HP OpenView Network Diagnosis Add-On Module

User's Guide

Version: A.02.00

For HP-UX and Solaris
OpenView Operations Management Servers

Manufacturing Part Number: None
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The support area of the HP OpenView web site includes:

- Downloadable documentation
- Troubleshooting information
- Patches and updates
- Problem reporting
- Training information
- Support program information

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1 Overview

In this chapter you will find introductory information on the HP OpenView Network Diagnosis Add-On Module including:

- A description of the individual components

- Link Monitoring concept
- Network Performance monitoring

HP OpenView Network Diagnosis Add-On Module

The HP OpenView Network Diagnosis Add-On Module (NDAOM) provides you with detailed information on network performance and how this performance is affecting the services. New service views help to identify network failures in relation to services that rely on those network connections.

Network integration is based on the Problem Diagnosis component of Network Node Manager 7.x. This enables a networking integration solution that quickly displays level-two and level-three device information, with further details being derived from health utilities such as `TraceRoute`.

The following sections introduce the NDAOM tools that are integrated into HP OpenView Operations (OVO).

Problem Diagnosis Component — HP OpenView Network Node Manager

HP OpenView Network Node Manager Advanced Edition (NNM) is a software application that discovers and monitors your IP network. HP OpenView Network Node Manager Advanced Edition's Extended Topology functionality (NNM-ET) discovers layer-2 device information and displays device connectivity.

Problem Diagnosis is a component embedded in NNM-ET. Problem Diagnosis is an automated IP network path analysis tool that presents accurate end-to-end path information. Problem Diagnosis also lets you see detailed information from nodes and devices in a particular path.

Problem Diagnosis gives NOC and IP network operators and engineers tools for fast problem diagnosis and resolution in IP-based networks. In particular, Problem Diagnosis offers a probe-based path tool that finds and monitors the paths between itself and any reachable node that it is configured to test. A Problem Diagnosis probe collects data over time and generates statistical and usage data about the paths it monitors.

Major Components

Problem Diagnosis has three primary components:

- Web-based graphical user interface

  Launch the Problem Diagnosis view from **`Home Base`**, which is a Java applet that interacts with the NNM server to present network information. Like all applets, it needs no installation because it runs in the context of a Web browser.

- Problem Diagnosis server

  The Problem Diagnosis server is the heart of the system, the intelligence behind the Problem Diagnosis functionality. It assimilates information and responds to requests from a user running a Problem Diagnosis view.

The Problem Diagnosis server gets its topology data from NNM, the Problem Diagnosis probes, and other HP OpenView applications. Based on the topology data it mines from these sources, the server can present several alternative ways to examine the paths between nodes.

- Problem Diagnosis probes

  The Problem Diagnosis probes are key suppliers of data to the Problem Diagnosis system. Probes are independent Java applications that can reside on any system of your choosing. (See the *Release Notes* for supported platforms and versions.) There is no limit to the number of probes you can install or to the number of paths a probe can monitor. Likewise, a probe can be used by more than one Problem Diagnosis server. However, NDAOM supports only one Problem Diagnosis server managing multiple probes simultaneously.

  A probe collects information about paths between itself and any desired target. It uses a technique similar to the familiar `traceroute` utility, and it runs periodically to test the route to the target or targets for which it is configured. On each run, it collects the following 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 you see the most recent information.

OVO Console Components

The HP OpenView Operations Console can be installed on either the management server system or an alternative system. The Console consists of two components:

- Web-based graphical user interface

  Launch the Problem Diagnosis view (PD GUI) from **`Home Base`**, which is a Java applet that interacts with the NNM server to present network information. Like all applets, it needs no installation because it runs in the context of a Web browser.

- OVO Motif user interface

  The OVO Motif GUI provides the interface to the NDAOM_Infrastructure node in the node bank, the NDAOM node group in the node group bank, the NDAOM message group in the message group bank, the NDAOM-Admin and NDAOM-Operator profiles in the user profile bank, and the NDAOM and NDAOM-Admin application groups present in application bank.

OVO Management Server Components

There are three essential components installed on the OVO management server:

- ovnwlinkmon
- NDAOM Monitor
- ovnwmonitor

ovnwlinkmon

The links to be monitored are stored with the corresponding affected services in the tuple database by `ovnwlinkmon`.

`ovnwlinkmon` triggers the download of the NetPath probe to the managed nodes. The tuple database contains deployment information about the probe; that is, it lists the nodes to which the probe is deployed.

`ovnwlinkmon` also triggers the download of configuration data and the NDAOM subagent to the managed nodes. The NDAOM subagent is NOT registered as a subagent on the management server. `ovnwlinkmon` is the only way to deploy the NDAOM subagent to the managed node, and then the NDAOM subagent is automatically registered as a subagent.

NDAOM Monitor

The NDAOM Monitor is an OVO monitor template with predefined threshold values. It waits for `opcmon` values that it gets from the `ovnwmonitor`. The NDAOM Monitor compares the `opcmon` values to the threshold values and sends an `opcmsg` to the OVO management server when the thresholds are exceeded. You can customize the predefined threshold values. If you do so, you must deploy the monitor template again to submit the new threshold values.

ovnwmonitor

The `ovnwmonitor` is an external monitor. It runs permanently as a daemon process and does not need to be triggered by the NW Monitor.

ovnwmonitor manages the following tasks:

- Checks NP Central availability
- Checks tuple DB content
- Subscribes to the Problem Diagnosis probe for events and performance data
- Processes the events or performance data that the Problem Diagnosis probe sends

The ovnwmonitor is the main process of NDAOM on the management server. It ensures that the Problem Diagnosis server monitors all destination nodes specified in the tuple database. The ovnwmonitor relies on a tuple database and ensures that all destination nodes contained in the tuple database are also specified in the Problem Diagnosis server configuration file, complete with the associated polling interval.

Initialization is completed by subscribing to the Problem Diagnosis server for events and performance data. This establishes two TCP connections to the Problem Diagnosis server.

After the initialization the ovnwmonitor keeps waiting for input on one of the two TCP connections to the Problem Diagnosis server. If the Problem Diagnosis server sends a message, the ovnwmonitor checks if the destination node concerned by this message is contained in the tuple database. If so, this message gets processed.

If it is an event message, for example *Network path to node B changed", "Network path to node B down*, the ovnwmonitor sends an opcmsg to Services concerned on the OVO management server.

If it is a performance data message, the ovnwmonitor picks the relevant performance values of the message and generates opcmon messages from them to be processed by the NW Monitor. If the NW Monitor finds out that these values exceed one of its thresholds, it sends a corresponding opcmsg to the OVO management server.

OVO Managed Node Component

One component is installed on OVO managed nodes: the Problem Diagnosis probe (PD probe).

Problem Diagnosis Probe

The main purpose of the network probe is to provide network connection information for the connection to a specified node and information about the network path to this node. Additionally, the network probe can return relevant health metrics and network performance metrics that it has collected for the specified network connections. See “Problem Diagnosis probes” on page 15 for more information.

The Problem Diagnosis probe is a daemon process running permanently as a subagent of the OVO agent. It is distributed from the OVO management server via `ovnwlinkmon`. Its functionality is accessed via TCP socket connections to the NP Central component of the NNM server.

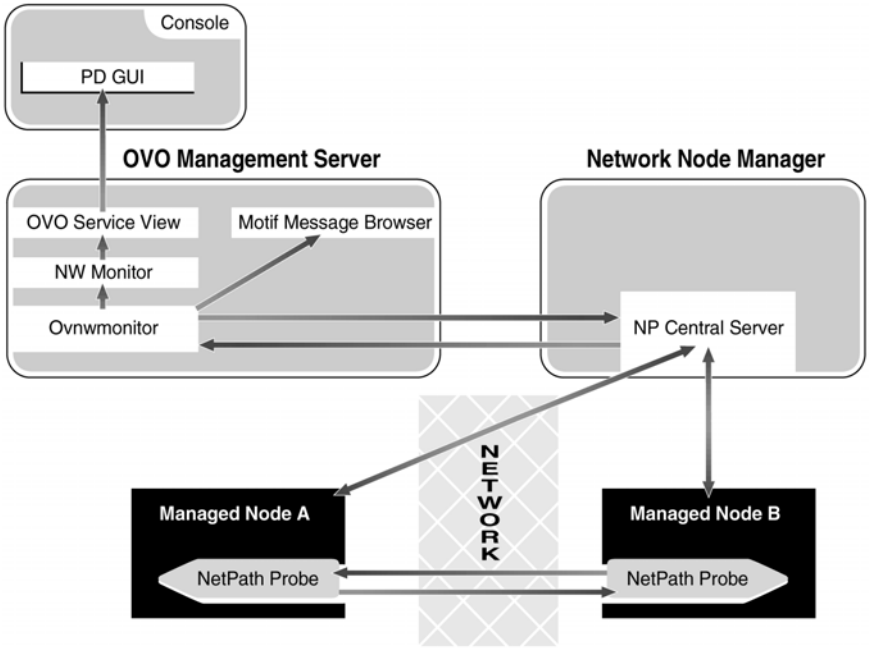
At startup the Problem Diagnosis probe reads its configuration file, `npprobe.conf`. This file includes information on the NNM server name, the IP address, and the port on which NP Central is running. NP Central configuration has the information about the connections that are to be monitored and the polling interval for each of these connections.

After the startup phase the Problem Diagnosis probe repeatedly polls for information about the network path to each destination node as defined in the NP Central configuration file. The Problem Diagnosis probe sends the information gathered during these polls to NP Central to generate statistical data.

Link Monitoring Concept

The link monitoring concept is the mechanism that is used to do network link health checking. The following figure illustrates how this concept works.

Node A and Node B run OVO agents and have NetPath probes deployed on these nodes via the `ovnwlinkmon` utility provided by NDAOM. The OVO management server has the `ovnwmonitor` program, which subscribes to the NP Central server located either on the same node or on the node where the NNM-ET server is installed to get new event or performance information about the connection between the nodes. Node B must be a managed node only if you want to monitor both directions of the connection. Probes would then be required on both systems.



The following are the possible scenarios:

- NP Central sends a “Network path has changed” event for the path to a remote node B that is contained in the tuple DB: an `opcmsg` “Network path to node B has changed” is sent to the management server.
- NP Central sends a “Network path down” event for the path to a remote node B that is contained in the tuple DB: an `opcmsg` “Cannot reach node B” is sent to the management server; in this case, the network operator would launch the Problem Diagnosis GUI to get the latest path information.
- NP Central sends a “Network path up” event for the path to a remote node B that is contained in the tuple DB: an `opcmsg` “Node B reachable” is sent to the management server; in this case, the network operator would launch the Problem Diagnosis GUI to get the latest path information.
- NP Central sends a “Network path has browned out” event for the path to a remote node B that is contained in the tuple DB: an `opcmsg` “Network path to node B has browned out” is sent to the management server. This event would happen depending on the configuration of brown-out for this connection on NP Central server.
- NP Central sends a “Trace error between source and target” event for the path to a remote node B that is contained in the tuple DB: an `opcmsg` “Network path to node B has trace errors” is sent to the management server.
- NP Central sends performance data for the path to a remote node B from node A that is contained in the tuple DB; the round-trip time is sent to the OVO agent via `opcmon` call. If a special round-trip time is exceeded, the NDAOM monitor sends an `opcmsg` “Round-trip time exceeded for node C on path to node B” to the management server.

2 Installing the HP OpenView Network Diagnosis Add-On Module

In this chapter you will find information on:

- Prerequisites for installing the NDAOM
- Installing NDAOM on the system where the HP OpenView Operations software is installed
- Uninstallation steps

Installation Prerequisites

Before starting the NDAOM installation process, make sure that the following requirements are met:

OVO Console System

The OVO Console can be installed on the same system as the management server, or on another suitable system in the network. The prerequisites are as follows:

- HP OpenView Operations Java™ GUI, version A.07.x or A.08.x is installed and configured on an appropriate Windows NT, Windows 2000 or UNIX® system.
- Refer to the HP OpenView Network Node Manager Release Notes for information regarding web browser requirements.

Management Server System

- HP OpenView Operations, version A.07.x or A.08.0x is installed and configured on a UNIX system running one of the following operating systems: HP-UX 11.0 or 11.11, Solaris 8 or 9.
- On OVO management servers running under Sun Solaris operating systems (Solaris 7, 8, 9), the Sun Workshop Compilers Bundled libC installation package `SUNWlibC` must be installed so that the library `libCstd.so.1` is in the standard library path.
- Install HP OpenView Network Node Manager on the same system as the HP OpenView Operations management server or on a different system. If NNM is installed on a different system, specify the location in the `ndaom.cfg` file, as explained in “How Is NDAOM Installed on the OVO Management Server?” on page 29. The supported versions of NNM are A.07.01 and higher.
- 300 MB disk space on the HP OpenView Operations management server system to install the integration components.

Managed Node Systems

- All managed nodes must meet the prerequisites of the Problem Diagnosis probe. This includes an installed Java Runtime Environment version 1.4.2.4 or higher. Refer to the HP OpenView Network Node Manager Release Notes for information regarding the requirements for Problem Diagnosis probes.
- 70 MB disk space on the managed node is required for the NDAOM software installation.

The Problem Diagnosis probe and the Network Monitoring program are available for the following platforms:

- Windows NT
- Windows 2000
- HP-UX 11.0 and 11.11
- Sun Solaris 8 and 9

Table 2-1 Supported OVO Managed Node Software

Platform	Operating System
HP-UX	11.00, 11.11
Solaris	8, 9
Windows	NT 4.0 with Service Pack 5
	2000

Table 2-2 Product Support Matrix

Product Name	Product Version	NDAOM A.02.00
Problem Diagnosis	NNM 7.01	✔
Problem Diagnosis	NNM 7.5	✔

Installation on the OVO Management Server System

Installing the HP OpenView Network Diagnosis Add-On Module on the HP OpenView Operations management server system is handled via HP OpenView Software Distributor. The steps are detailed in “How Is NDAOM Installed on the OVO Management Server?” on page 29.

Please follow the instructions given in this chapter to install the NDAOM on a system where HP OpenView Operations is already installed.

What Does NDAOM Give You?

Installation of NDAOM adds the following features to HP OpenView Operations:

- A virtual node, `NDAOM_Infrastructure`.
- A node group, `NDAOM`.
- A message group, `NDAOM`, that contains all messages generated by `NDAOM`.
- An application group, `NDAOM-Admin`, that contains applications added by NDAOM and used to administer the add-on module itself.
- A user profile, `NDAOM-Admin-Profile`.
- A user profile, `NDAOM-Operation-Profile`.
- A template group, `NDAOM`, that contains the following policies:
  - **NDAOM Templates**

    The NDAOM templates should be deployed to each node that is to supervise a network connection relevant to a service to forward events to the OVO message browser.
- A policy group, Network Diagnosis Add-On Module, is created with the following policy groups:
  - **NDAOM_MS**

    NDAOM policies for management server

— **NDAOM_UX**

NDAOM policies for UNIX (HPUX and Solaris nodes)

— **NDAOM_WIN**

— NDAOM policies for Windows nodes

What Files Are Installed?

The following files are installed on the HP OpenView Operations management server and the managed nodes.

OVO Management Server

The NDAOM files are placed in the following directories:

`/opt/OV/ndaom/bin`	Binary files
`/opt/OV/lib/nls/<locale>`	Message Catalog file (`ndaom.cat`) for NDAOM executable files
`/opt/OV/ndaom/doc`	Documentation
`/etc/opt/OV/ndaom/conf`	Configuration files
`/var/opt/OV/ndaom/tmp`	Temporary files
`/var/opt/OV/ndaom/log`	Log and trace files
`/var/opt/OV/share/ndaom`	Global tuple database

HP-UX and Solaris Managed Nodes

The PD probe files are placed in the following directories:

`/opt/OV/pdAE/config`	Directory containing probe configuration files
`/opt/OV/pdAE/bin`	Directory for probe binary files
`/opt/OV/pdAE/logs`	Directory for probe log files

Directories used by NDAOM via the OVO agent mechanisms are:

- HTTP agents: `/var/opt/OV/bin/instrumentation`
- DCE agents:
  - `/var/opt/OV/bin/OpC/actions`
  - `/var/opt/OV/bin/OpC/cmds`
  - `/var/opt/OV/bin/OpC/monitor`

Microsoft Windows NT and Windows 2000 Managed Nodes

The PD probe files are placed in the following directories:

`<drive>:\Program Files\HP Openview\pdAE\config`	Directory containing probe configuration files
`<drive>:\Program Files\HP Openview\pdAE\bin`	Directory for probe binary files
`<drive>:\Program Files\HP Openview\pdAE\logs`	Directory for probe log files

Directories used by NDAOM via the OVO agent mechanisms are:

- HTTP agents: `<drive>:\Program Files\HP Openview\data\bin\instrumentation`
- DCE agents:
  - `<drive>:\usr\OV\bin\OpC\actions`
  - `<drive>:\usr\OV\bin\OpC\cmds`
  - `<drive>:\usr\OV\bin\OpC\monitor`

How Is NDAOM Installed on the OVO Management Server?

Installation of the HP OpenView Network Diagnosis Add-On Module for HP OpenView Operations is divided into two parts:

- Install NNM 7.x
- Install the NDAOM software on the OVO management server

Installing Network Node Manager

If you plan install NNM on the same system as the OVO management server, use NNM 7.01 or higher.

If you plan to install NNM on a separate system, use NNM 7.01 or higher, as specified in the user guide for NNM. Also, be sure to install NNM-ET.

You can start the Problem Diagnosis server on the NNM system using the following command: **`ovstart pd`** .

If this command is not successful, execute the following:
`<OVInstallDir>/pdAE/bin/pdcentral.sh -start`

Installing NDAOM on the OVO Management Server System

To install NDAOM on the OVO management server:

1. Login to the OVO management server system as user **`root`**.
2. Execute the command appropriate for your operating system:
   - HP-UX

     `swinstall -s /cdrom/OV_DEPOT/11.0HPUX.sdtape AOM-ND-OVO-HP`
   - Sun Solaris

     `swinstall -s /cdrom/OV_DEPOT/SOLARIS.sdtape AOM-ND-OVO-SOL`

   This installs the NDAOM software and also configures it for the HP OpenView Operations installation.

NOTE During the installation process, the OVO management server processes are automatically stopped and restarted (`opcsv -stop`/`opcsv -start`).

NOTE If no product is specified, (e.g., `AOM-ND-OVO-HP`), swinstall will start with an interactive GUI (on HP-UX systems *only)*.

NOTE

Filesets remain the same for all SPIs as written in the installation instructions of each SPI. Only the depot name and location where the depot is located *may* change. Specify the following depot when entering the software install command:

`11.0HPUX.sdtape` or **`SOLARIS.sdtape`**

TIP

To unmount the CD-ROM, enter **`unmount /<mount_point>`**, and remove the CD-ROM from the disk drive.

3. Configure the NDAOM as user `root` by modifying the `ndaom.cfg` file as follows and adapt the entries for all variables to fit your environment (`PD_SERVER`, `PD_SERVER_IP`, `PD_SERVER_PORT`). See appendix A for a full description of the variables.

   Open the file:

   `/etc/opt/OV/ndaom/conf/ndaom.cfg`

   and edit it so that it reflects the following requirements:

   - An entry is required that defines the name of the NNM server system where the Problem Diagnosis server component is running. For example:

     `PD_SERVER=bug.London.mycom.com`

   - An entry is required that defines the IP address of the NNM server system where the Problem Diagnosis server component is running. For example:

     `PD_SERVER_IP=16.216.111.55`

   - An entry is required that defines the port number assigned to the Problem Diagnosis server. For example:

     `PD_SERVER_PORT=8069`

     The default value is 8069.

- An entry is required that defines the port number assigned to the NNM-ET Home Base. For example:

  `NNM_ET_PORT=7510`

  The default value is 7510.

4. NDAOM installs two user profiles in the user profile bank: `NDAOM-Admin-Profile` and `NDAOM-Operator-Profile`. Ensure that you assign one of them to the current user.
5. Start the following command on the OVO management server system:

   `/opt/OV/ndaom/bin/update_templates.sh`

   This shell script updates the NDAOM templates that are necessary for the Problem Diagnosis Server integration and uploads them again to the OVO management server.

Installing NDAOM on the OVO Managed Node Systems

Installing NDAOM on OVO managed node systems consists of these activities, which are described below:

- Installing NDAOM actions, commands, templates, and monitors
- Installing the NDAOM subagent

Installing the NDAOM Actions, Commands, Templates, and Monitors

From the message source templates, assign one of the following to each node, depending on the node type:

- NDAOM_MS — management server node
- NDAOM_UX — UNIX (HP or Solaris) node
- NDAOM_WIN — Windows node

Deploy the instrumentation using the standard OVO deployment mechanism.

Installing the NDAOM Subagent

The NDAOM subagent consists of the Problem Diagnosis probe. It is deployed from the OVO management server system using ovnwlinkmon.

1. Use the ovnwlinkmon program with the -add option to add the network connections to be monitored to the global tuple database.

   ovnwlinkmon is located in: /opt/OV/ndaom/bin

   For a detailed description of how to use ovnwlinkmon -add, see “ovnwlinkmon -add [-NoNewObject]” on page 62.

2. View the network connections in the global tuple database using the command:

   ovnwlinkmon -list

3. Deploy the NDAOM subagent to the managed nodes that are listed as Source nodes in the global tuple database using the command:

   ovnwlinkmon -deploy source=srcnode.xxx.com

   For a detailed description of how to use ovnwlinkmon -deploy, see “ovnwlinkmon -deploy” on page 68.

4. Deployment of the NDAOM subagents via ovnwlinkmon -deploy usually takes a few minutes. Please wait until you receive an Installation Success message in the OVO message browser on the management server.

If the NDAOM subagent installation fails, check the installation log file on the managed node system:

Unix	/tmp/install_nwagt.log
Windows	\TEMP\install_nwagt.log

Upgrading from Earlier Versions

If you are upgrading NDAOM to version A.02.00 from a previous version, you must first uninstall the previous version. Use the following procedure before you attempt to install the current version of NDAOM.

1. Find all the NDAOM services by executing the following command:

   ```
   opcservice -list -all | grep "Net:"
   ```

2. Manually remove all NDAOM services by executing the following command:

   ```
   opcservice -remove Net:*
   ```

3. Find all the NDAOM actions by executing the following command:

   ```
   opcservice -list -all | grep "NW:"
   ```

4. Manually remove all the NDAOM actions by executing the following command:

   ```
   opcservice -remove NW:*
   ```

5. Follow the uninstall instructions in the section called “Uninstalling NDAOM on the OVO Management Server System” on page 36.

Uninstallation Tasks

Uninstallation of the HP OpenView Network Diagnosis Add-On Module for HP OpenView Operations is divided into two parts:

- Uninstall the NDAOM components from the managed node.
- Uninstall the NDAOM software on the management server.

Uninstalling NDAOM on OVO Managed Node Systems

Although the managed node uses the subagent mechanism for the NDAOM, the nodes are not registered at the management server. Thus uninstallation of the probe cannot be done with the HP OpenView Operations subagent de-installation mechanism.

Do one of the following:

- Use the `ovnwlinkmon -remove_sa` command line call (see page 68 for further details).
- Call the uninstall script directly on the managed node, using one of the following commands:

  HP-UX/Solaris (HTTPS & DCE):

  ```
  <OvInstallDir>/pdAE/bin/pdcentral.sh
  -uninstall
  ```

  Windows (HTTPS):

  ```
  <OvInstallDr>/pdAE/bin/pdcentral.bat
  -uninstall
  ```

  Windows (DCE):

  ```
  <Drive>\Program Files\HP Openview\
  pdAE\bin\pdcentral.bat -uninstall
  ```

NOTE

After the uninstallation is complete, the following entities remain in the node:

- NDAOM tools
- NDAOM policies
- NDAOM node group

Uninstalling NDAOM on the OVO Management Server System

To uninstall the NDAOM from the OVO management server, carry out the following steps:

1. Log in to the OVO management server system as user **root**.
2. The software can be removed from the management server using the command appropriate for your operating system:

   HP-UX `# swremove AOM-ND-OVO-HP`

   SUN Solaris `# swremove AOM-ND-OVO-SOL`

3 Integrating NNM into OVO

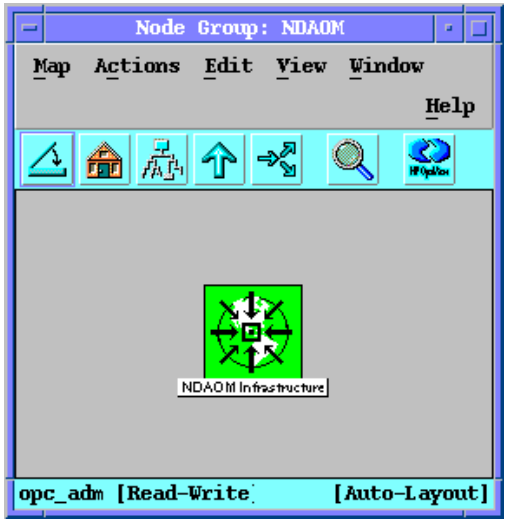
This section describes how NDAOM integrates NNM into the HP OpenView Operations user interface. Service views are covered in Chapter 4, “Integrating HP OpenView Network Diagnosis Add-On Module into OVO Service View,” on page 59.

Node Bank

The installation of NDAOM adds a virtual node `NDAOM_Infrastructure` for external events to the list of managed nodes. This node gets messages for the monitored network links. This makes it possible to assign the messages to a service representing a network connection in the Service View.

Attribute	Value
Label	NDAOM Infrastructure
Network Type	Others
Node Pattern	NDAOM_Infrastructure
Type of Node	Message allowed

Figure 3-1 NDAOM_Infrastructure Virtual Node



Node Group Bank

A node group, `NDAOM`, is incorporated containing all nodes that have a probe installed.

This node group can be used within the template assignment and the responsibility matrix of an operator. It is also used in the user profile.

Message Group Bank

Two message groups are used:

- The standard group `Network` that is available within HP OpenView Operations.
- The new message group, `NDAOM`, contains messages generated by the NDAOM due to unexpected behavior of the environment, for example, “Cannot find probe on node.”

Application Group Bank

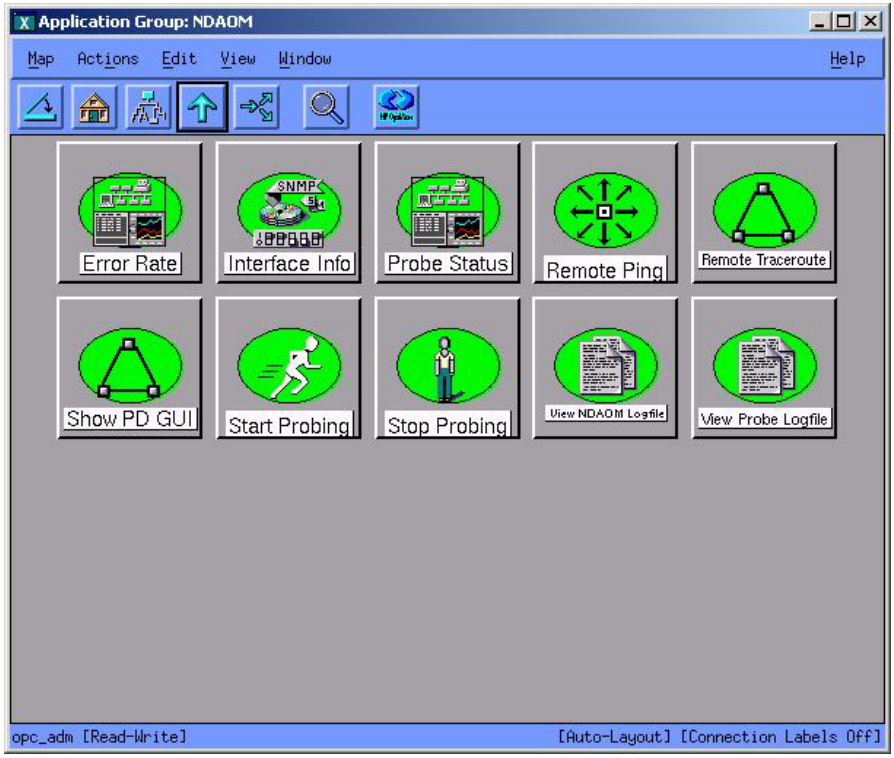
The NDAOM installation adds the following application groups to the application bank:

- **NDAOM**
- **NDAOM-Admin**

NDAOM Application Group

The NDAOM application group contains the following applications that are used with NDAOM in a runtime environment.

Figure 3-2 NDAOM Application Group



- **Error Rate**

  Error rate of interfaces per node.

  Executed On Managed Node

  Parameter `$OPC_NODES`

- **Interface Info**

  Show processed SNMP interface info per node.

  Executed On Managed Node

  Parameter `$OPC_NODES`

- **Probe Status**

  Get the status of the NDAOM subagent and the NetPath probe (stopped or running).

  Executed On Managed Node

  Parameter `$OPC_NODES`

- **Remote Ping**

  Execute a ping between two selected nodes.

  Executed On Managed Node

  Parameter $OPC_NODES

  Additional Parameters Name of the node to ping.

- **Remote Traceroute**

  Execute a manual traceroute between two selected nodes.

  Executed On Managed Node

  Parameter `$OPC_NODES`

  Additional Parameters Name of the node to traceroute.

- **Show PD GUI**

  Starts the Problem Diagnosis GUI as a standalone tool.

  Executed On Management Server System

  Parameter None

- **Start Probing**

  Start the NDAOM subagent (`PD probe`) on the managed node.

  Executed On Managed Node

  Parameter `$OPC_NODES`

- **Stop Probing**

  Stop the NDAOM subagent and cease probing network connections.

  Executed On Managed Node

  Parameter `$OPC_NODES`

- **View NDAOM Logfile**

  View the NDAOM logfile (log output of `ovnwlinkmon` and `ovnwmonitor`). This application can be executed only for the management server.

  Executed On Managed Node

  Parameter `$OPC_NODES`

- **View Probe Logfile**

  View the NetPath probe logfile.

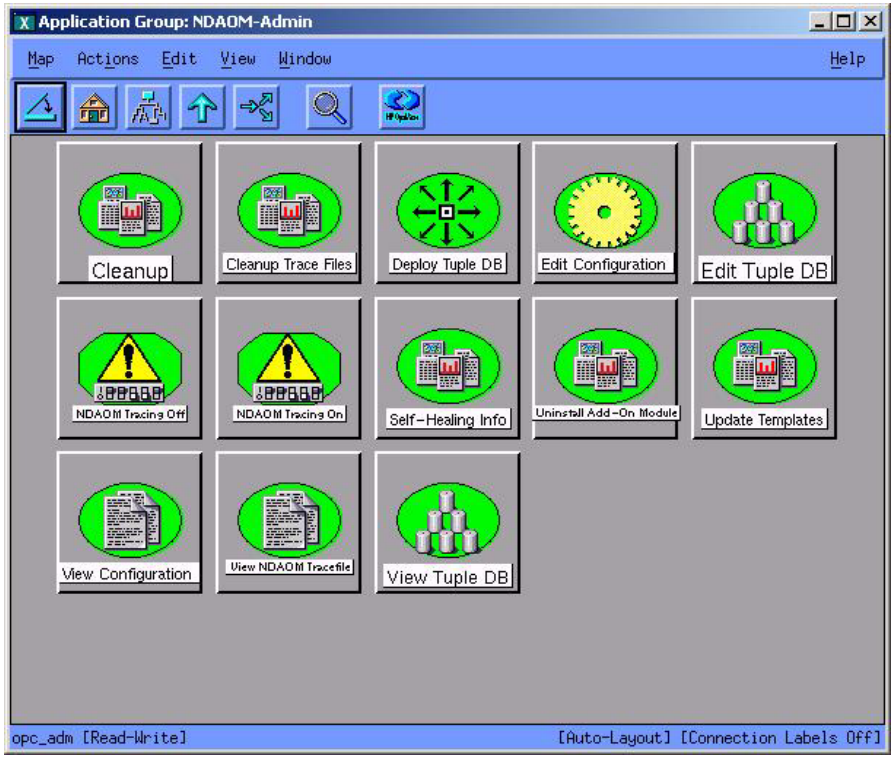
  Executed On Managed Node

  Parameter `$OPC_NODES`

NDAOM-Admin Application Group

The `NDAOM-Admin` application group contains applications that are used to do NDAOM configuration tasks, for example, modifying the tuple DB with the editor.

Figure 3-3 NDAOM-Admin Application Group



- **Cleanup**

  Remove the NDAOM and PD probe history data by resetting trace and log files and removing temporary files.

  Executed On Management Server

  Parameter `$OPC_NODES`

- **Cleanup Trace Files**

  Removes the NDAOM and PD probe trace files (`ndaom.trc`, `xml.trc.*` and `npprobe.log`).

  Executed On Management Server

  Parameter `$OPC_NODES`

- **Deploy Tuple DB**

  Deploys the tuple DB and, if necessary, the NDAOM subagent.

  Executed On Management Server System

  Parameter `$OPC_NODES`

- **Edit Configuration**

  Edit NDAOM configuration on the management server.

  Executed On Management Server

  Parameter `$OPC_NODES`

  Not available from the OVO Java GUI (input/output windows not supported).

- **Edit Tuple DB**

  Modify the tuple database using the Tuple Editor.

  Executed On. Management Server System

  Parameter. -

  Not available from the OVO Java GUI (input/output windows not supported).

- **NDAOM Tracing Off**

  Turns off tracing for the NDAOM executable files (`ovnwmonitor` and `ovnwlinkmon`).

  Executed On Management Server

  Parameter `$OPC_NODES`

- **NDAOM Tracing On**

  Turns on tracing for the NDAOM executable files. Sets `TRACE_LEVEL` to 2.

  Executed On Management Server

  Parameter `$OPC_NODES`

- **Self-Healing Info**

  Collects the information necessary for troubleshooting the SPI in case of any defects.

  Executed On Management Server

  Parameter None

- **Uninstall Add-On Module**

  Removes the NDAOM product from the management server. You must use the customized start of this application and add the parameter **`-YES`** to uninstall NDAOM.

  Executed On Management Server

  Parameter `-YES`

- **Update Templates**

  Updates and uploads NDAOM templates as specified in the NDAOM configuration file (`ndaom.cfg`).

  Executed On Management Server

  Parameter None

- **View Configuration**

  View the NDAOM configuration file (`ndaom.cfg`).

  Executed On Management Server

  Parameter `$OPC_NODES`

- **View NDAOM Tracefile**

  Views trace file of the NDAOM executable files.

  Executed On Management Server

  Parameter `$OPC_NODES`

- **View PD ProbeTracefile**

  Views trace file of the PD probe (NetPath probe).

  Executed On Managed Node

  Parameter `$OPC_NODES`

- **View Tuple DB**

  Show the contents of the tuple database.

  Executed On Management Server System

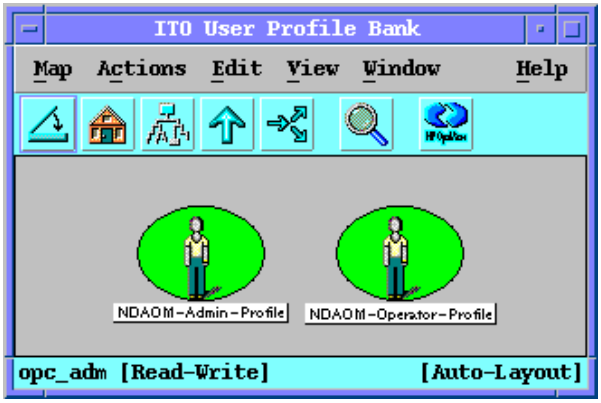
  Parameter `$OPC_NODES`

User Bank

No users are generated. It is assumed that the operators use the NDAOM as add-on functionality. For example, they already have an SAP SPI installed and will use those users. Thus, NDAOM will offer only two profiles that can be assigned to existing HP OpenView Operations users.

User Profile Bank

Figure 3-4 User Profile Bank



Two profiles are generated:

- `NDAOM-Admin-Profile`
- `NDAOM-Operator-Profile`

The following table shows the responsibilities associated with the profiles. Differences between the two profiles are mainly the administrative tasks that only the NDAOM administrator is allowed to do.

	NDAOM-Admin-Profile	**NDAOM-Operator-Profile**
Applications	NDAOM-Admin NDAOM	NDAOM
Message Groups	Network NDAOM	Network NDAOM
Node Groups	NDAOM	NDAOM

Message Source Templates

The standard NDAOM templates are distributed using the HP OpenView Operations deployment mechanism. The templates are divided into logical groups and can be assigned to a managed node individually or together.

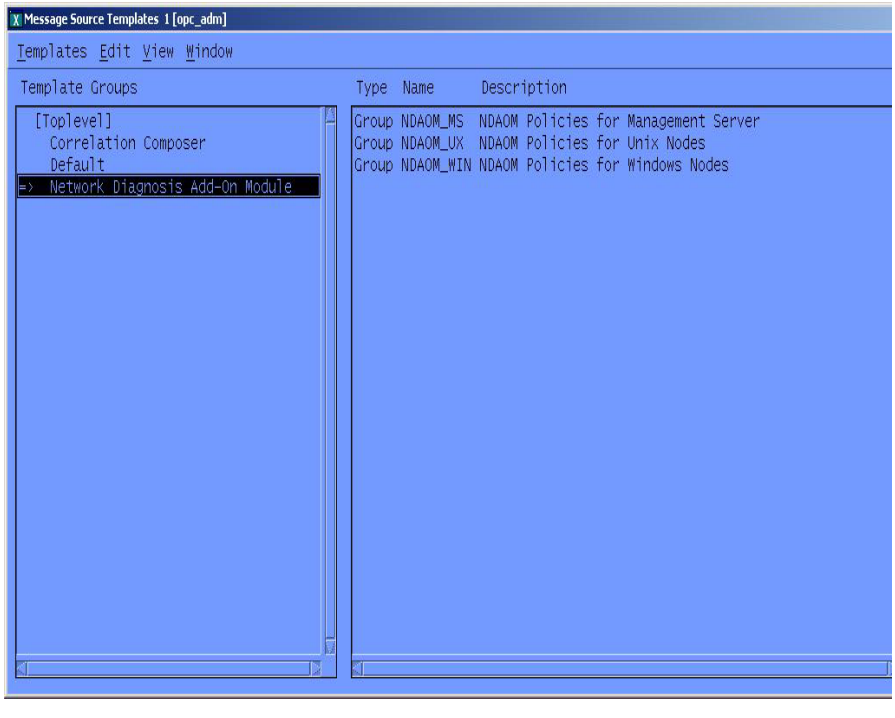
The policy groups that are available under Network Diagnosis Add-on Module are the following:

NDAOM_MS Policy group containing templates for the management server.

NDAOM_UX Policy group containing templates for UNIX managed nodes.

NDAOM_WIN Policy group containing templates for Windows managed nodes.

Figure 3-5 Message Source Templates



NDAOM_MS Policy Group

The following templates are in the NDAOM_MS policy group.

Message Templates

The following message templates are available:

- **`NDAOM_Messages`**

  Message template that adds an operator initiated action to the network path messages originating from the NDAOM monitor (ovnwmonitor). This operator-initiated action starts the PD GUI.

NOTE

This operator initiated action can only be started from the OVO Java GUI, *NOT* from the message browser in the OVO Operator Motif GUI (started with the opc command).

Condition	Network path message
Severity	Unchanged
Description	Adds an operator initiated action to Network Path related messages

This template also intercepts the message “NDAOM Subagent successfully installed/removed” and forwards it to the management server.

Condition	NDAOM Subagent installation message
Severity	Unchanged
Description	Forwards the NDAOM subagent installation/removal messages to the managment server

Logfile Templates

The following logfile templates are available:

- **`NDAOM_NDAOM_log_Ux`**

These templates analyze messages logged in `ndaom.log` and prepares them to be sent to the management server. They are located at:

`/var/opt/OV/ndaom/log/ndaom.log`

Entries have the format "`<mm/dd/yyyy> <hh:mm:ss> [<severity>] NDAOM-<msg_code>(<program_name>): <msg_text>`".

Condition	Checks for errors in ndaom.log	Checks for warnings in ndaom.log	Checks for info messages in ndaom.log
Severity	Critical	Warning	Normal
Description	Forwards any error condition	Forwards any warning condition	Forwards any information condition
Object	<object>	<object>	<object>
Message Text	<err_txt>	<warn_txt>	<info_txt>

Monitor Templates

The following logfile templates are available:

- **`NDAOM_Monitor`**

  A monitor template that uses the NP Central to analyze paths.

  Command `ovnwmonitor` (external monitor)

Condition	RespTime Error	RespTime Warning	RespTime Test
Severity	Major	Warning	Normal
Description	Message will be sent if response time is much too long.	Message will be sent if response time is too long.	Only for test purposes.
Threshold Value	1000 ms	500 ms	10 ms

- **NDAOM_Logfiles_Ux**

  A monitor template that checks the size of the NDAOM log and trace files on UNIX systems. If the size exceeds a specified limit, the logfile or tracefile is truncated and compressed.

  Command `ndaom_logsize.sh NDAOM_Logfiles_Ux`

  Action `ndaom_trunclog`

Condition	Size of error log
Severity	Normal
Description	File size limit reached - truncated
Threshold Value	500 KB

- **NDAOM_Vitalfiles_Ux**

  A monitor template that checks the existence of vital files, such as the tuple database file (`nwlmdb_sv`) and the config file (`ndaom.cfg`) OVO management server systems. If a file is accidentally deleted or moved, a critical message is sent to the management server, identifying the file and informing you that you must restore it.

  Command `ndaom_vitalfiles.sh NDAOM_Vitalfiles_Ux`

Conditions	Check for existence of NDAOM Config file Check for existence of NDAOM Tuple DB
Severity	Critical
Description	NDAOM Vital file (TupleDB / `ndaom.cfg`) missing. Please restore the file.

NDAOM_UX Policy Group

The **NDAOM_NPPROBE_log_Ux** template prepares the messages logged in `npprobe.log` to be sent to the management server. It is located at `/opt/OV/pd/netpath/log/npprobe.log`.

Entries have the format "<mm/dd/yyyy> <hh:mm:ss> [<severity>] NDAOM-<msg_code>(<program_name>): <msg_text>".

Condition	Checks for errors in npprobe.log	Checks for warnings in npprobe.log	Checks for info messages in npprobe.log
Severity	Critical	Warning	Normal
Description	Forwards any error condition	Forwards any warning condition	Forwards any information condition
Message Text	<err_txt>	<warn_txt>	<info_txt>

NDAOM_WIN Policy Group

The **NDAOM_NPPROBE_log_Win** template prepares the messages logged in npprobe.log to be sent to the management server. It is located at c:\Program Files\HP OpenView\pd\netpath\log\ndaom.log.

Entries have the format "<mm/dd/yyyy> <hh:mm:ss> [<severity>] NDAOM-<msg_code>(<program_name>): <msg_text>".

Condition	Checks for errors in npprobe.log	Checks for warnings in npprobe.log	Checks for info messages in npprobe.log
Severity	Critical	Warning	Normal
Description	Forwards any error condition	Forwards any warning condition	Forwards any information condition
Message Text	<err_txt>	<warn_txt>	<info_txt>

Messages

The following situations caused by events sent from the event port create messages:

Path Has Changed

This message is sent due to an event from the event port of the probe.

Attribute	Value
Severity	Minor
Node	NDAOM_Infrastructure
Application	NDAOM
Message Group	Network
Object	Destination Node
Message Text	Network connection between <$MSG_NODE> and <$OBJECT> has changed from path <$PATH1> to <$PATH2>
Automatic Action	None
Op. Initiated Act.	Start Problem Diagnosis GUI—This operator initiated action can only be started from the OVO Java GUI, NOT from the message browser in the OVO Operator Motif GUI (started with the opc command).

Link Down

This message is sent due to an event from the event port of the probe.

Attribute	Value
Severity	Major
Node	NDAOM_Infrastructure
Application	NDAOM
Message Group	Network
Object	Destination Node
Message Text	Network connection between <$MSG_NODE> and <$OBJECT> failed
Automatic Action	None

Op. Initiated Act.	Start Problem Diagnosis GUI—This operator initiated action can only be started from the OVO Java GUI, NOT from the message browser in the OVO Operator Motif GUI (started with the opc command).

Link Up

This message is sent due to an event from the event port of the probe.

Attribute	Value
Severity	Normal
Node	NDAOM_Infrastructure
Application	NDAOM
Message Group	Network
Object	Destination Node
Message Text	Network connection between <$MSG_NODE> and <$OBJECT> up
Automatic Action	None
Op. Initiated Act.	None

Network Response Time Too High

This message is sent due to an exceeded threshold value. The monitor uses data from the performance port of the probe.

Attribute	Value
Severity	Warning
Node	NDAOM_Infrastructure
Application	NDAOM
Message Group	Network
Object	Destination Node
Message Text	Response time between <$MSG_NODE> and <$OBJECT> was <$VALUE>. Threshold is <$THRESHOLD>.
Automatic Action	None
Op. Initiated Act.	Start Problem Diagnosis GUI—This operator initiated action can only be started from the OVO Java GUI, NOT from the message browser in the OVO Operator Motif GUI (started with the opc command).

Network Path Detection Too Slow

This message is sent when the polling interval that the NetPath probe uses to monitor the network connections is smaller than the time required by the path detection process.

Attribute	Value
Severity	Normal
Node	NDAOM_Infrastructure
Application	NDAOM
Message Group	Network
Object	Destination Node
Message Text	Network path between <$MSG_NODE> and <$OBJECT> could not be detected in <$INTERVAL> minutes, so the polling interval was increased to <$NEW_INTERVAL> minutes.
Automatic Action	None
Op. Initiated Act.	Start Problem Diagnosis GUI—This operator initiated action can only be started from the OVO Java GUI, NOT from the message browser in the OVO Operator Motif GUI (started with the opc command).

4 Integrating HP OpenView Network Diagnosis Add-On Module into OVO Service View

Integration into OVO Service View

Network connections monitored by NDAOM are integrated into OVO Service View, allowing network problems to be displayed within Service View.

NOTE The PD GUI, which is launched from the network connection object, opens the Problem Diagnosis view of NNM-ET. In this GUI you enter the source and destination for a message in order to examine the root cause of the problem.

In case of a network problem, the PD GUI can be launched from the service object representing the network connection that caused the problem. For this reason, the tool to start the PD GUI is always part of the set of tools that can be launched from a network connection service object.

To configure the Service View, you use the tool `ovnwlinkmon`, described in “Command Line Interface ovnwlinkmon” on page 62.

NOTE You must not add services representing network connections directly into the Service Configuration, because they will not be monitored. All network connections to be monitored must be defined using `ovnwlinkmon`.

Command Line Call ovnwlinkmon

A Smart Plug-In can manually define the network infrastructure that is to be monitored using `ovnwlinkmon`.

`ovnwlinkmon` enables the Smart Plug-In / OVO administrator to decide whether a new service object representing the network connection is to be inserted into the Service View or not.

Command Line Interface ovnwlinkmon

The command line interface ovnwlinkmon has the following options:

ovnwlinkmon -add [-NoNewObject]

[root=<RootServiceID> parent=<ParentServiceID>]
[label=<Label>] interval=<PollingInterval>
source=<SourceNode> target=<TargetNode>

This option adds a new network connection to be monitored into the tuple database, where:

NoNewObject is the option determining whether a new service object is created that gets the messages for the monitored network connections or the messages are sent to the parent service. This option is optional. The default is that a new service object is created.

<RootServiceID> is the Service ID of the service object where the NW Infrastructure is inserted as sub-service and the new service object that is inserted belongs to. If the `-NoNewObject` option is specified then the `RootServiceID` is only needed to determine to which service object the network connection belongs. This information is needed later on for the delete operation.

<ParentServiceID> is the Service ID of the service object that is the parent service of the newly created service object. If the `-NoNewObject` option is specified this service gets the messages for the monitored network connection. The parent service can only be either in the sub tree of the root service or the same as the root service.

<Label>	is the service label of the new created service object. This parameter is optional. If it is not specified the label is the same as the service ID. This parameter is only needed if the option `-NoNewObject` is not specified. Otherwise it is ignored.
<PollingInterval>	is the interval (with unit) that determines how often the state of the network connection is polled. The default unit is minutes.
<SourceNode>	is the IP Address or node name of the start point of the path.
<TargetNode>	is the IP Address or node name of the endpoint of the path.

A new tuple, with all parameters and the `TargetServiceID`, is written into the tuple database. The `TargetServiceID` is the identifier of the service object that receives the messages for the associated network connection. If the option `-NoNewObject` has been specified, the `TargetServiceID` equals the `ParentServiceID`. If the option `-NoNewObject` has not been specified (the default case), the `TargetServiceID` is:

```
<RootServiceID>:NW:<IP Address of source node in Hex>_<IP
Address of target node in Hex>
```

If the hostname is specified for the source node or the target node and they have more than one interface, the IP address of the first interface is taken for the `TargetServiceID`. Therefore the `TargetServiceID` is always unique and it does not matter which IP address of a node is taken for the Service ID, as it is only needed for identification.

If no service view integration is required or if the HP OpenView Service Navigator is not installed, the root and parent options can be omitted.

It is possible to monitor the same network connection for different parent services.

NOTE

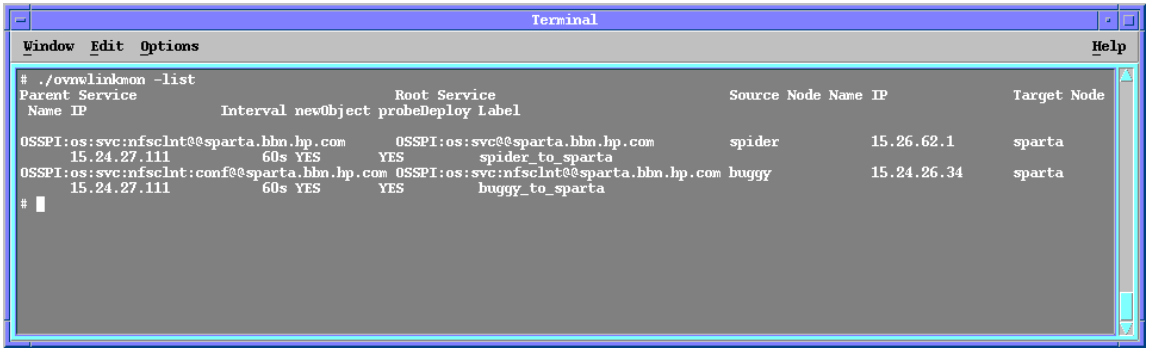
`ovnwlinkmon -add` only adds connection information to the global tuple database. It does not deploy the tuple database nor the NDAOM subagent.

In order to start monitoring the connections you have added to the tuple database, you must use the command **`ovnwlinkmon -deploy`** which actually deploys the tuple database and the NDAOM subagent to the managed node.

If `ovnwlinkmon -list` is executed the output of the tuple database is shown (provided that at least one network connection is defined). An example can be seen in Figure 4-1 on page 64:

`Parent Service Root Service Source Node Name IP Target Node Name IP Interval newObject probeDeploy Label`

Figure 4-1 ovnwlinkmon -list Output



The Tuple Database Format

The tuple database file can be modified before it is deployed. The tuple database file has the following format:

`<State> <TargetSvcID> <ParentSvcID> <RootSvcID> - <Source Name> <Source IP in Hex> - <Target Name> <Target IP in Hex> - <Interval in seconds> <noNewObject> - <probeDeploy> <xmlDeploy> <ldbDeploy> - <Label>`

where:

<State>	State of the network connection L = Valid Link D = Deleted Link
<TargetSvcID>	Created Service ID
<ParentSvcID>	Parent Service ID
<RootSvcID>	Root Service ID
<Source Name>	IP address or hostname of source system
<Source IP in Hex>	IP address of source system in Hex
<Target Name>	Hostname of target system
<Target IP in Hex>	IP address of target system in Hex
<Interval in seconds>	The interval (with unit) that determines how often the state of the network connection is polled. The default value for the unit is seconds.
<noNewObject>	Determines whether a new service object is created for the network connection 0 = new service object is created 1 = no new service object is created
<probeDeploy>	Has the NetPath probe been deployed to source node? 0 = No 1 = Yes
<xmlDeploy>	Has the network connection been inserted into the Service Tree? 0 = No 1 = Yes

`<ldbDeploy>`	Has the tuple database been deployed to the source node? 0 = No 1 = Yes
`<Label>`	The service label of the new created service object. This parameter is optional. If it is not specified the label is the same as the service ID. This parameter is only needed if the option `-NoNewObject` is not specified. Otherwise it is ignored.

An error message is generated if:

- the syntax of the command is incorrect.
- no IP address exists for a node being checked.

ovnwlinkmon -delete

root=<RootServiceID> [parent=<ParentServiceID>]
source=<SourceNode> target=<TargetNode>

This option marks a network connection in the list of monitored connections in the tuple database as deleted.

Depending on the parameter specified, it is possible to delete the specified network connection only for just one parent service or for all parent services.

If no parent service is specified, all network connections for the specified root service and the correct endpoints from the tuple database are marked as deleted. If no such network connections exist, a logging message is created. If a parent service is specified, only one network connection is deleted from the tuple database (the one with the correct root, parent, source and target).

An error/warning message is generated if:

- the syntax of the command is incorrect.
- a network connection with the specified parameters does not exist in the tuple database.
- the tuple database is empty.

ovnwlinkmon -delete_all

[root=<RootServiceID>][source=<source node>]

This option marks all network connections in the tuple database as deleted.

If no root service is specified, all tuples in the tuple DB are deleted.

If a root service is specified, all tuples with the specified RootServiceID as deleted in the tuple DB.

If a source node is specified, only the entries for this source node are deleted.

An error/warning message is generated if:

- the syntax of the command is incorrect.
- the tuple database is empty.
- a network connection with the specified root does not exist in the tuple database.

ovnwlinkmon -clear

This option clears all entries from the tuple database for each source node that is marked for deletion. Using `ovnwlinkmon -clear` is the only way to really remove tuples from the tuple database. All other operations only mark tuples as deleted.

If all tuple database entries of a source node are marked as deleted and all deployment flags of these entries are set (i.e. the entries that are to be deleted have been deployed before), all these entries from the tuple database are deleted.

An error/warning message is generated if:

- the syntax of the command is incorrect.
- the deployment flags are not set. Deployment must be done for these nodes before its entries can be removed.

ovnwlinkmon -list

[root=<RootServiceID>][-default|-verbose]

This option shows a list of all monitored network connections in the tuple database. If a root service is specified, only the network connections belonging to that root service are listed.

An error/warning message is generated if:

- the syntax of the command is incorrect.
- the tuple database is empty.
- there are no network connections defined for the root service.

ovnwlinkmon -remove_sa

[source=<source node>]

This option removes the NDAOM subagent for either all or a specified source node.

It checks the tuple database for entries of all or the specified node. If all relevant entries are marked as deleted, the subagent is removed from each specified node.

An error/warning message is generated if:

- the syntax of the command is incorrect.
- the deleted state flags are not set.

NOTE This option removes the subagents (PD probes) only on those sources for which the link status is deleted. Use this option only after you delete the link using the `ovnwlinkmon -delete` option.

ovnwlinkmon -deploy

[source=<source node>]

NOTE Make sure that the Problem Diagnosis component is up and running on the local or remote NNM server. If it is not running, start it with:

UNIX	**/opt/OV/pdAE/bin/pdcentral.sh -start**
Windows	**Start → Programs → HP OpenView → Problem Diagnosis → PD Server-Start**

If the Problem Diagnosis server is not running during the NDAOM subagent deployment/installation the newly installed NetPath probe may not be able to register at the Problem Diagnosis server and so the Problem Diagnosis server may not know this NetPath probe.

This action executes deployment to the managed nodes in two steps:

- Deployment of the NDAOM Subagent
- Update of the service view in the HP OpenView Service Navigator

If a source node is specified the deployment action will be performed for the specified node only.

Deployment of the NDAOM Subagent

Next, the NDAOM subagent (PD probe) is deployed to the source nodes of all network connections, provided that it has not already been deployed to these nodes.

The NDAOM subagent deployment consists of the following steps:

- The NDAOM subagent package is deployed to the managed node via `opcdeploy`.
- The PD probe is registered with the OVO agent via `ovcreg` for HTTPS agents and via `opcagtret` for DCE agents.
- An `opcmsg` message is sent to the message browser of the OVO management server, which informs whether the installation was successful.

  If the NDAOM subagent installation fails (for example with the error message, check the installation log file on the managed node system:

Unix	`/tmp/install_nwagt.log`
Windows	`\TEMP\install_nwagt.log`

NOTE

The NDAOM subagent installation is not finished until this message is sent. It is possible to observe the progress of the NDAOM subagent installation by executing the following command on the managed node:

```
tail -f /tmp/install_nwagt.log
```

Update of the Service View in Service Navigator

If deployment of the NDAOM subagent is successful, the contents of the tuple database is synchronized with the service view on the management server.

For every tuple of the tuple database, a check is made to ascertain whether a new service object has to be inserted into the Service View. If the `-NoNewObject` option is set for that tuple, no new service object has to be inserted. If the `-NoNewObject` option is not set for that tuple, a check is made to ascertain whether a service object for the NW Infrastructure of the root service already exists in the Service View. If this is not the case, a new service object with the service ID:

`Net:<RootServiceID>`

is inserted as a sub-service of the root service into the Service View.

Next, a check is made to ascertain whether a service object for the NW Infrastructure of the parent service already exists in the Service View. If not, a new service object with the service ID:

`Net:<ParentSrvID>`

is inserted as sub service of the service representing the NW Infrastructure of the root service.

Then a check is made to establish whether a service object with the same service ID as the TargetServiceID of the tuple already exists in the Service View. If not, a new service object with that service ID as sub service of the NW Infrastructure of the parent service is inserted. If such a service already exists, only a dependency between the NW Infrastructure of the parent service and the service representing the network connection is created.

An error/warning message is generated if:

- the syntax of the command is incorrect.
- the tuple database is empty.
- the tuple database on the management server is not deployed successfully to the managed nodes.
- the NetPath probe and monitor are not deployed successfully to the managed nodes.
- the Service View update was not successful for all network connections.
- the source node of a network connection is not a managed node.
- the root or the parent service does not exist.

Example

The Application Server of a SAP System always needs a working network connection between itself and the Database Server, for example, when it needs to get data out of the database. While the Database Server is not affected if there is a problem on that network connection, this network problem has a high impact on the Application Server. Without the network connection, the Application Server can not retrieve data for its applications from the Database.

In this example, let us assume that the Application Server resides on the node `parsley` and the Database Server resides on the node `sundev01`. To get data out of the database, the Application Server makes a request to the Database Server. To do this, it must have a working network path from the Application Server to the Database Server. To get the retrieved data, a working network path from the Database Server back to the Management Server must also exist. Because of this, the path from the Application Server to the Database Server and back must be monitored. To monitor these paths the following calls of `ovnwlinkmon` are executed:

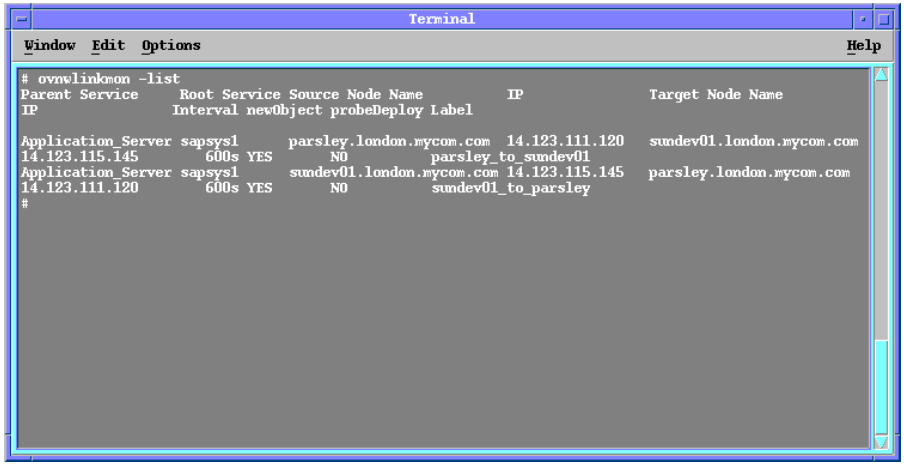
```
ovnwlinkmon -add root=sapsys1 parent=Application_Server
interval=10m source=parsley.london.mycom.com
target=sundev01.london.mycom.com label=parsley_to_sundev01
```

and

```
ovnwlinkmon -add root=sapsys1 parent=Application_Server
interval=10m source=sundev01.london.mycom.com
target=parsley.london.mycom.com label=sundev01_to_parsley
```

As the Application Server and the Database Server are part of the SAP System `sapsys1`, this service is used as the root service. The parent service is the Application Server, as it is dependent on these network paths. The first network connection monitors the path from node `parsley.london.mycom.com` to node `sundev01.london.mycom.com` while the second network connection monitors the path from node `sundev01.london.mycom.com` to node `parsley.london.mycom.com`. The status of these network connections is polled every 10 minutes. A call of **`ovnwlinkmon -list`** shows the following:

Figure 4-2 ovnwlinkmon Output



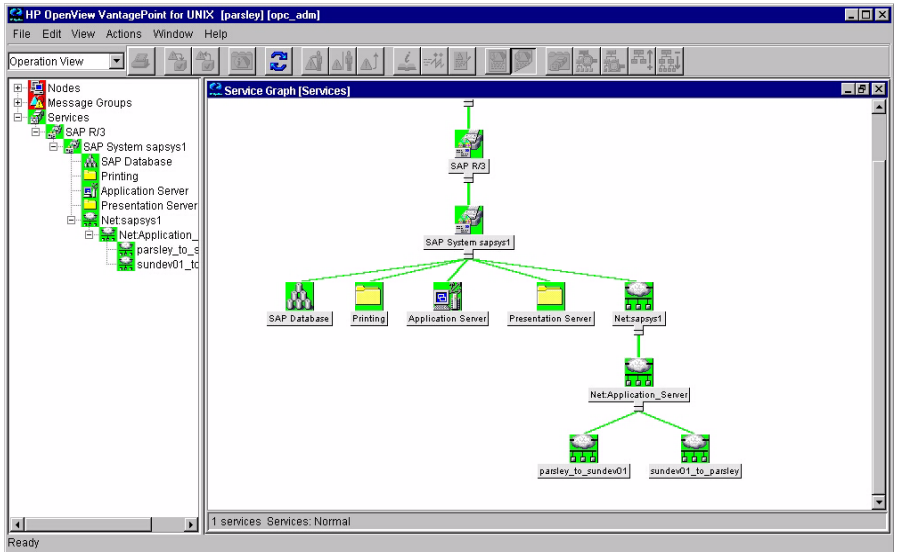
Although these network connections have been inserted into the tuple database, they will not be monitored before they are deployed. This is done with the following `ovnwlinkmon` call:

```
ovnwlinkmon -deploy
```

NOTE Probe deployment is successful for network connections only where the source node is a managed node. If the node is not a managed node, the probe cannot be deployed and an error message is generated.

The Service View is updated after the tuple database and the Probe have been deployed. However, before this is done the existence of root service and parent service is checked. If the root or parent services do not exist, an error message is generated and the network connection will not be inserted into the service view.

Figure 4-3 Service View with the Net:sapsys1 Subservice



A new service object, `Net:sapsys1`, is inserted as a subservice of the Root Service. This service represents the NW Infrastructure of the SAP System `sapsys1`. It contains just one subservice, the NW Infrastructure of the Application Server. Subsequently, if more network connections are defined with `sapsys1` as the root or parent service, the new services (NW Infrastructures or network connections) are inserted in the `Net:sapsys1` object. The two network connections that were defined with the above commands are inserted as subservices of the NW Infrastructure of the parent service. The service `Net:Application_Server` in this example. Now if network problems occur on the path between parsley and sundev01, for example, one of the interfaces on the path is down, this is displayed immediately in the OVO GUI as the status of a network connection is always propagated up to the root service. Therefore, it is easy to detect if the SAP System has a problem caused by network problems or by any of its applications.

In case of a network problems, the PD GUI can be launched from the service object that represents the network connection that caused the problem. To be able to do this, the Network Diagnosis Add-On Module inserted actions into the Service Configuration to start the PD GUI from network connection service objects. This is a web interface that displays the network connection information between two given nodes. It can be launched either in the context of the message that generated the status change or the service object representing the network connection. The PD GUI shows all possible paths between the nodes of the network connection as well as more details about a specific path.

Figure 4-4 Service View with NDAOM Actions

With the following `ovnwlinkmon` call, an additional network connection is defined that monitors the path from the Application Server to the Printer on node `escape.london.mycom.com`:

```
ovnwlinkmon -add -NoNewOject root=sapsys1
parent=Application_Server interval=30m
source=parsley.london.mycom.com
target=escape.london.mycom.com
```

As the `-NoNewObject` option is specified, no new service object is created for this network connection. Instead, all messages for this network connection are sent directly to the service object representing the Application Server.

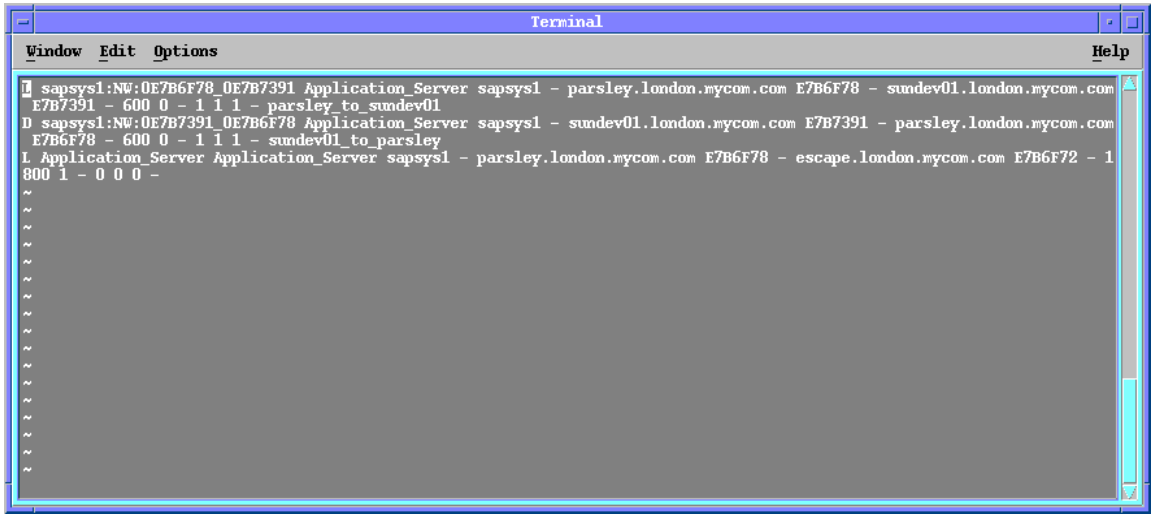
Later, if it is decided that the network connection from sundev01 to parsley is not to be monitored any more, the connection is deleted with the following command:

```
ovnwlinkmon -delete root=sapsys1
source=sundev01.london.mycom.com
target=parsley.london.mycom.com
```

These add-/delete-operations will not become effective before the next deploy operation. Before the network connection between the Application Server and the Printer is not monitored while the network connection between the Database Server and the Application Server is still monitored.

The following illustration shows the content of the tuple database before the deploy operation. The format of the tuple database is described in “The Tuple Database Format” on page 64.

Figure 4-5 Contents of the Tuple Database before Deploy Operation



The first letter of the definition of a network connection shows the state of the network connection. Network connections that is no longer to be monitored after the next deploy operation, show as state the letter “D” (= Deleted network connection). In the example this is the network connection `sundev01_to_parsley`. For the last network connection, the `noNewObject` flag is set to 1, as no service object is created for this network connection. In addition the `probeDeploy`, `xmlDeploy` and

`ldbDeploy` flags are set to zero. That means that neither the NetPath probe nor the tuple database has been deployed successfully to the source node of the network connection nor the Service Configuration has been updated successful. These flags should never be modified, otherwise it can lead to inconsistencies. For example, if the `probeDeploy` flag is set to 1 although the Probe has not been deployed to the source of the network connection, this network connection will not be monitored.

5 Troubleshooting

In this chapter you will find information on:

- Basic troubleshooting
- How to set tracing for UNIX scripts

Basic Troubleshooting

If you are having problems with your NDAOM installation, as a first step to solving the problems, please check the following points:

- Check that the required patches are installed.
- Check that the NetPath probes are running.

  You can check this with the command:

  `telnet <managed node> 9876`

  If telnet can connect to the NetPath probe port, the NetPath probe is running.
- Check that the configuration file is correctly configured. The file is located at:

  `/etc/opt/OV/ndaom/conf/ndaom.cfg`
- Check the tuple database (especially the flags). The tuple database is located at:

  `/var/opt/OV/share/ndaom/nwlmdb_sv`
- Check the NDAOM logfiles:

  — `/tmp/install_ndaom.log`

  — `/var/opt/OV/ndaom/log/install_nwagt.log`

  All log and trace files are stored in the `/var/opt/OV/ndaom/log` directory on both the management server and the managed nodes.
- Make sure that the database is unlocked using the following command:

  `ovnwlinkmon -unlock`

Set Tracing for UNIX Scripts

UNIX scripts on managed node systems can be traced using the HP OpenView Operations tracing facility, which helps you to investigate the causes of problems. For example, if processes or programs abort, performance is greatly reduced, or unexpected results appear. Trace logfiles can provide pointers to where and when the problem occurred.

Tracing can be activated for selected nodes, a specific management server, and/or agent processes. To simplify the interpretation of the trace logfile, tracing can be activated for specific functional areas by specifying one or more functional areas in the trace statement. Activating Tracing shows how to use the trace statement, and Functional Tracing Areas gives a list of all available functional areas that may be used for tracing. Note that some areas are not available for some processes.

NetPath Probe and Monitor Tracing

Tracing from the NetPath probe or monitor:

1. Select system from node bank that you wish to have traced.
2. Double click the **Tracing On** application in **NDAOM** application group.

   This will enable tracing on the selected system and restart the probe in trace mode.
3. Check the `NP Probe Log` and `NDAOM Log` files on the selected system using the **View Tracefile** application from the `Applications` bank.
4. Analyze contents of these files for information on potential causes of problems.

Advanced script tracing can be set using the **set -x** entry on UNIX nodes.

The script can be modified directly on the managed node

or

by executing the command: **`ksh -x <script> <paras>`**

On Windows nodes, comment out the `@echo off` statement in the first line (using the comment identifier **`rem`**).

A NDAOM Configuration Information

In this appendix you will find information on the variables that can be configured within the NDAOM configuration file, `ndaom.cfg`.

NDAOM Configuration File

The NDAOM configuration file, `ndaom.cfg`, contains the configuration information for the NDAOM:

- executable files
- scripts
- applications

It is located in:

`/etc/opt/OV/ndaom/conf/ndaom.cfg`

Each line in the `ndaom.cfg` file can be a comment or a variable assignment.

Comment: Every line beginning with a hash mark (#) is considered a comment and is skipped during the parsing.

Variable assignment: This must be of the form:

`<VAR>=<value>`

where `<VAR>` is the name of the variable and `<value>` is the value that should be assigned to this variable. The value must not be enclosed by quotes. Blanks are not allowed before or after the equal sign (=). The keyword `<VAR>` must always be written in uppercase letters.

- **`NNM_ET_PORT=n`**

  Defines the port number used by NNM ET home base. For example:

  `NNM_ET_PORT=7510`

  The default value is 7510.

- **`PD_SERVER=s`**

  The fully qualified domain name of the network node where the Problem Diagnosis (PD) server installation resides. Currently the PD product must be installed on the OVO management server. For example:

  `PD_SERVER=bug.London.mycom.com`

- **PD_SERVER_IP=xxx.xxx.xxx.xxx**

  Defines the IP address of the network node where the PD server installation resides. For example:

  ```
  PD_SERVER_IP=16.216.111.55
  ```

- **PD_SERVER_PORT=n**

  Defines the port number that the PD server uses to wait for information from its probes. For example:

  ```
  PD_SERVER_PORT=8069
  ```

  The default value is 8069.

- **TRACE_LEVEL=n**

  Defines the trace level to be used by the NDAOM executable files. The trace level can be an integer value between 0 and 9.

  0 corresponds to **no tracing** and 9 requests **maximum detail**. For example:

  ```
  TRACE_LEVEL=9
  ```

Table A-1 Trace Level Settings

Level	Trace Objects (cumulative)
0	Tracing is off
1	Major program actions
2	Major program events
3	Minor program actions
4	Minor program events
5	Function calls
6	Function parameters and results
7	Complete Embedded Performance Component dynamic data feed output of ovnwpdc

Table A-1 Trace Level Settings (Continued)

Level	Trace Objects (cumulative)
8	Complete TCP communication will be written to files (Filenames: xml.trc.xxx in the ndaom/log directory, where xxx is a number from 0 to 999). Every `send` or `receive` event creates a new file with incremented filename. After reaching file xml.trc.999 the next one will be xml.trc.000 and overwrites the old one.
9	Maximum detailed tracing. (Beware, this trace level produces very large trace files in a very short time).

- **`TRACE_AREA=s`**

  Defines the trace area that should be used when tracing is turned on (`TRACE_LEVEL > 0`). The trace area must be the name of an executable. For example `ovnwmonitor` or `ovnwpdc`.

  If a trace area is specified, then tracing is only turned on for this trace area.

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