONTS` for Problem Diagnosis applets to display properly. This is also true in any shell from which NNM is launched, so that Problem Diagnosis displays properly. Enter this command: `export JAVA_FONTS=/usr/lib/X11/fonts/ms.st/typefaces`

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