Tivoli. **Netcool/Precision for Transmission Networks**
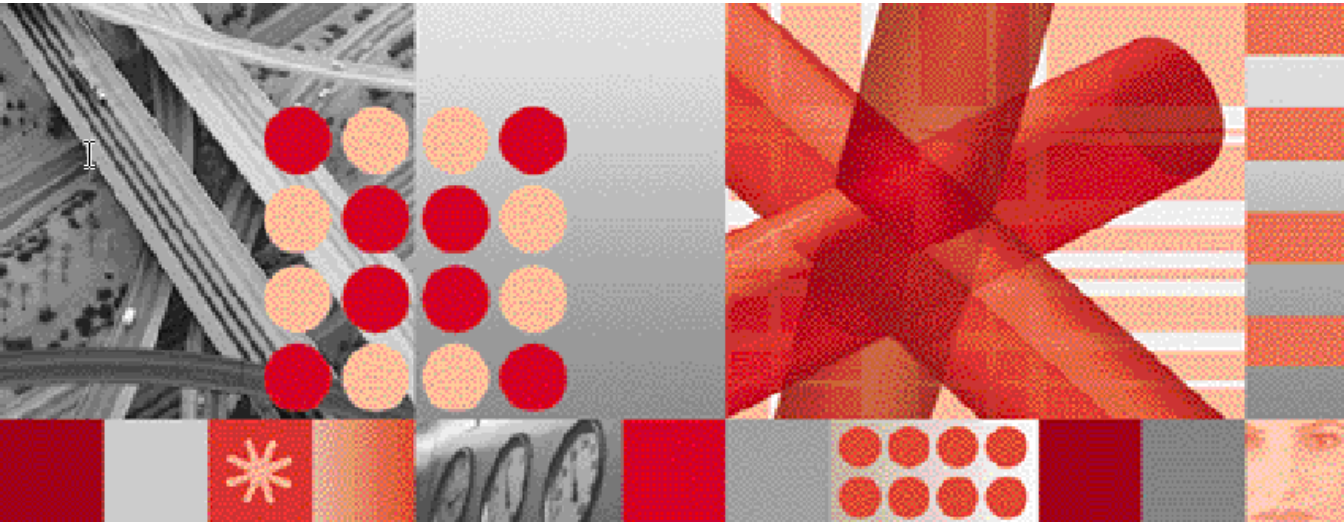
IBM

5.5

Administration Guide

Note

Before using this information and the product it supports, read the information in Appendix B. "Notices" on page 69.

Contents

Tables

Figures

Preface

This guide describes how to install and configure IBM Tivoli Netcool®/Precision™ for Transmission Networks (Netcool/Precision TN) on UNIX. The guide also covers how to use Netcool/Precision TN to discover a telecommunications network, view network inventory and reports, and visualize alerts in in IBM Tivoli Netcool®/OMNIbus™

The preface contains the following sections:

About this guide

This book is organized as follows:

  Provides an overview of Netcool/Precision TN, including a brief description of its features, how it works, and its web-based user interface.

  Describes how to install the product on supported platforms. It also includes information about how to use an existing copy of the MySQL database.

  Describes how to start the Netcool/Precision TN components, and how to use Netcool/Precision TN to discover your network, view its inventory, resolve topology, view logs and asset reports, manage security, and shut down the server.

  Describes how to configure Netcool/OMNIbus for visualization, start the components, and visualize alerts using Netcool/Precision TN.

  Describes how to configure the software to use an Oracle database instead of MySQL, how to configure failover, and how to configure the product so that it can be monitored by Netcool/OMNIbus process control. It also includes a section on troubleshooting setup problems.

- Appendix A. "Reference" on page 63

  Contains command line options, properties, and third-party software information for Netcool/Precision TN.

Audience

This guide is intended for administrators who need to install and set up Netcool/Precision TN, and configure network element visualization in Netcool/Precision TN.

The guide also explains how network administrators can use Netcool/Precision TN to discover telecom networks, view network topology and inventory.

Netcool/Precision TN works in conjunction with Netcool®/OMNIbus™ and it is assumed that you understand how Netcool/OMNIbus works. For more information about Netcool/OMNIbus, see the publications described in "Associated publications" on page xiii

Typographical notation

Table 1 shows the typographical notation and conventions used to describe commands, SQL syntax, and graphical user interface (GUI) features. This notation is used throughout this book and other IBM Tivoli ® publications.

Table 1. *Typographical Notation and Conventions (1 of 2)*

Example	Description
Monospace	The following are described in a monospace font: • Commands and command line options • Screen representations • Source code • Object names • Program names • SQL syntax elements • File, path, and directory names Italicized monospace text indicates a variable that the user must populate. For example, `-password password`.
Bold	The following application characteristics are described in a bold font style: • Buttons **Note:** Text in the pop-up tooltips is used to name buttons with icons. These button names are described in plain text. • Frames • Text fields • Menu entries A bold arrow symbol indicates a menu entry selection. For example, **File→Save**.

Table 1. *Typographical Notation and Conventions (2 of 2)*

Example	Description
Italic	The following are described in an italic font style: • An application window name; for example, the *Login* window • Information that the user must enter • The introduction of a new term or definition • Emphasized text • References to external documents

[1]	Code or command examples are occasionally prefixed with a line number in square brackets. For example:
	
	`[1] First command...`
	`[2] Second command...`
	`[3] Third command...`

{ a | b }	In SQL syntax notation, curly brackets enclose two or more required alternative choices, separated by vertical bars.
[ ]	In SQL syntax notation, square brackets indicate an optional element or clause. Multiple elements or clauses are separated by vertical bars.
|	In SQL syntax notation, vertical bars separate two or more alternative syntax elements.
...	In SQL syntax notation, ellipses indicate that the preceding element can be repeated. The repetition is unlimited unless otherwise indicated.
,...	In SQL syntax notation, ellipses preceded by a comma indicate that the preceding element can be repeated, with each repeated element separated from the last by a comma. The repetition is unlimited unless otherwise indicated.
<u>a</u>	In SQL syntax notation, an underlined element indicates a default option.
( )	In SQL syntax notation, parentheses within the statement syntax are part of the syntax and should be typed as shown unless otherwise indicated.

Many IBM Tivoli commands have one or more command line options that are specified following a hyphen (–).

Command line options are string, integer, or BOOLEAN types:

• A string can contain alphanumeric characters. If the string has spaces in it, enclose it in quotation (") marks.
• An integer must contain a positive whole number or zero (0).
• A BOOLEAN must be set to TRUE or FALSE.

SQL keywords are not case-sensitive, and might display in uppercase, lowercase, or mixed case. Names of ObjectServer objects and identifiers are case-sensitive.

Note, tip, and warning information

The following types of information are used in the documentation:

Note: Note is used for extra information about the feature or operation that is being described. Essentially, this is for extra data that is important but not vital to the user.

Tip: Tip is used for additional information that might be useful for the user. For example, when describing an installation process, there might be a shortcut that could be used instead of following the standard installation instructions.

Attention: Attention is used for highlighting vital instructions, cautions, or critical information. Pay close attention to this information, as it is vital to the successful use of IBM Tivoli Netcool's products.

Syntax and sample subheadings

The following types of constrained subheading are used in the documentation:

Syntax:

Syntax subheadings contain examples of ObjectServer SQL syntax commands and their usage. For example:

```
CREATE DATABASE database_name;
```

Sample:

Sample subheadings describe typical or generic scenarios, or samples of code. For example:

```
[1]    <body>
[2]        <img src="ChartView?template=barchart&format=PNG
[3]        &request=image&chart=quote&width=800&height=400" border="0"
    height="400"
[4]        width="800" alt="Events by Severity"
[5]        >
[6]    </body>
```

Associated publications

This section provides a description of the documentation associated with Netcool/Precision for Transmission Networks. To efficiently administer Netcool/Precision for Transmission Networks, you must also understand the IBM Tivoli OMNIbus technology.

IBM Tivoli Netcool®/OMNIbus™ Installation and Deployment Guide

This book is intended for IBM Tivoli administrators who need to install and deploy IBM Tivoli OMNIbus. It includes installation, upgrade, and licensing procedures. In addition, it contains information about configuring security and component communications. It also includes examples of IBM Tivoli OMNIbus architectures and how to implement them.

IBM Tivoli Netcool®/OMNIbus™ User Guide

This book is intended for anyone who needs to use IBM Tivoli OMNIbus desktop tools on UNIX or Windows platforms. It provides an overview of IBM Tivoli OMNIbus components, as well as a description of the operator tasks related to event management using the desktop tools.

IBM Tivoli Netcool®/OMNIbus™ Administration Guide

This book is intended for system administrators who need to manage IBM Tivoli OMNIbus. It describes how to perform administrative tasks using the IBM Tivoli OMNIbus Administrator GUI, command line tools, and process control. It also contains descriptions and examples of ObjectServer SQL syntax and automations.

IBM Tivoli Netcool®/OMNIbus™ Probe and Gateway Guide

This book contains introductory and reference information about probes and gateways, including probe rules file syntax and gateway commands. For more information about specific probes and gateways, see the documentation available for each probe and gateway on the Tivoli Software Support Site.

Online help

IBM Tivoli Netcool/OMNIbus GUIs contain either context-sensitive online help with index and search capabilities, or online documentation, HTML versions of the associated guides.

Operating system considerations

All UNIX command line formats and examples are for the standard UNIX shell. UNIX is case-sensitive. You must type commands as shown in the book.

How to send your comments

Your feedback is important in helping to provide the most accurate and highest quality information. If you have any comments about this book or any other Netcool/Precision for Transmission Networks documentation:

- Go to the Tivoli Support home page at http://www.tivoli.com/support.

  There you will find the feedback page where you can enter and submit comments.

- Send your comments by e-mail to pubs@tivoli.com. Be sure to include the name of the book, the part number of the book, the version of IBM Tivoli Netcool/Precision for Transmission Networks, and, if applicable, the specific location of the text you are commenting on (for example, a page number or table number).

Chapter 1. Introduction

This chapter provides an overview of Netcool®/Precision for Transmission Networks (Netcool/Precision TN).

This chapter contains the following sections:

Introduction to Netcool/Precision TN

Netcool/Precision TN enables real-time network asset management and reconciliation, regardless of the management protocols, technologies, and vendors' products used. Netcool/Precision TN:

- Collects any network data, including fault, performance, inventory, facility, and connection information.
- Provides complete asset visibility, enabling you to visualize the network in real time, including the inventory image for each device, the topology of the network, and customer circuits provisioned in the network.
- Provides the information needed to generate asset and network capacity reports to reconcile all offline OSS databases, such as inventory, provisioning, and billing.
- Provides flexible asset reporting, including standard and customizable asset reports, as well as direct access to the XML stream and the network data in the database.
- Provides a web-based GUI called Network Pilot for collecting and viewing the network data.
- Optionally integrates complete inventory, facility, and connection data with Netcool/OMNIbus alerts so that operators can locate, diagnose, and solve network problems more easily.

Telecom networks are more difficult than ever to manage; they are built on multiple technologies and managed by systems from multiple vendors. Service providers generally have multiple management systems (OSSs), each of which performs one function for one portion of their network. Each of these systems provides a limited view of a vendor-specific portion of the network.

In this sub-optimal environment, service providers have many manual processes. Even if an OSS retrieves real-time fault and performance data, inventory is likely to be disconnected from the network and accurate data about ports, connectivity, and status is not available. Operators have to update inventory and other OSSs manually, and use many different Element Management Systems (EMSs), Network Management Systems (NMSs), or even multiple Command Line Interfaces (CLIs), to provision their Network Elements (NEs.)

Netcool/Precision TN enables a complete, real-time inventory of the assets on service provider networks. Netcool/Precision TN:

- Performs deep discovery on the entire network, building an interrelated hierarchical view of network resources, including all the:

    – physical inventory, from racks to cards.
    – logical resources, including the cross-connects and circuits in the network.
    – fault and performance data, correlated to the affected entities.

- Maintains this real-time view of the entire network, continually extracting information directly from it.
- Works independently of all protocol, device, and vendor specifics.
- Provides instant Network Element (NE) connectivity via special network element type descriptions, known as NETypes. NETypes have been defined for many popular devices, enabling easy connectivity to widely deployed NEs, regardless of the management protocols they use.

    Note: A Network Element is any item of telecommunications hardware that is both addressable and manageable. NEs provide support or services to the network and can be managed through an Element Management System (EMS).

- Provides complete integration with Netcool/OMNIbus, adding complete inventory, facility, and connection data to Netcool alerts so that service providers can more easily diagnose and fix network problems.
- Provides information for comprehensive report generation by formatting XML. This information might be used to manually reconcile offline OSSs with the real network.
- Provides a GUI, called Network Pilot, for asset discovery, report generation, and Netcool/Precision TN administration.

How Netcool/Precision TN works

This section discusses the NETypes and deep discovery that Netcool/Precision TN uses to facilitate the collection of data from the network.

NETypes

A NEType is an XML-based description of the management interface for a specific type of NE. An NE's management interface is usually defined according to a specific protocol. But Netcool/Precision TN is based on a protocol-independent Telecom Object Model (TOM) that provides a consistent abstract model of manageable communications equipment. The NEType contains XML elements that map an NE's protocol-specific information (TL1 messages or SNMP MIBs) into the Telecom Object Model.

An NEType is used to configure Netcool/Precision TN so that it can discover and collect information about all NEs of that type. Netcool/Precision TN can process any number of NETypes simultaneously, so it can handle many different kinds of NEs in a network.

Netcool/Precision TN management software is flexible and is used in many different ways. For example, a provider might want to audit a vast network of different kinds of NEs without configuring them, or to use Netcool/Precision TN as a full-featured OSS.

Netcool/Precision TN uses the Data Collection NEType. This NEType must define all the addressable entities in the network, enabling Netcool/Precision TN to discover and collect any data from the NE, such as fault, performance, inventory, facility, or connection data. The data is mapped into the Telecom Object Model, stored in a relational database, and then funneled into existing multi-protocol OSSs and Netcool/Precision TN clients. Netcool/Precision TN can audit a network and report all available resources, as well as which ones are in use.

Deep discovery

When you use Netcool/Precision TN, in addition to discovering the existence of an NE, you also discover the NE's contents, the network's topology, and the circuits in the network.

The discovered information is stored in a relational database; both MySQL and Oracle are supported. The data is then published to OSSs and to Netcool/Precision TN clients such as Network Pilot.

Figure 1 shows the four steps involved in discovering a network. These steps are described further in the following sections.
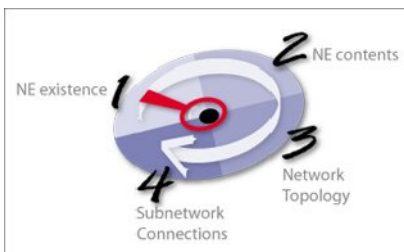
Figure 1. *Overview of network discovery*

STEP 1 – discovering the existence of an NE

Deep discovery starts by discovering the existence and, if possible, the type of equipment available in the network. Users specify a seed IP address/hostname, a subnet mask for the seed IP, and a set of possible ports to define the boundaries of their network. Users can also specify protocol-specific parameters, community strings in SNMP, or access parameters for TL1 devices. The Discovery service then determines the network address, calculates the set of all possible IP addresses for any machine on that network, and queries the appropriate addresses. For TL1-managed devices, Netcool/Precision TN sends a RTRV-HDR command; for SNMP-managed devices, Netcool/Precision TN tries an SNMP get request on the `sysObjectId` MIB value.

When the Discovery service receives a response from a device, it tries to identify the type of device at that address. For TL1-managed devices, Netcool/Precision TN extracts the target ID (TID) or name of the NE from the RTRV-HDR response. If the NE uses the CLLI naming convention, the Discovery service can use this information to extract the NEType. Alternatively, some TL1 devices receive requests on a unique port. This information can be configured in the NEType file so that the Discovery service can use this to identify the device. For SNMP NEs, each NEType file has a unique `SysObjectId` value. The Discovery service matches the `sysObjectId` returned by the NE with the value of this variable in the appropriate NEType to identify the device.

STEP 2 – discovering the contents of an NE

After discovering the existence of an NE, the Discovery service then instructs the Inventory service to retrieve all the resources in the NE. The NEType determines how this information is retrieved. For example, for TL1-managed NEs, the Inventory service issues a RTRV-EQPT command with wildcards to retrieve the rack, shelf, and card information; for SNMP-managed NEs, it does an SNMP get on the tables in the ENTITY-MIB.

Then, based on the cards that the Inventory service has retrieved, the Facility service looks for all the physical termination points (PTPs) on these cards, and then for all the logical resources; that is, the connection termination points (CTPs) for each PTP that is provisioned.

The Network Connection service locates all the cross-connects configured on each NE. Netcool/Precision TN discovers not just the existence of the entities, but also their properties.

STEP 3 – discovering and resolving network topology

Based on the information discovered by the Inventory and Facility services, Netcool/Precision TN queries the NEs to build a comprehensive topological map of the network. Devices from the same manufacturer that use similar technology might have knowledge of the NEs that are physically connected to the device. For example, some ATM devices, such as the SeaBridge XpressPassTM, support the PNNI protocol. This protocol enables an NE to communicate with the other NEs it is connected to topologically. PNNI-aware NEs can thus be queried for the topological connections they are a part of. For

TL1-managed NEs, Netcool/Precision TN can use other commands (for example, the RTRV-TOPOLOGY command supported by the Fujitsu 2400) to find topological connections. Device-specific scripts can be written for inclusion with the NEType files to discover these types of NEs.

Netcool/Precision TN also notifies the user of any topological connections it cannot resolve. For example, PTPs that are Active and Enabled signify they are involved in a topological connection. If Netcool/Precision TN discovers a PTP in this state, but cannot locate the corresponding topological connection (because, for example, the NE is connected to a different vendor's NE), Netcool/Precision TN notifies the user so that the topological connection can be created manually.

STEP 4 – network circuits

After discovering and resolving all the topological connections, Netcool/Precision TN determines the circuits in the network. In Netcool/Precision TN, a subnetwork is an entity that corresponds to a set of configurable NETypes. Subnetworks can contain other subnetworks. A circuit (also called a subnetwork connection) is contained within a subnetwork and provides an end-to-end connection between two termination points, on two separate nodes, in a subnetwork. See Figure 2 for a graphical representation.
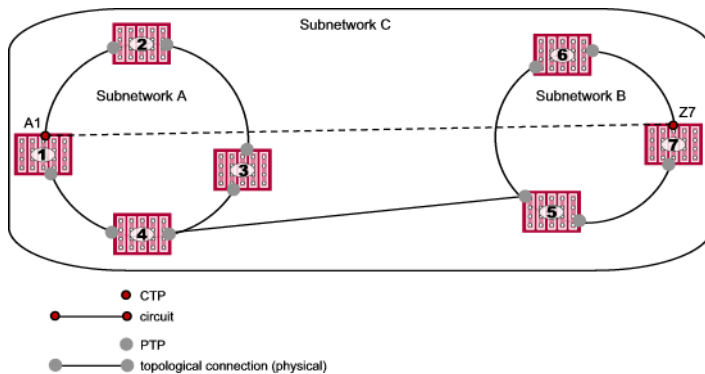
Figure 2. *Network circuit*

The discovery of circuits is based on the definition in TMF 513 v2. The three key steps in the process are the discovery of leaf circuits, the correlation of the leaf circuits into higher level parent circuits, and the storage of that data.

Chronologically, Netcool/Precision TN gets a list of all the NEs in each subnetwork (topological group). It determines the cross-connects for each NE in the subnetwork, and then normalizes the cross-connects into leaf circuit entities. A leaf circuit is a circuit that has all its edge points contained within a single network element. It correlates these circuits with higher level circuits (based on TMF 513's definition of circuit correlation). It then discovers the circuits and stores the information about it in the database.

After discovery: alarm correlation

Netcool/Precision TN can combine with Netcool/OMNIbus to provide contextual information to the NOC technician to quickly diagnose and resolve network problems. This integration with Netcool/OMNIbus provides the following functionality:

- Netcool/Precision TN uses Netcool/OMNIbus as the real time event repository, using Netcool/OMNIbus as the source for all alarm information displayed in the Network Pilot. As new alarms are received in Netcool/OMNIbus, and as automations in Netcool/OMNIbus update event records, these changes will be reflected in the Network Pilot.

- Netcool/Precision TN can also enrich events with the discovered network topology information, thus providing the NOC technican with more relevant information within their event console to help prioritize work items and reduce mean-time-to-repair.

After discovery: maintaining a real-time view of the network

Netcool/Precision TN maintains the inventory, facility, and connection data it gathers. It updates this data constantly for a real-time view of the entire network using scheduled polling. When a change occurs in the network, Netcool/Precision TN updates its internal representation in the database and notifies the OSSs to which it is connected and its own clients of the changes.

Scales to large networks

In order to scale to large telecom networks, Netcool/Precision TN implements a series of performance strategies. These include thread management, data caching, database resource management, and making use of Java's recent scalability enhancements.

Netcool/Precision TN product components

The Netcool/Precision TN package includes the following key components:

- Netcool/Precision TN server
- Network Pilot client
- Tools

Optionally, Netcool/Precision TN can be configured to work with Netcool/OMNIbus, enabling an operator to view a visualization of an NE, indicating precisely where a specific alarm occurred. See Figure 3 for a graphical representation of the system components.
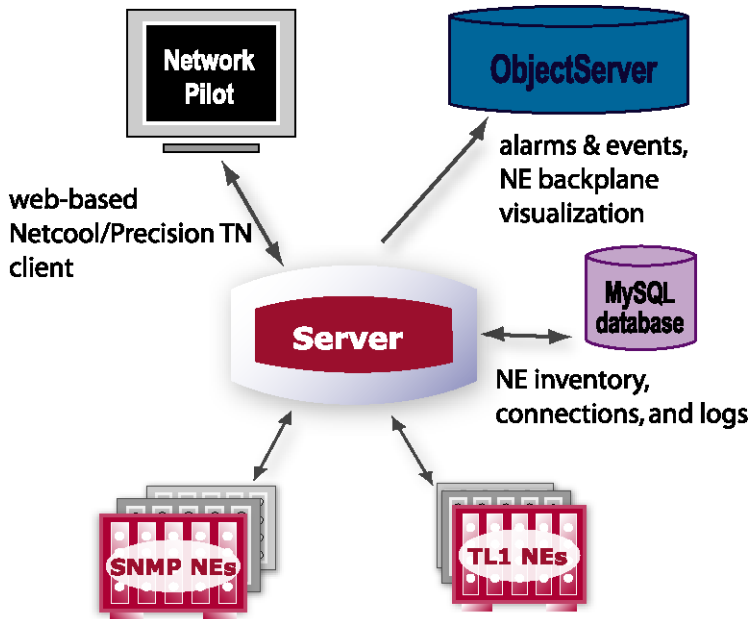
Figure 3. *System components*

Netcool/Precision TN server

The Netcool/Precision TN server implements discovery, inventory, fault management, can handle connections to SNMP (if so configured) and TL1 NEs, and provides logging, user authentication, and other server functions.

Network Pilot client

Network Pilot is Netcool/Precision TN's web-based management client. Network Pilot provides an easy-to-use graphical interface for managing NEs and security. As Netcool/Precision TN is integrated with Netcool/OMNIbus, it can be used to add complete inventory, facility, and connection data to Netcool/OMNIbus alerts so that operators can locate, diagnose, and solve network problems more easily.

Network Pilot enables the following features:

- Asset Visibility and Reconciliation:

    - Discover all the NEs in the network
    - View the NEs, their inventory information and their properties

- – View the topological connections, cross-connects, and circuits
- – Locate stranded bandwidth

- • Network Management:

  - – Create NEs manually or via discovery
  - – Delete NEs
  - – Manage NE associations
  - – Locate alerts in the NE, down to the affected port (either independently or using Netcool/OMNIbus)

- • Security Management:

  - – View information about users who are logged in (user name, time logged, last activity view), and terminate user sessions

  Note: See the online help for detailed instructions for how to use the Network Pilot.

Overview of the Netcool Installer

Netcool/Precision for Transmission Networks 5.5 uses the Netcool Installer. The Netcool Installer provides a common installation interface for all Netcool products. Features and benefits of the Netcool Installer include:

- • Ease of maintenance. Updated versions of the Netcool Installer are installed automatically with new Netcool products and patches.

- • Better reuse and integration of Netcool software within a consolidated Netcool suite. The Netcool Installer is based around packages, or installable units, which can be shared between products. The Netcool Installer ensures that a given package is only installed once. A package used by one product can be automatically updated by another product that uses the same package.

- • Consolidated installation logs. For information on viewing the installation log, see "Viewing the installation log" on page 21.

- • Common directory structure. For information on the directory structure for Netcool/Precision for Transmission Networks 5.5, see "Netcool/Precision TN directory structure" on page 28 for further details.

  Attention: The directory structure for products using the Netcool Installer is not compatible with the directory structure of older Netcool products. You must install products using the Netcool Installer in a different directory to any existing, non-Netcool Installer products.

Netcool Installer modes

The Netcool Installer can run in different modes. The different modes provide different degrees of user interaction. Netcool Installer modes are described below.

GUI mode

By default, the Netcool Installer runs in GUI mode. This mode uses a graphical user interface to present installation options, and includes descriptions and explanations.

Console mode

The Netcool Installer can also run in console mode. This mode uses a text-only user interface to present installation options, and does not provide descriptions or explanations. You may need to run the Netcool Installer in console mode if GUI mode is not currently supported on your installation platform.

Note: Tivoli Netcool recommends running the Netcool Installer in GUI mode where possible.

To run the Netcool Installer in console mode, follow the instructions in chapter 2, as for GUI mode. Additionally:

1. When starting the Netcool Installer, use the `-console` command line option.
2. When the list of features to install is displayed, press n to install Netcool/Precision for Transmission Networks interactively. Accepting the default value I will install Netcool/Precision for Transmission Networks using default values.
3. Note that the properties you can configure may appear in a different order in console mode than in GUI mode.

Silent mode

The Netcool Installer can also run without any user interaction. In this mode, the Netcool Installer uses predefined installation options held in a file. For information on installing Netcool/Precision for Transmission Networks in silent mode, see "Running the installation in silent mode" on page 20.

Changing the Netcool suite installation directory

The Netcool suite installation directory, OMNIHOME, is stored as an operating system environment variable. OMNIHOME must be set when the first Netcool product is installed using the Netcool Installer.

On UNIX, it is possible, although not recommended, to have more than one $OMNIHOME directory on one machine.

To change the location of an Netcool product installation on UNIX:

1. Shut down all running Netcool processes.
2. Back up all relevant directories.
3. Copy the $OMNIHOME directory and all its contents to a new location.

4. Manually change the environment variable $OMNIHOME.

5. Restart your Netcool products.

⚠ **Attention:** You must not move, copy, or delete executable or other required IBM Tivoli files except as directed in the product documentation or by Tivoli Software Support.

New relational database

Netcool/Precision TN 5.5 uses a new relational database that consolidates topology data from Netcool/Precision TN and from other Netcool products. Netcool for Asset Management 2.0 populates this same database with network topology information for layer 2 and layer 3 networks, including ethernet, IP and MPLS networks.

📌 **Note:** Upgrades are not possible from previous versions of Netcool/Precision TN to version 5.5 due to the introduction of the new relational database. Remove any previous installation of Netcool/Precision TN before you install Netcool/Precision TN 5.5.

Chapter 2. Installing Netcool/Precision TN

This chapter describes how to install Netcool/Precision TN on your system.

Throughout this guide, the directory where you install this product is referred to as *<netcool_install_dir>*. If you did not install in the default location (`/opt/netcool`), then replace *<netcool_install_dir>* in any instructions with the path to the directory where you installed Netcool/Precision TN.

Prerequisites

This section describes the hardware and software prerequisites you need to install and use Netcool/Precision TN on the supported platforms.

Netcool/OMNIbus version 3.6 or 7.x must already be installed on the same machine as Netcool/Precision TN in order to interoperate with Netcool/OMNIbus. However, the ObjectServer does not have to be running; Netcool/Precision TN uses libraries from the Netcool/OMNIbus installation to forward events to Netcool/OMNIbus, and for event correlation.

Netcool/OMNIbus can be obtained using your Passport Advantage account.

Solaris system requirements

Your Solaris system must meet the following requirements:

- Solaris 9 or 10 with the patches recommended by Sun for the Java 2 SDK and Java 2 Runtime Environment. See the patch instructions on the `http://java.sun.com` web site. The software ships with the reference implementation of the VM for Sun that is available from Javasoft at the time of this release.

- The following free disk space in these directories:
    - 200 MB in `/tmp`, where the installation contents extracted
    - 400 MB in the target installation directory (by default, `/opt/netcool/precisiontn`)

- Approximately 100 MB free for future expansion of the database that is included with Netcool/Precision TN

- A minimum of 512 MB RAM

Browser requirements

The lightweight GUI (Network Pilot) for Netcool/Precision TN 5.5 is tested and supported against the following browsers:

- Mozilla 1.4 or later
- Mozilla Firefox 0.9 or later
- Microsoft Internet Explorer 6.0 SP1 or later.

Attention: Earlier versions of these browsers might cause Network Pilot to exhibit some display problems.

Database requirements

Netcool/Precision TN 5.5 is tested and supported against both Standard and Enterprise editions of Oracle 9i. You can use the MySQL server and JDBC client software instead of using an Oracle database.

Note: If using MySQL, you must install the MySQL server on a local drive due to issues with running MySQL on an NFS volume.

Installing Netcool/Precision TN

This section describes the Netcool/Precision TN installation process.

⚠️ **Attention:** If you want to run Netcool/Precision TN with Netcool/OMNIbus then you must install Netcool/OMNIbus first and ensure the $OMNIHOME variable is set. If the Netcool/Precision TN installation detects the $OMNIHOME variable, some Netcool/OMNIbus configuration is automatically performed.

For information on downloading and installing Netcool/OMNIbus, see the *Netcool®/OMNIbus™ Installation Guide*. For information about setting up and configuring Netcool/OMNIbus, see the *Netcool®/OMNIbus™ Administration Guide.*

Netcool/Precision TN can be installed using the GUI, console, and silent modes. The documented instructions apply for a new installation of Netcool/Precision TN as the first, or a subsequent Netcool product that is installed by the Netcool Installer.

For further information on installing Netcool/Precision TN, see the relevant section:

- "Obtaining the software" on page 13
- "Running the installation in GUI mode" on page 14
- "Running the installation in console mode" on page 19
- "Running the installation in silent mode" on page 20

Obtaining the software

Check that your user login has permission to install in the target directory, for example, /opt. If you have the appropriate permissions, the installation creates the necessary directories.

ⓘ **Tip:** It is recommended that you have root privileges when you actually run the Netcool/Precision TN software.

To download the software:

1. Create an empty directory in your home directory. For example:

   ```
   cd $HOME; mkdir tmp
   ```

2. Log in to your IBM Support account.
3. Go to the download page, click the precisiontn-5.5-*arch*.tar.gz download file and save it in the tmp directory that you created.
4. Untar the file into the directory that you want to install Netcool/Precision TN.

Running the installation in GUI mode

To install Netcool/Precision TN on your system:

1. From a command prompt, change to the directory where you extracted the contents of the Netcool/Precision TN `tar` file.

2. Run the installation by entering:

   `./INSTALL`

   Running this command with no arguments sets the installation log file level to a default of warning messages only. If you want to set the level of detail in the installation log file for information or troubleshooting purposes, enter the following command instead:

   `./INSTALL -errorlevel ERRORLEVEL`

   Where *ERRORLEVEL* takes one of three values:

   – `debug` - Detailed logging for debug purposes
   – `info` - Warning and information notices
   – `warning` - Warning messages only

   You will be presented with the *Welcome* window (Figure 4.) Click **Next** to proceed.

Figure 4. *Netcool Installer Welcome window*

3. You will be presented with the *License Agreement* window. Read the license agreement and select *Yes* to accept it, or *No* if you do not accept the license agreement.

   Note: If you select *No*, the Netcool Installer will exit when you click **Next**.

4. If the $NCHOME environment variable has not previously been set, you are prompted for the Netcool home location where Netcool/Precision TN will be installed. The default location is /opt/netcool (Figure 5.)
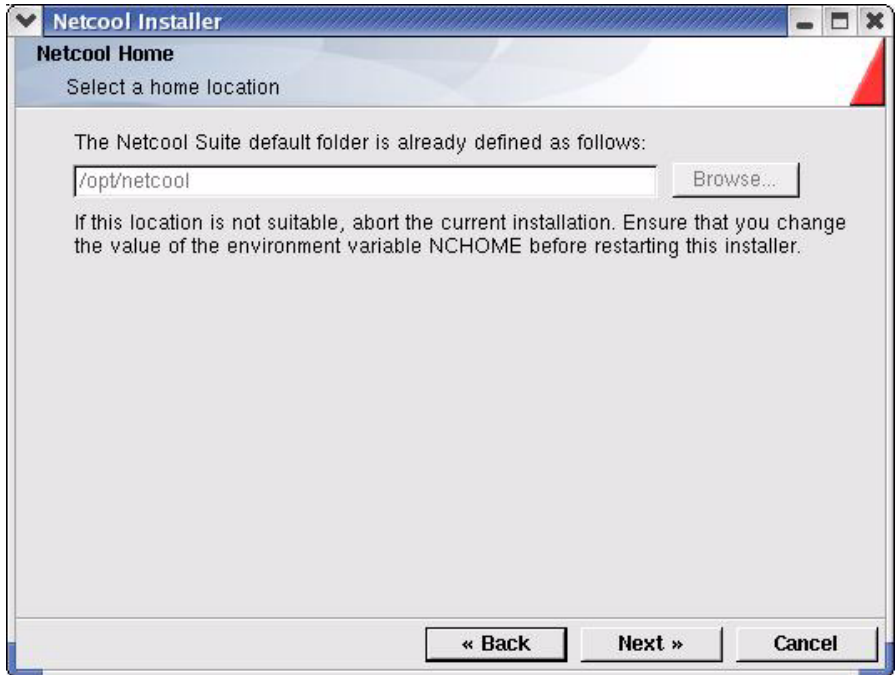
Figure 5. *Netcool Installer Home window*

Click **Next** to go to the *Setup Type* window.

5. Select the type of installation you want to perform and then click **Next** (Figure 6.)
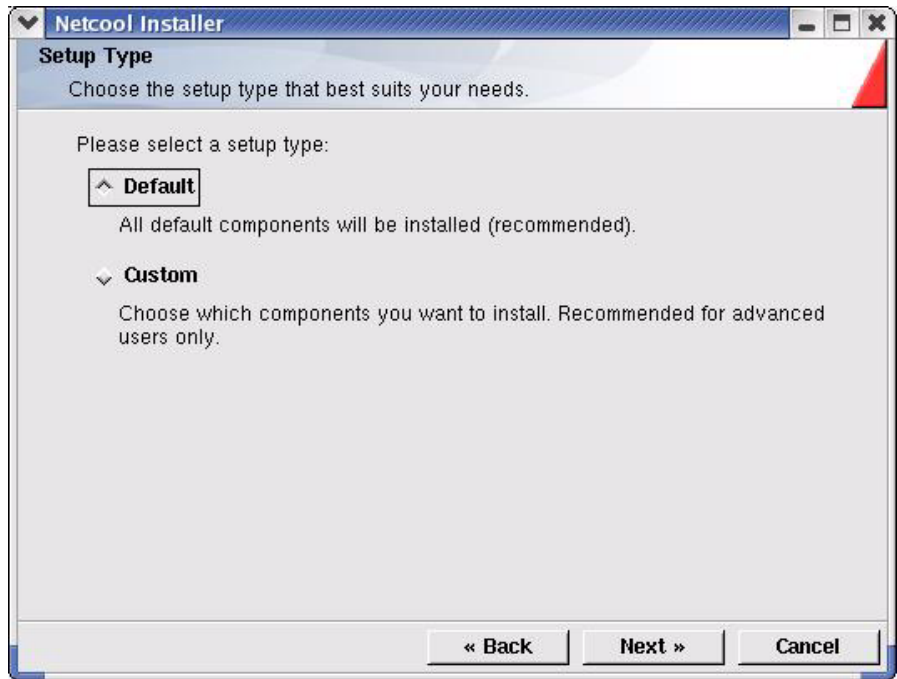
Figure 6. *Netcool Installer Setup Type window*

If you selected *Default*, go to Step 7. If you selected *Custom*, go to Step 6.

6. Select the features you want to install and then click **Next** (Figure 7.)
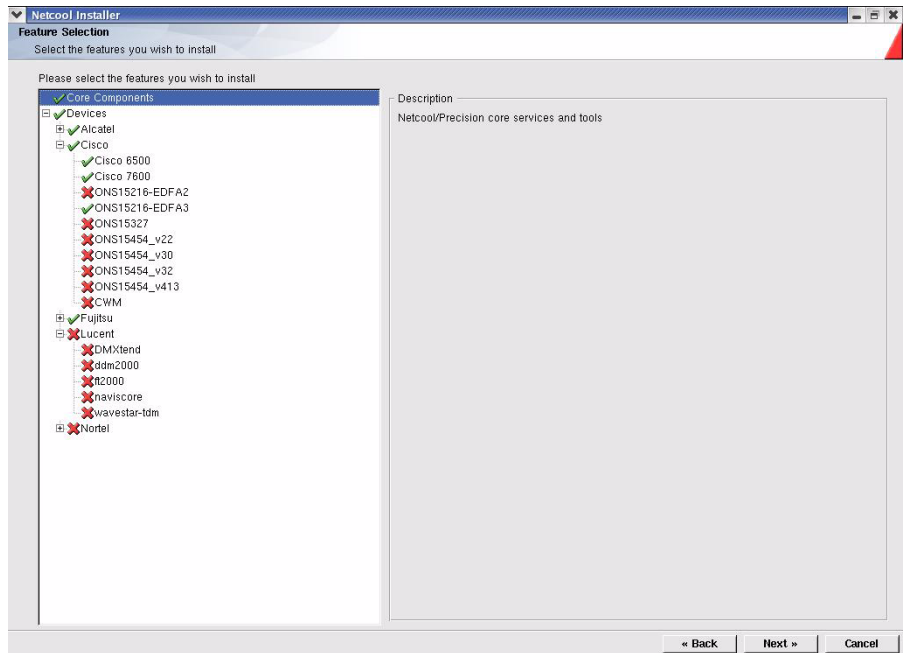
Figure 7. *Netcool Installer Feature Selection window*

> **Note:** You can click on each feature to toggle its selection on or off. A tick indicates a selected feature and a cross indicates a deselected feature. Select the devices for which you want NETypes to run on Netcool/Precision TN.

7. Provide details of the Netcool/OMNIbus installation you want to use and then click **Next**.

8. Type in the details of your Oracle configuration and then click **Next**.

9. Read the *Ready to Install* window to review the list of features selected for installation. If the list contains the required features, go to Step 8.

   You can view the list of packages that will be installed by clicking the `show details` hyperlink.

> **Note:** If you want to change the features selected for installation, click **Back**, modify your selection of features, and then return to the *Ready to Install* window.

10. click **Install** to start the installation.

Two progress bars appear, displaying the overall progress of the Netcool/Precision TN installation, as well as the installation progress of each package (Figure 8.) On completion, click **Finish** to close the Netcool Installer.
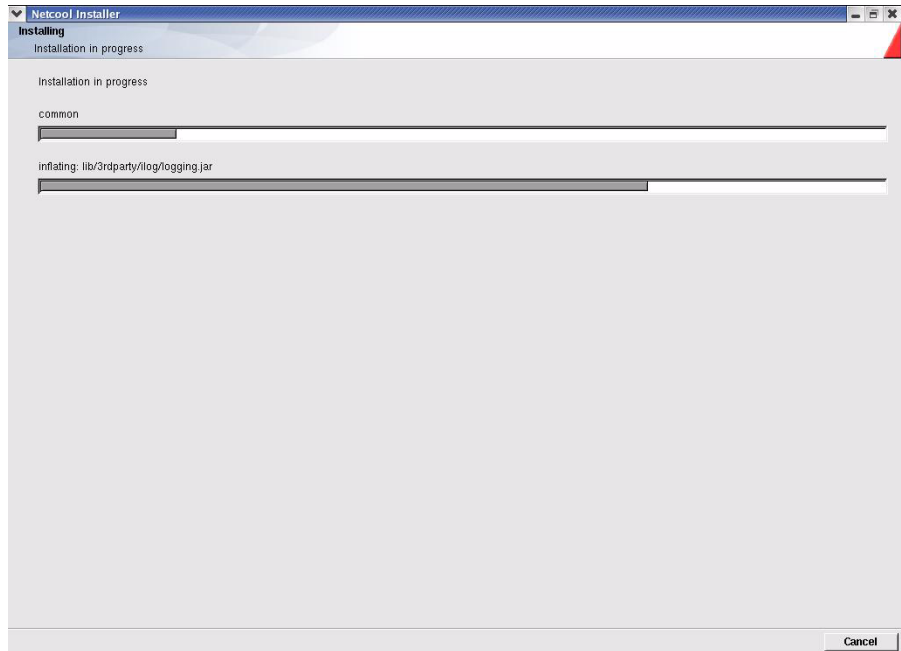
Figure 8. *Netcool Installer Installation Progress window*

Installation of the Netcool/Precision TN components is complete. Continue the overall installation by configuring the Oracle database. See "Setting up an Oracle database" on page 22 for further information.

Running the installation in console mode

The console mode uses a text-based user interface to present installation options using a series of menus and prompts.

To run the Netcool Installer in console mode:

1. From a command prompt, navigate to the directory where you extracted the Netcool/Precision for Transmission Networks archive bundle.

2. Give the downloaded file execute permissions for yourself, for example:

   ```
   chmod +x precisiontn-5.5-sun.sh
   ```

3. Run the installation program using the following command; optional command line parameters are shown in square brackets.

   ```
   ./INSTALL -console [-errorlevel ERRORLEVEL]
   ```

   You can use the optional -errorlevel command line parameter to define the level of detail in the error messages written to the Netcool Installer log. Omitting this parameter defaults the log file level to warning messages only. The *ERRORLEVEL* variable in this parameter takes one of three values:

   – debug - Detailed logging for debug purposes
   – info - Logs warning and informational messages
   – warning - Logs warning messages only

4. The script then asks where to install Netcool/Precision TN. The default location is /opt/netcool/precisiontn. You need sufficient permissions to create the directory. Once you enter a valid directory, the tar file starts unpacking.

   If the $OMNIHOME variable is set, the installation attempts to configure Netcool/Precision TN appropriately.

   Note: You can set this location as your $NCHOME value at a later stage as part of your post-installation tasks.

5. When the Welcome information appears, press Enter to continue.

6. Read the IBM license agreement and type y to accept the terms and then press Enter to proceed.

   The menu of installable features and installation options appears.

7. To select or remove a feature for installation, type the number of the feature and press Enter. All selected features have the notation [I] in the Select column, and deselected features have the [] notation. You can also type s to select all features, or u to deselect all features.

8. To start the installation process, type i and press Enter.

9. Do either of the following:

    –   To confirm that you want to proceed with the installation, type i and press Enter.
    –   To view the list of packages selected prior to installation, type m and press Enter. After reviewing the package listing, type y to confirm that you want to continue with the installation, and then press Enter.

    Wait for the installation to complete. A message appears confirming that the installation was successful.

    The installation adds files to your system, as described in "Netcool/Precision TN directory structure" on page 28.

Before attempting to run Netcool/Precision for Transmission Networks, you must set up the Oracle database. See "Setting up an Oracle database" on page 22 for further details.

Running the installation in silent mode

You can run the Netcool Installer in silent mode if you want to deploy Netcool/Precision for Transmission Networks with identical installation configurations on multiple machines. In silent mode, the installer suppresses the graphical or text interface and obtains the installation specification from a predefined XML configuration file. No configuration options are displayed during installation, and you cannot cancel the installation.

Note: This mode of installation assumes your consent of the IBM Tivoli Netcool End-User License Agreement.

Running the Installation Program

To run the Netcool Installer in silent mode:

1. From a command prompt, navigate to the directory where you extracted the Netcool/Precision for Transmission Networks archive bundle.

2. Run the installation program using the following command. Optional command line parameters are shown in square brackets.

    ```
    ./INSTALL -silent -nchome NetcoolDIR -params filename.xml [-errorlevel
    ERRORLEVEL]
    ```

    Table 2 describes the command line parameters for starting the Netcool Installer in silent mode.

Table 2. *Netcool Installer command line parameters (1 of 2)*

Parameter	Description
-silent	Runs the Netcool Installer in silent mode.
-nchome	Specifies the installation location for the Netcool product suite. The *NetcoolDIR* variable should define the directory path - for example, /opt/netcool.
-params	Specifies the name of the parameter description file. The *filename*.xml variable should define the actual filename.

Table 2. *Netcool Installer command line parameters (2 of 2)*

Parameter	Description
`-errorlevel`	Defines the level of detail in the error messages written to the Netcool Installer log. This parameter is optional, and omitting it defaults the log file level to warning messages only.
	The *ERRORLEVEL* variable in the `-errorlevel` parameter takes one of three values:
	`debug` - Detailed logging for debug purposes
	`info` - Logs warning and informational messages
	`warning` - Logs warning messages only

3. Wait for the installation to complete. A confirmation message appears at the end.

   On completion, the installation adds files to your system, as described in "Netcool/Precision TN directory structure" on page 28. You can view the installation log file, as described in "Viewing the installation log" on page 21.

Before attempting to run Netcool/Precision for Transmission Networks, you must set up the Oracle database. See "Setting up an Oracle database" on page 22.

Viewing the installation log

The Netcool Installer generates an installation log file of actions performed during the installation. You can use this file to verify that you installed Netcool/Precision for Transmission Networks successfully or to troubleshoot your installation. The level of detail in the log file is set by using the `-errorlevel` command line parameter when running the installation program.

The installation log is stored in the following location:

`$NCHOME/log/install/ncisetup.log`

You can view the installation log at any time using the Netcool Installer Maintenance Wizard in GUI mode or in console mode.

To view the installation log using the Netcool Installer Maintenance Wizard in GUI mode:

1. From a command prompt, enter the following command:

   `$NCHOME/install/ncisetup`

   The *Welcome* page of the Netcool Installer Maintenance Wizard appears.

2. Select the **Installer Log** option and click **Next** to continue. The *Installer Log* page appears with the list of actions performed by the Netcool Installer.

3. After reviewing the log, click **Cancel** to exit the Netcool Installer Maintenance Wizard.

To view the installation log in console mode, enter the following command:

```
$NCHOME/install/ncisetup -report log
```

The log file listing appears.

Viewing installed packages

Netcool products are made up of packages. You can view the versions of all installed packages at any time using the Netcool Installer Maintenance Wizard in GUI mode or in console mode. You might be asked for package information by IBM Tivoli Software Support.

To view installed packages using the Netcool Installer Maintenance Wizard in GUI mode:

1. From a command prompt, enter the following command:

   ```
   $OMNIHOME/install/ncisetup
   ```

   The *Welcome* page of the Netcool Installer Maintenance Wizard appears.

2. Select the **Package List** option and click **Next** to continue. The *Package List* page appears with the list of all installed IBM Tivoli packages.

3. After reviewing the list, click **Cancel** to exit the Netcool Installer Maintenance Wizard.

To view the packages for all installed products in console mode, enter the following command:

```
$OMNIHOME/install/ncisetup -report all
```

The list of packages is displayed.

Setting up an Oracle database

This section describes how to configure Netcool/Precision TN to use an Oracle database for storing data from the Netcool/Precision TN server.

Netcool/Precision TN works with either Standard or Enterprise editions of Oracle 9i. The version that you select depends upon your own requirements.

If you need a high availability database, we recommend you select the Enterprise edition. Oracle Enterprise edition can also support a greater number of simultaneous connections via the use of its multi-threaded server and the Oracle Connection Manager. Simultaneous connections are of concern only if the product database will be shared with other applications or configured for use in a large, federated system.

Creating the Oracle schema

To create the Oracle database schema, you must first run the `leap_schema.sql` script located in the `<netcool_install_dir>`/etc/precisiontn/sql/oracle directory. This file must be loaded into the database using any client, for example the SQL*Plus tool provided by Oracle.

To create the schema:

1. You must log in as an appropriate user with the permissions needed to create new tables in the database. See your Oracle documentation for Oracle user information.

   Run Oracle SQL*Plus to load the schema by entering:

   ```
   $ sqlplus [user/password options]
   SQL> @<netcool_install_dir>/etc/precisiontn/sql/oracle/ncim.sql;
   SQL> @<netcool_install_dir>/etc/precisiontn/sql/oracle/leap_schema.sql;
   ```

   Note: If you are already running Netcool/Precision TN with Netcool/Precision IP or Netcool for Asset Management which are already using the NCIM schema, do not execute the `ncim.sql` file.

2. If the tables have been successfully created in the Oracle database, you see output similar to:

   ```
   SQL> @<netcool_install_dir>/etc/precisiontn/sql/oracle/leap_schema.sql

   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Commit complete.
   SQL>
   ```

Configuring advanced Oracle features

The server can take advantage of such Oracle features as parallel servers, redundant databases, and connection concentration. These advanced features of the Oracle database are transparently available to the server through the use of the included OCI JDBC driver, in conjunction with additional database configuration steps.

This document is not meant as a full tutorial on the deployment of these features. Oracle databases are complicated products -- please consult an experienced database administrator before you employ these techniques.

This section references the Oracle Technology Network web site, `http://technet.oracle.com/`. If you have not already done so, you must register for a free account to access these pages.

Prerequisites

Your system must meet the following requirements:

- Most of these features require the Oracle Enterprise Edition. See the Oracle Techweb descriptions and comparisons of the features provided by Oracle Standard and Enterprise Editions.

- Once the client software has been installed, the server must be configured accordingly. Configuring the server to use Oracle's OCI driver is a straightforward process.

Oracle RAC

Consider using the Oracle RAC option when a robust high availability solution is required. A properly configured Oracle RAC environment can tolerate failures with minimal or no downtime. Furthermore, Netcool/Precision TN can operate seamlessly with an Oracle RAC database - simply update the connection string in the `oracle_config.xml` file appropriately.

See the relevant Oracle documentation for more information on how to configure an Oracle RAC server.

Connection concentration

The connection concentration feature of the Oracle Connection Manager consolidates multiple connection requests from clients to establish a single connection to a server. This conserves server resources. This feature is available in the Oracle Enterprise Edition. Connection concentration might be desirable when the server shares the database with many other applications and/or users.

Concentration enables the Netcool/Precision TN server to use fewer connection end-points for incoming requests, thus reducing the demand on the resources needed to maintain multiple connections between two processes. Concentration lets you increase the total number of network sessions that the Oracle database server can handle. By using multiple Connection Managers, thousands of concurrent users can connect to a server.

Connection concentration requires:

- Oracle Enterprise Edition Server
- Multi-threaded server enabled
- Installation of Oracle Connection Manager
- Oracle Connection Manager configurations steps for the server and client

Setting up a MySQL database

The MySQL server and JDBC client software is not included in this version of the Netcool/Precision TN software. Download the latest MySQL server software and JDBC driver from:

```
http://www.mysql.com
```

Once downloaded, the JDBC driver should be placed in `<netcool_install_dir>/precisiontn/platform/java/lib/3rdparty`. The filename must be in `mysql-connector-java-X.Y.Z.jar` format, where `X.Y.Z` is the version number. Netcool/Precision TN will automatically select this driver and add it to the bootstrap classloaders.

Using an existing copy of MySQL

You can use your existing copy of MySQL with Netcool/Precision TN if it is version 5.0 or later. To do this, you must manually configure both your version of MySQL and your Netcool/Precision TN installation.

Configuring your version of MySQL

To configure your version of MySQL to work with Netcool/Precision TN:

1. Change directory to the location where your version of MySQL is installed.

2. Check that MySQL is running.

3. Create the Netcool/Precision TN databases by entering:

   ```
   mysqladmin create precisiontn
   mysqladmin create demo
   ```

4. Verify that a database has been created, by entering:

   ```
   mysql precisiontn
   mysql> show tables;
   ```

The result is similar to: `Empty Set (0.00 sec)`

Grant permissions on the databases to the user you want to use (if it is other than the `root` user), by entering:

```
mysql> grant all on precisiontn.* to username;
mysql> flush privileges;
```

Configuring Netcool/Precision TN

To configure Netcool/Precision TN to work with an existing copy of MySQL:

1. Change directory to `<netcool_install_dir>` configuration directory, for example:

   ```
   /opt/netcool/etc/precisiontn
   ```

2. If you are running a default installation of MySQL on your local machine, you might not need to make any changes in this file. If you are not running a default installation, open the `mysql_config.xml` file with a text editor and update the following properties:

   – Set the `port` property value to the number of the MySQL server port.
   – Set the `username` and `passwd` property values to match the user account you want to use for this product software on the MySQL server.
   – Set the `host` property value to the host name of the MySQL server you want to use.
   – Set the `dbname` property value to the name of the database you want to use.

3. Save and close the file.

4. Change directory to `<netcool_install_dir>`/etc/precisiontn, open the `precisiontn.xml` file and locate the `<application>` section.

   Within this section, find the following lines:

   ```
   <!-- To use oracle set the value to 'oracle'. -->
   <variable name="db" value="oracle" />
   ```

5. Replace the `oracle` value with `mysql`. The modified lines are shown below.

   ```
   <!-- To use oracle set the value to 'oracle'. -->
   <variable name="db" value="mysql" />
   ```

6. Save and close the `precisiontn.xml` file.

Creating the MySQL schema

To create the MySQL database schema, you must first run the `ncim.sql` and `leap_schema.sql` scripts located in the `<netcool_install_dir>`/etc/precisiontn/sql/mysql directory.

To create the schema:

1. Ensure that you have followed the steps in "Configuring Netcool/Precision TN" on page 26.

2. You must log in as an appropriate user with the permissions needed to create new tables in the database. See your MySQL documentation for MySQL user information.

   Run MySQL to load the schema by entering:

   ```
   cat <netcool_install_dir>/etc/precisiontn/sql/mysql/ncim.sql | mysql
   --user=<username> --password=<password> <databasename>
   ```

   ```
   cat <netcool_install_dir>/etc/precisiontn/sql/mysql/leap_schema.sql |
   mysql --user=<username> --password=<password> <databasename>
   ```

   Note: If you are already running Netcool/Precision TN with Netcool/Precision IP or Netcool for Asset Management which are already using the NCIM schema, do not execute the `ncim.sql` file.

3. If the tables have been successfully created in the MySQL database, you will see output similar to:

   ```
   SQL> @<netcool_install_dir>/etc/precisiontn/sql/mysql/
   leap_schema.sql;

   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Table created.
   Commit complete.
   SQL>
   ```

Netcool/Precision TN directory structure

The installation process creates the Netcool/Precision TN directory structure provided in Table 3.

Table 3. *Netcool/Precision TN directory structure*

Location	Contents
`/opt/netcool/precisiontn/bin`	Netcool/Precision TN binaries.
`/opt/netcool/precisiontn/<arch>/java/lib`	Java JAR files and JNI libraries.
`/opt/netcool/platform/<arch>/lib`	Shared libraries of binary images.
`/opt/netcool/etc/precisiontn`	Configuration files.
`/opt/netcool/log/precisiontn`	Log files.
`/opt/netcool/var/precisiontn`	Application data files.
`/opt/netcool/var/precisiontn/netype`	NEtype files.

Netcool/Precision TN executables

The executables in Table 4 apply to the Netcool/Precision TN application. Other executables might be present in this directory, but are used internally or in other Netcool products.

Table 4. *Netcool/Precision TN executable files*

Executables	Use this executable file to:
`precisiontn`	Start the Netcool/Precision TN server.
`shutdown.sh`	Stop the Netcool/Precision TN server gracefully. Always use either this script or the **Shutdown server** button on the **Admin** tab in Network Pilot to shut the server down gracefully.
`sws`	Run the SNMP Workshop tool.
`ws`	Run the TL1 Workshop tool.

Third-party and Open Source software

Your software installation is self-contained and includes the following third-party software:

- Certicom ECC (security implementation)
- ILOG JTGO 3.5 (Java graphic components for OSSs)
- Java Transaction API 1.0.1
- Macrovision FLEXlm 7.2e (License Manager)
- Oracle Instant Client version 10
- Sun Java Communications API 1.0r
- Sun Java Message Service API
- Sun JDBC 2.0
- Sun JNDI RMI Registry Service Provider 1.2.1
- Sun J2SE Java Runtime Environment JRE 1.4.2_10-b03
- Sybase Jconnect JDBC driver 5.5

Additionally, you must obtain Oracle database software or MySQL software. Netcool/Precision TN supports Oracle Database version 9i.

Your Netcool/Precision TN installation also includes the following Open Source software:

- Ant 1.5.1
- Bean Scripting Framework 2.3.0
- Castor XML 0.9.3.19
- Commons:
    - BeanUtils 1.5
    - Collections 2.1
    - Digester 1.3
    - Logging 1.0.2
    - Modeler 1.0
- Commons-Net 1.4.1
- Jakarta Regexp 1.2
- JDOM 1.0beta8
- Log4J 1.2.8
- MX4J 1.1.1
- OpenORB 1.3.0
- Tomcat 4.1.18
- Xalan-J 2.4.1

- Xerces-J 1.4.4
- XML APIs 1.0
- XP XML Parser for Java v0.5

Chapter 3. Running Netcool/Precision TN

This chapter describes the process of starting and stopping Netcool/Precision TN.

This chapter contains the following sections:

Downloading NETypes

Before stating Netcool/Precision TN, you must download the Data Collection NETypes that are required to connect to the NEs your network:

1. Go to the IBM Tivoli Netcool support site.
2. Select **Precision TN** at the top of the home page; these pages include supporting documentation on NETypes.
3. Download the NETypes you require from the download page.
4. Place the downloaded JAR files in the `<netcool_install_dir>`/var/precisiontn/netype/ directory.

   Note: If you require an NEType that is not available, contact IBM Tivoli Netcool support.

Starting the product components

Start the components in the following order:

1. The Oracle or MySQL database
2. The Netcool/Precision TN server
3. The Network Pilot client

These steps are described in detail in the following sections.

Step 1 – starting the database

This section describes the process of starting the database used by Netcool/Precision TN.

⚠️ **Attention:** The server must be running before you start the other Netcool/Precision TN components.

Consult your Oracle or MySQL documentation to determine how to start the server.

Step 2 – starting the Netcool/Precision TN server

To start the Netcool/Precision TN server:

1. It is recommended that you first log in as the `root` user.
2. Change directory to `<netcool_install_dir>/precisiontn/bin`
3. Enter the command:

   ```
   ./precisiontn
   ```

Netcool/Precision TN starts, displaying its status in the shell window. Wait until this status completes before you start the next component.

Step 3 – starting Network Pilot

You can view Network Pilot using either Microsoft Internet Explorer 5.x, or Netscape Navigator 6.0 or later. Earlier versions of these browsers might exhibit display problems.

To start Network Pilot:

1. Open a web browser and enter the address `http://hostname:5960.`
2. The *Login* page is displayed, as shown in Figure 9.

Figure 9. *The Login Window*

3. If you *do not* have an instance of Netcool/OMNIbus running, enter the user name `admin` and leave the password blank.

4. If the Netcool/OMNIbus ObjectServer is running, you must enter the user name `root`, and the password assigned to the `root` user in Netcool/OMNIbus.

5. In the **Server** drop-down list, leave `srleap` as the selected server.

6. Click **OK** and Network Pilot opens to the **Precision TN** tab.

Shutting down the server

Always shut the server down gracefully using one of the methods in this section.

Shutting the server down from Network Pilot

To shut the server down gracefully from Network Pilot:

1. Select the **Admin** tab.

2. Click the **Shutdown server** button.
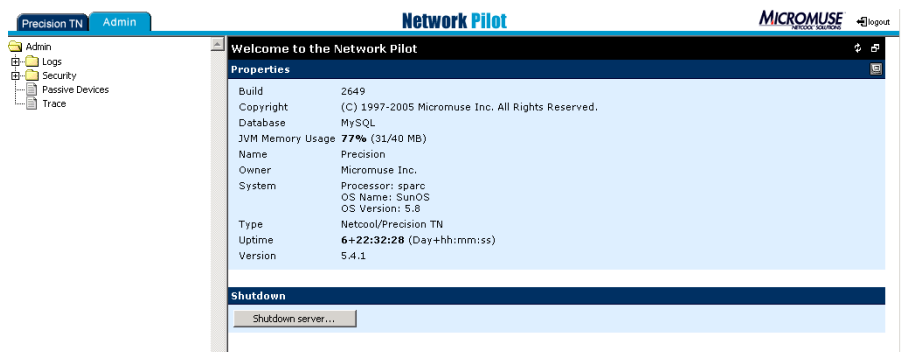
Figure 10. *Shutdown Server*

Invoking the shutdown script from the command line

The shutdown script is located in *<netcool_install_dir>*/precisiontn/bin. To run the script, enter:

```
shutdown.sh hostname port username [password]
```

Chapter 4. Integrating with Netcool/OMNIbus

This chapter describes the process of configuring the Netcool/Precision TN server and Netcool/OMNIbus ObjectServer in order to display NE data for a selected alert in the Netcool/OMNIbus event list.

This chapter contains the following sections:

- "Introduction to visualization" on page 35
- "Configuring the Netcool/OMNIbus ObjectServer version 3.6" on page 36
- "Configuring the Netcool/OMNIbus ObjectServer versions 7.0 and 7.1" on page 37
- "Connecting to an ObjectServer" on page 39
- "Configuring Netcool/Webtop event lists in Netcool/Precision TN" on page 42
- "Creating the visualization menu option" on page 42
- "Visualizing alerts in a desktop" on page 43

Introduction to visualization

Netcool/Precision TN is integrated with Netcool/OMNIbus. If you have Netcool/OMNIbus installed, you can use Netcool/Precision TN to add complete inventory, facility, and connection data to Netcool/OMNIbus alerts so that network operators can more easily diagnose and fix network problems.

Using Netcool/Precision TN, an operator can visualize Netcool/OMNIbus alerts to see exactly where they occur in the network. Netcool/Precision TN listens for alarms received from Netcool/OMNIbus, correlates these alarms to the relevant entities in it's network topology model, and enriches these events with network information.

From the active event list, an operator can select an alarm and then drill down in real time to the shelf, card, and port that is involved in the alert.

From the topology map, you can launch a filtered active event list showing only alarms on the selected device.

Note: After you completed the configuration described in this chapter, you must always start the ObjectServer before you start the Netcool/Precision TN server. In addition, when you start Network Pilot you must enter the root user name and password configured in the Netcool/OMNIbus ObjectServer.

Configuring the Netcool/OMNIbus ObjectServer version 3.6

This section describes the configuration tasks you must complete for Netcool/OMNIbus ObjectServer version 3.6. See "Configuring the Netcool/OMNIbus ObjectServer versions 7.0 and 7.1" on page 37 for instructions on configuring versions 7.0 and 7.1.

Adding fields to the ObjectServer and migrating data

To configure Netcool/OMNIbus, you must edit the ObjectServer SQL file and migrate the data within it.

Note: The default ObjectServer name is `NCOMS` and the SQL file is `NCOMS.sql`. In this chapter references to this file will be shown as *ObjectServername*`.sql`. Replace *ObjectServername* with the name you gave to your own Netcool/OMNIbus ObjectServer.

To visualize alerts in Netcool/OMNIbus, you must add new elements to the ObjectServer `alerts.status` table in the *ObjectServername*`.sql` file that was installed as part of Netcool/OMNIbus. You must add the following columns to the end of the `alerts.status` table:

```
PtnEntityID varchar(255),
PtnNative1 varchar(255),
NmosDomainName varchar(255),
```

To add the columns to the `alerts.status` table:

1. Check that the ObjectServer is not running. See the *Netcool®/OMNIbus™ Administration Guide* if you need instructions on how to stop the server.
2. Back up all of the Netcool/OMNIbus database files by creating a `tmp` directory and copying the database files to the `tmp` directory. The database files are typically located in `$OMNIHOME/db`.
3. Change directory to `$OMNIHOME/etc`.
4. Copy *ObjectServername*`.sql` and rename it *ObjectServername*`.orig`.

   Note: You must use the `.orig` suffix when you rename this file. The `nco_migrate` migration tool looks for a file with this extension.

5. Open *ObjectServername*`.sql` file with a text editor.
6. Edit the definition within the parentheses that start after this line:

   ```
   create table status
   ```

   Paste the columns (shown below in bold) into the file, before this line:

   ```
   primary key ( Identifier ),
   ```

   After you paste in the columns, the relevant part of the file should look similar to this:

   ```
   create database alerts;
   use database alerts;
   ```

```
create table status
(
...
-- MasterSerial    int,              -- DSD Master serial
        PtnEntityID varchar(255),
        PtnNative1 varchar(255),
        NmosDomainName varchar(255),
        primary key ( Identifier ),
        permanent
);
create table objclass
   (
        Tag int,
        Name varchar(64),
...
```

7. Save and close the *ObjectServername*.sql file.

8. If you are connecting to an existing ObjectServer, you must migrate your existing data to the new database by running the nco_migrate command.

   To migrate the data, change directory to $OMNIHOME/bin and enter:

   ```
   nco_migra -server ObjectServerName
   ```

For additional information about the ObjectServer, see the *Netcool®/OMNIbus™ Administration Guide*.

Configuring the Netcool/OMNIbus ObjectServer versions 7.0 and 7.1

This section describes the configuration tasks you must complete for the Netcool/OMNIbus ObjectServer version 7.0 or 7.1. See "Configuring the Netcool/OMNIbus ObjectServer version 3.6" on page 36 for details of how to configure version 3.6.

Adding fields to the ObjectServer

Add the `PtnEntityID` and `PtnNative1` columns to the `alerts.status` table using the following steps. The column names are case-sensitive:

1. Check that the ObjectServer is running.

2. Execute the following command to start `nco_sql`. This command will change the object server name as appropriate for your system. Enter the root password when prompted.

   ```
   $OMNIHOME/bin/nco_sql -username root -server NCOMS
   ```

3. Enter the commands below exactly as shown. The caret character is the `nco_sql` prompt and must not be entered.

   ```
   > alter table alerts.status add column PtnEntityID varchar(255);
   > go
   > alter table alerts.status add column PtnNative1 varchar(255);
   > go
   > alter table alerts.status add column NmosDomainName varchar(255);
   > go
   > exit
   ```

Connecting to an ObjectServer that is not named NCOMS

If you did not use the default name when you installed the Netcool/OMNIbus ObjectServer, you need to follow the steps below before you can run visualization:

1. If you copied the `t11.rules` and `t11.props` files to the `$OMNIHOME/tsm/solaris2` directory, change to that directory.
   If you plan to use the `-rulesfile` and `-propsfile` command line arguments to use the files in the `<netcool_install_dir>`/etc/precisiontn directory, change to that directory.

2. Open the `t11.props` file with a text editor.

3. Find the following line (toward the bottom of the file):

   ```
   #Server: "NCOMS"
   ```

4. Uncomment the line by removing the # character.

5. Replace NCOMS with the name of your ObjectServer.

6. Save and close the file.

As an alternative, you can give the name of your ObjectServer to Netcool/Precision TN using a command line argument each time you start Netcool/Precision TN. To do this, change directory to `<netcool_install_dir>`/precisiontn/bin and enter:

```
./precisiontn -server ObjectServername
```

where *ObjectServername* is replaced by the name of your ObjectServer.

You can obtain a list of all the command line arguments available to Netcool/Precision TN by changing directory to *<netcool_install_dir>*/precisiontn/bin and entering:

```
precisiontn -help
```

Connecting to an ObjectServer

Netcool/Precision TN connects to the object server named in the *<netcool_install_dir>*/etc/precisiontn/tl1.props file. The name specified in this file can be changed by editing the file, or overriden using command line arguments when starting Netcool/Precision TN, such as:

```
./precisiontn -server NCOMS
```

Replace `NCOMS` with the name of your object server.

To run Netcool/Precision TN with a remote ObjectServer, you must install Netcool/OMNIbus locally and configure the system to connect to the remote Object Server with the server configuration tool, `nco_xigen`.

Netcool/Precision TN implements Netcool/OMNIbus user authentication, so Netcool/OMNIbus users can log into Netcool/Precision TN with their Netcool/OMNIbus user name and password.

To open the connection, Netcool/Precision TN needs to connect with the ObjectServer database where the user authentication records are stored. You must configure Netcool/Precision TN to open the connection as follows:

1. Change directory to *<netcool_install_dir>*/etc/precisiontn and open the `precisiontn.xml` file with a text editor.

2. Locate the following lines and uncomment the example by removing the `<!--` and `-->` characters:

    ```
    <!-- The following are provided as an example to override the default

    extension property for TSM specific extensions. -->

    <!--

    <properties name="Netcool TSM">

        <property name="PropsFile"
    value="$(app.install.root)config/tl1.props" />

    </properties>


        <properties name="Netcool TL1 Connect">

        <property name="hostsPath" value="$(app.install.root)/config/" />
    ```

```
        </properties>



        <properties name="Netcool User Authentication">

             <property name="jdbcuser" value="root" />

             <property name="jdbcpwd" value="null" />

        </properties>

        -->
```

3. Replace the default property values in the file with the property values you need to create a connection from the Netcool/Precision TN database to the ObjectServer database:

   – In the `jdbcuser` property, enter a valid ObjectServer user name with ISQL access. The default is `root`.
   – In the `jdbcpwd` property, enter the ObjectServer password for this user name. The default is `null`.

4. Save and close the file.

Whenever Netcool/Precision TN starts, it uses this information to connect to the ObjectServer database, enabling Netcool/OMNIbus users to log into Netcool/Precision TN.

Configuring Netcool/OMNIbus probes

This section describes the configuration tasks you must complete for probes to ensure the alerts are correctly processed by the Netcool/Precision TN server.

By default, Netcool/Precision TN does not forward or process traps and alarms from NEs. Instead, the trap and alarm information is expected to be forwarded into Netcool/OMNIbus via probes such as the Muti-threaded Trapd probe or TL1 TSM. Netcool/Precision TN implements Netcool/OMNIbus gateway functionality in order to enrich alerts so that they can be displayed in Netcool/Precision TN's alarm summaries, backplane view, and topology view.

The configuration changes required by Netcool/Precision TN involves minor changes to the probe rules files. Additionally, the rules file changes for any given probe are dependent on the method of data collection employed by Netcool/Precision TN for the same NEs. For example, changes to the Multi-threaded Trapd probe's rules file for NE's in which Netcool/Precision TN collects data via SNMP will be different than those required for the same probe when Netcool/Precision TN collects data via the Cisco WAN Manager.

SNMP Data Collection / Multi-Threaded Trapd probe

If Netcool/Precision TN collects data from NEs via SNMP and Netcool/OMNIbus receives alerts for the same NEs from its Multi-Threaded Trapd probe, Netcool/Precision TN must be able to correlate the alerts in Netcool/OMNIbus with its own entity information gathered using SNMP.

In this case, Netcool/Precision TN requires the Netcool Knowledge Library (NKL) rules files for the Multithreaded Trapd probe. If you require these rules files, contact IBM Tivoli Netcool Support.

No modifications to this rules file are required.

TL1 data collection / TL1-TSM

If Netcool/Precision TN collects data from NEs using TL1 data collection and Netcool/OMNIbus receives alerts for the same NEs from its TL1 TSM, Netcool/Precision TN must be able to correlate the alerts in Netcool/OMNIbus with its own entity information gathered using TL1 data collection.

The Netcool Knowledge Library "contributed" `tl1.rules` file is highly recommended in this case. This rules file is available from IBM Tivoli Netcool Support.

Note: If this web page is unavailable, see the IBM Tivoli Netcool Support page for further details.

One modification to this rules file is required. You must add a line to assign the value of `QuotedLine` to `PtnNative1` (add the line `@PtnNative1 = $QuotedLine`). This line must be added to a section of the rules file such that is applied to all alerts except "TSM watch" messages and discarded alerts.

If the `NKL tl1.rules` file is not used, the following requirements must be met:

- The NE SID must be in the **Node** column of `alerts.status`.
- The **AlertGroup** column must be populated with the alarm's verb, modifiers, and condition type. The verb and modifiers must be separated by spaces and the condition type enclosed in parenthesis. For example `"REPT ALM OC3 (LOS)"`
- The **PtnNative1** column must be populated with the value of `$QuotedLine`.

Configuring Netcool/Webtop event lists in Netcool/Precision TN

Netcool/Precision TN can display alerts for network elements via Netcool/Webtop. To configure this feature follow the steps below:

1. Modify the *<webtop_install_dir>*/config/server.init file such that the value of the aelview.queries.enabled property is true. For example:

   "aelview.queries.enabled:true"

2. Restart Netcool/Webtop.

3. Edit *<netcool_install_dir>*/var/precisiontn/netpilot/ webapps/root/default/link.properties and modify the value of the webtop.base.url property to the correct URL for accessing the Netcool/Webtop interface.

The action menu associated with individual network elements in Netcool/Precision TN contains an "Alarms..." item. When selected, a popup window containing the alerts will be displayed.

Creating the visualization menu option

This section describes the method of adding the visualization menu options to the event list for Netcool/OMNIbus and Netcool/Webtop.

Adding the menu to the Netcool/OMNIbus desktop

Netcool/Precision TN provides the ability to select an alert from the Netcool/OMNIbus event list and visualize the entity at fault, by showing the specific NE in Network Pilot.

To add a new menu item that enables you to call up NE images from Netcool/OMNIbus:

1. Start the ObjectServer. See "Starting the components" on page 43 or see the *Netcool®/OMNIbus™ Administration Guide* for further information.

2. From the command line, check the value of the OMNIHOME environment variable is set to the location of the Netcool/OMNIbus installation.

3. Execute the following command:

   <netcool_install_dir>/precisiontn/bin/util/install_backplane_tool.sh

The script prompts for the object server name, user name and password. It also prompts for the browser pathname. This assumes that either your Mozilla or Netscape browsers are configured properly, that is, LD_LIBRARY_PATH includes all the necessary shared libraries.

Adding the menu to the Netcool/Webtop desktop

Before you can add the visualization menu option to Netcool/Webtop, you must have Netcool/Webtop 1.1 and the latest patches installed. For information about how to do this, see the *Netcool/Webtop Administration Guide*. Once the product is installed, you need to follow the steps described in "Configuring the Netcool/OMNIbus ObjectServer version 3.6" on page 36.

To add the Visualize menu option to Netcool/Webtop:

1. Find the `visualize.zip` file in the `<netcool_install_dir>`/etc/precisiontn/webtop directory and copy it to the `Netcool/Webtop` installation directory.

2. Unzip `visualize.zip` in the Netcool/Webtop installation directory.

3. Open the *Netcool/Webtop Administration* page and click on the **Content** tab.

4. Expand the **Menus & Tools** section and click on **Menus**.

5. Select a menu to add the Visualize tool to (for example, "alerts") and then click on the **Modify** menu.

6. In the resulting pop-up window, select **Visualize** from the selection box on the left.

7. Click the **<- Add** button.

8. Click the **Ok** button.

Visualizing alerts in a desktop

This section describes the process of starting the components that are used when visualizing alerts. It also describes the operation of the visualization menu option to display data.

Starting the components

When using Netcool/Precision TN visualization with Netcool/OMNIbus:

- You must start the ObjectServer before you start the Netcool/Precision TN server.

- If you are using Netscape as your web browser you must start Netscape before you start the Netcool/Precision TN server.

- Netcool/Precision TN uses Netcool/OMNIbus security, so you must log in to Network Pilot using the Netcool/OMNIbus `root` user name and password.

See the *Netcool®/OMNIbus™ Administration Guide* if you need additional instructions on how to start the Netcool/OMNIbus ObjectServer. For instructions on how to log in to the event list, see the *Netcool®/OMNIbus™ User Guide*.

Starting the ObjectServer

To start the ObjectServer, enter the command:

```
$OMNIHOME/bin/nco_objserv
```

Starting the database

You must start your database as described in "Starting the database" on page 44 before starting the Netcool/Precision TN Server.

Starting the Netcool/Precision TN server for visualization

It is recommended that you first log in as `root`. From the `<netcool_install_dir>`/precisiontn/bin directory, enter:

```
./precisiontn
```

Opening an event list

To open the Netcool/OMNIbus event list:

1. Start the Netcool/OMNIbus event list using the command:

    ```
    $OMNIHOME/nco_event
    ```

    The **Login** window is displayed, as shown in Figure 11.
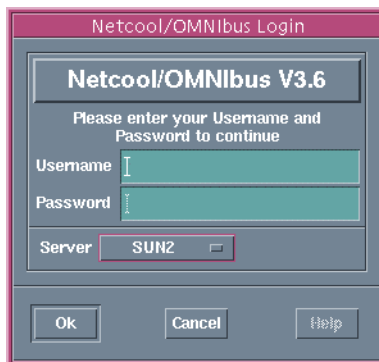
Figure 11. *Login window*

2. Use the user name and the password assigned to `root` on your system. If no password has been assigned, leave the password field blank. Click **Ok**.

   The Netcool/OMNIbus **Monitor Box** window is displayed, as shown in Figure 12.
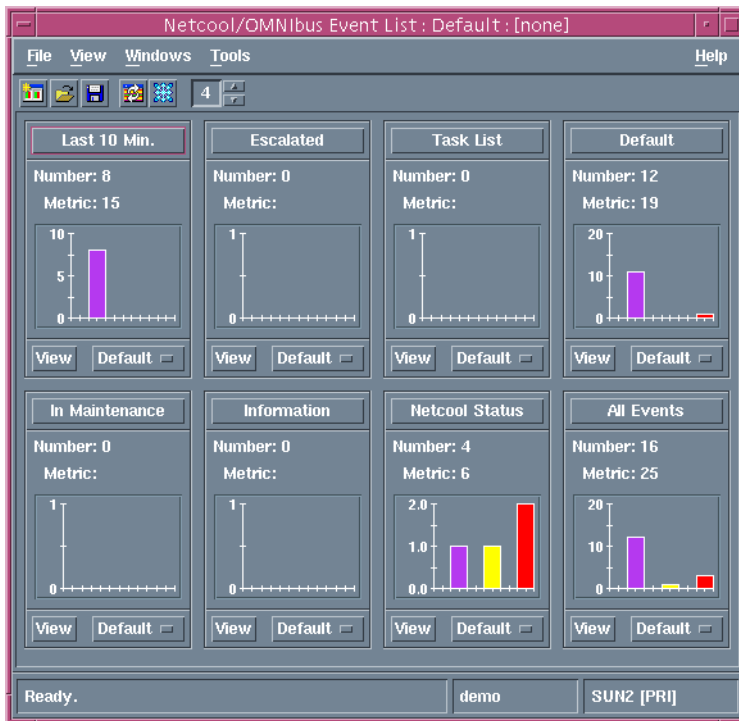
Figure 12. *Monitor box window*

3. Click the **View** button beside the **Default** drop-down list to display the default event list, as shown in Figure 13.
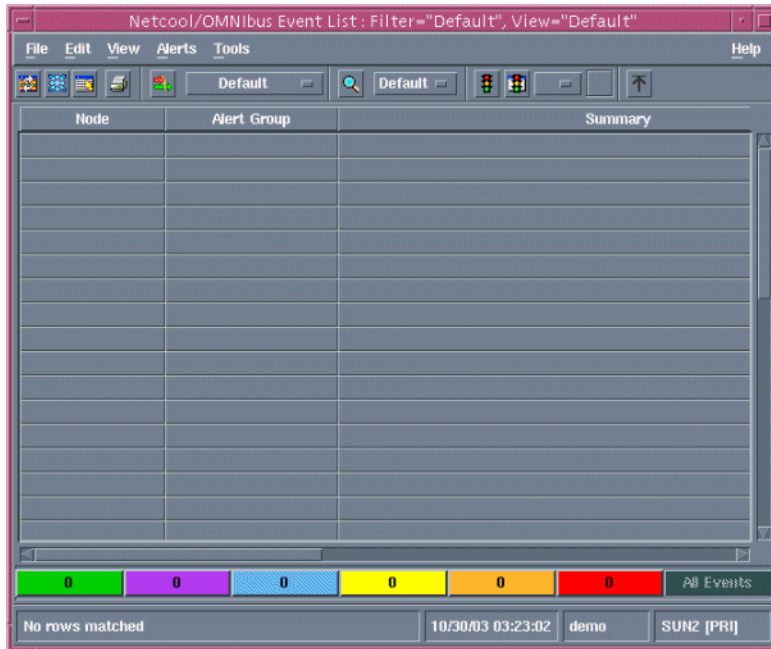
Figure 13. *Event list window*

> **Note:** No alerts from NEs are presented until you have used Network Pilot to discover, or manually connect to, the NEs in the network.

Start Network Pilot as described in "Step 3 – starting Network Pilot" on page 32.

Using the visualization menu

Once you have completed the configuration and started the components, as described in earlier sections, Netcool/Precision TN automatically forwards all alerts to Netcool/OMNIbus for processing.

To visualize the data from the Netcool/OMNIbus alerts:

1. Ensure you have previously run Netcool/Precision TN and used Network Pilot to discover, or manually connect to, the NEs in the network.

2. Open the Netcool/OMNIbus event list, as described in "Opening an event list" on page 44, to see the current alerts. An example event list is shown in Figure 14.

Figure 14. *Populated event list window*

3. Right-click an alert in the event list and select **Visualize** from the context-sensitive menu, as shown in Figure 15.
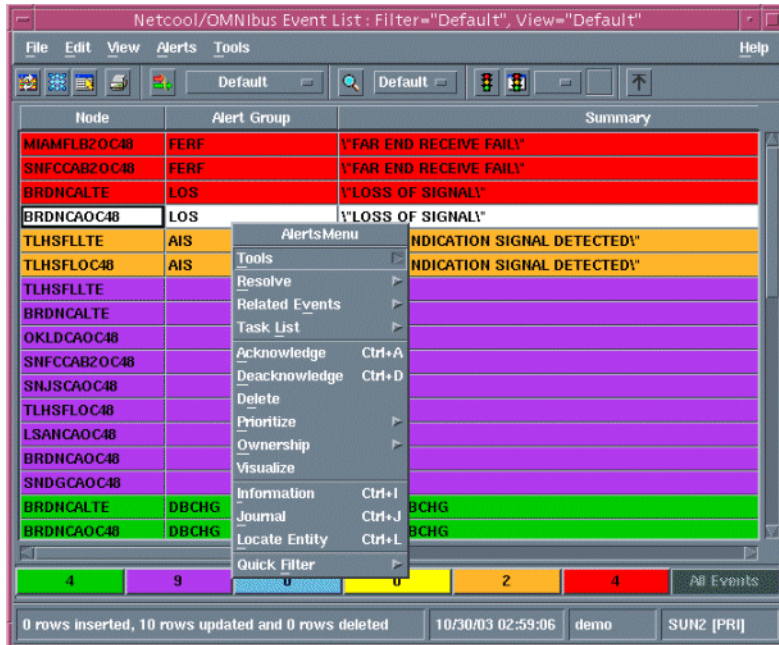
Figure 15. *Visualize menu*

4. The Network Pilot browser window is displayed, as shown in Figure 16. The window shows the affected entity within the context of the NE itself.
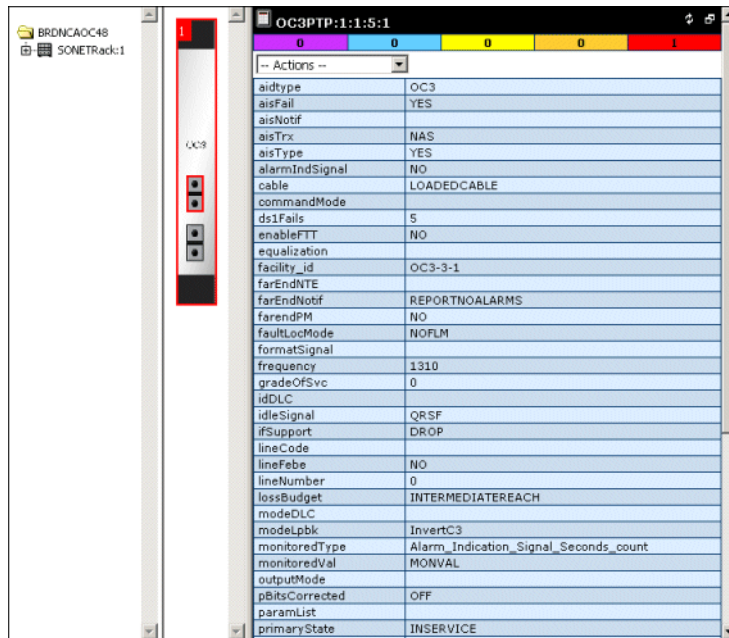
Figure 16. *Network Pilot window*

Depending on your browser settings, your browser might reuse a window that is already open to display the information from Network Pilot rather than opening a new window.

The highlighted port is the one which generated the alert. Technicians can use this page to physically locate the problem hardware.

You can also expand the node in the navigation pane on the left and click other entities to visualize the impact of the alert's location at other levels in the NE.

Chapter 5. Setting configuration options

This chapter describes how to configure your Netcool/Precision TN installation, and how to troubleshoot some common issues.

This chapter contains the following sections:

Configuring failover

In the failover scenario described in this section, the primary and secondary servers share a single database. The primary server is a standard Netcool/Precision TN server, while the secondary server is a very limited (cold) server whose only purpose is to detect when the primary server goes down. This secondary server does not maintain connections to the NEs in the network nor bind to the RMI registry. It also performs no security checks, and as a result, remote clients in this configuration do not have access to the secondary server.

Figure 17 shows an overview of the network in this configuration:

Figure 17. *Failover functionality*

⚠️ **Attention:** You must use an Oracle database to run Netcool/Precision TN in this failover configuration.

Implementation overview

The failover process in this configuration comprises the following phases:

1. Startup. The first instance of Netcool/Precision TN started becomes the primary server. This server performs the typical startup procedures, including any security mechanisms, binding to the RMI registry, and creating and loading the Netcool Management Framework. The second instance of Netcool/Precision TN to start becomes the secondary server. It reads the `<netcool_install_dir>`/etc/precisiontn/secondary.xml file, performs the necessary startup functionality, and then goes into a quiescent or resting state. Startup functionality for the secondary server is minimal.

2. Normal Operation. The primary server operates with no modification; the secondary server uses a combination of a semaphore and a heartbeat mechanism to detect when the primary goes down and when the primary's network or database connections are dropped. When any of these events occurs, the secondary detects it and performs a switchover.

3. Switchover. During switchover:

    –   The secondary server unloads or destroys all of the extensions associated with the `secondary.xml` file. The class definitions are also unloaded.

    –   The secondary server loads the extension assembly instructions specified in the `<netcool_install_dir>`/etc/precisiontn/precisiontn.xml file. This means loading all the primary server extensions and their properties.

– The secondary server does not repoll the NEs in the network, as this information is already present in the database.

– If the problem is that the primary server's network or database connection has gone down, then as soon as the primary server detects this, it shuts itself down.

How the semaphore mechanism is implemented

An Oracle database lock is used as a semaphore to detect when the primary server goes down. The primary server acquires the lock resource and does not release it until the primary server goes down. The Oracle server detects that the primary Netcool/Precision TN server has gone down and releases the lock. The secondary server blocks and waits until the lock is released. When the lock is released, the secondary acquires the lock and becomes the primary.

How the heartbeat mechanism is implemented

There is also a failsafe in case the network connection goes down or the primary server process becomes hung or suspended. The primary updates a table in the database with a unique value every *n* seconds. If the secondary server detects that the time stamp has not been updated within *n* seconds, it stops the primary server's Oracle database session (using the Oracle `alter system kill session` command) and becomes the primary. If this occurs, the initial primary shuts itself down as soon as it detects that there is another primary server.

Configuring Oracle for use with failover

Before you configure Netcool/Precision TN for this failover scenario, ensure that you have followed steps 1 through 4 in "Configuring the Netcool/Precision TN servers" on page 54. If you are only using Oracle for failover, you do not need to follow any of the other steps in that section.

In "Configuring the Netcool/Precision TN servers" on page 54, you will configure the Netcool/Precision TN servers to use at least one Oracle user and password. When selecting the Oracle users, you must ensure:

• The users must either use the DEFAULT Oracle profile or the profile that it uses must have its `CONNECT_TIME` and `IDLE_TIME` properties set to `UNLIMITED`. These properties must be unlimited so that the database session being used by the instances of Netcool/Precision TN will not time out.

• The users must have been granted the following privileges:

```
grant select on v_$session to username;
grant alter system to username
```

If a user does not have these privileges, you must set them using an SQL tool such as Oracle's SQL*Plus or a third-party SQL tool of your choice. These permissions are needed because the secondary server needs the session information from `v_$session` and uses the `alter system kill session` command to stop the primary server's database session.

There is one further Oracle requirement. The default tablespace of the Oracle connection created by the primary server must be the same as the one created by the secondary. This will be the case if both servers are using the same `precisiontn.xml` file.

Configuring the Netcool/Precision TN servers

The primary and secondary instances of the Netcool/Precision TN server should run on different machines. It is recommended that the two installations are identical.

⚠️ **Attention:** The minimum requirement is for the `precisiontn.xml` and `oracle_config.xml` files to be identical between the two instances.

Running failover

This section describes how to start and stop failover.

Starting the servers

To start the servers:

1. Start the database. See your Oracle documentation for information about starting the database you are using.

2. Start the servers using the command:

    ```
    ./precisiontn
    ```

    The first instance you start will come up as the primary server. Start a second instance of Netcool/Precision TN as your secondary server.

3. Start Network Pilot. To monitor the primary server, follow the instructions in "Step 3 – starting Network Pilot" on page 32 to start Network Pilot. You cannot monitor the secondary server.

Switching the state of a server

To force the instances of the server to switch state, you must shut down the primary server. To shut it down gracefully from Network Pilot, click the **Shutdown** button on the **Admin** tab. The secondary will detect that it has been shut down and become the primary. After the initial secondary has finished the switchover, you can start another secondary instance from the command line, as described above.

Stopping servers running in failover configuration

Although it is unusual to go from running servers in a failover configuration to running just one server, you might want to do this at some point. To stop the servers:

1. Shut down the primary server gracefully from Network Pilot by clicking the **Shutdown** button on the **Admin** tab.

2. Because you cannot use Network Pilot with the secondary server, you can shut down the secondary server manually using the `kill` command.

Using Netcool/Precision TN with Cisco WAN Manager

Cisco WAN Management System (CWM) is used to manage Cisco WAN devices such as Asynchronous Transfer Mode (ATM) devices and frame relays. It manages devices, topological connections among devices, and PVC (User Connections) as well.

CWM uses Informix as its database, and uses database access through a major northbound interface. When integrating Netcool/Precision TN with Cisco WAN Manager, data from the Informix database is used in all the Netcool/Precision TN functions (such as NE discovery, asset polling, and network connection polling.)

Discovering Cisco WAN Manager NEs

To configure a discovery of CWM NEs:

1. Start Network Pilot.

2. Select menu **Actions** -> **Discover** -> **Manage Discovery** and click the **Create New...** button.

3. Type the identifier and display names, then click the **Next** button.

4. Click on the **Scope** tab and add the IP address of CWM database; port information will be added in the steps below.

5. Click on the **Protocols** tab, select CiscoCWM from the drop-down menu, and then click the **Configure** button.

6. Type in the port used to access the the database and then click the **Next** button.

7. Add the Informix database access information and discovery parameters. See Table 5.

Table 5. *Informix database access information and discovery parameters*

Property	Description
Server Name	The name of Informix Server (not the name of host on which Informix is installed.)
Database Name	The name of Informix database that CWM uses.
User Name	The user name required to access the Informix database.
Password	The password required to access the Informix database.
Encryption	If encrypted access is required by the Informix database, check this option.
Aggregate BIS	This a discovery parameter. There are two kinds of nodes in CWM, feeder node and router node. Feeder nodes are associated with router node. If you want feeder node to be created in the same NE as router node, check this option. Otherwise, feeder node and router node will be created as seperate NEs.

8. Click the **Finish** button.

Polling CWM topological connections

To configure a polling schedule for CWM TC polling, follow the steps below:

1. Start the Network Pilot.
2. Select **Actions** -> **Polling** -> **Manage Network Connection Discovery** from the menu.
3. Click the **New TC Schedule...** button.
4. Enter the name of the new polling schedule and then select
   CWMInformixTopoConnSA.

   Note: If no CWM NEs have been discovered, CWMInformixTopoConnSA will be
   unavailable for selection.

5. Click the **->** button.
6. Click the **Apply** button to add the new CWM TC polling schedule.

Polling CWM SubNetwork Connections (SNCs)

To configure a polling schedule for CWM SNC polling, follow the steps below:

1. Start the Network Pilot.
2. Select **Actions** -> **Polling** -> **Manage Network Connection Discovery** from the menu.
3. Click the **New SNC Schedule...** button.
4. Enter the name of the new polling schedule and then select
   CWMInformixSNCConnSA.

   Note: If no CWM NEs have been discovered, CWMInformixSNCConnSA will be
   unavailable for selection.

5. Click the **->** button.
6. Click the **Apply** button to add the new CWM SNC polling schedule.

Configurable properties in CiscoWanManagerExtension

The CiscoWanManagerExtension extension contains various configurable parameters, all of which are Boolean. See Table 6 for further details.

Table 6. *Configurable parameters in CiscoWanManagerExtension*

Property	Property Description
DeleteNEOnDiscoveryFailure	Determines how a missing NE is handled in the latest discovery. The default value is "false". If the value is set to "false", the NEs missing from the latest discovery will be retained in the database. The GUI will display this element as a green icon. If the value is set to "true", the NEs present in the first discovery will be deleted if they are missing from the latest discovery.
facility.createVirtualCard	Determines the behavior when the card is missing for new PTPs. The default value is "true". If the value is set to "true", the PTPs reported as not having a parent card will have one virtual parent card created for them. If the value is set to "false", the PTPs reported as not having a parent card will not be created.
connection.topoconnection. createVirtualEndPoint	Determines the behavior when the physical termination point (PTP) is missing for new topological connections. The default value is "true". If the value is set to "true", the missing PTPs will be created as a virtual end points. These end points will then be used to create the topological connections. If the setting is set to "false", the missing topological connections will not be created.
connection.subnetworkconnection. createVirtualEndPoint	Determines the behavior when the PTP is missing, to create connection termination points (CTPs) before creating a newly discovered sub network connection. The default value is "true". If the value is set to "true", the missing PTPs will be created as a virtual end points. These end points will then be used to create the sub network connections and associated parents up to card level. If the value is set to "false", neither the virtual end points, the missing sub network connections, nor the associated parents will be created.

Configuring Netcool/OMNIbus process control

Netcool/OMNIbus process control allows the Netcool/Precision TN process to be monitored and automatically restarted if it exits unexpectedly. If Netcool/Precision TN is not configured to run using process control, it must be started or restarted manually using system init scripts or the command line.

To set up the process control daemon and agent, follow the instructions in the *Netcool®/OMNIbus™ Administration Guide* .

Netcool/Precision TN is not PA Aware. To configure the process agent to monitor the Netcool/Precision TN process, add the following section to your `$OMNIHOME/etc/`*process_agent_name*`.conf` configuration file:

```
nco_process 'PrecisionTN'
{
   Command '<netcool_install_dir>/bin/precisiontn' run as 0
   Host='my_host_name'
   Managed=true
   RestartMsg='Netcool/Precision TN has been restarted'
   AlertMsg='Netcool/Precision TN has gone down'
   RetryCount=0
   ProcessType=PaNOT_PA_AWARE
}
```

where *<netcool_install_dir>* is replaced with the Netcool installation directory (the default is `/opt/netcool`), and *my_host_name* is replaced with the hostname of the machine where Netcool/Precision TN is running.

Disabling use of Netcool/OMNIbus

If you do not want event correlation and only want to perform asset polling, you can disable Netcool/OMNIbus. Netcool/Precision TN should always perform event correlation which requires the Netcool/OMNIbus ObjectServer.

You can configure Netcool/Precision TN not to use Netcool/OMNIbus by editing the `precisiontn.xml` file.

Go to the `<netcool_install_dir>/etc/precisiontn` directory and open the `precisiontn.xml` file and change the "`lumos.leap.service.opl.Enable`" value to "`false`" to disable the Netcool/OMNIbus integration.

```
<properties name="LEAPFramework">
<property name="lumos.leap.service.opl.Enable"
value="false" />
</properties>
```

Configuring connections to known devices

Netcool/Precision TN allows you to specify a set of devices with which to connect; this information is held in a plain text hosts file.

This feature allows you to bypass both the Network Pilot manual creation process and the automatic discovery mechanism when the set of devices in the network are known to you.

Netcool/Precision TN automatically creates the Network Elements (NEs) listed in the hosts file if they do not already exist. The NE creation is a controlled and configurable process by which Netcool/Precision TN can cumulatively add new NEs, or delete ones no longer listed in the hosts file.

Packaging and configuration

This feature is part of the discovery framework, and provides the ability to schedule the task at specified times.

A single host file is defined by the discovery schedule, listing the set of devices to which Netcool/Precision TN will connect.

This feature is enabled by default. Disable the feature by adding the following lines to the `precisiontn.xml` file:

```
<properties name="LEAPFramework">

<property name="lumos.leap.service.discovery.filedriven.Enabled"
value="false" />

</properties>
```

The hosts-based connectivity can be configured to cumulatively create all the NEs across different runs of the discovery task, or to delete NEs removed from the hosts file. Add the following lines to the `precisiontn.xml` file if you want to cumulatively add NEs (replace the "`false`" value with "`true`" to remove them):

```
<properties name="LEAPFramework">

<property name="lumos.leap.service.discovery.filedriven. DeleteMissingNE"
value="false" />

</properties>
```

Syntax

The hosts file can reside anywhere in the file system. It is a plain text file with comma separated positional fields.

A comment line starts with "`//`". Each line in the file represents an NE with which to connect. The format of each line is as follows:

```
neName,NEType,host,port,usr,pwd,connType,protType,scenario,run_fir
st_enabled,run_always_enabled,cron_tab
```

See Table 7 for details of each parameter.

Table 7. *Hosts file parameters*

Parameter	Value
neName	Name of the NE (the TID in TL1).
NEType	The NEType name of the NE.
host	Either the host name or the host IP address.
port	The port from which the NE accepts the management session.
usr	Authentication user name.
pwd	Authentication password.
connType	Name of the type of connection (for example, telnet, tcp, and so on.)
protType	Name of the type of protocol (for example, TL1, SNMP, and so on.)
scenario	Scenario name, mainly used for TL1 devices.
run_first_enabled	Boolean value of either true or false used to determine whether asset polling is to be run the first time the schedule is enabled. The default value is false.
run_always_enabled	Boolean value of either true or false used to determine whether asset polling is to be run every time the schedule is enabled. The default value is false.
cron_tab	The cron tab defining the asset polling run times.

An example of one line in the hosts file is as follows:

```
NE1,OVM_ADM_V2,10.0.0.176,3082,user1,pwd1,telnet,TL1,scenario_name,,,2 * *
* *
```

Rules

The following rules apply to configuring connections to known devices:

- All fields are mandatory and must be entered in the order specified in "Syntax" on page 59.
- The last three fields can be omitted if the associated comma separator is retained to indicate the position of the omitted parameter.

  Note: All comma seperators are mandatory.

- Lines starting with // indicate comments and are ignored.

- If any of the field values contain a comma, it must be preceded by the escape character back slash (\). For example, if the password field value is the string "ibmnet,co\ol", it is represented by the string "ibmnet\,co\\ol".

- If any of the fields contain a back slash, they need to be preceded by another escape character back slash (\). For example, if the usr field value is the string "ibmnet,co\ol", it will be represented by the string "ibmnet\,co\\ol".

- If provided, the only values allowed for the run_first_enabled field are "true" or "false". If omitted, the value provided in the discovery schedule will be used. If the discovery schedule also does not define this value, the default value provided by the scheduler extension is used.

- If provided, the only values allowed for the run_always_enabled field are "true" or "false". If omitted, the value provided in the discovery schedule will be used. If the discovery schedule also does not define this value, the default value provided by the scheduler extension is used.

- If the cron_tab value is omitted, the value provided in the discovery schedule will be used. If the discovery schedule does not define this value, the default value provided by the scheduler extension is used.

The hosts file is the only mandatory parameter of the File Driven Discovery Service Adapter. It is created manually by you, and the path to the file input to the Discovery Configuration Wizard through the Network Pilot.

Configuring on-demand connectivity to devices

Netcool/Precision TN supports an on-demand connectivity feature to support large networks. Netcool/Precision TN can be configured to remain connected to a specific device for the duration of the configuration discovery process only, thus reducing both the network traffic and the processing time dedicated to the device; this feature increases the product scalability.

When configured in this manner, Netcool/Precision TN does not automatically establish connectivity to a device when is created through a network discovery run, manually through the Network Pilot, or at start up by use of the simple configuration policy process.

Packaging and configuration

This feature is delivered as part of the scheduler extension in the lf-svc-scheduler.jar file. It must be added in the lfserver_ext_assembly.xml configuration file, to be loaded with any other extensions.

The on-demand connectivity feature can be enabled for individual NETypes. The NEPollingExtension parameter defines the ne.polling.association.AssocControlledNETypes property whose syntax is a set of comma separated NEType names. The on-demand connectivity feature is applied to all the devices having a NEType specified in the above set.

If you want to disable this feature, provide an empty set (the default value.)

For example, to allow on-demand connectivity for all Cisco 15454 (`NEType name=`
`"ONS15454"`) devices, add the following lines to the `precisiontn.xml` file:

```
<properties name="NEPollingExtension ">
       <property name="ne.polling.association.AssocControlledNETypes"
value="{ONS15454}" />
</properties>
```

Dependencies

The simple configuration extension must be loaded before the on-demand connectivity
feature. Check that the `lfserver_ext_assembly.xml` file has the
`lf-svc-scheduler.jar` file entry listed after the `lf-cfgpol-simple.jar` entry.

Configuring remote load balancing

Netcool/Precision TN can perform remote load balancing by controlling the amount of
traffic sent to a remote target, whether it is a single device, gateway, or an EMS.

In order to support fragile or specific network limitations and requirements,
Netcool/Precision TN allows you to specify the number of threads to use for polling on a
per NEType basis.

This setting will prevent some agents (whether a single device or EMS) being overloaded,
or crash, due to excessive management traffic.

Packaging and configuration

This feature is delivered as part of the scheduler extension in the
`lf-svc-scheduler.jar` file. It must be added in the `lfserver_ext_assembly.xml`
configuration file, to be loaded with any other extensions.

A set of NETypes can be associated with a given queue, with a number of threads to process
it. The `NEPollingExtension` parameter defines the
`ne.polling.thread.PrivateThreadQueue` property whose syntax is a set of pairs
composed by a named value (`Names=Value`) set of NEType names and the number of
threads separated by commas.

For example, to instruct Netcool/Precision TN to poll Cisco 15454 and Cisco 15327 NEs one
at a time, add the following lines to the `precisiontn.xml` file:

```
<properties name="NEPollingExtension ">
       <property name="ne.polling.thread.PrivateThreadQueue "
value="{{ONS15454,ONS15327}=1}" />
</properties>
```

Appendix A. Reference

This section describes the properties and command line options used to configure Netcool/Precision TN, as well providing information about the third-party software delivered as part of Netcool/Precision TN.

This appendix contains the following sections:

- "precisiontn.xml properties file" on page 63
- "Netcool/Precision TN command line options" on page 67

precisiontn.xml properties file

Netcool/Precision TN stores some global properties in the `<netcool_install_dir>`/etc/precisiontn/precisiontn.xml file.

The `precisiontn.xml` file is used to define the `CLASSPATH` for the Netcool/Precision TN application and specify the Java extension packages that make up the application. The file also contains settings for properties defined in the various Java extension packages.

You can modify the property settings for Netcool/Precision TN Java extension packages in this file; the settings take effect when you restart Netcool/Precision TN.

To modify a property:

1. Open the `<netcool_install_dir>`/etc/precisiontn/precisiontn.xml file with a text editor.

2. Look through the `<properties>` tags at the end of the file, and locate the property you want to set.

3. For example, to force TL1 clients to authenticate with Netcool/Precision TN, you need to change the value of the `lumos.leape.north.tl1.LoginMode` property from `NONE` to `GATEWAY`. The modified entry is shown below:

```
<properties name="TL1 Northbound">
  <property name="lumos.leape.north.tl1.LoginMode"
  value="GATEWAY"/>
</properties>
```

4. Some properties might be commented out using this notation `<!-- property -->`, which means they assume the system default value. Once you have set a new value for the property, you must also uncomment it (remove the `<!--` and the `-->`).

5. Save and close the file.

6. Restart Netcool/Precision TN for your change to take effect.

Note: The name attributes are case sensitive and must be input exactly as they appear in Table A1 on page 65.

Sample: - Properties in the precisiontn.xml file

The following example shows the property definition section in the `precisiontn.xml` file:

```
<extension-assembly>
    ....
<properties name="TopoMediatorExtension">
  <property name="lumos.leapx.service.topo.mediator.UseCLLICodes"
value="true"/>
</properties>

<properties name="LEAPFramework">
  <property name="lumos.leap.association.InitialReconnectDelay" value="1"
/>
  <property name="lumos.leap.association.MaxReconnectDelay" value="4096" />
  <property name="lumos.leap.association.ReconnectIncrement" value="100" />
  <property name="lumos.leap.association.MaxReconnectAttempt" value="-1" />
</properties>

<properties name="LEAPFramework">
 <property name="lumos.leap.KAStrict"
value="{TL1PassThru,TL1PassThruNoLogin}" />
</properties>

<!--
<properties name="Netcool TSM">
    <property name="PropsFile" value="$(app.install.root)config/tl1.props"
/>
</properties>
<properties name="Netcool TL1 Connect">
    <property name="hostsPath" value="$(app.install.root)/config/" />
</properties>
<properties name="Netcool User Authentication">
    <property name="jdbcuser" value="root" />
    <property name="jdbcpwd" value="" />
</properties>
-->

<properties name="LEAPFramework">
    <property name="lumos.leap.adaption.ProtocolTypeManager.MsgLogEnabled"
 value="{TL1}" />
</properties>

<properties name="TL1 Northbound">
  <property name="lumos.leape.north.tl1.LoginMode" value="NONE"/>
</properties>
```

Note: The `app.install.root` property defines *<netcool_install_dir>*.

Table A1 on page 65 describes the properties in the `precisiontn.xml` file. The `name` attributes are case sensitive and must be input exactly as they appear in the table.

Table A1: *Properties in the precisiontn.xml file (1 of 3)*

Netcool/Precision TN Component	Property and Syntax	Description
`Netcool TSM` Basic TL1 TSM properties. These properties are applicable for TL1 TSM customers only.	`PropsFile` *java.net.URL*	Defines the default path for the `tl1.props` file. In a typical installation this would default to `$OMNIHOME/tsm/`*platform*`/tl1.props`. If a different location is required, set this property using an absolute path, for example: `$(app.install.root)/config/` `tl1.props`
`Netcool TL1 Connect` TL1 TSM NE connection properties. This property is applicable for TL1 TSM customers only.	`hostsPath` *java.net.URL*	A hosts file describes TL1 NE connection information. Netcool/Precision TN looks for a hosts file as follows: • If no value is set for `hostsPath`, Netcool/Precision TN checks the `HostsFile` property in the `tl1.props` file for the hosts file location. • If `hostsPath` specifies a hosts file location, the `HostsFile` property in the `tl1.props` file is ignored and this setting is used. • If both `hostsPath` and `HostsFile` properties are empty, then Netcool/Precision TN checks for the host file in `$OMNIhome/tsm/`*platform*.
`Netcool User Authentication` Enables Netcool/Precision TN to access ObjectServer user records.	`jdbcuser` *string*	This user name is used by TL1 TSM to create a connection with ISQL access to the Netcool/OMNIbus database. The default user name is `root`.
	`jdbcpwd` *string*	This user password is used by TL1 TSM to create a connection with ISQL access to the Netcool/OMNIbus database. Default is null, indicating no password.

Table A1: *Properties in the precisiontn.xml file (2 of 3)*

Netcool/Precision TN Component	Property and Syntax	Description
`LEAPFramework` The reconnect properties are applicable for TL1 TSM only. The MsgLogEnabled property activates the raw message log.	`lumos.leap.associ ation. InitialReconnect Delay` *integer*	Defines the initial interval (in seconds) between reconnection attempts. The default is `1`.
	`lumos.leap.assoc iation. MaxReconnectDela y` *integer*	The maximum permitted interval (in seconds) between one reconnect and another. The default is `4096`.
	`lumos.leap.assoc iation. ReconnectIncreme nt` *integer*	The percentage increment between one reconnect attempt and another. Set this property to zero to define a constant reconnect interval. The default is `100`.
	`lumos.leap.assoc iation. MaxReconnectAtte mpt` *integer*	The maximum number of attempts to reestablish an association. The default is `-1`, indicating indefinite attempts.
	`lumos.leap.KAStri ct` *TL1PassThru* | *TL1PassThruNoLog in*	Not applicable.

Table A1: *Properties in the precisiontn.xml file (3 of 3)*

Netcool/Precision TN Component	Property and Syntax	Description
`TopoMediatorExtension` Netcool/Precision TN Topology property.	`lumos.leapx.service.topo.mediator.UseCLLICodes` `true|false`	Specifies whether Netcool/Precision TN should use CLLI codes in NE names to attempt to automatically place NEs in the correct state and city groups in a Topology view. The default is `true`.

`LEAPFramework`
 	
Netcool/Precision TN TL1 Northbound property.
	`lumos.leape.north.tl1.LoginMode`
	
	`NONE|GATEWAY`
		Determines whether TL1 clients must log in to Netcool/Precision TN. If set to `NONE`, no login message (ACT-USER) is required and users are notified of alarms and can issue TL1 commands as soon as they connect to Netcool/Precision TN.
		
		If `GATEWAY` is specified then Netcool/Precision TN acts as a Gateway NE and TL1 clients are required to log in. In the `TID` field of the ACT-USER message, specify the Netcool/Precision TN name, or leave the TID blank. In the user name and password fields, specify a valid Netcool/Precision TN user name and password. Any valid user name and password will grant full access to Netcool/Precision TN and all TL1 commands to all NEs.
		
		The default is `NONE`.

Netcool/Precision TN command line options

Table A2 describes the `precisiontn` command line options.

Table A2: *Command line options (1 of 2)*

Command Line Option	Description
`-ext comma-separated string`	Loads a comma-separated list of `jar`, `zip`, and Java class files.
`-exthelp`	Prints this message and exits (same as `-help`).
`-help`	Prints this message and exits.
`-notrace`	Turns trace off. Trace is enabled by default.
`-verbose`	Turns verbose mode on. Verbose mode is disabled by default.
`-bsize integer`	This is the pool size for TL1 Messages. The default is `8192`.

Table A2: *Command line options (2 of 2)*

Command Line Option	Description

-nons	For ease of use, Netcool/Precision TN by default brings up an embedded nameserver. By doing this, the nameserver (`rmiregistry.exe`) does not have to be started separately. If you include -nons at the command line, you set the `RemoteNameServer` property to true for this session; the nameserver is outside the Netcool/Precision TN server process – it can be on the same box or a remote box. To use a remote nameserver, start Netcool/Precision TN with the following command:
	
	`precisiontn -nons -ORBInitialPort port_no`
	`-ORBInitialHost hostname`

-nosecure	By default, the server forces all remote users of the server to be authenticated. By including this option in the command line, you disable user authentication. The default is `false`.
-nsname *precisiontn_name*	The name to register with the nameserver. This parameter lets you partition a network among multiple servers. Each Netcool/Precision TN server needs to register with the nameserver under its own unique name. The default is `DEFAULT`.
-ORBInitialHost *name*	Connect to the nameserver running on the specified host. This option automatically sets the RemoteNameServer option to `true` if the host is not the localhost. The default is `localhost` (implies -nons if remote).
-ORBInitialPort *integer*	Start the nameserver on this port, or if `RemoteNameServer` is `true` or `ORBInitialHost` is specified, connect to a remote name server on this port. The default is `1099`.
-rebindfreq *seconds*	Frequency, in seconds, with which to try and rebind to the nameserver. You would set this so that if the nameserver restarts, you can rebind. If you do not rebind, then clients that start after the nameserver restarts are unable to connect to Netcool/Precision TN. Once the nameserver is down, this tries every second. If this is set to a value less than or equal to zero, this logic is disabled. The default is `0`.
-trapPort *integer*	SNMP Only: Port that the server should listen on for incoming SNMP trap messages. The majority of SNMP agents send traps to port 162. The default is `162`.
-resynchabsolute *string*	Do not restart the resynch interval on connection reconnect. Determines whether Netcool/Precision TN adheres absolutely to the `resynchinterval`, or restarts the resynch interval after a connection goes down and comes back up. The default is `false`.
-tomcatPort *number*	Specifies the port for accepting HTTP connections to the JSP application.

Appendix B. Notices

This appendix contains the following:

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