



Overview of the WAN Modeling Tools

This chapter provides an overview of the applications that make up the Cisco WAN Modeling Tools, and of the Cisco products they support.

Cisco WAN Modeling Tools Overview

Release 15 of the Cisco WAN Modeling Tools includes the following tools:

- The Network Modeling Tool (NMT)
- The Configuration Extraction Tool (CET)
- The Third-Party Interface (TPI)
- The Spread Sheet Interface (SSI)

The NMT is the primary application of the Cisco WAN Modeling Tools. NMT verifies the provisioning and predicts the routing behavior of the network. NMT supports the following Cisco MSSBU ATM platforms:

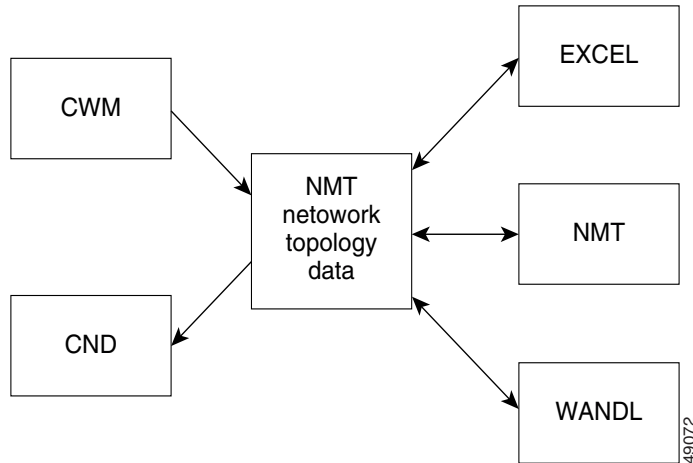
- MGX series
- BPX series
- IGX series

For each major switch software release, NMT verifies the physical and logical provisioning of the front and back cards that support the specified topology. NMT also verifies connection routing and rerouting capabilities of each supported switch in the network.

The CET, SSI, and TPI tools enable the exchange of information between the NMT and other applications. These tools provide interfaces to CWM, Excel, and WANDL.

Figure 1-1 shows the relationship between the applications that make up the Cisco WAN Modeling Tools.

Figure 1-1 Relationship between the Cisco WAN Modeling Tools



Functionality of the NMT

The NMT is a menu driven application that enables you to model the behavior of both simple and complex networks. The program processes information provided by you and returns a proposed configuration. This configuration can then be modified and reprocessed to add redundant links, support additional sites, and so forth. You can also perform failure analysis of the network model by failing selected links and then evaluating the rerouting capability of the remaining links. The NMT allows you to interface to WANDL and other systems to further optimize the design.

Only a few fields need to be completed in order for the NMT to generate a configuration. To create the best configuration possible, you should have extensive knowledge of computer networks, including ATM and Frame Relay networks. In addition, entering precise values for optional fields will help the NMT provide you with a precise parts list that you can use to order Cisco products.

Once the NMT processes the data, it provides configuration information in the following form:

- Updated tables—Modifies your configuration tables as necessary to create a working configuration.
- Reports—Provides a series of reports that describe links, nodes, part numbers, costs, and so on.
- Graphical display—Displays your network design graphically with node icons and maps.
- Import/Export—Displays data imported/exported to other systems.

The NMT always selects the newest available parts for a function, based on the software release you specify. You can explicitly request older cards from the input tables. Some obsolete parts are not supported.

Cisco Products Supported by the NMT

New functionality is added in each release of the NMT to accurately reflect the current capabilities of the following Cisco equipment:

- MGX 8850, MGX 8830, and MGX 8950 switches—Enables a wide range of user services to be supported by the BPX service node. Interfaces supported by the NMT include the following:
 - Frame Relay
 - ATM User-Network Interface (UNI)
 - Circuit emulation
 - n x T1/E1 inverse multiplexing for ATM (IMATM AUSM-8) UNI
 - 3T3 interface using the SRM-3T3 module
- MGX 8220, MGX 8230, and MGX 8250 edge concentrators—MGX Edge concentrators enable a wide range of user services to be supported by the BPX service node. Interfaces supported by the NMT include the following:
 - Frame Relay
 - ATM User-to-Network Interface (UNI)
 - Circuit emulation
 - n x T1/E1 inverse multiplexing for ATM (IMATM AUSM-8) UNI
 - 3T3 interface using the SRM-3T3 module
- BPX switch—A standards based high-capacity (9.6 Gb) broadband ATM switch that provides backbone ATM switching and delivers a wide range of user services. Fully integrated with the IPX and IGX switches, the BPX switch provides broadband ATM services when ASI and BXM cards are used. It also provides a variety of narrowband services; these services are provided by tiered network configurations that use IPX switches and MGX 8220 feeders.

The BPX switch supports the high density Broadband Switch Module (BXM) cards that provide standard interfaces for connecting to cell-based equipment by way of the ATM User-Network Interface (UNI).

- BXM DS3/E3 supports E3/DS3 native ATM access and trunk ports.
- BXM 155 supports OC-3/STM-1 native ATM access and trunk ports.
- BXM 622 supports OC-12/STM-4 native ATM access and trunk ports.

BXM cards also support ATM Frame Relay networks and services and enables configuration of permanent virtual circuits (PVCs) or switched virtual circuits (SVCs) for the following defined service classes:

- Constant bit rate (CBR)
 - Variable bit rate (VBR)
 - Unspecified bit rate (UBR)
 - Available bit rate (ABR)
- SES PNNI Controller—Attaches to a BPX switch to provide Private Network-to-Network Interface (PNNI) signaling and routing for the establishment of ATM switched virtual circuits (SVCs) and soft permanent virtual circuits (SPVCs) over a BPX 8600 wide area network (WAN). Features supported by the NMT include PNNI Routing, resource partitioning, and shelf provisioning.

- IGX switch—A multi-service ATM networking switch that provides interfaces to support legacy and emerging broadband applications. It supports ATM technology over subrate, narrowband E1 and T1, and broadband E3 and T3 trunks. The IGX switch is used as the basis for a leased-line campus, metropolitan area network (MAN) and WAN network, as an intelligent access device to high speed-public digital services such as ATM, in a hybrid application using both, and as a WAN service switch.
- Generic Node -- The NMT allows you to create your own node type for an ATM switch or feeder. Use the node table to provide the high level specifications for the WAN product.
- Obsolete Equipment -- The NMT models obsolete equipment that users may encounter in CWM extracts, and need to model for upgrade considerations. The following obsolete platforms are modeled:
IPX switch, 3810 feeder, FastPad feeder, Port Concentrator Shelf Feeder

Basic Usage/Charter Functionality

The NMT models the WAN network using a classic node, link, and demand model. The nodes are the sites in the site table, which are provisioned as Cisco MSSBU WAN switches. The links are the inter switch trunks in the link table. The connections are specified in the voice, data, and bursty table.

The model provisions the network using the latest Cisco equipment, unless otherwise specified. The model will verify that the network will route all connections, or will report on what resources have been exceeded.

The NMT tool predicts the behavior of a WAN network that uses Cisco WAN switches (MGX, BPX and IGX product series) as follows:

1. the user specifies the site locations and switch types, the links, and the connections in the network.
2. the NMT uses the AutoRoute and PNNI routing algorithms identical to those in the products.
3. based on the Connection Admission Control (CAC) parameters, the NMT verifies that the links and connections can be provisioned, and that the connections can be routed.
4. the WAN network is modeled at the chassis, front card, and back card granularity level.



Note

All connections used by the NMT are ATM connections, with the exception of some legacy IGX voice and data services.

Keep the following in mind when you use the NMT:

- The NMT provides the primary reason any connections cannot be provisioned or routed, based on the CAC rules.
- The NMT does not do discrete simulation, and no real time statistics are involved in the modeling.
- The NMT address the following real time issues only:
 - delay estimate
 - requirements specified in the CAC.
- The NMT verifies the connections routed in the base state
- The NMT verifies which connections will re-route under any network failure scenario.

- The NMT extracts the network topology and connection parameters from Cisco WAN Manager. The NMT handles changes in the CWM DB schema, so these changes are invisible to the user. CWM coded values are translated to more usable strings, and tables are merged so in NMT, there is 1 table per network element.
- The NMT translates topology data to and from MS Excel data. The NMT tables are translated to DBASE3 format and a MS Excel macro is provide for creating a file of spreadsheets for each table.
- NMT translates the topology data to and from the WANDL format for use by their NCAPS tool.
- PNNI CAC parameters are not as granular as they are in the product. For example, some parameters are network specific.
- A 10 character node naming limitation is imposed. CWM provides translation for node naming.

Gaps

The following features are not supported by the NMT:

- XPVCs
- Voice traffic channel mapping entering the network for VISM/VXSM cards
- IP traffic entering the network for RPM cards
- LVC resource support for RPM cards
- Port Partitioning by COS
- Priority bumping in AutoRoute
- VXSM card and connections terminated on that card
- PPP types of traffic on MPSM-16T1E1 cards
- MFR links and connections on MPSM-T3E3-155 cards
- Cisco MGX 8880 node (not supported by CWM)

Data Translation Tools

The NMT Data Translation Tools use data exchanged between the NMT and other network design software aides to create a complex network model. These tools allow the NMT to interface with other Cisco products as well as third-party products. [Table 1-1](#) describes the data translation tools.

Table 1-1 Data Translation Tools

NMT WAN Modeling Tool	Description
Configuration Extraction Tool (CET)	Reads the database of a Cisco Wan Manager (CWM) system, and creates an NMT configuration file with all critical topology and connection information. For further description, see Chapter 10, “Configuration Extraction Tool.”
Third Party Interface (TPI) conversion plug-in	Translates NMT Data into WANDL format. WANDL is a design product that helps you optimize generic networks. TPI also provides translation from WANDL-to-NMT configuration files. for more information, see Chapter 11, “Third Party Interface.”
SpreadSheet Interface (SSI) conversion plug-in	Translates the NMT configuration file tables into standard DBF and XLS formatted files, for use in other systems. It also supports an EXCEL XLS interface for entering, modifying, and analyzing integer data. Several NMT reports are also available in DBF and XLS. For more information, see Chapter 12, “SpreadSheet Interface.”
Cisco Network Designer (CND) import tool	Loads an NMT into the CND as a project. The CND provides low level local configuration of each site on a network, and generates graphic displays and a Bill of Materials (BOM).