

## Chapter 1

# NMC-RX Application Overview

This chapter provides a product overview of the Network Management Center for all Juniper Networks E-series devices.

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## Welcome

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In today's fast-moving and constantly changing Internet environment, service providers have the task of managing complex network services for a high volume of customers. The NMC-RX Element Management System brings order to your task of managing these network services, reduces complexity, and can be customized to your specific needs.

The NMC-RX application provides a portable and scalable way to manage all your network services, enabling you to communicate with the E-series routers in your network to obtain a complete picture of the network services you provide.

## Benefits

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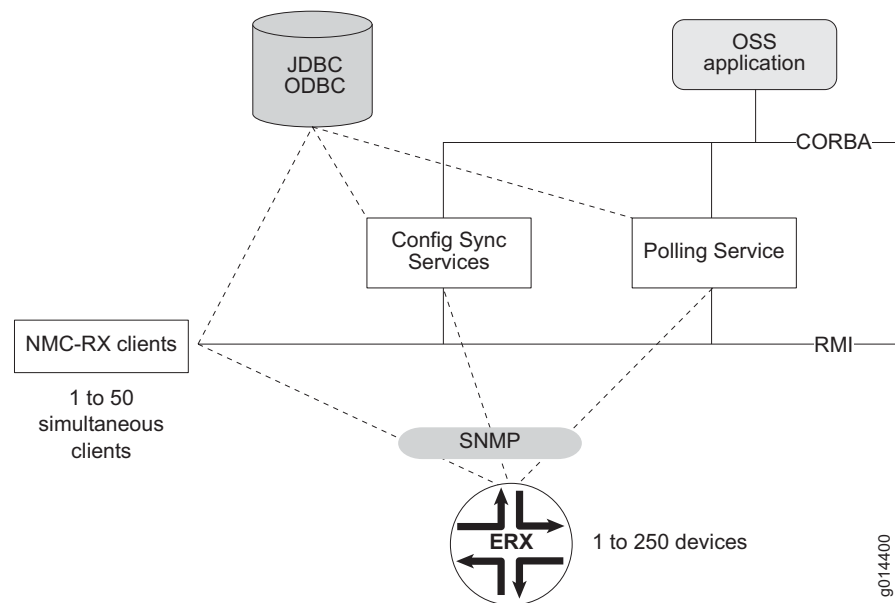
The NMC-RX application offers the following benefits:

- *Customization features*—You can easily and quickly customize the NMC-RX open environment to your specific environment. You have the flexibility of using customized management templates.
- *Ease of navigation*—You can easily get around and perform configuration tasks in the user interface.
- *Increased performance*—You can manage large quantities of network management operations with ease.
- *Autodiscovery*—You can use the NMC-RX application to automatically discover and map the configuration of a device.
- *Device status*—You can quickly see the overall health of your system with color-coded status levels.
- *Time-saving predefined templates*—You can save time by using templates for configuration tasks.
- *Intuitive workshop approach*—You can easily learn, use, and remember the NMC-RX workshop paradigm.
- *Bulk services*—You can create large numbers of objects easily on your device.
- *Profiles*—You can save time and effort by creating a profile with a specific set of characteristics and then assign the profile to multiple interfaces.
- *Statistics*—You can view and monitor detailed information about network activity on most interfaces, subinterfaces, and circuits.
- *Security*—You can create and control security, which makes administration of the E-series device manageable and secure.

## Architecture

The NMC-RX network management system consists of several subsystems, as shown in Figure 1.

**Figure 1: NMC-RX Architecture Framework**



### GUI Client / Java Application

The NMC-RX Element Management System uses a Sun Microsystems Java-based architecture. The Java application provides end-user functionality for configuring and monitoring. The NMC-RX software is a GUI-driven application.

The GUI client interacts with the database through Java Database Connectivity (JDBC) and interacts with the physical devices through SNMP.

- The JDBC application program interface is an industry standard for database-independent connectivity between Java and a wide range of databases, and allows communication with the database.
- The NMC-RX Element Management System uses a robust SNMPv2c-compatible package to provide all basic SNMP functions and to allow communication with the SNMP client.

## SNMPv2c and SNMPv3

You can install SNMPv2c or SNMPv3 of the NMC-RX application. Each version provides authentication and privacy for users in different ways:

- SNMPv2c—Provides password protection via a community string.
- SNMPv3—Each user is associated with a group. A group is a set of users with the same access privileges to the router. For each NMC-RX user, you can configure only one SNMP user.

## Relational Database

The NMC-RX architecture is based on an SQL-compliant Open Database Connectivity (ODBC) relational database system (RDBS) that allows several NMC-RX clients to communicate with a single centralized host. The NMC-RX application supports Sybase Adaptive Server Anywhere 9.0, an SQL-compliant database.

The ODBC/JDBC-compliant relational database is used to store information characterizing the managed devices, as well as network management-level authentication information. The database architecture provides a tight security policy, with all function calls entered and checked by the database before being issued to a device, such as an E-series router.

## Workshop Approach

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The NMC-RX application uses a workshop approach that provides a consistent look and feel throughout. In *Chapter 3, Understanding the User Interface*, you will learn to use the two workshop windows—the Network Workshop and the Device Workshop—to perform configuration tasks (see Figure 2). Within the workshops, you can manage network-wide objects.

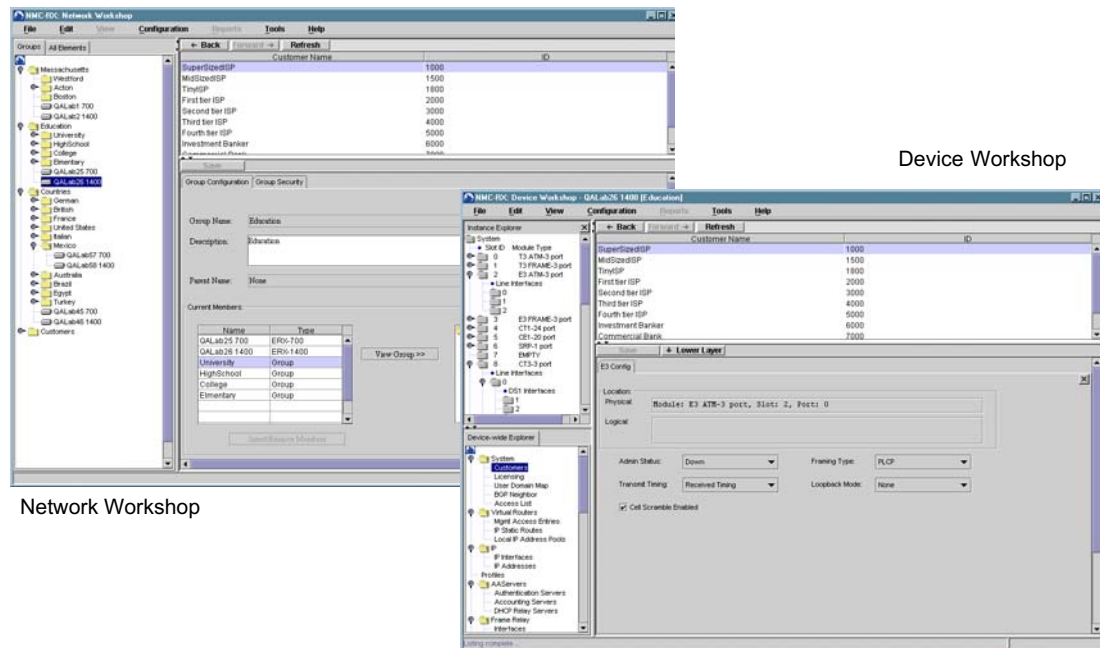
### Network Workshop

The Network Workshop acts as the home base of the application and is the first window displayed when the NMC-RX application opens. From this window, you can examine all managed elements in your network, create groups and devices, and arrange them in a logical manner. After you establish a meaningful hierarchy, you can easily navigate to any given device to configure or troubleshoot.

### Device Workshop

From the Device Workshop, you can examine all managed objects across a single device and view a *device perspective*. For example, you can see all the customer accounts present on a particular device. The Device Workshop lets you control and view all aspects of the device configuration process.

Figure 2: Network Workshop and Device Workshop

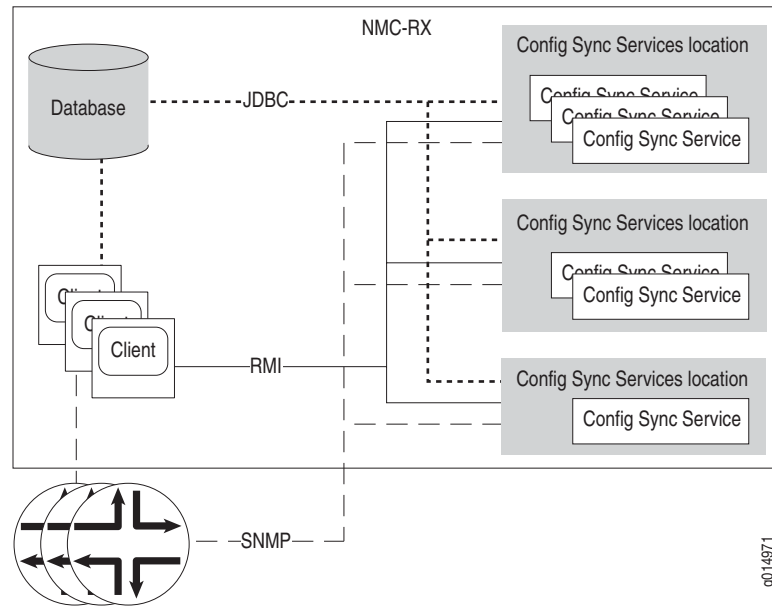


To learn more about the NMC-RX workshop approach, see *Chapter 3, Understanding the User Interface*.

## Config Sync Services

The NMC-RX application uses a distributed processing model to provide greater scalability and control of discovery and update processes for E-series devices (Figure 3).

**Figure 3: Sample Config Sync Service Distribution**



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A Config Sync Services pool allows multiple Config Sync Services to be active simultaneously, thus providing a wealth of processing power that is available to multiple Config Sync Service locations. A system administrator can control the number of Config Sync Services that are allowed in the pool by using a license key. You can purchase the license key separately from Juniper Networks.

You can run multiple Config Sync Services on a single platform or utilize multiple platforms as part of the same NMC-RX Config Sync Service pool. You can oversee and manage the distributed Config Sync Services pool using the NMC-RX client application.

System administrators can scale their NMC-RX installation as their network size grows. For example, it may be possible for the NMC-RX application to control a pool of Config Sync Services that are distributed across multiple host machines. A configuration such as this allows the NMC-RX application to reduce the discovery time for multiple E-series devices by distributing tasks across multiple processes and platforms.

With the addition of the new Config Sync Services installation option, a system administrator can choose to install one or more Config Sync Services on a workstation, without having to install the other NMC-RX components.

For more information about installing and configuring Config Sync Services, see *Chapter 2, Installing and Running the NMC-RX Application* and *Chapter 5, Configuring NMC-RX Application Settings*.

## Provisioning Service

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The NMC-RX Provisioning Service provides a programmatic application programming interface (API) for integration with the NMC-RX Element Management System application. The service requires that the NMC-RX database and the NMC-RX Config Sync Services be fully operational. The NMC-RX database acts as a repository of information, which is used by both the NMC-RX client GUIs and clients accessing the NMC-RX application through the provisioning interface.

You install the NMC-RX Provisioning Service when you install certain NMC-RX Element Management System installation sets. For information about installing the NMC-RX Provisioning Service, see *Chapter 2, Installing and Running the NMC-RX Application*. To activate the NMC-RX Provisioning Service, you must purchase a license key.

Figure 4 shows the NMC-RX Provisioning Service components.

### Figure 4: NMC-RX Provisioning Service Components

You can access the provisioning interface either through the Common Object Request Broker Architecture (CORBA) API or Java remote method invocation (RMI) API; both allow for a wide range of integration capabilities. This guide focuses on the CORBA API.

The Juniper Networks implementation of NMC-RX Provisioning Service is based on the TeleManagement Forum (TMF).814, Interface Definition Language (IDL) Solution Set model. The basics of the TMF.814 model consist of specifying an object by its object path and specifying an action to perform on this object. We combine our own proprietary IDLs with the TMF.814 standard IDLs.

The NMC-RX application lets you:

- View—View all the parameters associated with a particular object.
- List All—List all objects of a particular type related to a selected object.

- Create—Create an instance of a particular object type relative to a selected object.
- Configure—Configure or modify the parameters of a selected object.
- Delete—Delete a selected object.

For more information about the Provisioning Service, see *NMC-RX User Guide, Vol. 2, Chapter 11, Using the Provisioning Service*.

## Templates

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NMC-RX templates can save you time by eliminating repetitive tasks. By using templates, you can set non-unique configuration parameters associated with any given object. You can apply templates to existing objects in the course of modifying the configuration of the object, or you can use a template as the initial configuration when you create an object.

### TemplatePaks

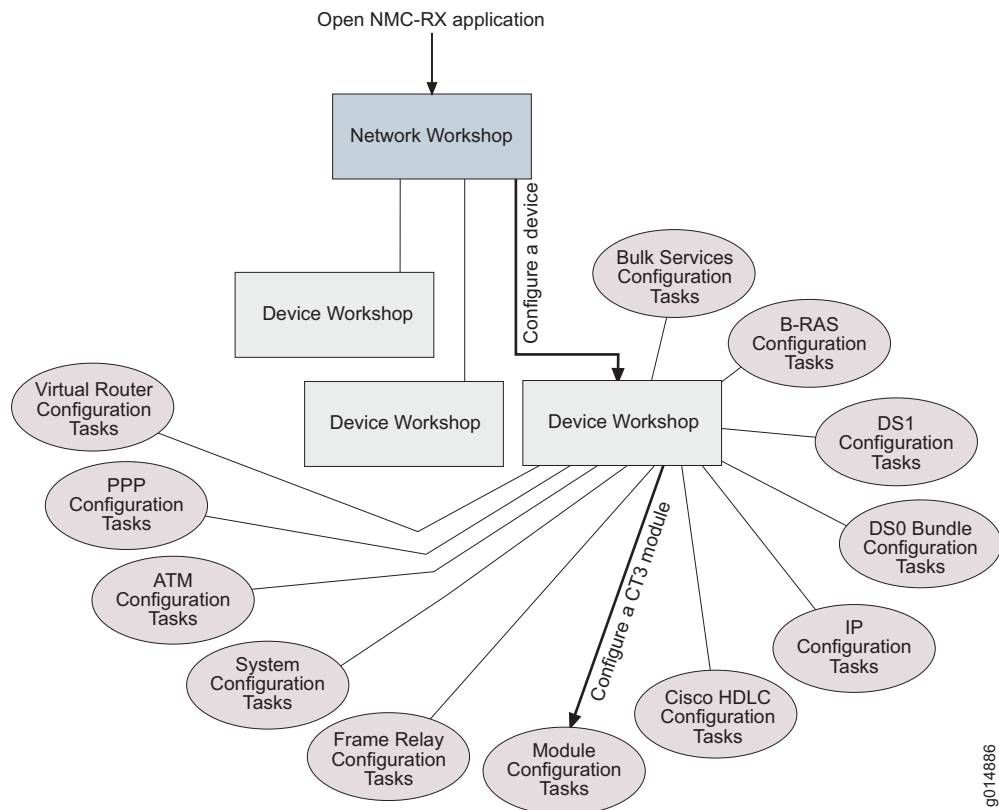
TemplatePaks help you characterize and organize a suite of object configurations together under the same name. Using the TemplatePak feature, you can quickly and effectively find and apply all appropriate changes. You can also preview the TemplatePak before using it.

For a more detailed discussion about NMC-RX templates, see *Chapter 10, Using Templates*.

## Configuration Tasks

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The NMC-RX management software helps you manage objects by organizing information within the structure of the Device-wide Explorer and the Instance Explorer. You can view, list all, create, configure, or delete managed objects by using the two Explorers. Figure 5 shows some of the configuration tasks that you can perform using the NMC-RX application.

**Figure 5: Sampling of Configuration Tasks**

Most configuration tasks are discussed in separate chapters in this book.

## Other Management Methods

In addition to the NMC-RX application, you can use other management tools to configure an E-series router to meet your specific networking requirements.

### CLI Management

The Juniper Networks command-line interface (CLI) provides fully developed and automated configuration and status functionality accessible through a local RS-232 port, an Ethernet connection, or Telnet via any reachable network.

### SNMP MIB Management

Juniper Networks offers a complete Simple Network Management Protocol (SNMP) interface for configuration, status, and alarm reporting for E-series routers. E-series routers support both standard and enterprise MIBs (Management Information Bases). The Juniper Networks enterprise MIB is ASN.1 notated for easy importing into third-party SNMP management applications.

These alternative management methods are discussed in the *JUNOS System Basics Configuration Guide, Chapter 4, Configuring SNMP*.

