



Deploying a Site, Object, or Network

Introduction to Deployment

This chapter describes how to deploy a site, object, or network. Deployment is the term used within CMNM to mean the addition of objects to the CEMF network model. CMNM provides two methods to deploy Cisco MGC nodes and subobjects:

- Manual deployment uses the standard CEMF deployment framework.
- Seed file deployment allows you to specify, on a bulk basis rather than on an individual basis, the components to be managed.

Seed file configuration requires that you define the Cisco MGC network or object (or a portion of it) in an external file that is read by CMNM. Based on the contents of this file, CMNM deploys the file to Cisco MGC nodes and subnodes.

Meeting Password Requirements

IDs and passwords must be consistent across all of the devices being deployed or deployment does not fully succeed. As a result, you must use an additional CEMF dialog to specify the correct login ID and password for the devices. In addition, you have to manually discover the logical connectivity network for those devices.

Anytime a password is changed on a device, you must make a corresponding change in CMNM. Otherwise CMNM's saved passwords do not match those on the devices; polling and connectivity network discovery fail. The same is true for SNMP community strings on the Cisco SLTs and LAN switch.

- When using manual deployment, the deployment wizard templates prompt for the appropriate IDs and passwords.
- When using seed-file deployment, you are prompted to enter the name of the seed-file, the login IDs, and passwords.

Device Inventory

Inventory attributes are shown for each type of device in the CMNM object model. This data is available using a number of dialogs that can be invoked against an object. The following sections outline the data that is available in these dialogs.

Alternate Cisco MGC Configurations

CMNM is able to support any type of Cisco MGC configuration. As such, CMNM does not make any assumptions as to the presence of the various devices. For example, when directed SP links are used, SS7 signaling is terminated on the media gateway. Therefore there are no Cisco SLT devices. CMNM is designed so that it gracefully handles the absence of the Cisco SLTs and LAN switches. However, there must be at least one Cisco MGC host defined.

Different configurations result in changes to the elements in the connectivity network and the relationship between the connectivity network objects. However, CMNM is able to dynamically create the hierarchical representation of the configuration network regardless of how the Cisco MGC is being used.

Cisco SLT and LAN Switch Inventory

The Cisco SLT and LAN switch are listed as generic network devices. The data in Table 6-1 is associated with each Cisco SLT and LAN switch. Some of the data is accessible using SNMP. The remaining data is stored as local attributes in the CEMF database.

Table 6-1 Cisco SLT and LAN Switch Inventory

Attribute	Description
SNMPv2-MIB.sysContact	Identification of the contact person for the device.
SNMPv2-MIB.sysDesc	Textual description of the device.
SNMPv2-MIB.sysLocation	Physical location of the device.
SNMPv2-MIB.sysName	Administratively assigned name for the device.
SNMPv2-MIB.sysUpTime	Time (in hundredths of a second) since the network management portion of the system was re-initialized.
IP Address	IP Address of the Cisco SLT/LAN switch host
Login ID	IOS/Switch Code login ID
Login Password	IOS/Switch Code Telnet login password
Enable Password	Enable-mode password
SNMP Read Community	SNMP read-community string
SNMP Write Community	SNMP write-community string

Interfaces

Each Cisco SLT and LAN switch has numerous network interfaces. Tables from the IF-MIB are read to determine how many network interfaces are in each network element.

For each network interface, the inventory data in Table 6-2 is retrieved (using SNMP) and displayed.

Table 6-2 Cisco SLT and LAN Switch Network Interface Inventory

Attribute	Description
IF-MIB.ifIndex	Unique value for each interface.

Table 6-2 Cisco SLT and LAN Switch Network Interface Inventory

IF-MIB.ifAdminStatus	Desired state of the interface.
IF-MIB.ifDescr	Textual string containing information about the interface.
IF-MIB.ifLastChange	Value of sysUpTime at the time of the last creation or deletion of an entry in the ifTable.
IF-MIB.ifMtu	Size of the largest packet that can be sent or received on the interface, specified in octets.
IF-MIB.ifOperStatus	Current operational state of the interface.
IF-MIB.ifPhysAddress	Interface's address at its protocol sublayer.
IF-MIB.ifSpecific	Reference to MIB definitions specific to the particular media being used to realize the interface.
IF-MIB.ifSpeed	Estimate of the interface's current bandwidth in bits per second.
IF-MIB.ifType	Type of the interface.
IF-MIB.ifInErrors	Number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
IF-MIB.ifInOctets	Total number of octets received on the interface, including framing characters.
IF-MIB.ifOutErrors	Number of outbound packets that could not be transmitted because of errors.
IF-MIB.ifOutOctets	Total number of octets transmitted out of the interface, including framing characters.

In addition to the network interfaces, each Cisco SLT has numerous TDM interfaces (the connections to the STPs). MIB tables from the RFC1406-MIB are read to determine how many TDM interfaces are present.

For each Cisco SLT TDM interface, the statistical data in Table 6-3 is retrieved (using SNMP) and displayed.

Table 6-3 Cisco SLT and LAN Switch Network Interface Statistics

Attribute	Description
RFC1406-MIB.dsx1IfIndex	Value for this object is equal to the value of ifIndex from the Interfaces table of MIB II (RFC 1213).
RFC1406-MIB.dsx1CurrentESs	Number of errored seconds encountered by a DS1 interface in the current interval.
RFC1406-MIB.dsx1CurrentSESs	Number of severely errored seconds encountered by a DS1 interface in the current interval.
RFC1406-MIB.dsx1IntervalESs	Number of errored seconds encountered by a DS1 interface in a previous interval.
RFC1406-MIB.dsx1IntervalSESs	Number of severely errored seconds encountered by a DS1 interface in a previous interval.
RFC1406-MIB.dsx1FarEndIntervalESs	Number of far end errored seconds encountered by a DS1 interface in a previous interval.

Table 6-3 Cisco SLT and LAN Switch Network Interface Statistics

RFC1406-MIB.dsx1FarEndIntervalSESS	Number of far end errored severely seconds encountered by a DS1 interface in a previous interval.
RFC1406-MIB.dsx1FarEndCurrentESs	Number of far end errored seconds encountered by a DS1 interface in the current interval.
RFC1406-MIB.dsx1FarEndCurrentSESSs	Number of far end severely errored seconds encountered by a DS1 interface in the current interval.

Each device supports a number of different memory pools (defined in the `ciscoMemoryPoolTable` table). At a minimum, a device that implements CISCO-MEMORY-POOL-MIB must support the processor memory pool. Any other memory pools are device-specific.

CMNM displays data from the Cisco SLT memory pools described in Table 6-4.

Table 6-4 Cisco SLT Memory Pools

Memory Pool	CiscoMemoryPoolTable Index
Processor Memory	1
I/O Memory	2

CMNM displays data from the LAN switch memory pools described in Table 6-5.

Table 6-5 LAN Switch Memory Pools

Memory Pool	CiscoMemoryPoolTable Index
Processor Memory	1
Flash Memory	6
Non-Volatile RAM	7
MBUF Memory	8
Cluster Memory	9
Malloc Memory	10

Cisco MGC Host Inventory

Unlike the Cisco SLT and LAN switch, no inventory data is retrieved via SNMP from the Cisco MGC host. Rather, certain (static) data, described in Table 6-6, is retrieved during object deployment.

Table 6-6 Cisco MGC Host Inventory

Description	Data Source
Desired Platform State	XECfgParm.dat: desiredPlatformState
IP Peer Addresses	XECfgParm.dat: ipAddrPeerA, ipAddrPeerB
Network Addresses	XECfgParm.dat: IP_Addr1, IP_Addr2, IP_Addr3, IP_Addr4
Transpath Home Directory	XECfgParm.dat: homeDirRoot
Virtual Switch Indicator	XECfgParm.dat: SysVirtualSwitch

Table 6-6 Cisco MGC Host Inventory

MGC Host Vendor	XECfgParm.dat: product.vendor
MGC Host Version	XECfgParm.dat: product.version
Maximum Number of Links	XECfgParm.dat: maxNumLinks
Maximum Number of PRI Links	XECfgParm.dat: maxNumPRIL3Links
Maximum Number of MGCP Links	XECfgParm.dat: maxNumMGCPLinks
Solaris OS Release Level	uname -r
Solaris OS Version	uname -v
Solaris Hostname	hostname or uname -n
Solaris Host ID	hostid
Solaris Serial Number	sysinfo
Solaris Hardware Model	sysinfo
Number of CPUs	sysinfo
Last Boot Time	sysinfo
Main Memory Size	sysinfo

Other data is stored in the local CEMF database. The data in Table 6-7 is entered during deployment of the Cisco MGC host objects and is used internally by the CMNM systems.

Table 6-7 Cisco MGC Host Local Inventory

Attribute	Description
IP Address	IP Address of the Cisco MGC Host
MML Login ID	Login ID for invoking an MML session
MML Password	Password for the specified ID
Root Password	Password for the root account (used when rebooting)

Connectivity Network Inventory

CMNM displays the logical connectivity network from the Cisco MGC host to external devices. Each one of these logical connections is represented as a node in the CEMF object viewer.

Each connectivity network object type has an inventory dialog associated with it. The contents of these inventory dialogs match the contents of the connectivity network object model.

Synchronization

CMNM ensures that the EMS database (as provided by CEMF) is synchronized with the underlying network elements. All relevant management data within the EMS is automatically updated on receipt of a modification trap from the various network elements.

The traps in Table 6-8 are used to respond to changes in the network elements.

Table 6-8 Network Element Configuration Traps

Network Element	Configuration Changed Trap
Cisco MGC host	POM: DynamicReconfiguration
LAN switch	coldStart, warmStart, configChange
Cisco SLT	reload, configChange

When CMNM receives a POM:DynamicReconfiguration trap from the active Cisco MGC host, it resynchronizes its view of the connectivity network with that of the device.

Deploying a Network Using a Seed File

For bulk deployment, you can use a deployment seed file. This seed file contains all of the information necessary to deploy an entire Cisco MGC network.



Note Only one site can be deployed at a time. Each site requires a separate seed file.

This seed file contains the IP addresses of all of the devices in the Cisco MGC network, plus the relationship (hierarchy) between the devices. Given this file, CMNM is able to automatically deploy all of the elements in the network.

The data in the seed file includes, but is not limited to the:

- Logical names of each Cisco MGC node in the network
- IP address of each Cisco MGC host for each Cisco MGC node
- IP address of each Cisco SLT for each Cisco MGC node
- IP address of each LAN switch for each Cisco MGC node

A sample seed file is shown in Example 6-1.

Example 6-1 Sample Seed File

```
BAM (name=bam1, ip=172.18.137.103)
MGC (name=mgc1)
{
  HOST (ip = 172.18.145.30)
  SLT (name = 2600a, ip = 172.18.145.9)
  SLT (name = 2600b, ip = 172.18.145.10)
  SWITCH (name = n2900XL-a, ip = 172.18.145.12)
}
GATEWAY (name=gateway1, ip = 172.24.236.118) }
```

Seed File Attributes

The seed file allows you to specify a number of attributes for each device. In some cases these attributes are required. Optional attributes assume a default value if they are not specified. The default values are specified in the seed file deployment dialog.

The supported attributes are described in Table 6-9.

Table 6-9 Seed File Attributes

Attribute	Device Types	Required	Description
name	All	Only on Cisco MGC node, BAMS, and gateway	Name of the object as seen in the GUI
ip	All except Cisco MGC node	Yes	IP Address of the network element
login	All except Cisco MGC node	No	Login ID for the device
password	All except Cisco MGC node	No	Password to login to the device
rootPassword	Cisco MGC host	No	Root (super-user) password for the device
enablePassword	Cisco SLT, switch	No	IOS and Catalyst enable password
read	All except Cisco MGC node	No	SNMP read-community string
write	All except Cisco MGC node	No	SNMP write-community string

Each Cisco MGC can have, at most, one active host. You can define a maximum of two hosts per Cisco MGC, one representing the active Cisco MGC host and the other the standby Cisco MGC host. You do not have to define which host is active or standby; this is determined automatically by CMNM.

You must specify the name for each Cisco MGC node. Optionally, you can then specify names for the other elements. If no name is specified, a default name is generated. In addition, you can specify account information about the various devices: login IDs, passwords, and SNMP community strings. Each value is optional and, if missing, is initialized by the corresponding value in the seed file deployment dialog.

To perform seed file deployment, you launch a dialog from a site node or other type of CEMF container. This dialog prompts you for the name of the seed file and the login ID and password for the Cisco MGC host devices. You also specify SNMP read- and write-community passwords for the Cisco SLT and LAN switch.

Specifying a Deployment Seed File

To deploy a network using a seed file:

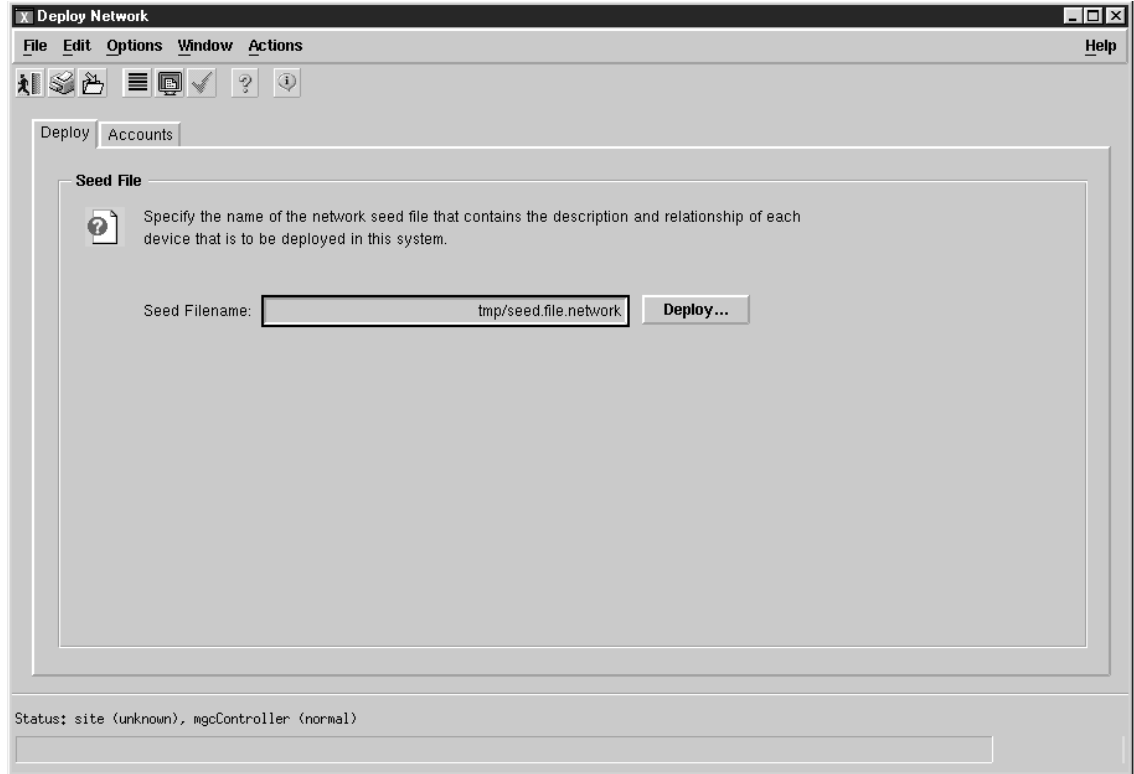
-
- Step 1 From the Map Viewer screen, select the site icon.
 - Step 2 Right-click to display the pull-down menu, select **Deployment**, then **Deploy Network Seed File**.



Note Only one site can be deployed at a time. Each site requires a separate seed file.

You see the screen in Figure 6-1.

Figure 6-1 Deploy Network Screen—Display Tab



- Step 3** To enter account information, click the **Accounts** tab.
You see the screen in Figure 6-2.

Figure 6-2 Deploy Network Screen—Account Tab

- Step 4** If any fields for a type of device are not specified in the seed file, you can enter account information for each type of device on this screen. When you are finished, click the **Deploy** tab to return to the screen in Figure 6-1.
- Step 5** Enter a filename in the Seed Filename field and click **Deploy**. You see the screen in Figure 6-3.

Figure 6-3 Deploy Confirmation Prompt



- Step 6** Click **Yes**.
The network is deployed.

Manually Deploying a Site, Object, or Network

The deployment wizard is the graphical interface used to create new objects representing the network elements to be managed with CMNM. The deployment wizard uses deployment profiles to prompt you for the information that is required by the deployment process. It can be accessed from different windows within CMNM as outlined below.

**Note**

Only one deployment wizard can be open at any time. If you attempt to open a second wizard, you see the message:

The Deployment Wizard is already active. Select it from the Window menu, or check for iconified or hidden windows.

Complete the first deployment task before proceeding.

CMNM defines a number of templates that allow you to manually configure Cisco MGC nodes and subobjects. The templates include:

- Template to deploy a top-level Cisco MGC node (This template also allows you to deploy a Cisco MGC host pair as a child of the Cisco MGC node.)
- Template to deploy a top-level gateway (Cisco MGX 8260)
- Template to deploy a top-level BAMS
- Template to deploy a Cisco MGC host pair as child of a Cisco MGC node
- Template to deploy a Cisco SLT as a child of a Cisco MGC node
- Template to deploy a LAN switch as a child of a Cisco MGC node

The deployment wizard reads the templates and presents screens prompting for information about the devices.

Deployment Attributes

Table 6-10 describes deployment attributes.

Table 6-10 Deployment Attributes Table

Attribute	Device Type	Required	Description
Name	All	Yes	Name of the object as seen in the GUI
Ip	All except Cisco MGC and common host	Yes	IP address of the network element
Login	Cisco MGC host, Cisco SLT, LAN switch	Yes for Cisco MGC host	Login ID for the device
Password	Cisco MGC host, Cisco SLT, LAN switch	Yes	Password to login to the device
Root password	Cisco MGC host	Yes	Root (super-user) password for the host
Enable password	Cisco SLT, LAN switch	Yes	IOS/Catalyst enable password

Table 6-10 Deployment Attributes Table

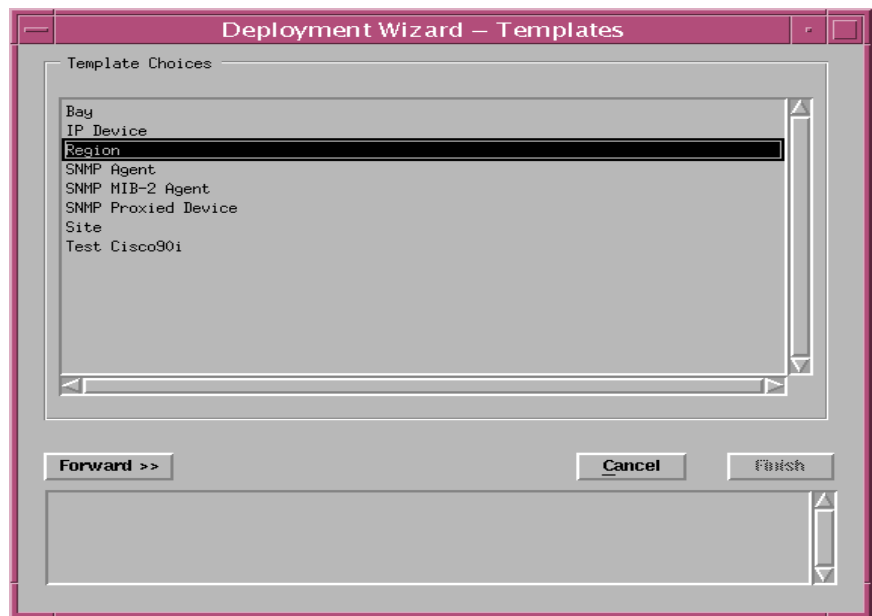
Read Community	All except Cisco MGC and common host	Yes	SNMP read-community string
Write community	All except Cisco MGC and common host	Yes	SNMP write-community string

Opening the Deployment Wizard

To open the deployment wizard:

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- Step 1** Right-click the object below which you want to deploy.
- Step 2** From the pop-up menu, select **Deployment**, then select **Deploy Generic Objects**.
You see the screen in Figure 6-4.

Figure 6-4 Deployment Wizard Screen—Templates



Deploying a Site

A site is a generic, non-technology-specific object.

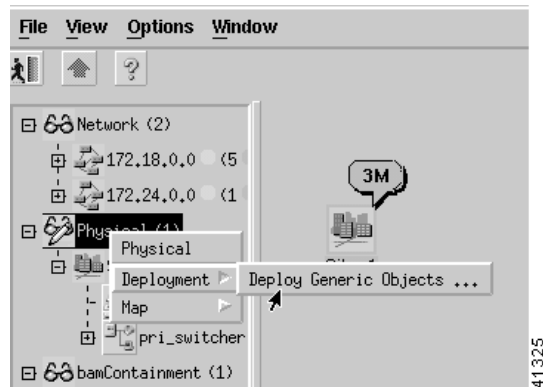


Note When you launch the deployment wizard, you are presented with a set of all available generic deployment profiles.

To deploy a site:

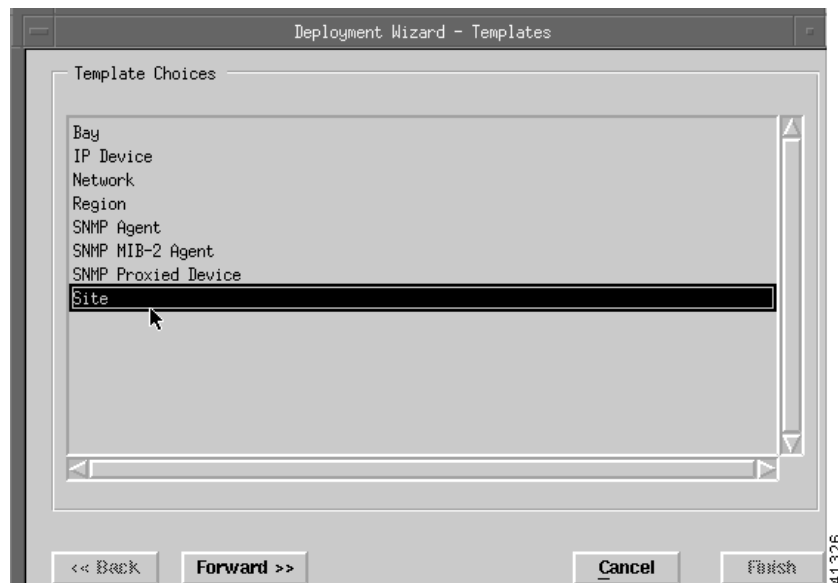
- Step 1** From the CEMF Launchpad screen, click the **Viewer** icon. The Map Viewer window opens.
- Step 2** On the left pane of the Map Viewer window, right-click the **Physical Site** icon, select **Deployment**, then **Deploy Generic Objects** as shown in Figure 6-5.

Figure 6-5 Deployment Wizard Screen—Deploy Generic Objects Option



You see the screen in Figure 6-6.

Figure 6-6 Deployment Wizard Screen—Templates



- Step 3** In the template options list, select **Site** and click **Forward**.

You see the screen in Figure 6-7.



Note You can cancel at any point before you click **Finish**.

Figure 6-7 Deployment Wizard Screen—Object Parameters (Number of Sites)



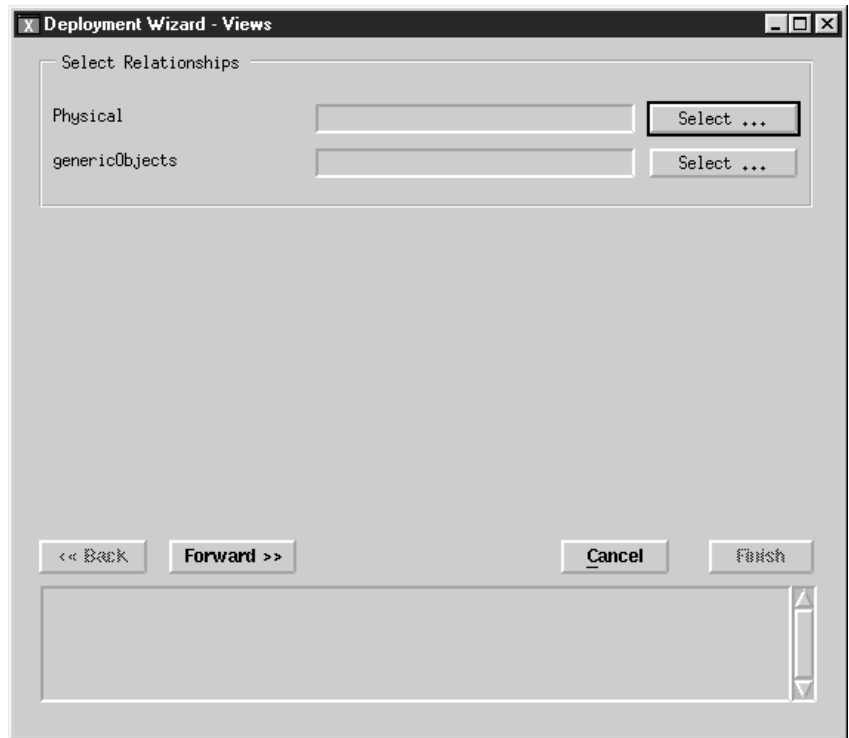
- Step 4** Enter the number of sites; the default is 1. Click **Forward**.
You see the screen in Figure 6-8.

Figure 6-8 Deployment Wizard Screen—Object Parameters (Site Name)



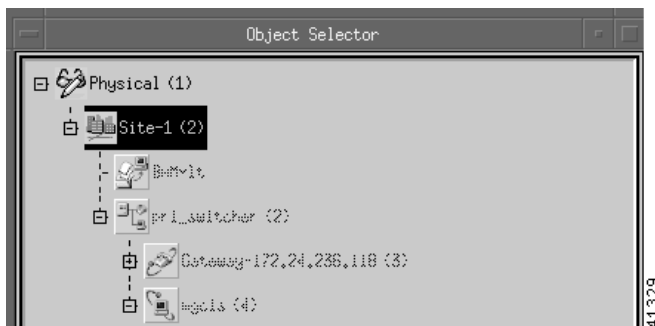
- Step 5** Enter a name (one word with no spaces) as the Site name. Click **Forward**.
You see a screen similar to Figure 6-9, only the fields are blank.

Figure 6-9 Deployment Wizard Screen—Views



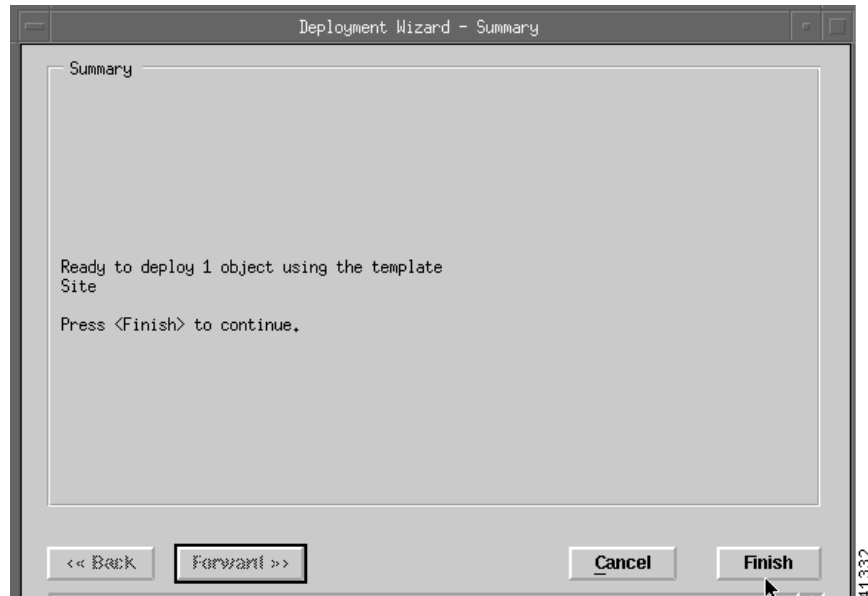
- Step 6** Next to the **Physical** field, click **Select**.
You see the screen in Figure 6-10.

Figure 6-10 Object Selector Screen



- Step 7** Click the **Physical** item to select it, then click **Apply**.
The Object Selector window closes. In Figure 6-9, the **Physical** and **genericObjects** fields should be filled in with the word **physical**.
- Step 8** Click **Forward**.
- Step 9** If you entered more than one site in Step 4, continue with the screen in Figure 6-8.
When you are done, you see the screen in Figure 6-11.

Figure 6-11 Deployment Wizard Screen—Summary



This screen summarizes the deployment you have created and allows you to commit or reject the deployment.

Step 10 Click **Finish**.

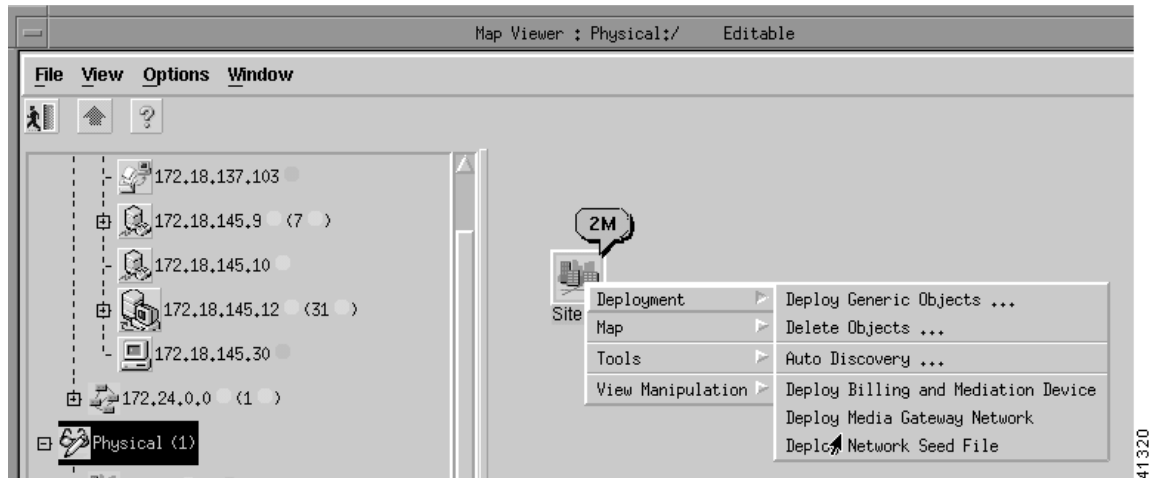
You are informed if deployment has been successful. A site icon appears on the right pane of the Map Viewer window.

Deploying a Media Gateway Network

To deploy a Cisco media gateway network:

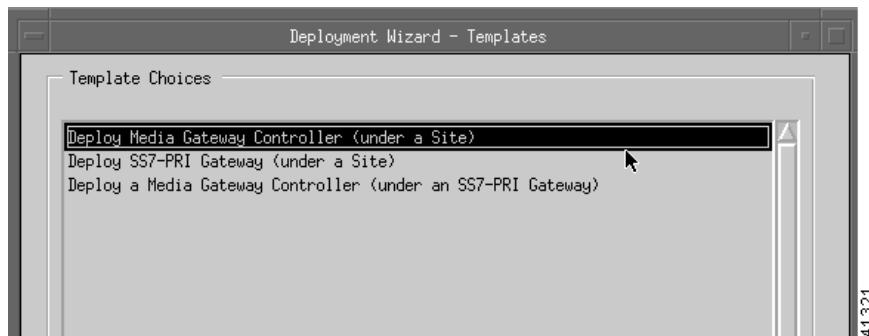
- Step 1** Open the Map Viewer window.
- Step 2** Click to select a Site icon from the left panel of the Map viewer window.
- Step 3** Right-click the **Site** icon, select **Deployment**, then **Deploy Media Gateway Network**, as shown in Figure 6-12.

Figure 6-12 Map Viewer Screen—Deployment>Deploy Media Gateway Network Option



You see the screen in Figure 6-13.

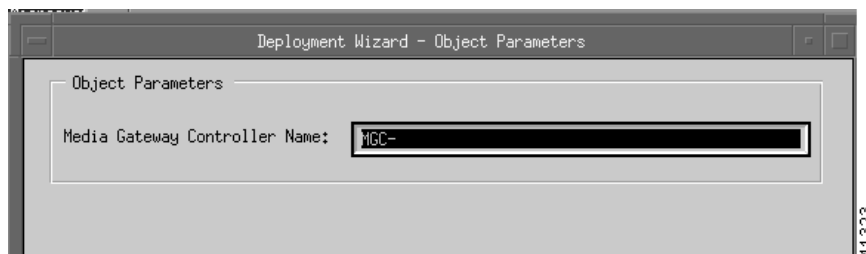
Figure 6-13 Deployment Wizard Screen—Templates



Step 4 Select the template you want to use and click **Forward**.

You see the screen in Figure 6-14.

Figure 6-14 Deployment Wizard Screen—Object Parameters



Step 5 Enter the name of the media gateway controller (no spaces). Click **Forward**.

You see a screen similar to Figure 6-11. This screen summarizes the deployment you have created and allows you to commit or reject the deployment.

Step 6 Click **Finish**.

You are informed if deployment has been successful. A Cisco MGC icon appears on the right pane of the Map Viewer window.

- Step 7** Deploy Cisco MGC hosts by following the instructions in the “Deploying a Cisco MGC Host” section on page 6-17.
 - Step 8** Deploy Cisco SLTs by following the instructions in the “Deploying a Cisco SLT” section on page 6-17.
 - Step 9** Deploy LAN switches by following the instructions in the “Deploying a LAN Switch” section on page 6-18.
 - Step 10** Deploy Cisco MGX 8260s by following the instructions in the “Deploying a Cisco MGX 8260” section on page 6-18.
 - Step 11** Deploy the optional Billing and Measurement Server by following the instructions in the “Deploying a Billing and Measurements Server (BAMS)” section on page 6-18.
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Deploying a Cisco MGC Host

- Step 1** Open the Map Viewer window.
- Step 2** Click to select a MGC icon from the left panel of the Map Viewer window.
- Step 3** Right-click the **MGC** icon and select **Deployment**, then **Deploy MGC Host**.
- Step 4** Enter a number in the field Number of MGC Hosts; the default is 1. Click **Forward**.
- Step 5** Enter data for the host. See Table 6-10 on page 6-10 for descriptions of the fields. Click **Forward**.
- Step 6** Repeat Step 5 for each deployed host. Make sure that you enter the same login and passwords.
- Step 7** Click **Finish**.

A common-host icon appears on the right pane of the Map Viewer window. Also, a host icon appears on the left panel as a child node of the common-host node.

Deploying a Cisco SLT

- Step 1** Open the Map Viewer window.
- Step 2** Click to select a Cisco MGC icon from the left panel of the Map Viewer window.
- Step 3** Right-click the **MGC** icon and select **Deployment**, then **Deploy SLT Chassis**.
- Step 4** Enter data for the Cisco SLT. See Table 6-10 on page 6-10 for descriptions of the fields. Click **Forward**.
- Step 5** Click **Finish**.

A Cisco SLT icon appears on the right pane of the Map Viewer window.

Deploying a LAN Switch

- Step 1 Open the Map Viewer window.
 - Step 2 Click to select a Cisco MGC icon from the left panel of the Map Viewer window.
 - Step 3 Right-click the **MGC** icon and select **Deployment**, then **Deploy LAN Switch**.
 - Step 4 Enter data for the LAN switch. See Table 6-10 on page 6-10 for descriptions of the fields. Click **Forward**.
 - Step 5 Click **Finish**.
A LAN switch icon appears on the right pane of the Map Viewer window.
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Deploying a Cisco MGX 8260

- Step 1 Open the Map Viewer window.
 - Step 2 Click to select a Site icon from the left panel of the Map Viewer window.
 - Step 3 Right-click the **Site** icon and select **Deployment**, then **Deploy MGX8260**.
 - Step 4 Enter data for the Cisco Media Gateway. See Table 6-10 on page 6-10 for descriptions of the fields. Click **Forward**.
 - Step 5 Click **Finish**.
A Cisco Media Gateway icon appears on the right pane of the Map Viewer window.
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Deploying a Billing and Measurements Server (BAMS)

- Step 1 Open the Map Viewer window.
 - Step 2 Click to select a Site icon from the left panel of the Map Viewer window.
 - Step 3 Right-click the **Site** icon and select **Deployment**, then **Deploy Billing and Measurement Server**.
 - Step 4 Enter data for the BAMS server. See Table 6-10 for descriptions of the fields. Click **Forward**.
 - Step 5 Click **Finish**.
An icon appears on the right pane of the Map Viewer window.
-