



## Preparing for Dial Plan Provisioning

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This chapter describes how to prepare for dial plan provisioning. It includes the following sections:

- [Provisioning Prerequisites, page 2-1](#)
- [Provisioning Tools, page 2-3](#)
- [Creating a Dial Plan, page 2-5](#)

### Provisioning Prerequisites

This section describes the tasks that must be completed and the information that you need before you start dial plan provisioning.

### Prerequisite Tasks

The following steps describe the tasks you should perform prior to using this dial planning guide.

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- Step 1** Plan and diagram your network configuration in detail.
- A detailed network diagram is essential when creating a dial plan. Refer to the respective solution overview and provisioning documentation for detailed information about a particular solution.
- Step 2** Set up the hardware components used in your solution and install all required software.
- Before you start the dial planning 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 Regulatory Compliance and Safety Information*
  - *Cisco Media Gateway Hardware Installation and Configuration Guide<sup>1</sup>*
  - *Cisco Media Gateway Controller Software Release 7 Installation and Configuration*
  - *Cisco Media Gateway Controller Software Release 7 Provisioning Guide*
- You should also refer to the solution specific provisioning guide for your solution.
- Step 3** Complete all provisioning worksheets, including filling in the names and IP addresses of all devices, attributes, properties of components, circuit designations, and all other necessary information.
- For blank copies of the necessary provisioning worksheets refer to the *Cisco Media Gateway Software Release 7 Provisioning Guide*.
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1. Refer to the *Hardware Installation and Configuration Guide* for the media gateway used in your solution.

## Prerequisite Information

This guide provides a set of blank worksheets in [Appendix C, “Dial Planning Worksheets,”](#) that you can copy and fill in with the dial plan information specific to your system. Before you can complete the dial plan provisioning worksheets, you must collect provisioning information about all the available trunks.

During the provisioning process, all the bearer trunks that connect remote switches to all the media gateways attached to the Cisco MGC were defined. Each remote switch is identified by its destination point code (DPC), and each trunk is identified by its trunk ID or Circuit Identification Code (CIC).

[Table 2-1, “Trunk Worksheet Example,”](#) provides space for you to enter the following information:

- **Trunk ID**—Designation assigned to a trunk.
- **Source Signaling Service**—MML name of the previously defined source signaling service. Valid signaling services are ISDN PRI, DPNSS, or any SS7 signaling service.
- **Source Span**—Number of circuits assigned to the source span (range 0 through 65536).
- **Source Span ID**—Identification assigned to the source span (range 0 through 65536).
- **Source Time Slot/CIC**—Time slot or Circuit Identification Code (CIC) (range 0 through 31).
- **Destination Signaling Service**—MML name of a previously defined destination signaling service. Valid signaling services are ISDN PRI, DPNSS, or any SS7 signaling service.
- **Destination Span**—Number of circuits assigned to the destination span (range 0 through 65536).
- **Destination Span ID**—Identification assigned to the destination span (range 0 through 65536).
- **Destination Time Slot/CIC**—Time slot or Circuit Identification Code (CIC) (range 0 through 31).
- **Line Type**—T1 or E1.
- **Multiple Trunk Field**—Number of trunks per span (greater than 0, but less than or equal to 31).

The ingress and egress trunk IDs must match the corresponding trunk IDs used on the remote switches. The circuit identification codes (CIC) are the SS7 values representing the trunks and must also match the CIC values defined at the remote switches.

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 (channels) 0-31.

To save space, you can specify ranges of trunk IDs for each T1 or E1 connection. For large installations, you can make copies of this worksheet which is included in [Appendix C, “Dial Planning Worksheets.”](#)

For more information on media gateway configuration, refer to the appropriate *Media Gateway Installation and Configuration Guide* for your solution. Keep in mind that some of the procedures performed might vary depending on the configuration of your solution.

**Table 2-1 Trunk Worksheet Example**

Trunk ID	Source Signaling Service	Source Span	Source Span ID	Source Time slot/CIC	Destination Signaling Service	Dest Span	Dest Span ID	Dest Time Slot/CIC	Line Type	Multiple Trunk Field
101	ss7srv	fixed	ffff	1	signal-1	fixed	0	1	T1	24
102	ss7srv	fixed	fffe	2	signal-2	fixed	1	2	T1	24

# Provisioning Tools

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

- The Cisco Media Gateway Controller Manager (CMM) GUI application for Release 7.4(x)
- The Cisco Voice Services Provisioning Tool (VSPT) GUI application for Release 7.4(x) and later
- The Man-Machine Language (MML) command-line interface (CLI) application

## Cisco MGC Manager

The CMM can also be used to provision Cisco MGC dial plan components. CMM makes provisioning easier by listing all the components that must be configured and by providing windows that display all configuration parameters for each component. Detailed procedures and instructions for provisioning with CMM can be found in [Chapter 3, “Provisioning Dial Plans with CMM.”](#)

## Cisco VSPT

The Cisco VSPT can also be used to provision Cisco MGC dial plan components. VSPT also makes provisioning easier by listing all the components that must be configured and by providing windows that display all configuration parameters for each component. Detailed procedures and instructions for provisioning with VSPT can be found in [Chapter 4, “Provisioning Dial Plans with VSPT.”](#)

## Man-Machine Language

Although MML provisioning requires more keystrokes, provisioning updates can sometimes be made faster using MML commands, because you do not have to go through the process of launching the CMM or VSPT and navigating to the proper screen.

You can also import an MML script (or batch file), which is a collection of individual MML commands. When you enter MML commands into a batch file, you can copy and paste commands to speed entry. You can also copy and modify MML scripts to provision additional SSPs.

The dial plan production directory `/opt/CiscoMGC/dialPlan` is where all active dial plans reside. Backup dial plans, if any, reside in the subdirectory `/opt/CiscoMGC/etc/CONFIG_LIB/<config_dir>`.

For detailed information on provisioning with MML, refer to [Chapter 5, “Provisioning Dial Plans with MML.”](#)

You can use CMM, VSPT, and MML to provision the Cisco MGC; however, only one configuration session can be supported at one time by either CMM or MML. [Table 2-2](#) lists some of the features of CMM, VSPT, and MML and provides some guidelines for selecting between the three tools.

Table 2-2 CMM, Voice Service Provisioning Tool, and MML Features

Specification/Feature	CMM	Voice Service Provisioning Tool	MML
System basics	X Window System graphical user interface (GUI) front end, SNMP back end	X Window System GUI front end  Any client software supporting the X Window System, such as Reflection, can be used.	CLI that interacts directly with Cisco MGC
System hardware/software requirements	Sun SPARCstation running Sun Solaris 2.6 OS or later  Running the CMM on the same host as the Cisco MGC can adversely impact performance. We recommend using a separate server.	Sun SPARCstation running Solaris 2.6 OS or later  Running VSPT on the same host as the Cisco MGC can adversely impact performance. We recommend using a separate server.	Runs on the Cisco MGC host server
Batch file support	No	No	Yes
Best used for	<ul style="list-style-type: none"> <li>Setting up a single configuration or few configurations on individual machines</li> <li>Modifying an existing configuration</li> </ul>	Some experience required; easy to use	<ul style="list-style-type: none"> <li>Creating batch files to configure many Cisco MGC servers or retrieve measurements</li> <li>Modifying configurations</li> <li>Scaling large configurations</li> <li>Troubleshooting</li> </ul>

The remaining sections in this chapter describe how to plan for provisioning and provide sample dial plans. In this chapter you might see different component names listed for the CMM, VSPT, and MML provisioning tools. When you begin provisioning, you will provision components using the name that applies to the provisioning tool you are using.

The order in which you provision dial plan tables is important. Many tables refer to other tables that must be defined first. When you create the tables described in Chapter 1 and in this chapter, be sure to create them in the order described.

**Note**

The virtual switch node can use two Cisco MGC hosts for maximum availability. The dial plan provisioning described in this chapter applies to both Cisco MGC hosts. You can create a dial plan for one host and apply it to both hosts.

**Tip**

[Appendix C, “Dial Planning Worksheets,”](#) provides a complete set of worksheets that you can use to plan the dial plan provisioning. Before you start planning, copy these worksheets. Do not write in the original worksheets, because you may need additional copies later.

# Creating a Dial Plan

The following sections describe how to create a dial plan for Cisco MGC software Release 7.4(x):

- [Dial Plan Creation Rules, page 2-5](#)
- [Dial Plan Text File, page 2-6](#)
- [Implementing the Dial Plan, page 2-7](#)

## Dial Plan Creation Rules

The dial plan is used to identify and analyze unique calling number (A-number) or called number (B-number) digit strings. Keep in mind the following issues when creating your dial plan:

- Each number (calling or called) is a unique digit string
- The number is either an A-number (calling number) or a B-number (called number)
- You must create a subset string before creating a superset string

These issues are discussed and examples are provided in the following sections. For purposes of example only, as many as six digits of any string are analyzed. In your dial plan implementation, you might want to analyze additional digits.

## Dial Plan Strings

The following numbers are examples of digit strings that are used in the dial plan discussion:

703

703 484

301 555

301 684

40555

The starting node is a special node and is either a 1 (for originating) or a 2 (for terminating). All of the originating digit strings in the A-digit tree will share the starting node (1). Since node 2 is reserved for terminating digit strings, the first node available for use in this dial plan is node 3.

## Dial Plan Provisioning Sequence

The following list identifies the recommended sequence for dial plan provisioning:

1. Create the dial plan file
2. Provision the Digit Modification table
3. Provision the Service table
4. Provision the Result and Result Set tables
5. Provision the A Digit and B Digit Trees
6. Provision pre-analysis (NPI and NOA tables)
7. Provision the Location table
8. Provision the Cause table
9. Provision the A and B Whitelist and Blacklist screening files

## Dial Plan Text File

Once you have created all the necessary tables, as described in [Chapter 1, “Dial Plan Overview,”](#) you can create a dial plan text file containing the MML commands. The first two lines in the file are to start a provisioning session and to create a dial plan file.


**Note**

The order in which the digit string MML commands are entered reverses the order in which they were created.

**MML commands**

```
prov-sta::srcver="new",dstver="session1"
numan-add:dialplan:custgrpid="t001"
numan-add:service:custgrpid="t001",name="Washington"
numan-add:service:custgrpid="t001",name="FreePhone"
numan-add:service:custgrpid="t001",name="TollLine"
numan-add:digmodstring:custgrpid="t001",name="digmod1",digitstring="703484"
numan-add:resultset:custgrpid="t001",name="set1"
numan-add:resulttable:custgrpid="t001",name="result1",resulttype="SCREENING",
    dw1="1",dw2="Washington",setname="set1"
numan-add:resultset:custgrpid="t001",name="set2"
numan-add:resulttable:custgrpid:"t001",name="result1",resulttype="ANNOUNCEMENT",
    dw1="100",dw2="1",dw3="rtlist1",setname="set2"
numan-add:resultset:custgrpid="t001",name="set3"
numan-add:resulttable:custgrpid="t001",name="result1",resulttype="IN_TRIGGER",
    dw1="1",dw2="1",setname="set3"
numan-add:resultset:custgrpid="t001",name="set4"
numan-add:resulttable:custgrpid="t001",name="result1",resulttype="A_NUMBER_TYPE",
    dw1="5",setname="set4"
numan-add:resulttable:custgrpid="t001",name="result2",resulttype="BLACKLIST",
    dw1="1",setname="set4"
numan-add:resultset:custgrpid="t001",name="set5"
numan-add:resulttable:custgrpid="t001",name="result1",resulttype="BMODDIG",
    dw1="1",dw2="1",dw3="digmod1",setname="set5"
numan-add:resultset:custgrpid="t001",name="set6"
numan-add:resulttable:custgrpid="t001",name="result1",resulttype="B_NUMBER_TYPE",
    dw1="3",setname="set6"
numan-add:resultset:custgrpid="t001",name="set7"
numan-add:resulttable:custgrpid="t001",name="result1",resulttype="INC_NUMBERING",
    dw1="0",dw2="4",dw3="4",setname="set7"
numan-add:resulttable:custgrpid="t001",name="whitelist",resulttype="WHITELIST",setname="set8"
numan-add:defresultset:custgrpid="t001",resulttype="BLACKLIST",dw1="2"
numan-add:npi:custgrpid="t001",npiblock=1,setname="set3"
numan-add:noa:custgrpid="t001",noavalue=1,npiblock=1
numan-add:location:custgrpid="t001",locationblock=1,setname="set5"
numan-add:cause:custgrpid="t001",causevalue=1,locationblock=1
numan-add:bdigtree:custgrpid="t001",callside="originating",digitstring="703484",setname="set1"
numan-add:bdigtree:custgrpid="t001",callside="originating",digitstring="301555",setname="set2"
numan-add:bdigtree:custgrpid="t001",callside="originating",digitstring="301684",setname="set3"
numan-add:bdigtree:custgrpid="t001",callside="originating",digitstring="40555",setname="set4"
```

## Implementing the Dial Plan

When you have filled in the dial plan worksheets (from [Table C-1](#) through [Table C-8](#)) you can provision the Cisco MGC to implement your dial plan. When provisioning the Cisco MGC, you can use the dial plan worksheets and the available CMM, VSPT, or MML parameters.

[Table 2-3](#) describes the parameters that apply to each dial plan you define.

**Table 2-3** *Dial Plan Parameter Descriptions*

Parameter Name	Description
DIALPLAN	Selects the customer-created dial plan.
ADIGTREE	Selects the A-digit tree table in the dial plan.
SETNAME	MML name of a result set.
DIGITTOPRESENT	If set to 0, it is the next digit; otherwise, it is the number of digits to skip (forward or backward) during analysis.
CALLSIDE	Indicates if call side is originating or terminating.
DIGITSTRING	All the digits in a calling or called number.
BDIGTREE	Selects the B-digit tree table in the dial plan.
SETNAME	MML name of a result set.
DIGITTOPRESENT	If set to 0, it is the next digit; otherwise, it is the number of digits to skip (forward or backward) during analysis.
CALLSIDE	Indicates if call side is originating or terminating.
DIGITSTRING	All the digits in a calling or called number.
RESULTTABLE	Selects the result table in the dial plan.
NAME	MML name of the result type.
RESULTTYPE	Indicates the type of result.
DW1	First data word.
DW2	Second data word.
DW3	Third data word.
DW4	Fourth data word.
NEXTRESULT	Next result name.
SETNAME	MML name of the result set.
DIGMODSTRING	Selects digit string modification table in the dial plan.
NAME	MML name of the digit modification string.
DIGSTRING	The digit string.
NOA	Selects the nature of address (NOA) table in the dial plan.
NOAVALUE	The incoming NOA value.
NPIBLOCK	The NPI block value.
SETNAME	MML name of the result set.

**Table 2-3** *Dial Plan Parameter Descriptions (continued)*

<b>Parameter Name</b>	<b>Description</b>
NPI	Selects the numbering plan indicator (NPI) table in the dial plan.
NPIBLOCK	The incoming NPI block offset value.
BLOCKVALUE	The NPI block value from the NOA table.
SETNAME	MML name of the result set.
CAUSE	Selects the cause table in the dial plan.
CAUSEVALUE	The cause value.
LOCATIONBLOCK	The cause location block.
SETNAME	MML name of the result set.
LOCATION	Selects the location table in the dial plan.
LOCATIONBLOCK	The location block.
SETNAME	MML name of the result set.
BLOCKVALUE	The location block value.
SERVICE	Selects the service index table in the dial plan.
NAME	MML name of the service.
RESULTSET	Sets the result type in the result table in the dial plan.
NAME	MML name of the result set.
AWHITE	Selects the A-digit tree whitelist.
CLI	Sets the calling line identity (CLI) for the A-digit tree whitelist.
ABLACK	Selects the A-digit tree blacklist.
CLI	Sets the CLI for the A-digit tree blacklist.
BWHITE	Selects the B-digit tree whitelist.
CLI	Sets the CLI for the B-digit tree whitelist.
SVCNAME	MML name of the previously defined service.
BBLACK	Selects the B-digit tree blacklist.
CLI	Sets the CLI for the B-digit tree blacklist.
SVCNAME	MML name of the previously defined service.
DEFRESULTSET	Selects the default result set in the dial plan.
RESULTTYPE	Indicates the default result type.
DW1	First data word.
DW2	Second data word.
DW3	Third data word.
DW4	Fourth data word.

Table 2-4 lists the major MML commands used to provision and deploy dial plans as well as the corresponding CMM/VSPT commands.

**Table 2-4 MML and CMM/VSPT Commands**

MML Command	CMM/VSPT Command	Description
numan-add	Number analysis add	Adds an element to the dial plan table
numan-dlt	Number analysis delete	Deletes an element from the dial plan table
numan-ed	Number analysis edit	Edits an element in the dial plan table
numan-rtrv	Number analysis retrieve	Retrieves an element from the dial plan table
prov-add	Provisioning add	Adds provisioning data
prov-dply	Provisioning deploy	Deploys the provisioning data (dial plan)
prov-cpy	Provisioning copy	Commits the provisioning data (dial plan)
prov-exp	Provisioning export	Creates a dial plan export file in MML format for each configured dial plan

After you create a dial plan or add information to an existing dial plan, you must enter a **prov-cpy** command followed by a **chg-dpl** command. Without the change dial plan (chg-dpl) command the dial plan will not be loaded into the system and will not have any effect on call processing.

## Tips

Use the following information when you are working the dial plan and number analysis program:

- Use the dial plan branch on the number analysis tree to perform digit manipulation.
- Each branch under the number analysis tree represents a path used by the call-processing engine to process the dialed or dialing digits.
- The result table must usually be configured before the digit trees are configured; however, here are some considerations that you should keep in mind:
  - Some of the result types require that other tables be configured first. (For example, digit modification requires that you configure the digit modification tables before creating the result.)
  - For a result type where an index is required from another table, complete the other table first.
  - Create result types for each type of analysis you want the server to process.
  - At a minimum, each result type requires a result name and as many as four data words.

Refer to [Appendix C, “Dial Planning Worksheets,”](#) for blank dial plan worksheets to copy and fill in for your dial plan.

