Provisioning Overview

The provisioning process described in this document applies to all solutions running Release 7 media gateway controller (MGC) software.

The provisioning overview prepares the Cisco MGC platform using the Cisco MGC software to communicate with the Signaling System 7 (SS7) network and with the media gateway controller exchange components that control bearer-traffic routing. This chapter contains the following sections:

- Provisioning Prerequisites, page 1-1
- Configuring the Media Gateway Controller, page 1-11

Provisioning Prerequisites

This section describes the tasks that must be completed before provisioning and describes the configuration information for the major components shown in Figure 1-1 that you need before you get started.

Figure 1-1 Provisioning Major Components for the Media Gateway Controller Software
## Task Checklist

The following task checklist presents the steps you should have performed before using this guide.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Plan your network configuration. A detailed network diagram is very helpful when provisioning.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Refer to the respective solution overview document.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Set up your hardware components and install all required software.</td>
</tr>
<tr>
<td></td>
<td>• Cisco Media Gateway Controller Hardware Installation Guide</td>
</tr>
<tr>
<td></td>
<td>• Cisco Media Gateway Controller Software Release 7 Installation and Configuration Guide</td>
</tr>
<tr>
<td></td>
<td>• Cisco Media Gateway Controller Online Documentation Notice</td>
</tr>
<tr>
<td></td>
<td>• Cisco Media Gateway Controller SLT Documentation Notice</td>
</tr>
<tr>
<td></td>
<td>• Cisco SS7 Interconnect for Access Servers and Voice Gateways Solutions Media Gateway Guide</td>
</tr>
<tr>
<td>Step 3</td>
<td>Complete provisioning worksheets, including filling in names and IP addresses of machines, names, attributes, and properties of components, and other necessary information.</td>
</tr>
<tr>
<td></td>
<td>• Chapter 1, “Provisioning Overview” (this chapter)</td>
</tr>
<tr>
<td></td>
<td>• Chapter 2, “Planning for Provisioning”</td>
</tr>
</tbody>
</table>

## Prerequisite Tasks

Before you start the provisioning process, you should prepare the Cisco MGC hardware and software as described in the following manuals:

- *Cisco Media Gateway Controller Hardware Installation Guide*
- *Cisco Media Gateway Controller Software Release 7 Installation and Configuration Guide*

## Prerequisite Overview

The following list identifies one possible sequence of events for provisioning:

- Adding external nodes for each device connected to the network
- Adding point codes (OPC, DPC, and APC)
- Adding the interface cards
- Adding SS7 signaling service
- Adding gateway signaling service
- Adding linksets
- Adding C7 IP links (redundant)
- Adding IP links
Provisioning Prerequisites

- Adding SS7 routes
- Adding SS7 subsystem
- Adding trunks (x24 or x31)

This guide provides worksheets to be copied and filled in with information specific to your system. Keep in mind that the steps described and the procedures performed will vary depending on your specific system.

Prerequisite Provisioning Information

Before you can complete the provisioning planning tables in Chapter 2, you must collect the following information:

- Device addresses
- SS7 point codes
- Media gateway controller interface card information
- Trunk identification data

Collecting External Device Addresses

For the control signaling network, each device attached to the network that has a unique IP address assigned to it must be listed in Table 1-1. In addition to the device IP address, a device name, and a description should also be provided.

<table>
<thead>
<tr>
<th>Device IP Address (x.x.x.x)</th>
<th>Device Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.15.7.34</td>
<td>as5300-34</td>
<td>Media Gateway 5300-34</td>
</tr>
</tbody>
</table>

Collecting SS7 Point Code Data

The SS7 point codes are SS7 network addresses that uniquely identify every switch, Signal Transfer Point (STP), and MGC node on the SS7 network. To communicate with the SS7 network, you must get the SS7 point codes for your Cisco MGC and for every SS7 network device with which you are to communicate. At a minimum, you need at least one origination point code (OPC) for the MGC node and one destination point code (DPC) for the remote switch. If you plan to connect the Cisco MGC to STPs, you need an adjacent point code (APC) for every STP to which you connect.
Table 1-2 serves as a form where you can enter point codes for the OPCs, DPCs, and APCs you need to configure. The point code type and address are required for each SS7 network device. The description column is not required; however, you can use this column to note special information about a point code, such as its geographical location or network administrator.

Table 1-2  Point Code Worksheet Example

<table>
<thead>
<tr>
<th>Point Code Type (OPC, APC, or DPC)</th>
<th>Point Code Address (x.x.x)</th>
<th>Network Address</th>
<th>Network Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPC</td>
<td>214.135.034</td>
<td>2</td>
<td></td>
<td>MGC1 OPC</td>
</tr>
</tbody>
</table>

Collecting Media Gateway Controller Interface Card Data

When configuring connections between the Cisco MGC and Cisco Signaling Link Terminals (SLTs), media gateways (MGWs), or SS7 signaling points (SPs), you must be ready to enter information about the name, location, type, and address of the network interface cards. The interface card location and type are determined when the card is installed. The location is identified by the slot where the card is installed, and the type must be one of the types listed in the second column of Table 1-3.

Table 1-3  Media Gateway Controller Network Interface Card Types

<table>
<thead>
<tr>
<th>Card</th>
<th>Type Designation</th>
<th>Card Slot Location</th>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITK E1/T1 Card</td>
<td>ITK</td>
<td></td>
<td></td>
<td>Used for direct connections between the media gateway controller and an APC or DPC (no Cisco SLT). Digi International Inc. (formerly ITK International).</td>
</tr>
<tr>
<td>PTI V.35</td>
<td>V35</td>
<td></td>
<td></td>
<td>Used for direct connections between the media gateway controller and an APC or DPC (no Cisco SLT).</td>
</tr>
</tbody>
</table>
When configuring connections between the Cisco MGC and the SS7 signaling network, you must be ready to enter the following information about the SS7 service for the link to be created.

- **Service type**
- **Name**
- **Description**
- **Protocol type**
- **Side (MGC side or SS7 side)**

This SS7 signaling service link information can be listed in Table 1-5.

**Table 1-5 SS7 Signaling Service Worksheet Example**

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Name</th>
<th>Description</th>
<th>Protocol</th>
<th>Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS7</td>
<td>ss7-135034</td>
<td>SS7 path to MGC1</td>
<td>ANSISS7_STANDARD</td>
<td>SS7</td>
</tr>
</tbody>
</table>

1. Ethernet cards do not need a slot number.

**Collecting SS7 Signaling Service Data**

When configuring connections between the Cisco MGC and the SS7 signaling network, you must be ready to enter the following information about the SS7 service for the link to be created.

- **Service type**
- **Name**
- **Description**
- **Protocol type**
- **Side (MGC side or SS7 side)**

This SS7 signaling service link information can be listed in Table 1-5.
Chapter 1 Provisioning Overview

Provisioning Prerequisites

Collecting NAS Signaling Service Data

The signaling service between the Cisco MGC and the media gateway (MGW) needs to be defined for each pair attached to the network. You must be ready to enter the following information about the MGW signaling service:

- Service type
- Device
- Description
- Protocol service
- Side

This NAS signaling service link information can be listed in Table 1-6.

### Table 1-6 NAS Signaling Service Worksheet Example

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Device</th>
<th>Description</th>
<th>Protocol</th>
<th>Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGCP</td>
<td>MGW1</td>
<td>NAS1 from MGW1</td>
<td>BELL_1268_C3</td>
<td>MGC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Collecting Linkset Data

The linkset must be defined for each link between the Cisco MGC and the adjacent STP. If there are two adjacent STPs, you need to create two linksets (for example, LS01 and LS02). A linkset can contain from 1 to 16 links. You must be ready to enter the following information about each linkset:

- Point code
- Type of component
- Name
- Description
- Protocol
- IP transport type

This linkset information can be listed in Table 1-7.
Chapter 1  Provisioning Overview

Provisioning Prerequisites

Collecting Cisco SLT Data

A link must be defined for each path from the Cisco SLT to the Cisco MGC. There must be one link (two maximum) for each Ethernet card in the Cisco MGC. The link corresponds to the linksets you previously created. You will create a linkset pair for each linkset that exists in your system. For example, if your system has two linksets, you will create two links for each linkset, resulting in your creating a total of four links. You must be ready to enter the following information about each Cisco SLT linkset:

- Description
- Linkset name
- Card interface type
- Linkset type
- Linkset rate
- Protocol family variant
- Cisco SLT IP address
- MGC IP address

This linkset information can be listed in Table 1-8.

Table 1-7  Linkset Worksheet Example

<table>
<thead>
<tr>
<th>Point Code</th>
<th>Type of Component</th>
<th>Name</th>
<th>Description</th>
<th>Protocol</th>
<th>IP Transport Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ls-stpa</td>
<td>APC</td>
<td>stpa</td>
<td>LS01 to STPA</td>
<td>SS7-ANSI</td>
<td>IP</td>
</tr>
<tr>
<td>ls-stpb</td>
<td>APC</td>
<td>stpb</td>
<td>LS02 to STPB</td>
<td>SS7-ANSI</td>
<td>IP</td>
</tr>
</tbody>
</table>

Table 1-8  Cisco SLT Linkset Worksheet Example

<table>
<thead>
<tr>
<th>Description</th>
<th>Linkset</th>
<th>Card Interface</th>
<th>Linkset Type</th>
<th>Linkset Rate</th>
<th>Protocol</th>
<th>Cisco SLT IP Address</th>
<th>MGC IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signaling Link 2 to SLT1</td>
<td>ls-stpa</td>
<td>T1</td>
<td>A link</td>
<td>64 kbps</td>
<td>SS7-ANSI</td>
<td>10.15.7.5</td>
<td>10.15.7.8</td>
</tr>
<tr>
<td>Signaling Link 2 to SLT1</td>
<td>ls-stpb</td>
<td>T1</td>
<td>A link</td>
<td>64 kbps</td>
<td>SS7-ANSI</td>
<td>10.15.7.5</td>
<td>10.15.7.8</td>
</tr>
</tbody>
</table>
Collecting C7 IP Link Data

A C7 IP link needs to be defined for each physical SS7 link that is connected to the SS7 network by the Cisco SLT. The C7 IP links correspond to linksets you previously created. You must be ready to enter the following information about the C7 IP link:

- Description
- Line interface
- IP address
- Port number
- Priority
- Peer IP address
- SLC
- Linkset
- Time slot

This C7 IP link information can be listed in Table 1-9.

<table>
<thead>
<tr>
<th>Table 1-9  C7 IP Link Worksheet Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Signaling link 1 to SLT1</td>
</tr>
<tr>
<td>Signaling link 2 to SLT1</td>
</tr>
</tbody>
</table>

Collecting IP Link Data

An IP link needs to be defined from the MGW to the Cisco MGC (MGC path), from the Cisco MGC to the SLT (SS7 MTP3 backhaul path), from one Cisco MGC to another Cisco MGC (EISUP path), and from each NAS to the Cisco MGC. You must be ready to enter the following information about the IP link:

- Description
- Line interface
- IP address
- Port number
- Priority
- Peer IP address
- Peer port field
• Service

This IP link information can be listed in Table 1-10.

**Table 1-10  IP Link Worksheet Example**

<table>
<thead>
<tr>
<th>Description</th>
<th>Line Interface</th>
<th>IP Address</th>
<th>Port Number</th>
<th>Priority</th>
<th>Peer IP Address</th>
<th>Peer Port Field</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGC-lnk34</td>
<td>en-1</td>
<td>IP_Addr1</td>
<td>2427</td>
<td>1</td>
<td>10.15.7.5</td>
<td>2427</td>
<td>mgcp-34</td>
</tr>
</tbody>
</table>

**Collecting SS7 Route Data**

You must define an SS7 route for each signaling route from the Cisco MGC to the PSTN switch. There must be an SS7 route for each linkset. You must be ready to enter the following information about the SS7 route to be created:

• Name
• Description
• Signal DPC
• Linkset
• OPC

This SS7 route information can be listed in Table 1-11.

**Table 1-11  SS7 Route Worksheet Example**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>DPC</th>
<th>Linkset</th>
<th>OPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>rt1-stpa</td>
<td>Route direct to STPA</td>
<td>stpa</td>
<td>ls-stpa</td>
<td>opc</td>
</tr>
<tr>
<td>rt1-stpb</td>
<td>Route direct to STPB</td>
<td>stpb</td>
<td>ls-stpb</td>
<td>opc</td>
</tr>
</tbody>
</table>
Collecting SS7 Subsystem Data

An internal SS7 subsystem must be defined that connects each mated pair of STPs. This allows the Cisco MGC to route traffic over the C-links between the STPs. Thus if one STP fails, the Cisco MGC can route traffic over a C-link to the other STP. You must be ready to enter the following information about the SS7 subsystem:

- Name
- Description
- APC
- Mated APC
- Protocol family
- Priority
- Subsystem number
- STP-to-SCP index (not required for mating STP pairs)
- Transport protocol (not required for mating STP pairs)

This SS7 subsystem information can be listed in Table 1-12.

<table>
<thead>
<tr>
<th>APC</th>
<th>Mated APC</th>
<th>Description</th>
<th>Protocol Family</th>
<th>Priority</th>
<th>Subsystem Number</th>
<th>STP-SCP Index</th>
<th>Transport Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNP-1</td>
<td>stpa</td>
<td>LNP to STPA</td>
<td>SS7 ANSI</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>SCCP</td>
</tr>
<tr>
<td>LNP-2</td>
<td>stpb</td>
<td>LNP to STPB</td>
<td>SS7 ANSI</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>SCCP</td>
</tr>
</tbody>
</table>

Collecting Trunk Data (Nailed)

During the provisioning process, you must define all of the bearer trunks that connect remote switches to the media gateway. Each remote switch is identified by its DPC, and each trunk is identified by the trunk ID. Table 1-13 provides space for you to provide the following information for the trunks coming from remote switches:

- Trunk ID
- Source signaling service
- Source span
- Source span ID
- Source time slot/CIC (1)
- Destination signaling service
To save space, you might want to specify ranges of trunk IDs for each E1 or T1 connection. For large installations, you might want to make copies of this table or create your own worksheet with these columns.

The trunk ID must match the trunk ID used on the remote switch. The circuit identification code (CIC) is the SS7 value representing the trunk and must match the CIC value defined at the remote switch.

The destination span ID and destination time slot must match the trunk configuration values defined during Cisco MGC configuration. The destination span ID is defined when configuring T1 and E1 controllers and must match the value of the nfas_int parameter. T1 spans use time slots (channels) 1-24 and E1 spans use time slots 0-31. For more information on gateway configuration, see the Cisco SS7 Interconnect for Access Servers and Voice Gateways Solutions Media Gateway Installation and Configuration Guide.

Note
You can configure either the MGW or the Cisco MGC first, and then configure the other. If you prefer to configure the MGW first, use the information from that configuration to complete the worksheet in Table 1-13. If you prefer to configure the Cisco MGC first, enter the Cisco MGC configuration parameters in Table 1-13, then use these values when configuring the MGW.

<table>
<thead>
<tr>
<th>Trunk ID</th>
<th>Source Signaling Service</th>
<th>Source Span</th>
<th>Source Span ID</th>
<th>Source Time slot/CIC</th>
<th>Dest Sig Service</th>
<th>Dest Span</th>
<th>Dest Span ID</th>
<th>Dest Time Slot/CIC</th>
<th>Line Type</th>
<th>Multiple Trunk Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>ss7srv</td>
<td>fixed</td>
<td>ffff</td>
<td>1</td>
<td>signal1</td>
<td>fixed</td>
<td>0</td>
<td>1</td>
<td>T1</td>
<td>24</td>
</tr>
</tbody>
</table>

**Configuring the Media Gateway Controller**

Figure 1-2 shows the major components that must be defined in the Cisco MGC software before the media gateway can operate.
Figure 1-2 is a simplified view of the Cisco MGC; it does not show all system components and interdevice links. Most of the links shown represent multiple connections between devices.

The Cisco MGC shown in Figure 1-2 is the device that runs the Cisco MGC software. When you provision the Cisco MGC software, you are configuring communications between the Cisco MGC and at least one external SS7 Signaling Point (SP). Service Switching Points (SSPs) and Signal Transfer Points (STPs) are two types of SPs to which the Cisco MGC can connect. The Cisco MGC connects to SSPs directly using fully associated links (F-links) or indirectly through STPs using access links (A-links).

Within the media gateway, you must also provision the Cisco MGC connections to the MGW and define the bearer trunks that connect to the MGW. The connections between the Cisco MGC and the MGW are used to exchange signaling information between the SS7 network and the signaling protocol used on the quality of service (QoS) packet network. The bearer trunks transport call traffic between the remote switch and the Cisco MGC. This call traffic passes through the gateway to destinations on the QoS packet network.

To provision the Cisco MGC, you define software components for each of the entities shown in Figure 1-2. To define the connections between entities, you specify parameters for each component. Planning for provisioning is important, because many components cannot be configured until others have been provisioned. For example, you cannot provision links between two devices until you have provisioned the individual devices. Chapter 2, “Planning for Provisioning,” explains these dependencies and how to plan for provisioning in the correct sequence.

Provisioning Tools

The Cisco MGC includes two tools that you can use to provision the software:

- The Telephony Controller Manager (TCM) graphical user interface (GUI) application for Release 7.3(x) or the Cisco Media Gateway Controller Manager (CMM) GUI application for Release 7.4(x).
- The Man-Machine Language (MML) command-line interface (CLI) application.
Figure 1-3 shows a sample CMM window that you can use to provision Cisco MGC components. CMM makes provisioning easier for less-experienced administrators by listing all the components that must be configured and by providing windows that display all configuration parameters for each component. Instructions for provisioning with TCM can be found in Chapter 3, “TCM Provisioning Procedures for Release 7.3(x)” and Chapter 3, “CMM Provisioning Procedures for Release 7.4(x).”

Figure 1-3  Sample Cisco Media Gateway Controller Manager Window

Example 1-1 shows a sample MML script, which is a collection of individual MML commands. Although MML provisioning requires more keystrokes, quick provisioning updates can sometimes be made faster with MML commands, because you don’t have to go through the process of launching CMM. When you enter MML commands into a batch file, you can copy and paste configuration commands to speed command entry, and you can copy and modify MML scripts to configure additional SSPs. For information on provisioning with MML, refer to Chapter 5, “Configuring with MML.”

Example 1-1  Sample MML Script

numan-add:bdigtree:custgrpid="t001",index=18,digit=5,resultindex=4
numan-add:bdigtree:custgrpid="t001",index=17,digit=5,nextnode=18
numan-add:bdigtree:custgrpid="t001",index=16,digit=5,nextnode=17
numan-add:bdigtree:custgrpid="t001",index=15,digit=0,nextnode=16
You can use both CMM and MML to provision the Cisco MGC; however, only one configuration session can be supported at one time by either CMM or MML. Table 1-14 lists some of the features of CMM and MML and provides guidelines for selecting between the two tools.

Table 1-14   CMM, Voice Service Provisioning Tool, and MML Features

<table>
<thead>
<tr>
<th>Specification/Feature</th>
<th>CMM</th>
<th>Voice Service Provisioning Tool</th>
<th>MML</th>
</tr>
</thead>
</table>
| System Basics         | X-windows GUI front end, SNMP back end | X-windows graphical user interface (GUI) front end.  
**Note** Any client software supporting X-windows, such as Reflection for remote management, can be used. | CLI that interacts directly with Cisco MGC |
| System Hardware/Software Requirements | Sun Sparc station running Sun Solaris 2.6 OS  
**Note** Running the CMM on the same server as the Cisco MGC can adversely impact performance. Cisco recommends using a separate server. | Sun Sparc station running Solaris 2.6 or greater  
**Note** Running the Voice Service Provisioning Tool on the same host as the MGC can adversely impact performance. Cisco recommends using a separate server. | Runs on the Cisco MGC host server. |
| Batch File Support    | No  | No                            | Yes |
| Best Used For         | • Setting up a single configuration or few configurations on individual machines.  
• Modifying an existing configuration. | Some experience required; easy to use.  
• Creating batch files to configure many Cisco MGC servers or retrieve measurements.  
• Modifying configurations.  
• Scaling large configurations.  
• Troubleshooting. | |

The remaining chapters in this book describe how to plan for provisioning and provide sample provisioning plans for different Cisco MGC configurations (solutions). In Chapter 2, “Planning for Provisioning,” you will see component names listed for CMM and MML provisioning (these names are sometimes different). When you begin provisioning, you will provision components using the name that applies to the provisioning tool you are using.