



Cisco Media Gateway Controller Software Release 7 Dial Plan Guide

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Preface

This preface describes the objectives, audience, organization, and conventions of this document. It also explains how to find additional information on related Cisco products and services and how to obtain technical assistance, should it be needed. It contains the following sections:

- Document Objectives, page ix
- Audience, page ix
- Document Organization, page x
- Document Change History, page x
- Documentation Map, page xi
- Documentation Suite, page xii
- Document Conventions, page xiii
- Obtaining Documentation, page xvi
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Document Objectives

This document describes the information that you will need to create, implement, and deploy dial plans for the Cisco Media Gateway Controller (MGC) software Release 7.4(x).

This document also contains tables and worksheets for you to use to create dial plans for your system.

Audience

The primary audience for this document is network operators and administrators who have experience in the following areas:

- Telecommunications and data network hardware and software
- Telecommunications and data network design, planning, and operations
- Signaling, switching, dial planning, and routing

In addition, the following audiences might also find this document useful:

- Software and hardware installers
- Network designers

Document Organization

This document explains dial plan functions and how the dial plan is provisioned in Cisco MGC Software Release 7.4(x).

This document contains five chapters, three appendixes, and an index as described in Table 1:

Table 1 Major Sections of the Cisco MGC Software Release 7 Dial Plan Guide

Chapter/ Appendix	Title	Description
Chapter 1	Dial Plan Overview	This chapter describes the functions that the dial plan enables the Cisco MGC to perform. It describes the information you need before you can create a dial plan.
Chapter 2	Preparing for Dial Plan Provisioning	This chapter describes the actual process of creating, implementing, and deploying a dial plan.
Chapter 3	Provisioning Dial Plans with CMM	This chapter describes dial plan provisioning procedures using the Cisco MGC Manager (CMM).
Chapter 4	Provisioning Dial Plans with VSPT ¹	This chapter describes dial plan provisioning procedures using the Voice Services Provisioning Tool (VSPT).
Chapter 5	Provisioning Dial Plans with MML ²	This chapter describes the MML commands and provisioning procedures for dial plans.
Appendix A	NOA and NPI Codes ³	This appendix lists NOA codes and NPI codes for the result types described in Chapter 1.
Appendix B	Cause and Location Codes	This appendix lists the cause and location codes for the result types described in Chapter 1.
Appendix C	Dial Plan Worksheets	This appendix contains page-size copies of all the worksheets used in this guide.

1. VSPT = Voice Services Provisioning Tool
2. MML = Man-Machine Language
3. NOA = Nature of Address
NPI = Numbering Plan Indicator

Document Change History

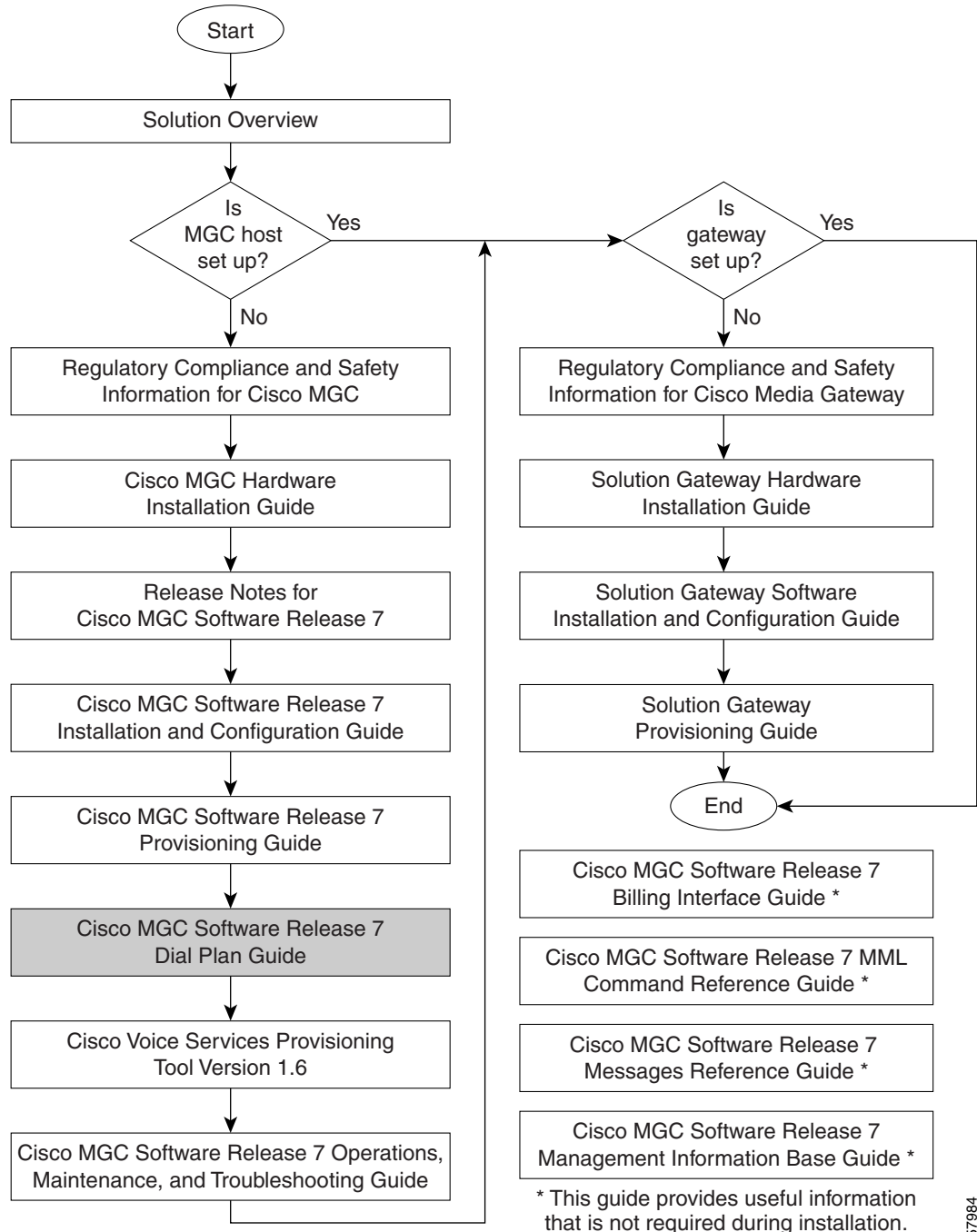
Table 2 describes the document changes made after the initial release of the *Cisco Media Gateway Controller Software Release 7 Dial Plan Guide*.

Table 2 Summary History of Document Changes

Subject	Document Number, Change Date	Change Summary
	OL-1204-01, July 23, 2001	Initial release.

Documentation Map

Refer to the following documentation map to navigate through the Cisco MGC Software Release 7 documentation suite. This document is indicated by the shaded background.



57984

Documentation Suite

Consult the related documentation listed in the following subsections for information about the Cisco MGC and media gateway hardware, as well as the Cisco MGC Release 7 software and the solutions it supports.

Documentation Guide

For an overview of the content of all of the documentation for Cisco MGC Software Release 7, refer to

- *Cisco Media Gateway Controller Software Release 7 Documentation Guide*

The Documentation Guide a master index that provides information for the entire Cisco MGC Software Release 7 documentation suite. In addition, each individual book also contains a book-specific index.

Release Notes

For information regarding subsequent releases of the Cisco Media Gateway Controller Software Release 7, refer to:

- *Release Notes for Cisco Media Gateway Controller Software Release 7.3 (x)*
- *Release Notes for Cisco Media Gateway Controller Software Release 7.4 (x)*

Hardware Documentation

- *Cisco Media Gateway Controller Hardware Installation Guide*
- *Regulatory Compliance and Safety Information for Cisco Media Gateway Controller Hardware*
- *Cisco Media Gateway Hardware Installation Guide*

Software Documentation

- *Cisco Media Gateway Controller Software Release 7 Installation and Configuration Guide*
- *Cisco Media Gateway Controller Software Release 7 Provisioning Guide*
- *Cisco Media Gateway Controller Software Release 7 Billing Interfaces Guide*
- *Cisco Media Gateway Controller Software Release 7 MML Command Reference Guide*
- *Cisco Media Gateway Controller Software Release 7 Messages Reference Guide*
- *Cisco Media Gateway Controller Software Release 7 Operations, Maintenance, and Troubleshooting Guide*
- *Cisco Media Gateway Controller Software Release 7 Management Information Base Guide*
- *Cisco Media Gateway Controller Node Manager User's Guide 2.0*
- *Cisco Voice Services Provisioning Tool User's Guide 2.0*
- *Cisco Signaling Link Terminal*
- *Cisco Media Gateway Controller Online Documentation Notice*
- *Cisco Media Gateway Controller SLT Documentation Notice*

Related Documentation

Other useful reference publications include:

- *Solution Overviews* of related Cisco telephony solutions—Describe the Cisco telephony solutions with which the Cisco MGC is associated.
- *Solution Provisioning Guides* for related Cisco telephony solutions—Describe the provisioning steps for the Cisco telephony solutions with which the Cisco MGC is associated.
- *Solution Media Gateway Installation and Configuration Guides*—Describe how to install and configure the media gateway for a particular Cisco telephony solution.

Document Conventions

In Chapter 5, “Provisioning Dial Plans with MML,” the same command syntax conventions are used as those shown by MML itself when the **HELP** command is entered within an MML session. For MML commands, Backus-Naur conventions are used. For additional information on MML command syntax, refer to the *Cisco Media Gateway Controller Software Release 7 MML Command Reference Guide*.

Notes use the following conventions:



Note

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Cautions use the following conventions:



Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Other conventions used in this guide are shown in Table 3.

Table 3 Conventions

Convention	Meaning	Description / Comments
Boldface	Commands and keywords you enter as shown.	offset-list
<i>Italics</i>	Variables for which you supply values.	command <i>type interface</i> You replace the variable with the type of interface. In contexts that do not allow italics, such as online help, arguments are enclosed in angle brackets (< >).
Square brackets ([])	Optional elements.	command [abc] abc is optional (not required), but you can choose it.

Table 3 Conventions (continued)

Convention	Meaning	Description / Comments
Vertical bars ()	Separated alternative elements.	command [abc def] You can choose either abc or def, or neither, but not both.
Braces ({ })	Required choices.	command { abc def } You must choose either abc or def, but not both.
Braces and vertical bars within square brackets ([{ }])	A required choice within an optional element.	command [abc { def ghi }] You have three options: <ol style="list-style-type: none"> 1. nothing 2. abc def 3. abc ghi
Caret character (^)	Control key.	The key combinations ^D and Ctrl-D are equivalent: Both mean “hold down the Control key while you press the D key.” Keys are indicated in capital letters, but are not case sensitive.
A nonquoted set of characters	A string.	For example, when setting an SNMP community string to <i>public</i> , do not use quotation marks around the string; otherwise, the string will include the quotation marks.
System prompts	Denotes interactive sessions, indicates that the user enters commands at the prompt.	The system prompt indicates the current command mode. For example, the prompt Router (config) # indicates global configuration mode.
Screen font	Terminal sessions and information the system displays.	
Angle brackets (< >)	Nonprinting characters such as passwords.	

Data types used in the Cisco MGC system (such as in MML commands) are shown in Table 4.

Table 4 Data Type Definitions

Data Type	Definition	Example
Integer	A series of decimal digits from the set of 0 through 9 that represents a positive integer. An integer can have one or more leading zero digits (0) added to the left side to align the columns. Leading zeros are always valid as long as the number of digits is less than or equal to ten digits. Values of this type have a range of zero through 4294967295.	123 000123 4200000000
Signed integer	This data type has the same basic format as the integer but can be either positive or negative. When negative, it is preceded by the minus sign character (-). As with the integer data type, this data type can be as many as ten digits in length, not including the sign character. The value of this type has a range of 0 minus 2147483647 through 2147483647.	123 -000123 -21000000001
Hexadecimal	A series of 16-based digits from the set of 0 through 9, a through f, or A through F. The hexadecimal number can have one or more leading zeros (0) added to the left side. For all hexadecimal values, the maximum size is 0xffffffff (eight hexadecimal digits).	1f3 01f3000
Text	A series of alphanumeric characters from the ASCII character set, where defined. Tab, space, and double quote (" ") characters cannot be used. Text can be as many as 255 characters; however, it is recommended that you limit the text to no more than 32 characters for readability.	EntityID LineSES_Threshold999
String	A series of alphanumeric characters and white-spaces. A string is surrounded by double quotes (" "). Strings can be as many as 255 characters; however, it is recommended that you limit the strings to no more than 80 characters for readability.	"This is a descriptive string."

**Note**

Hexadecimal and integer fields in files might have different widths (number of characters) for column alignment.

Terminology

The following terms are used in this document and in other documents in the documentation suite:

- **Cisco MGC host**—A Sun host server running Cisco MGC software. If your product is the Cisco SC2200 signaling controller, this is called an SC host. If your product is the Cisco PGW 2200 virtual switch controller, this is called a VSC host.
- **Cisco SC2200 node**—The combination of the Cisco SC2200 software product and the control network. The Cisco SC2200 node consists of all solution components except the media gateways.
- **Cisco PGW 2200 node**—The logical grouping of the active and standby Cisco PGW 2200 hosts, the control network, and the Cisco Signaling Link Terminals (SLTs).
- **Cisco MGC node**—A generic term that can mean either the Cisco SC node or the Cisco VSC node.
- **Simplex Cisco MGC node**—A node that uses a single Cisco MGC host. Typically, these types of nodes are used only for solution evaluation tests or for small, noncritical installations. In this configuration, any loss of service in the Cisco MGC host disrupts all call traffic. If the product is the Cisco SC2200, this is also called a simplex SC node. If the product is the Cisco PGW 2200, this is also called a simplex VSC node.
- **Continuous-service Cisco MGC node**—A node that uses two Cisco MGC hosts to prevent system downtime caused by failure of a single MGC host. Calls in progress are maintained when one Cisco MGC host fails. Continuous-service nodes use Cisco SLTs to distribute SS7 signaling to both Cisco MGC hosts. If a failover occurs, all stable calls are maintained. If the product is the Cisco SC2200, this is also called a continuous-service SC node. If the product is the Cisco PGW 2200, this is also called a continuous-service VSC node.

Obtaining Documentation

These sections explain how to obtain documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com>

Translated documentation is available at this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

Ordering Documentation

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:
http://www.cisco.com/cgi-bin/order/order_root.pl
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:
<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

You can submit comments electronically on Cisco.com. In the Cisco Documentation home page, click the **Fax** or **Email** option in the “Leave Feedback” section at the bottom of the page.

You can e-mail your comments to bug-doc@cisco.com.

You can submit your comments by mail by using the response card behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages

- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

If you want to obtain customized information and service, you can self-register on Cisco.com. To access Cisco.com, go to this URL:

<http://www.cisco.com>

Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Cisco TAC inquiries are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

The Cisco TAC resource that you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Web Site

You can use the Cisco TAC Web Site to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to this URL:

<http://www.cisco.com/tac>

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

<http://www.cisco.com/register/>

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC Web Site, you can open a case online by using the TAC Case Open tool at this URL:

<http://www.cisco.com/tac/caseopen>

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.



Dial Plan Overview

This chapter provides a comprehensive overview of the role that the dial plan plays in call processing. Dial plans enable the Cisco Media Gateway Controller (MGC), running the Cisco MGC software, to communicate with the Signaling System 7 (SS7) network and with the system components that control Cisco media gateways and bearer-traffic routing.

This chapter contains the following sections:

- Dial Plan Design, page 1-1
- Dial Plan Functions, page 1-2
- Analysis, page 1-5

The dial plan provisioning processes described in this document apply to all solutions running Cisco MGC Software Release 7.4(x) and later.

Dial Plan Design

The dial plan design provides the basic functionality to meet customer requirements for calling and called number analysis. It also allows the creation of permutations of combined open and closed numbering plans, as well as the ability to easily modify them. The Cisco MGC dial plan design also provides the interface to a real time database.

The dial plan is, of necessity, the final step in provisioning the Cisco MGC node. To create a dial plan, you must first determine what routes, trunk groups, and trunks have been provisioned in the Cisco MGC. The provisioning information on the Cisco MGC provides a logical representation of the actual routes, trunk groups, and trunks on the Cisco media gateways that are controlled by the Cisco MGC.

The routing plan types developed during provisioning of the Cisco MGC determine which trunks in a media gateway are assigned to a specific trunk group and which trunk groups are assigned to which routes. The routes determine what originating and terminating points are serviced by the Cisco MGC.

With this information in hand, you can use the procedures detailed in this guide to create a dial plan specifying what types of service requests can be accommodated by the Cisco MGC, based on the call setup information, the calling number (A-number), the called number (B-number), and the routes, trunk groups, and trunks (individual circuits) available on the attached Cisco media gateways.



Note

For detailed information on the provisioning of the Cisco MGC, refer to the *Cisco Media Gateway Controller Software Release 7 Provisioning Guide*. For detailed information on provisioning the Cisco media gateways used in your solution, refer to the appropriate *Solution Provisioning Guide*.

Dial Plan Functions

The dial plan holds the key as to how each and every call that comes into the Cisco MGC is processed. Call processing rules that you establish in dial plans are static; however, the events and circumstances that determine how each call is ultimately processed are dynamic, and depend on a number of different factors both within and external to the Cisco MGC.

Before you can successfully build a dial plan, it is imperative that you understand the functions that the dial plan can perform. These functions are described in the following subsections:

- Call Processing Functions, page 1-2
- Call Analysis, page 1-3
- Call Routing, page 1-3

Call Processing Functions

As calls arrive in the system, two telephone numbers and other data in the Initial Address Message (IAM) or the ISDN PRI setup message are processed to determine what call processing actions will be taken. Various actions can be implemented, such as call acceptance or rejection based on the calling or called number, what call control instructions are sent to the media gateways, and which egress trunk (or circuit) is ultimately selected to carry the call.

Using the dial plan that you create, the Cisco MGC performs the following functions:

- Can analyze at least two different telephone numbers (digit strings) per call: the calling number (the A-number) and the called number (the B-number).

The dial plan includes a list of all the numbers (digit strings) that require analysis, which is called a digit tree. The digit tree in which you enter a specific digit string is determined by whether the digit string is an originating number, which is entered in an A-digit tree, or a terminating number, which is entered in a B-digit tree.

Forwarded or redirected calls can also be subject to a screening feature that allows you to specify whether the calls are screened using the original calling party number (A-number) or the redirecting number.

- Performs several different types of analysis on the listed digit strings. The analysis determines how the A-number and B-number information is processed by the Cisco MGC.

Each branch under the A-number and B-number analysis trees represents a path used by the call-processing engine to process the calling or called number. You can also use the number analysis trees to perform digit modification. Digit insertion and removal permits digits to be removed and inserted in the B-number at any point in the process and at any point in B-number reception.

The dial plan also provides for backward information requests, which are required for specific protocol functionality, dependent on whether the protocol supports backward request messaging.

- Completes number analysis, which usually ends in a Result Set table.

Result Set tables must be configured before the A-number and B-number digit trees are configured. You must create result sets for each type of analysis that you want the Cisco MGC to process. At a minimum, each result set requires at least one result type. Some result types require that other tables be configured first. For example, digit modification requires configuration of the digit modification trees before creation of the Result table. For a result type where a name or an index is required from another table, you must complete that table before you can complete the Result table.

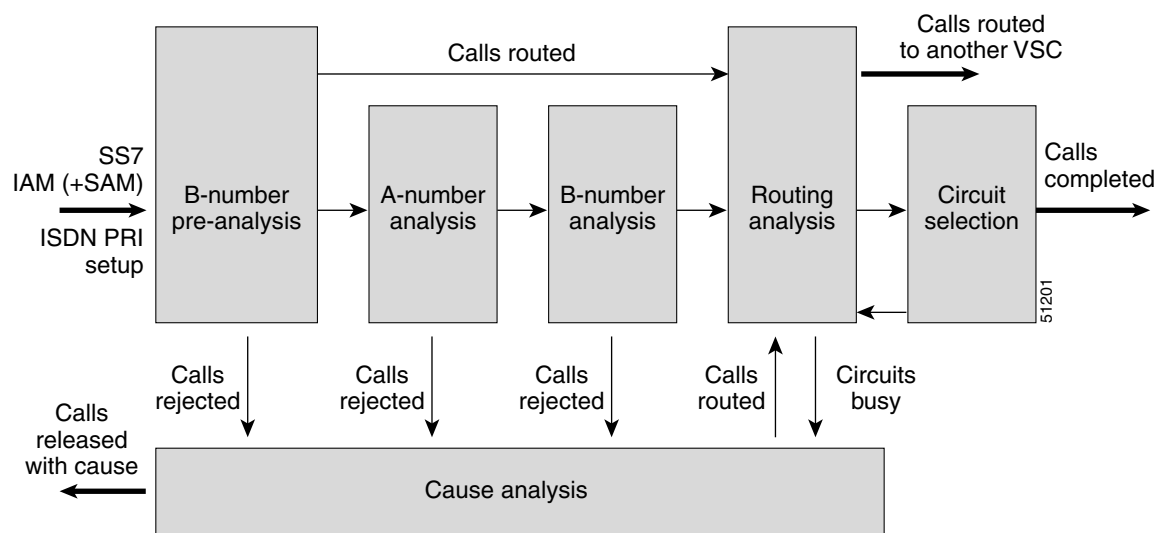
A dial plan is a single file organized as a set of tables, each in a different section. The different sections are basically linked lists of values to be used after number analysis is completed. The dial plan can be changed dynamically at any time and the change will be effective with the next call that is processed.

The system must be able to handle multiple independent customer networks, each with its own set of digit trees, black lists and white lists, and other data. To accomplish this, all dial plan tables contain a CustGrpID field, which indicates the customer group for which a given database query applies.

Call Analysis

The processes by which the Cisco MGC analyzes and routes calls are illustrated in Figure 1-1. These processes depend on the information that is provisioned in the dial plan and the routing plan.

Figure 1-1 Cisco MGC Call Analysis and Routing Processes



The calling number (A-number) and the called number (B-number) are contained in the ISDN User Part (ISUP) initial address message (IAM), which is included in the Signaling Information Field (SIF) of an SS7 Message Signal Unit (MSU), or in the ISDN PRI setup message, as shown on the left in Figure 1-1.

The IAM is just one part of the ISUP information that the Cisco Signaling Link Terminal (SLT) transmits to an associated Cisco MGC. In B-number pre-analysis, the called number (B-number) undergoes varying degrees of analysis, depending on other data in the IAM or the ISDN PRI setup message.

Call Routing

The ultimate objective of a dial plan is to establish a connection or circuit between the calling number (A-number) and the called number (B-number). There are three call routing terms that require definition to help you understand the information that follows.

- **Trunk**—A trunk (or circuit), in Cisco PGW 2200 terms, is a single TDM voice channel (DS0). It is a physical connection between two points through which a call can be established.
- **Trunk group**—A trunk group is a collection of identical trunks (or circuits) that connect the same two points and are controlled by the same signaling channel. Cisco MGC trunk groups are often arranged exactly the same as the trunk groups on the switches on the opposing ends of the packet network for the sake of simplicity.

- **Route**—The route defines the path that a call uses. It might be a collection of trunk groups with the same destination, or a logical path over a packet network fabric. A Route List is a collection of routing alternatives that can be used to transport a call between the origination and the destination points. Individual routes within a Route List can connect the same two origination and destination points, but over different physical paths.

The dial plan is the primary determinant of how a call is routed from its origination to its termination through a Cisco MGC-controlled packet-switched network. Figure 1-2 is a simplified illustration of the sequence of events that occur in routing a call from its origination (TDM network A) to its termination (TDM network B).

Routing Functions

The routing functionality of the Cisco MGC includes the following, as illustrated in Figure 1-2.

- The Cisco MGC is designed for tandem (transit) applications; all calls originate or terminate outside the MGC-controlled packet network.
- The Cisco MGC receives and analyzes signaling messages, either SS7 or ISDN PRI, determines ingress and egress gateways, and selects the egress trunks (or circuits) to external TDM switches and networks.
- The Cisco MGC controls the ingress and egress media gateways on the packet network edges; however, it does not control the route taken within the packet network.
- The Cisco MGC connects the ingress trunk circuit to the egress trunk circuit and routes packets from the origin to the destination.

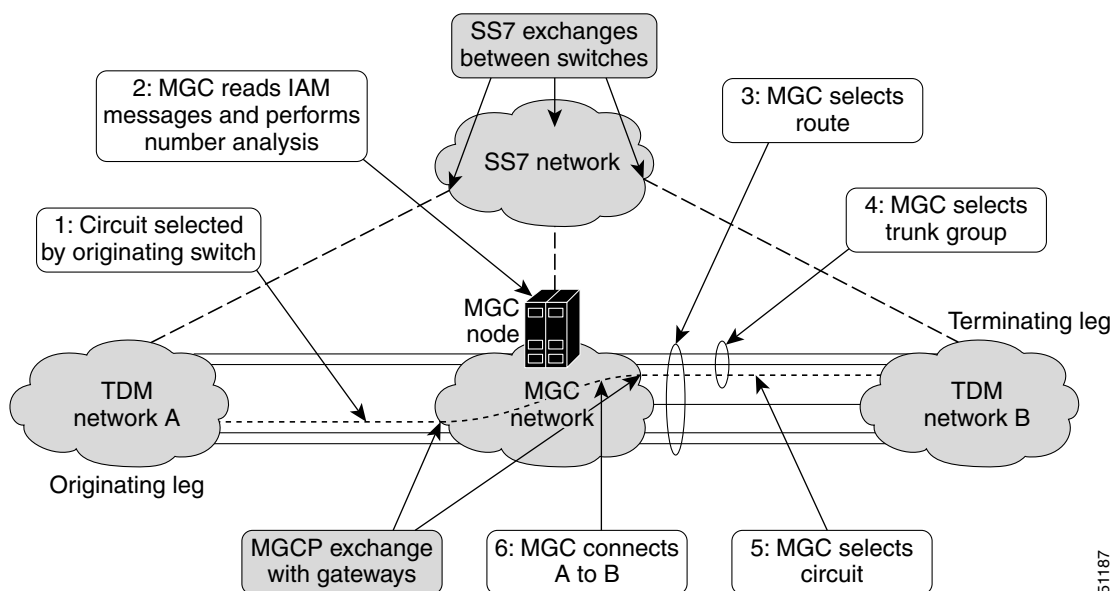
The Cisco PGW 2200 supports the random distribution of calls across multiple trunk groups that belong to a particular route. The ability to turn random distribution on or off is supported on a route-by-route basis.



Note

The Cisco SC2200 operates only in “nailed-up” solutions, where the ingress trunk is connected directly to the egress trunk, so no routing plan is necessary.

Figure 1-2 Cisco MGC Call Routing Sequence



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Call routing can be accomplished based on a number of factors, including the NOA value in the incoming IAM or Setup message or the combination of the NOA value and the incoming NPI value. If the routing is not determined solely on the basis of the B-number pre-analysis, then the B-number is formally analyzed. After formal B-number analysis is completed, routing analysis is performed based on the results of the B-number analysis.

**Note**

Routing applies only to the Cisco PGW 2200. The Cisco SC2200 is used in “nailed up” systems where the ingress trunk is tied directly to the egress trunk and no routing is necessary,

Once a route is chosen, the Cisco MGC selects a trunk group and an available trunk (circuit). If there is no available trunk, the Cisco MGC releases the call with a Cause Code that indicates all circuits are busy. As shown in Figure 1-1, calls can also be rejected at any point during analysis and released with an appropriate Cause Code, or routed to an announcement server that informs the caller of the reason the call could not be completed.

These are the basic call processing and routing functions of a dial plan. Creating a complete, efficient, and comprehensive dial plan requires *thorough planning* and some degree of foresight. Organization can simplify dial plan implementation.

Analysis

This section describes the various stages of analysis in some detail. When a call is received, normal call processing actions take place with regard to the protocol handling. The ingress trunk group (or sigpath) indicates the initial dial plan identity from data provisioned in the trunk group or sigpath files. Once the initial message is unpacked into the Call Context (CC), an internal signal is sent to the Universal Call Module (UCM), which sends the call to generic analysis to initiate pre-analysis.

The various types of analysis performed by Cisco MGC dial plans are described in the following subsections and illustrated in Figure 1-1

- Pre-Analysis, page 1-5
- Formal Analysis, page 1-8
- Result Analysis, page 1-17
- Cause Analysis, page 1-26
- Routing Analysis, page 1-28

Pre-Analysis

The initial analysis request, made after the reception of an SS7 IAM or an ISDN PRI setup message, is called pre-analysis. Pre-analysis, if any, is performed according to the data in the received message. Pre-analysis provides you with the capability to perform NOA/NPI analysis as well as early analysis of the called number (B-number) to determine if it should be modified (“shaped”) prior to formal analysis. The results from this stage of analysis are then returned to the UCM.

Pre-analysis can be divided into three actions, which occur in the following sequence:

- NOA and NPI Analysis
- NANP B-Number Normalization
- Early B-Number Analysis

NOA and NPI Analysis

Nature of Address (NOA) and Numbering Plan Indicator (NPI) analysis is performed based on the data provisioned in their respective tables and the NOA and NPI values contained in the incoming ISUP IAM or ISDN PRI setup messages. The incoming NOA and NPI values are protocol dependent.

Nature of Address Table

The NOA table is used to define the actions to be taken based on the NOA value in the incoming call. The two fields in the NOA table are the NPI Block and the result set name, as shown in Example 1-1.

- The NPI Block value is used to identify a unique NPI block in the NPI table.
 - If the NPI Block value is set to 0, no analysis is performed in the NPI table.
 - If the NPI Block value is set to any value other than 0, analysis is performed in the NPI block indicated by the NPI Block value and at an offset determined by the incoming NPI value.
- The result set name in the NOA table is used to associate a result set with the incoming NOA value.
 - If the result set name is set to 0, then no action is taken.
 - If the result set name is set to any value other than 0, the action taken is based on the result types included in the Result Set table under the specified result set name.

A result set name can be configured in the NOA table only if you have an NPI Block value other than 0. If both the NPI Block value and the result set name are set to 0, no analysis is performed.

The following MML command was used to set up the NOA table with a CustGrpID of t001, an incoming NOA value of “3,” an NPI Block value of “1,” and a result set name (setname) value of “set3.”

→ **MML command** `numan_add:noa:custgrpID="t001",noavalue=3,npiblock=1,setname="set3"`

Example 1-1 Nature of Address Table Example

NOA Value		
1	2	3
4	5	6
7	8	...

The incoming NOA value (noavalue=3) in the MML command above is the offset into the NPI Block column of the NOA table. If the incoming NOA value is 3, then the value in that row of the NPI Block column (npiblock=1) determines whether analysis is performed in the NOA table.

NPI Block	Result Set Name
1	set1
1	set2
1	set3
1	set4
1	set5
1	set6
1	set7
...	...

Since the NPI Block value in row 3 of the NOA table is greater than zero (0), the result set name (setname="set3") in that row is used to determine the action taken.

Refer to Appendix A, “NOA and NPI Codes,” for a list of the NOA codes for various protocol variants. Table C-2 in Appendix C, “Dial Plan Worksheets,” can be used for planning your NOA table.

Numbering Plan Indicator Table

The NPI table is used to identify an associated Result Set Name, as shown in Example 1-2. The NPI table can have a number of blocks, each consisting of 16 entries (0 through 15). The specific block of 16 entries in the NPI table that is used is determined by the NPI Block value from the NOA table.

The NPI block value received in the incoming IAM or Setup message determines an offset into the designated NPI block. The result set name, if any, located at that offset into the designated NPI block is the result set to which the received NPI block value is mapped. The result types associated with this result set name determine what actions are associated with the incoming NPI block value.

There does not have to be an NPI table for every NOA entry, only when it is required because of a non-zero entry in the NPI Block column of the NOA table, as shown in Example 1-1.

The following MML command was used to set up the NPI table with a CustGrpID of “t001,” an NPI block value of 1, a received NPI block value of 8, and a result set name of “set8.”

→ **MML command** `numan_add:npi:custgrpId="t001",npiblock="1",blockvalue="8",setname="set8"`

Example 1-2 Numbering Plan Indicator Table Example

Block Value			
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

The MML command above specifies the first block in the NPI table (npiblock=1), which consists of the Result Set Name column. The offset into the NPI block is specified by the NPI block value in the incoming IAM or Setup message (blockvalue=8).

Result Set Name
set1
set2
set3
set4
set5
set6
set7
set8
set9
set10
set11
set12
set13
set14
set15
set16

The result set name (setname="set8") specifies that the eighth row of the first block of the NPI table contains the result set name “set8.” The result types included in result set name set8 determine the call processing actions to be performed, as described in the “Result Set Table” section on page 1-24.

If a block value is not specified in the MML command, all 16 entries (0 through 15) in the specified NPI block default to an empty result set name. so no action is performed.

Refer to Appendix A, “NOA and NPI Codes,” for a list of the NPI codes for various protocol variants. Table C-3 in Appendix C, “Dial Plan Worksheets,” can be used for planning your NPI table.

Early B-Number Analysis

At this later pre-analysis stage, B-digit tree analysis is actually being performed on the B-number digit tree. However, it is not considered part of formal analysis because this analysis is looking for only those result types that require a calling line identity (CLI). CLI result types are searched for because in certain locations it is possible to receive an IAM that does not have a CLI. When an IAM is encountered without a CLI, the CLI must be requested in a backward request message to the preceding switch.

Early B-number analysis also allows modification of the B-number digit string before formal analysis.

NANP B-Number Normalization

North American Numbering Plan (NANP) number normalization applies B-number normalization to intraLATA calls only for North American networks. B-number normalization is required only if the number plan analysis (NPA) property contains the 3-digit string providing the NPA prefix for the associated trunk group. If the NPA property is empty, then B-number normalization is not required.

If B-number normalization is required, the NPA property value for the trunk group is prepended as a 3-digit number to the 7-digit B-number (NXX-XXXX). This creates a 10-digit B-number in the format NPA-NXX-XXXX.

Formal Analysis

Once pre-analysis is completed and a valid response has been returned to the UCM, preparation of the channel on the originating channel controller (OCC) side is initiated by the UCM. Once this is complete and the OCC side is ready, the UCM makes the formal analysis request to invoke A-number analysis, followed by B-number analysis, and finally routing analysis.

Formal analysis provides full digit tree analysis of both the calling number (A-number) and the called number (B-number), if necessary, to determine (1) if further processing is required, and (2) if any resulting action must be taken after the number analysis is completed. The steps in processing are similar in each case, but the details might vary slightly.

Formal analysis of either the calling number or the called number can include any or all of the following:

- A-Number Analysis
- B-Number Analysis
- Call Screening
- Number Type Modification (NOA modification)
- Number Modification

A-Number Analysis

A-number analysis provides “digit by digit” analysis using the analysis tables, as well as call screening that supports both Blacklist and Whitelist screening capability.

From the point of view of the Cisco MGC, each digit arrives and is processed separately. Each digit is processed through a tree-structured representation that is stored in the digit tree table. Each digit tree allows analysis of the digits 0 through 9.

The data stored in the table for a particular digit includes a pointer to a record in the Result Set table. The Result Set table contains more details about the actions to be performed. Many different digit combinations can link to the same detailed record in the Result Set table.

A-number analysis provides the following specific capabilities:

- A-number address type modification (NOA)
- A-number modification, including digit insertion and removal
- Automatic Number Identification (ANI)/CLI verification (length)
- Indication for call to perform A-number call screening
- Route preference setting as a result from digit analysis
- Call release or rejection cause result

B-Number Analysis

B-number analysis provides digit insertion and removal, number length determination, and vacant number identification. Digit insertion and removal permits digits to be removed and inserted at any point in the B-number and at any point in the process of B-number reception. Backward information requests are provided as required for specific protocol functionality, dependent on protocol support of backward request messaging. Also provided is the ability to return results such as cause codes, announcement identities (for routing to an announcement server), and route list names (as indexes into the routing process). Finally, B-number analysis is also capable of supporting both enbloc and overlap numbering schemes providing equivalent functionality to each mode.

B-number analysis provides the following specific capabilities:

- B-number address type modification (NOA)
- B-number modification, including digit insertion and removal
- Incoming side, or originating channel controller (OCC), digit numbering data (max/min digits)
- Outgoing side, or terminating channel controller (TCC), digit numbering data (max/min digits)
- Indication for call to perform A-number call screening
- Request for more digits to analyze, if sufficient digits are not received
- Request for more information (ANI/CLI, CPC, BSM, and so on)
- Intelligent network triggers (trigger for a query to the SCP for LNP, 800, or 900 calls)
- Charge result information for Call Detail Record (CDR)
- Announcement result providing an announcement identity and data for use in the routing process
- Blacklist and whitelist result screening from B-number
- Route name as an index into the routing process
- Call release or rejection cause result

Call Screening

Call screening is a type of analysis done on the calling number digit string to determine if the call is to be accepted or rejected, as shown in Table 1-1. Analysis of either the A-number or the B-number can trigger call screening; however, only the calling number (A-number) is screened.

The Cisco MGC software supports either white list or black list screening of the A-number:

- If the A-number is either present in the whitelist or absent in the blacklist, the call is completed.
- If the A-number is either present in the blacklist or absent in the whitelist, the call is terminated.

The Cisco MGC software also supports either white list or black list screening of the B-number:

- If the B-number is either present in the whitelist or absent in the blacklist, the call is completed.
- If the B-number is either present in the blacklist or absent in the whitelist, the call is terminated.

Table 1-1 Call Screening Actions

Number Status	Whitelist	Blacklist
A- or B-number listed	Call completed	Call terminated
A- or B-number not listed	Call terminated	Call completed

Maintaining the Screening Database

Due to the nature and magnitude of the A-number/B-number whitelist and blacklist screening database, the screening files are usually *not* created by entering individual MML commands. The screening files can be created independently, then imported by using the MML command **prov-add: files**.

All of the whitelist and blacklist screening files can be populated using imported files. Screening files must all be placed in the `/opt/CiscoMGC/etc/cust_specific` directories and named as shown in Table 1-2.

Table 1-2 Call Screening Database Files

Number	White List Files	Black List Files
A-number	<code>custgrpid.awhite</code>	<code>custgrpid.ablack</code>
B-number	<code>custgrpid.bwhite</code>	<code>custgrpid.bblack</code>

A-Number File Formats

The file format for each entry in the A-number whitelist or blacklist screening files is the same:

`<Type> <CallingPartyNumber>`

where,

- The value in the Type field designates whether the calling party number is to be added to or deleted from the A-number screening file:
 - Type=1 if the calling party number is to be added
 - Type=2 if the calling party number is to be deleted

Additions and deletions can be commingled in the same file; however, the A-number whitelist and blacklist files must be maintained separately.

- The Calling Party Number field is used to enter the calling party number.

B-Number File Formats

The file format for each entry in the B-number whitelist or blacklist files is also the same:
`<Type> <ServiceName> <CallingPartyNumber>`

where,

- *Type* designates whether the calling party number is to be added or deleted:
 - Type=1 if the calling party number is to be added to the B-number screening file
 - Type=2 if the calling party number is to be deleted from the B-number screening file

Additions and deletions can be commingled in the same file; however, the B-number whitelist and blacklist files must be maintained separately.

- *ServiceName* is a string field that designates a valid service name in the Service Name table.
- *CallingPartyNumber* is used to enter the calling party number.

MML Command

The format of the MML command to import both dial plan files and A-number and B-number whitelist and blacklist screening files is as follows:

prov-add:files:name=<file_format>, file=<file_name>, action=<file_action>

where,

- *file_formats* relevant to number analysis are:
 - NumAnFile=dial plan files
 - AWhiteFile=A-number whitelist files
 - ABlackFile=A-number blacklist files
 - BWhiteFile=B-number whitelist files
 - BBlackFile=B-number blacklist files
- *file_name* is the name of the file, as follows:
 - *custgrpId.dialPlan*=dial plan files
 - *custgrpId.awhite*=A-number whitelist files
 - *custgrpId.ablack*=A-number blacklist files
 - *custgrpId.bwhite*=B-number whitelist files
 - *custgrpId.bblack*=B-number blacklist files
- *file_action*=**import** for dial plan files and A and B whitelist and blacklist screening files

Updating Screening Files

The screening database is designed to allow you to add and remove entries without opening a provisioning session. It also enables more than one user at a time to access the screening database. This capability is applicable to the Cisco PGW 2200 and the Cisco SC2200.

A provisioning session is not needed for individual MML commands; however, a provisioning session still needs to be opened when you are using the file import procedure described previously.

The target identifiers (TIDs) that are allowed without the opening of a provisioning session include:

- *custgrpId.awhite*—A-number whitelist files
- *custgrpId.ablack*—A-number blacklist files
- *custgrpId.bwhite*—B-number whitelist files
- *custgrpId.bblack*—B-number blacklist files

Maximum File Sizes

The maximum number of ANI/CLIs that can reside in the A-number/B-number screening database depends on the Cisco MGC host platform. For Sun Microsystems Netra t112x hosts, the maximum number of entries is 500,000. For the Sun Netra 140x, the maximum is 1 million entries. It should be noted, however, that when the number of entries in the database approaches either maximum, it can have an adverse affect on the maximum number of sustained calls that can be supported.

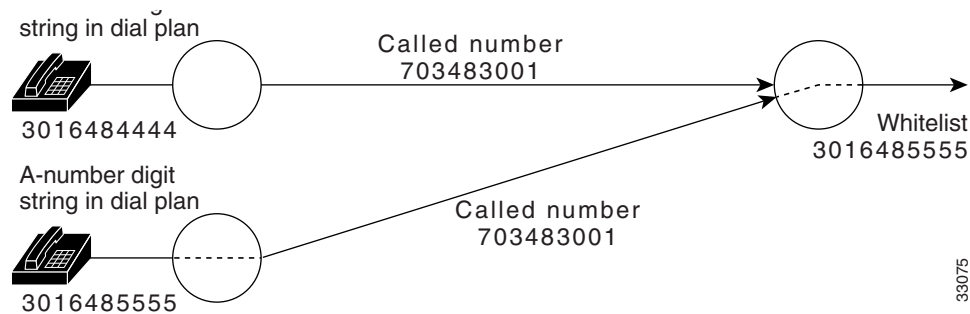
White List Screening From the A-Digit Tree

Number screening is used to verify if a call can be completed. In the case of white list screening, the call is completed if the digit string is configured, or the call is terminated if the digit string is not configured. For an example of white list screening from the A-digit tree, see Figure 1-3.

In the dial plan, the digit string 301 was connected to the SCREENING result type from the A-digit tree. When the digit string was connected, it was associated with white list screening. When a customer dials with a calling number area code of 301, the calling number is screened to see if it is configured. In the white list example, the call is allowed through if the calling number is configured, or the call is terminated if it is not configured.

In this example, if the calling number is (301) 648-4444, the call is terminated because that number is not configured in the white list. However, if the calling number is (301) 648-5555, the call is connected because that number is configured in the white list.

Figure 1-3 White List Screening from the A-Digit Tree



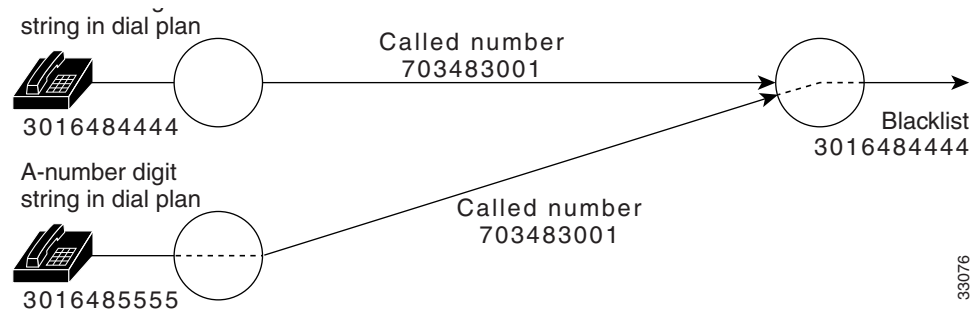
Black List Screening From the A-Digit Tree

In the case of black list screening, the call is terminated if the digit string is configured in the list. The call is completed if the digit string is not configured in the list. For an example of black list screening from the A-digit tree, see Figure 1-4.

In the dial plan, the digit string 301 was connected to the SCREENING result type from the A-digit tree. While the digit string was connected, it was associated with black list screening. In this example, when a customer dials with a calling number area code of 301, the calling number is screened to see if it is configured. In the black list example, the call is terminated if the called number is configured in the black list, or the call is completed if it is not configured in the black list.

In this example, if the calling number is (301) 648-4444, the call is completed because that number is not configured in the black list. However, if the calling number is (301) 648-5555, the call is terminated because that number is configured in the black list.

Figure 1-4 Black List Screening from the A-Digit Tree



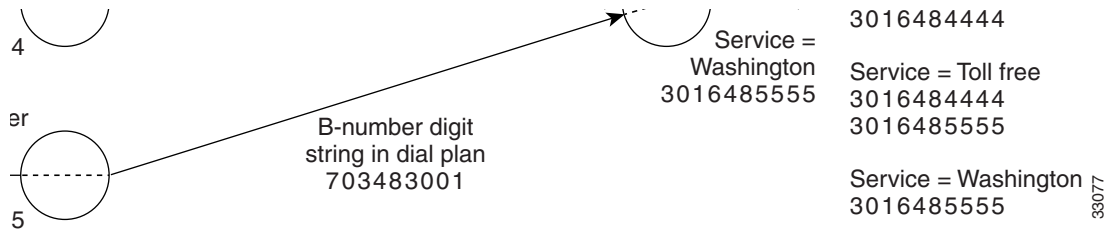
White List Screening From the B-Digit Tree

Number screening is used to verify if a call can be completed. In the case of white list screening, the call is completed if the called digit string is configured with a service and the calling number is associated with the same service in the screening table; otherwise, the call is terminated. For an example of white list screening from the B-digit tree, see Figure 1-5.

In the dial plan, the digit string 7034 was connected to the SCREENING result type from the B-digit tree. When the call is connected, it is associated with the Washington service and white list screening.

In this example, when a customer dials a number with 7034, the calling number (301) 648-4444 is screened and the call is terminated because the calling number is not configured in the white list for the Washington service. However, if the calling number were (301) 648-5555, the call would be connected because that number is configured in the white list for the Washington service.

Figure 1-5 White List Screening from the B-Digit Tree



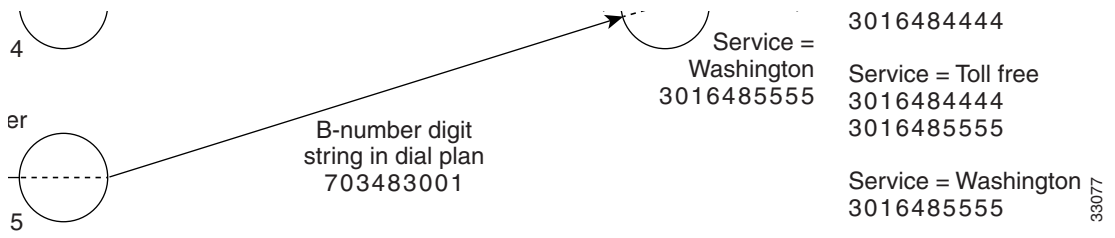
Black List Screening From the B-Digit Tree

In the case of black list screening, the call is terminated if the called digit string is configured with a service and the calling number is associated with the same service in the screening table; otherwise, the call is connected. For an example of black list screening from the B-digit tree, see Figure 1-6.

In the dial plan, the digit string 7034 was connected to the SCREENING result type from the B-digit tree. When the call is connected, it is associated with the Washington service and black list screening.

In this example, when a customer dials a number with the 7034, the calling number (301) 648-4444 is screened and the call is connected because the calling number is not in the black list for the Washington service. However, if the calling number were (301) 648-5555, the call would be terminated because that number is configured in the black list for the Washington service.

Figure 1-6 Black List Screening from the B-Digit Tree



Redirecting Number Screening



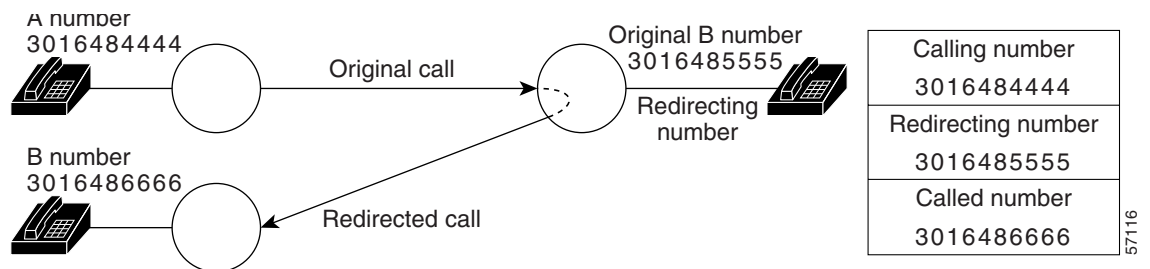
Caution

The redirecting number screening capability has no effect on the provisioning of the A-number screening and analysis tables described previously; however, the capability is not backward compatible with releases of the Cisco MGC software earlier than Release 7.4(12).

Redirecting number screening is designed to augment, not replace, screening of the original calling party number (A-number) by introducing screening of the redirecting number.

Redirecting number screening allows you to specify whether redirected calls are screened by using the original calling party number (A-number) or the redirecting number, which was originally the called party number (B-number) when the call was initiated, as illustrated in Figure 1-7.

Figure 1-7 Redirecting Number Screening



For redirected calls, the calling number parameter contains the A-number of the station that originated the call, the redirecting number parameter contains the calling number (A-number) of the station that redirected the call, and the called number parameter contains the new B-number of the station to which the call is redirected.

A-number screening for redirected calls can vary from customer to customer, so an office-based or switch-based parameter is required to specify which parameters are to be used for A-number screening. The XEConfigParm.dat file contains office-wide or switch-wide parameters in the Cisco MGC software, including the MDLANumberScreening parameter.

The default value of the MDLANumberScreening parameter is 0 (zero), which invokes the standard A-number screening on the number in the calling number parameter, regardless of whether the call is redirected or not. No screening is done on the number in the redirecting number parameter.

The redirecting number screening capability is enabled by setting the MDLANumberScreening parameter to a value of 1 (one) in the XEConfigParm.dat file.



Note

For more information on setting parameters in the XEConfigParm.dat file, see the *Cisco Media Gateway Controller Software Release 7 Installation and Configuration Guide*.

Depending on the type of analysis that invoked the original A-number screening, redirecting number screening makes it possible to screen either the original calling party number or the redirecting number.

- A-number analysis screening result—Only the original calling party number is screened.
- B-number analysis screening result—Either the original calling party number or the redirecting number can be screened, dependent on:
 - a. Setting the MDLANumberScreening system property in the XECfgParm.dat file to 1 (enabled) and
 - b. Presence of the redirecting number data in the received IAM or Setup message.



Note The absence of either of the above conditions, or setting of the MDLANumberScreening parameter to its default value 0 (zero) in the XECfgParm.dat file, causes all screening actions to default exclusively to the original calling party number (A-number).

When redirecting number screening is activated, the initial address message (IAM) is returned to A-number screening where it is re-screened to determine whether the call can be completed based on the redirecting number instead of the original calling number. If the redirecting number can make calls to the new called party number (B-number), the call is completed.

If the result types digit modification (ADIGMOD or BDIGMOD) or number type (A_NUMBER_TYPE or B_NUMBER_TYPE) are encountered when a redirecting number is used during A-number analysis, no modification is performed on the redirecting number. In addition, the number analysis does not set the screening indicator field, because this field is not applicable for the redirecting number.

If a succeeding switch should determine that a redirected call is to be subjected to A-number screening, it uses the number contained in the redirecting number parameter in the A-number screening process.

Number Type Modification

Number type modification, or NOA modification, enables you to change the value of the incoming NOA, which may be required in certain international applications. This feature is designed for applications when a carrier is extending its services to new markets (usually in other countries), where local carriers might have different rules or formats for assigning NOA codes.

Number Modification

Number modification (ADIGMOD or BDIGMOD) can be used to add, delete, or modify specific digits of the calling number (A-number) or the called number (B-number) to support private dialing plans.

Result Analysis

Result analysis is not explicitly shown in any of the figures in this chapter; however, the result from reading the Cause table is either a Result Set Name or a Location Block, depending on whether the Cause table has been provisioned to read just the cause code or both the cause code and the location code.

- If a Result Set Name is received, this indicates that cause analysis is complete, and the Result Set table must be read to determine the required action(s).
- If a Location Block is received, the Location table is read, which contains one field per entry, a Result Set Name. If there is no Result Set Name configured, no action is taken.

For more detailed information on the Cause table, refer to the “Cause Table” section on page 1-26. For more detailed information on the Location table, refer to the “Location Table” section on page 1-27.

Before creating a Result table, you must create a Digit Modification table and a Service table. These two tables define additional parameter values that are used by the Result table. In addition, a route group must be created before the ROUTE result type can be defined.

Digit Modification Table

The Digit Modification table, Example 1-3, is used to define the digit modification string for a digit modification name. The digit modification string in the table is used to insert numbers into the calling number (A-number) or called number (B-number) at the application point specified in the AMODDIG or BMODDIG result type. Table C-4 in Appendix C, “Dial Plan Worksheets,” can be copied and filled in to document the digit modification names and digit modification strings used in your dial plan.

The following MML command was used to set up the Digit Modification table with a CustGrpID of t001, a digit modification name of digmod3, and a digstring value of 703486.

→ **MML command** `numan-add:digmodstring:custgrpID="t001",name="digmod3",digstring="703486"`

Example 1-3 Digit Modification Table Example

Digit Modification Name	Digit Modification String
digmod1	703484
digmod2	703485
digmod3	703486

Service Name Table

Example 1-4 is an example of a Service Name table. Table C-5 in Appendix C, “Dial Plan Worksheets,” can be used to plan the Service Name table.

The following MML commands were used to create the Service Name table shown in Example 1-4.

→ **MML command** `numan-add:service:custgrpID="t001",name="Washington"`
MML command `numan-add:service:custgrpID="t001",name="FreePhone"`
MML command `numan-add:service:custgrpID="t001",name="TollLine"`

Example 1-4 Service Name Table Example

Service Name
Washington
FreePhone
TollLine

Result Table

The Result table, Table 1-3, lists all the result type names and their data words, which prescribe the actions that must be taken when the last analyzed digit in a digit string is reached. See the “Result Type Definitions” section following this table for definitions of result types and their associated data words.

Table 1-3 Result Table

Result Type Name (Click on link to see definition)	Data Word 1	Data Word 2	Data Word 3	Data Word 4	Analysis Points		Result Type Valid For			
					Intermediate	End Point	A-digit tree	B-digit tree	Cause	Pre-analysis
NONE	0 (not used)	0 (not used)	0 (not used)	0 (not used)	X					
MORE_DIGITS_REQUIRED	Num. of digits	0 (not used)	0 (not used)	0 (not used)	X			X		
ROUTE	RouteListName	0 (not used)	0 (not used)	0 (not used)	X			X	X	X
INC_NUMBERING	Numbering Type	Min. digits	Max. digits	0 (not used)	X			X		X
AMODDIG	Application Point	Num. of digits to remove	Modification name	0 (not used)	X		X	X		X
BMODDIG	Application Point	Num. of digits to remove	Modification name	0 (not used)	X		X	X	X	X
CAUSE	Cause Code	0 (not used)	0 (not used)	0 (not used)		X		X	X	
ANNOUNCEMENT	Announcement ID	Local/Remote	RouteListName	Announcement Data		X		X	X	
CPC_REQ	0 (not used)	0 (not used)	0 (not used)	0 (not used)	X		X	X		
CLI_REQ	0 (not used)	0 (not used)	0 (not used)	0 (not used)	X		X	X		
BSM_REQ	0 (not used)	0 (not used)	0 (not used)	0 (not used)	X		X	X		
FSM_REQ	0 (not used)	0 (not used)	0 (not used)	0 (not used)	X		X	X		
A_NUMBER_TYPE	A-number Type	0 (not used)	0 (not used)	0 (not used)	X		X	X		X
B_NUMBER_TYPE	B-number Type	0 (not used)	0 (not used)	0 (not used)	X		X	X	X	X
OTG_NUMBERING	NumberingType	Min. digits	Max. digits	0 (not used)	X			X		
BLACKLIST	Screening Criteria	0 (not used)	0 (not used)	0 (not used)		X	X	X		
CLI_NUMBER_LENGTH	NumberingType	Min. digits	Max. digits	0 (not used)	X		X			
ROUTE_PREFERENCE	routePref	0 (not used)	0 (not used)	0 (not used)	X		X			
IN_TRIGGER	Service Type	SCP/STP Index	0 (not used)	0 (not used)	X			X		
SCREENING	Screen Type	Service Name	0 (not used)	0 (not used)	X		X	X		
DATA_EXCHANGE	Action Type	0 (not used)	0 (not used)	0 (not used)	X			X		
WHITELIST	0 (not used)	0 (not used)	0 (not used)	0 (not used)		X		X		
RTRN_START_ANAL	Num. of digits to remove	0 (not used)	0 (not used)	0 (not used)	X			X	X	

Result Type Definitions

The following paragraphs contain definitions of the result types listed in Table 1-3

NONE

If this result type is received from an analysis, no action is required.

MORE_DIGITS_REQUIRED

The DIG_REQD result type indicates that insufficient digits were received for analysis to provide a result with which call processing can be continued. This result type returns an indication to the call module of how many more digits are required for analysis to be completed by subtracting the number of digits returned in the analysis result type from the number of digits that have already been received.



Note This result type is intended for use in conjunction with overlap signaling working, so be aware that this generic result might not be invoked if the protocol that needs to receive it does not support overlap signaling.

ROUTE

The ROUTE result type supplies a route list name, which is used as a starting index to the routing analysis process.



Note This result type is used on a call processed in a switched (that is, call control) configuration, but is not necessary in a nailed-up (that is, signaling) application.

INC_NUMBERING

The INC_NUMBERING result type returns information regarding the incoming trunk group side (OCC). This information sets the numbering criteria (overlap or en bloc) and the minimum and maximum numbers of digits permitted for that side.

- **Numbering Type**—0 = Closed numbering (en bloc)
1 = Open numbering (overlap)
- **Minimum and Maximum digits**—Refers to the minimum and maximum number lengths. In the case of closed numbering (en bloc), these values should be equal.

The data returned in this result type is used to overwrite default values loaded into the OCC at startup.



Note This result type is used only on a call processed in a switched (that is, call control) configuration.

AMODDIG

The AMODDIG and BMODDIG result types are for digit modification on the A-number or B-number, **BMODDIG**

respectively. The capability exists to remove *x* digits from any point in either digit string and replace them with whatever digits are required. An example of this operation is as follows:

If we get result type 5 (BMODDIG) to modify the B-number, we receive the following datawords:

- **Application point**—The point (digit) in the digit string to begin applying the modification. The range is from 1 through the total number of digits in the digit string (20 maximum).

- **Number of digits to remove**—Remove x digits (if required). The range is from 1 through the number of digits remaining in the digit string from the application point (20 maximum).
- **Modification name**—If required, this is a name that specifies an entry in the table containing the digit modification string that is to be inserted beginning at the application point.

For example, if the application point is set to 1, then begin at the start of the digit string, remove 5 digits, and replace them with the digit string at the location specified by the modification index. After reading the digmodstrings table, the modification name gives a digit string to insert of 1321.

For example, if the application point = 1, the number of digits to remove = 5, and the modification name gives a result of 1321, then:

- B-number received pre-analysis = 01444 567891
- B-number post analysis = 1321 567891

CAUSE

The CAUSE result type provides a release cause code as a result from analysis, which is then used in the release (REL) and clear-down messages as the call is cleared. The CAUSE result type provokes a negative result from analysis, and the cause is identified. Currently, the given cause value is passed into the cause analysis process and by table analysis the decision is made whether or not to:

1. Reattempt the call on an alternate route
2. Return an announcement (that is, route to the announcement server)
3. Clear the call down, writing the cause value returned into call context for protocol use

The cause code corresponds to any provisioned value that complies with the range of cause values permitted in call context. Refer to Appendix B, “Cause and Location Codes,” for cause code values.

ANNOUNCEMENT

The ANNOUNCEMENT result type provides an announcement ID, local or remote indication, and route ID. These fields are defined as follows:

- **Announcement ID**—Identity value of announcement that is played to the caller (a 4-digit string)
- **Local/Remote**—Indication as to whether or not the announcement server is locally connected to this Cisco MGC or is remote in the network requiring routing to reach it. (Local = 0, Remote = 1)
- **RouteID**—For a remote announcement server, this is the route list name that provides a startIndex into the routing process
- **Announcement Data**—Reserved for future use



Note

For the CPC_REQ, CLI_REQ, BSM_REQ, and FSM_REQ result types, the required information can be retrieved by an internal request signal if the originating protocol supports backward requests. If not, the call progresses without this information and the next exchange determines if it is required.

CPC_REQ

The CPC_REQ result type indicates that the calling party category (CPC) has not been supplied and is required for the outgoing side.

CLI_REQ

The CLI_REQ result type indicates that the calling line identity (CLI) has not been supplied and is required for the outgoing side.

BSM_REQ

The BSM_REQ result type indicates that the basic service markings (BSM) have not been supplied and are required for the outgoing side.

FSM_REQ

The FSM_REQ result type indicates that the facility service markings (FSM) have not been supplied and are required for the outgoing side.

A_NUMBER_TYPE

The A_NUMBER_TYPE result type and B_NUMBER_TYPE result type (16) provide the capability

B_NUMBER_TYPE

to change the A-number type or B-number type NOA from that presented in the IAM or Setup message.

The value given as data in the result type (data word 1) will be the Cisco PGW 2200 internal call context value for the NOA relating to either the A-number or B-number.

The result is restricted to its analysis type, that is, the A-number type can only be changed in A-number analysis and the B-number type only in B-number analysis.

OTG_NUMBERING

The OTG_NUMBERING result type returns information regarding the outgoing trunk group side (Terminating Call Control). This information sets the numbering criteria (that is, overlap or en bloc), and the minimum and maximum permitted digits for that side.

- **Numbering type**—0 = Closed numbering (en bloc), 1 = Open numbering (overlap).
- **Minimum and maximum digits**—This refers to the minimum number length and the maximum number length. (In the case of closed numbering, these values should be equal.)

BLACKLIST

The BLACKLIST result type provides the basic ability to screen A-numbers or B-numbers by digit tree analysis. If this result is received, the call is released with the cause value IC_BLACKLIST_CLI_MATCHED (which may be changed by the protocol when sending the release message to the line).

The possible result types (screening criteria) and their application are as follows:

- **Calling Line Identity (CLI)**—Analysis of the A-number reveals that this calling line is restricted. It is supported only in A-digit tree analysis tables.
- **Dialed Address**—Analysis of the B-number reveals that this called line is restricted. It is supported only in B-digit tree analysis tables.



Note The handling of the CPC and NOA types that follow is currently not implemented.

- **Calling Party Category (CPC)**—Analysis of the A-number reveals that this calling line is restricted due to its calling party category. Alternatively, analysis of the B-number reveals that this calling line cannot have access to the dialed B-number.
- **Nature of Address (NOA)**—Analysis of the A-number reveals that this calling line is restricted due to its NOA value.

CLI_NUMBER_LENGTH

The CLI_NUMBER_LENGTH result type basically indicates that the calling line identity has the incorrect number of digits. The Numbering Type field is not processed, but the maximum and minimum digit fields are used to determine if the CLI is too long or too short. If it is, a negative result is returned, the cause is set to IC_BLACKLIST_CLI_LENGTH_INVALID, and the call is released. Note that the protocol may apply a different cause code in the outgoing release message.

ROUTE_PREFERENCE

The ROUTE PREFERENCE result type delivers a result from A-number analysis. The data provided is set according to the Cisco PGW 2200 internal call context values for route preferences and is used during the routing process to bias the selection of trunk groups.

The possible values for route preference are as follows:

- 0—RTE_SEL_DONT_CARE
- 1—RTE_SEL_ATM_ESSENTIAL
- 2—RTE_SEL_ATM_PREFERRED
- 3—RTE_SEL_ATM_EXCLUDED
- 4—RTE_SEL_IP_ESSENTIAL
- 5—RTE_SEL_IP_PREFERRED
- 6—RTE_SEL_IP_EXCLUDED
- 7—RTE_SEL_TDM_ESSENTIAL
- 8—RTE_SEL_TDM_PREFERRED
- 9—RTE_SEL_TDM_EXCLUDED

IN_TRIGGER

The IN_TRIGGER result type delivers a result from B-number analysis, which indicates that further analysis by an SCP is required due to an intelligent network (IN) call. The data provided identifies the service required (such as LNP) and, if necessary, an SCP/STP index for use when the TCAP call is made.

- **Service Type**—This returned value is provisioned in a table within an internal file used to configure the handling of IN requests by the trigger module. The value returned is not processed within analysis, but is retrieved and passed back to the call module for action. This value is an indication of the type of IN service that needs to be invoked to advance this call (LNP, 800, 900, and so on).

The valid Service Type values are as follows:

- 1—xxxxxx LNP (where “xxxxxx” is a user-assigned name)
- 2—Generic LNP
- 3—xxxxxxx 800 (where “xxxxxx” is a user-assigned name)
- 4—ANSI AIN 800 NPA
- 5—ANSI AIN 800 NPA-NXX
- 6—ANSI AIN 800 NPA-NXX-XXXX
- 7—ANSI AIN 800 Termination Information
- 8—ANSI PRE AIN 800
- 9—ANSI PRE AIN 800 Termination Information
- **SCP/STP Index**—Index value used in the trigger module for selection of the SCP for TCAP query

SCREENING

The SCREENING result type delivers a result from either A-number or B-number analysis indicating that a call must be made to the main memory database to carry out call screening on the A-number. Data word1 (screen type) identifies the type of screening that must be requested.

- **ScreenType**—1 = Whitelist, 2 = Blacklist
 - **Whitelist**—If the presented A-number is not found in the database, then the screening is considered to have failed and the call is released.
 - **Blacklist**—If the presented A-number is found in the database, then the screening is considered to have failed and the call is released.
- **Service Name**—This is an integer value used to identify the particular database list of A-numbers that are appropriate to this B-number (that is, when this B-number is called, the A-numbers that must be screened). This value is used as an index to read the Service table, from which a provisioned service name (string) can be obtained. The service name is then passed, as read, into the database when the screening request is made.

Examples of service name string values are “FreePhone,” “800,” and “900.”

DATA_EXCHANGE

The DATA_EXCHANGE result type delivers a result from B-number analysis indicating that there are actions required to move certain data from one call context location to another. For example, if the result indicates a home-based local routing number (LRN), then the called party number and the generic address parameter (GAP) number must be exchanged, and new B-number analysis is invoked. The associated field, “ActionType,” indicates the type of action that is required.

- **ActionType**—Currently the only value is 1—Home LRN

This number is a home LRN, that is, local to this Cisco MGC. This signifies that the Cisco MGC must complete the call to the dialed number contained in the GAP (not the number in the called party number). Consequently the GAP and called party numbers must be exchanged.

WHITELIST

The WHITELIST result type is returned from B-number analysis and signifies by table analysis that this number is valid and the call can proceed. No data words are used and any call processing action is implicit by the presence of the result type.

The absence of the WHITELIST result type invokes the default result type on a Cisco SC2200 signaling controller.

RTRN_START_ANAL

The RTRN_START_ANAL result type performs different actions depending on what stage of the analysis generates it:

- In B-number analysis, this result type causes the carrier code prefix, if any, to be deleted and B-number analysis is restarted with the modified B-number.
- In cause analysis, this result type causes a return to B-number analysis; however, the B-number to be analyzed will include any modifications and any NOA call type modifications.

Result Set Table

A Result Set table is a grouping of result types that can be associated with an A-digit tree, a B-digit tree, pre-analysis, or cause analysis. You can have only one result set for each digit string; however, you can have one or more result types in a result set. Each result set requires a unique name, and each result type within a result set also requires a unique name. However, the result type names do not need to be unique across result sets—it is the combination of result set name and result type name that must be unique. The result set name can be as many as 20 alphanumeric characters in length. The Result Set table is used only for configuration. Table C-6 in Appendix C, “Dial Plan Worksheets,” can be used to plan your Result Set table.

Only one default result set is allowed. Creating a new default result type overwrites the previous default result type. Only one of the following result types is allowed for the default result set at any time:

- **BLACKLIST**—Analysis of the B-number reveals that the called number is on the black list and the call is terminated (released).
- **ROUTE**—Analysis of the B-number reveals that the called number is to be routed elsewhere.
- **CAUSE**—Analysis of the B-number reveals that the called number is to be terminated (released) with a specified cause.

When determining the result types for a result set, enter them in a logical order; for example, from screening to route. You can have as many intermediate analysis point result types in a result set as you want; however, once a result set has an endpoint analysis result type, that is the end of the result set.

Example 1-5 is an example of a Result Set table and the accompanying MML commands. The Result Set table lists the values that are included for each digit string in the table: Result Set Name, Result Name, Result Type, datawords 1 through 4, and the Next Result Name. The dataword values in the Result Set table are determined by the dataword values of the result type, as shown in Table 1-3.

In Example 1-5, the result name for result set1 is for the SCREENING result type. The value for dataword1 is 1, indicating whitelist screening will be performed on the first digit string. The value for dataword2 is also 1, which is an index for the Service Name table from which a service name can be obtained.

Note that two result types (A_NUMBER_TYPE and BLACKLIST) have been connected in Example 1-5 by using the same result set name (set4). When the MML session is run, the last result in a result set has to be created first. If the last result in a result set is not created first, an error is generated because a next result cannot be connected, because that result does not yet exist.

Example 1-5 Result Set Table Example

Result Set Name	Result Name	Result Type ¹	Dataword1	Dataword2	Dataword3	Dataword4	Next Result
set1	result1	SCREENING	1	1			
set2	result1	ANNOUNCEMENT	100	Washington	relist1		
set3	result1	IN_TRIGGER	1	1			
set4	result1	A_NUMBER_TYPE	5				result2
set4	result2	BLACKLIST	1				
set5	result1	BMODDIG	0	1	digmod1		
set6	result1	B_NUMBER_TYPE	3				
set7	result1	INC_NUMBERING	0	4	4		

1. Click the result type to see the result type definition.

MML commands

The following MML commands were used to create the Result Set table in the example above.

```

numan-add:resulttable:custgrpId="t001",name="result1",resultType="SCREENING",
    dw1="1",dw2="Washington",setname="set1"
numan-add:resulttable:custgrpId="t001",name="result1",resultType="ANNOUNCEMENT",
    dw1="100",dw2="1",dw3="rtlist1",setname="set2"
numan-add:resulttable:custgrpId="t001",name="result1",resultType="IN_TRIGGER",
    dw1="1",dw2="1",setname="set3"
numan-add:resulttable:custgrpId="t001",name="result1",resultType="A_NUMBER_TYPE",
    dw1="5",nextResult="result2",setname="set4"
numan-add:resulttable:custgrpId="t001",name="result2",resultType="BLACKLIST",
    dw1="1",setname="set4"
numan-add:resulttable:custgrpId="t001",name="result1",resultType="BMODDIG",
    dw1="1",dw2="1",dw3="digmod1",setname="set5"
numan-add:resulttable:custgrpId="t001",name="result1",resultType="B_NUMBER_TYPE",
    dw1="3",setname="set6"
numan-add:resulttable:custgrpId="t001",name="result1",resultType="INC_NUMBERING",
    dw1="0",dw2="4",dw3="4",setname="set7"

```

Cause Analysis

Cause analysis is performed when a release (REL) message is received, or when a failure of some kind has occurred implying that the call must be released. The cause code value or the combined cause code and location code values from the Cause and Location tables are analyzed to provide a cause code that provokes rerouting of the call to another switch by the preceding switch, or rerouting of the call to an announcement server.

Cause Table

The Cause table lists the cause codes generated when a call is rejected or cleared by the system. The cause for release can be a result type (from either B-number analysis or cause analysis) or a failure (generated during call processing). The cause codes are used as the release message for internal causes.

The two fields in the Cause table are the Location Block and Result Set Name, as shown in Example 1-6.

- The Cause value is used to define the offset into the location block column.
If the value at the specified offset in the location block column is set to 0, no further analysis is performed based on the location.
- The result set name is used to associate a result set with a Cause value.
If a result set name is not configured, then no action is taken.

A location block entry must be configured on the Cause table to have a result set name other than null (0). However, if both the location block and the result set name are set to null, no analysis is performed.

The following MML command was used to set up the Cause table with a CustGrpId of t001, a cause value of 3, a location block value of 1, and a result set name of "set3."

→ **MML command** `numan-add:cause:custgrpId="t001",causevalue=3,locationblock=1,setname="set3"`

Example 1-6 Cause Table Example

Cause Value		
1	2	3
4	5	6
7	8	...

Location Block	Result Set Name
1	set1
1	set2
1	set3
1	set4
1	set5
...	...



Note

The cause and location values used here are the internal values, not those seen in a REL message.

Refer to Appendix B, "Cause and Location Codes," for a list of the cause codes for the protocol variants. Table C-7 in Appendix C, "Dial Plan Worksheets," can be used to plan the Cause table.

Location Table

The Location table is used to identify an associated result set, as shown in Example 1-7. This table is accessed from the Cause table through the *locationblock* value. The *locationblock* value refers to a block of 16 entries (0 through 15) in the Location table. There can be multiple blocks in a Location table. The *blockvalue* specifies an offset into the specified location block. An action is associated with a specific *blockvalue* by associating the *blockvalue* with the result set name (*setname*) at the specified offset in the specified location block.

The following MML command was used to set up the Location table with a CustGrpID of t001, a locationblock of 1, a block value of 8, and a result set name of “set8.”

→ **MML command** `numan_add:location:custgrpID="t001",locationblock=1,blockvalue=8,setname="set8"`

Example 1-7 Location Table Example

Block Value			
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Result Set Name
set1
set2
set3
set4
set5
set6
set7
set8
set9
set10
set11
set12
set13
set14
set15
set16

Refer to Appendix B, “Cause and Location Codes,” for a list of the location codes for the protocol variants. Table C-8 in Appendix C, “Dial Plan Worksheets,” can be used to plan the Location table.

Routing Analysis

Routing analysis is started when pre-analysis, B-number analysis, or Cause analysis returns a route list name, which is used to access the Route List index as illustrated in Figure 1-8. The output from the Route List index is used to access the Route List table, from which the search for routes and trunk groups is started.

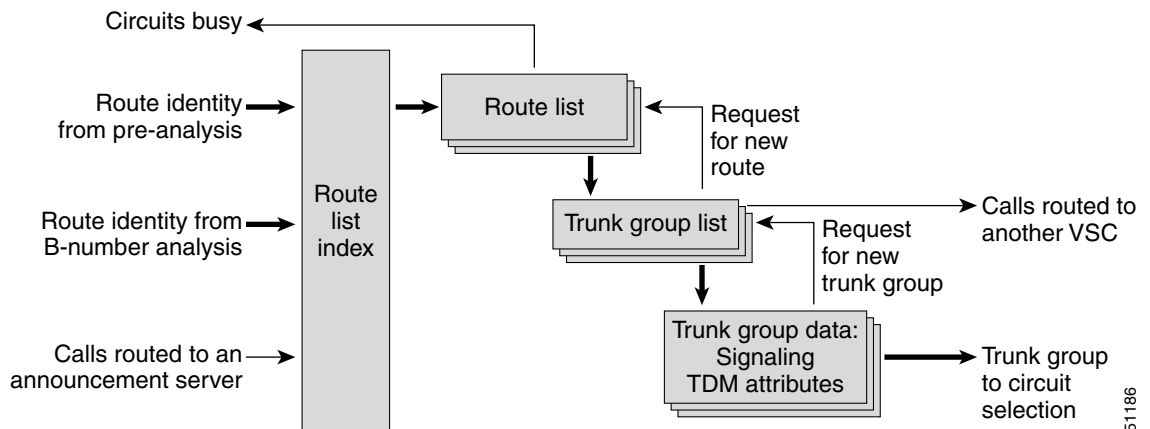
Route analysis and selection is based entirely on the trunk group data provisioned in the routing plan. Route preferences or bearer preferences present in the incoming IAM or Setup message are read and applied during the route selection process.


Note

For detailed information on provisioning trunks and trunk groups, routing analysis, and setting up the routing plan, refer to the *Cisco Media Gateway Controller Software Release 7 Provisioning Guide*.

The full B-number routing analysis capability can be applied to any trunk group the Cisco MGC handles (SS7 or ISDN PRI), a case in point being those telephony solutions where the Cisco PGW 2200 is functioning in an end-office capacity and switching to multiple PRI terminations. The ability to select between these multiple PRI terminations on full B-number analysis is provided, but with no requirement for a full B-number decode in the digit trees.

Figure 1-8 Routing Analysis and Selection



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Note

Although routing analysis and route selection is part of the call routing process, it is not used by the Cisco SC2200 Signaling Controller. In solutions that employ the Cisco SC2200, all routes are static, or “nailed-up,” and the outgoing trunk is based on the trunk used by the incoming call.



Preparing for Dial Plan Provisioning

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.

- 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 Guide¹*
 - *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*.
-

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"> Setting up a single configuration or few configurations on individual machines Modifying an existing configuration 	Some experience required; easy to use	<ul style="list-style-type: none"> Creating batch files to configure many Cisco MGC servers or retrieve measurements Modifying configurations Scaling large configurations Troubleshooting

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:bdigtrees:custgrpid="t001",callside="originating",digitstring="703484",setname="set1"
numan-add:bdigtrees:custgrpid="t001",callside="originating",digitstring="301555",setname="set2"
numan-add:bdigtrees:custgrpid="t001",callside="originating",digitstring="301684",setname="set3"
numan-add:bdigtrees: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)*

Parameter Name	Description
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.



Provisioning Dial Plans with CMM

This chapter provides information and procedures for provisioning dial plans for Cisco Media Gateway Controller Software Release 7.4 using the Cisco Media Gateway Controller Manager (CMM).

The topics addressed in this chapter include:

- CMM Overview, page 3-2
- Provisioning the Dial Plan, page 3-7



Note

The dial plan provisioning procedures in this chapter are applicable only to Cisco Media Gateway Controller (MGC) software Release 7.4(x).

The CMM is an X Window System graphical user interface (GUI) that accesses Cisco Media Gateway Controller (MGC) information using the Simple Network Management Protocol (SNMP).

You can use the CMM to perform a variety of provisioning tasks, including:

- Setting up your system
- Provisioning component properties
- Adding or deleting system components
- Setting up links and signaling services
- Setting up dial plans and routing plans

The CMM can be used alone or with MML commands to provision dial plans for your system. For more information on using MML commands, refer to Chapter 5, “Provisioning Dial Plans with MML.”

You should have the information described in Chapter 2, “Preparing for Dial Plan Provisioning,” before beginning your dial plan provisioning session.

When provisioning dial plans, you must first ensure that all system components have been provisioned as described in the *Cisco Media Gateway Controller Software Release 7 Provisioning Guide*.

CMM Overview

The CMM provides a GUI that allows you to create dial plan provisioning sessions. The CMM saves your current provisioning session each time you click a **set** command. After you finish the provisioning session and choose **commit** or **deploy**, the CMM saves your dial plan as the active dial plan. After you have created the active dial plan, you cannot modify it. To make changes, you must save it with another name and commit or deploy the new provisioning session to make it active.

The software allows only one active provisioning session. Therefore, you cannot have an active MML provisioning session open at the same time you are using the CMM. Other users can access the CMM in read-only mode from a different host; however, the Create, Modify, Set, and Delete buttons are not enabled in read-only mode.



Note

Only one active TCM provisioning session is permitted to run on a host machine, and read-only mode is not permitted on that machine. You must use a different host machine to gain read-only access. Typically, the Cisco MGC software resides on a different host than the CMM provisioning tool, but they can both reside on the same host.

Read-only mode permits viewing of the current active provisioning data stored in the `/opt/CiscoMGC/etc` directory on the Cisco MGC host. Read-only users cannot access any other provisioning sessions, regardless of what is entered in the Source Version Name or Destination Version Name field. In read-only mode, information in the View, Traffic, and Number Analysis tabs can be edited and used to create files on the local machine. You can also export customer-specific files, such as dial plans, when in read-only mode.

The number of dial plans you can store might be limited by available disk space. Consider deleting old or unwanted dial plans, or saving them to another machine if you do not have sufficient disk space.



Note

If you change the default directory value, you must use the new value throughout this document where the `/opt/CiscoMGC/etc` directory is referred to.

Starting the CMM

To start the CMM, complete the following steps:

Step 1 Log in as a member of the `mgcuser` group.

You must be logged in to the CMM server or access it from a machine with X Window System capability. See the *Cisco Media Gateway Controller Software Release 7 Installation and Configuration Guide* for more information on setting up user privileges and access rights.

Step 2 In the terminal window, enter:

```
cd /opt/CMM/bin
./start.sh cmm IPAddr/HostName SourceVersionName DestVersionName
```

The system opens the X Window System interface, and the login window is displayed (Figure 3-1).



Tip

Depending on the X Window System software you are using when entering data in the TCM, you might need to press the **Shift** key when using the **Backspace** key.

**Timesaver**

The system automatically enters the values in the login window if you type the IP Address (or Host Name) of the Cisco MGC host, Source Version Name, and Destination Version Name after the `./start.sh cmm` command as shown above. If you prefer, you can type them into the login window.

Figure 3-1 Login Window

**Note**

The terminal window in which you originally started the CMM remains open and, due to software limitations, extraneous error messages can appear. You can safely ignore these messages.

Step 3 In the IP Address/Host Name field, enter the host name or the IP address of the Cisco MGC host.

Step 4 Accept the default values (Public) in the Read and Write Community Name fields.

Step 5 In the Source Version Name field, enter one of the following:

- **new**—Creates a new configuration.

If you are creating an entirely new dial plan, you must create a new configuration.

- **active**—Retrieves the active configuration for changing.

You can use information in the active configuration as the basis for a new configuration; however, you must enter a new destination version name. You cannot overwrite the active configuration.

- **SourceVersionName**—If you enter the name of an existing, inactive configuration, the system uses that configuration as a basis for a new configuration.

The name can be as many as 250 alphanumeric characters and must start with a letter or number.

To modify the information in an existing, inactive configuration, use the same name for both the source and destination version names. If the destination version name you specify exists, but is inactive, it can be overwritten and no error messages appear.

Step 6 In the Destination Version Name field, enter the name of a new version you want to create.

The name can be as many as 250 alphanumeric characters, including hyphens or underscores; however, you cannot use the labels “active” or “new” in the Destination Version Name field.

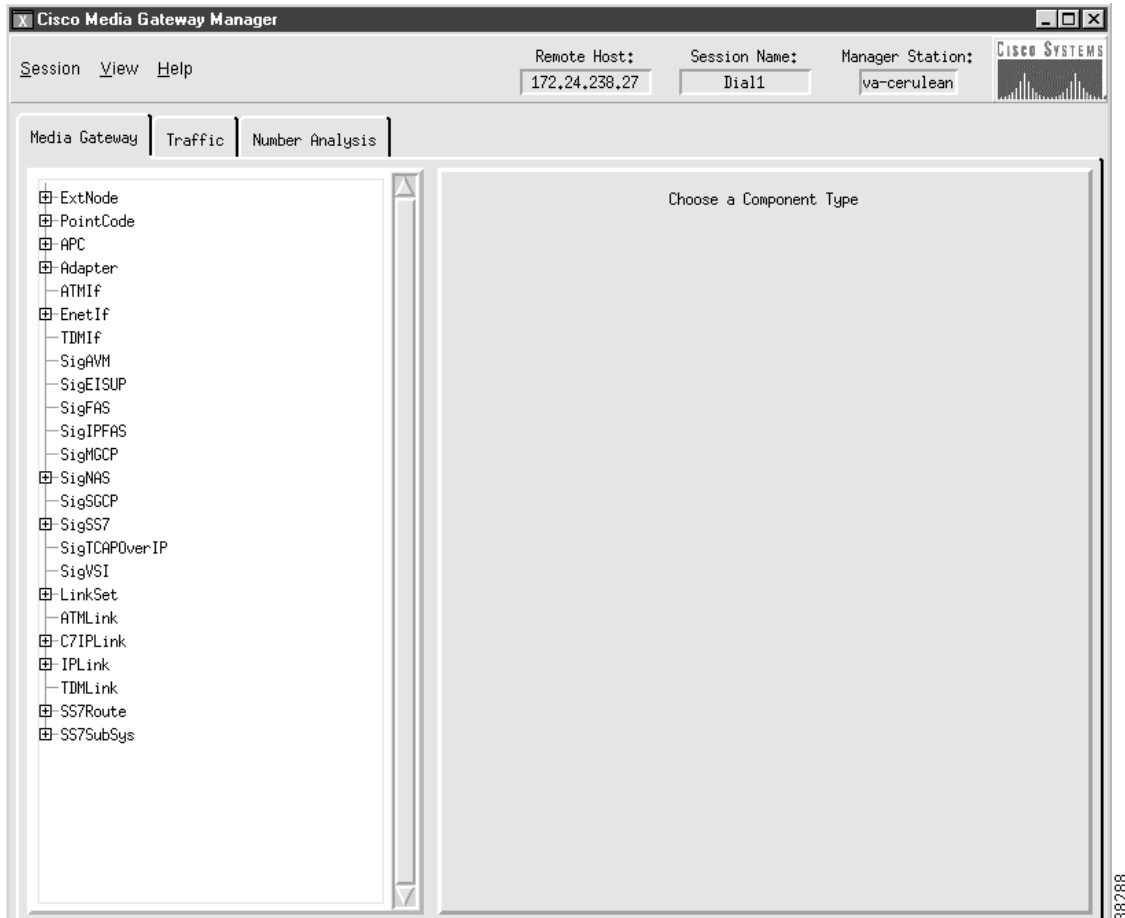
**Caution**

Do not name the destination directory “active.” The name “active” has a special meaning in the Cisco MGC software. If you use this name as the destination directory, you cannot access the configuration in later provisioning sessions.

If the destination directory you specify already exists, an error message is displayed. The Cisco MGC software does not allow you to overwrite an existing configuration unless you previously specified that configuration as the source version and it was inactive.

Step 7 Click **Connect** to start the provisioning session. The CMM main window is displayed (Figure 3-2).

Figure 3-2 Main Window



Note

If you are working on a small window, all of the buttons may not be visible on your screen. Adjust the screen resolution or the font size until you can see all the buttons.

The CMM main window displays two panes. The left pane displays a list of components that you can select. To expand the component list, click the plus sign (+) next to the component name in the left pane. To select a component, click the component name. The right pane then displays fields in which you can enter data for the selected component.

The bottom left portion of the CMM main window provides status messages when you perform an action. For example, after you start the CMM the message “Cisco Media Gateway Controller Manager started” appears. After you click the **Create** button when creating an external node, the message “extnode set successful” appears.

Navigating the CMM

This section describes the procedures to use when navigating the CMM.

Tabs

The CMM main window provides tabs to navigate through the system. You click on these tabs to add or change network components. The top of the CMM main window contains the following tabs:

- Media Gateway—Used to add Cisco MGC components and provision component properties
- Traffic—Used to create customer-specific files, including trunk groups, trunks, and routing
- Number Analysis—Used to provision dial plans

Information Boxes

The top of the CMM main window also contains the following information boxes:

- Remote Host—The IP address of the machine that contains the active provisioning session
- Session Name—The name of the provisioning session that you entered in Step 6 above
- Manager Station—The IP address or host name of the CMM server

Menu Bar

The CMM also provides a menu bar whose selections remain constant throughout the provisioning session; however, the menu choices depend on whether you are in read-only mode or read-write mode. The menu bar contains the following options: Session, View, and Help

Session Menu

The Session menu contains the choices listed in Table 3-1. The choices that are displayed in the Session menu depend on whether you are in read-only mode or read-write mode.

Table 3-1 Session Menu Choices

Menu Choices	Description	Mode
Sync	Copies all dial plans on the active ¹ host to the standby host if you have a continuous-service configuration.	Read-only
Stop	Ends the current session.	Read-write
Deploy	Ends the session and saves the current dial plan as the active dial plan. Copies the dial plan to the standby host if you have a continuous-service configuration.	Read-write
Commit	Ends the session and saves the current dial plan as the active dial plan. In a continuous-service configuration, this is regardless of whether it is deployed on the active host or the standby host.	Read-write
Exit	Stops any open provisioning session and exits the TCM.	Read-only Read-write

1. The active Cisco MGC in a continuous-service configuration is the machine that is currently processing calls. Do not confuse the active machine with the active provisioning session, which is located on the TCM host machine.

To activate the provisioning session:

- If you have a continuous-service configuration with two Cisco MGC hosts, choose **Deploy** from the Session menu. The dial plan is saved on the active host and copied to the standby host. You must restart the standby server after reconfiguration to apply changes.
- If you have a simplex configuration with one Cisco MGC host, choose **Commit** from the Session menu.
- If you have a continuous-service configuration and you are in read-only mode, choose **Sync** from the Session menu to copy the dial plan from the active to the standby host.

**Note**

The CMM saves your dial plan each time you click the Create, Modify, Set, or Delete button. You can exit and return to the CMM later to modify this dial plan before you commit or deploy it.

**Note**

In a continuous-service configuration, always deploy the new dial plan onto the active MGC host.

View Menu

The View menu contains the View Next option, which allows you to choose the number of data rows displayed in the CMM list boxes. For example, if you enter 10, the list boxes in the CMM display data 10 rows at a time. You can display a range of 1 through 999.

Help Menu

The Help menu currently contains only software copyright and version information.

**Note**

In a continuous-service configuration, the XECfgParm.dat file on each machine must be configured properly. If you experience problems, verify the XECfgParm.dat files on both machines using the procedures in Chapter 2, “Installing the Cisco Media Gateway Controller Software,” in the *Cisco Media Gateway Controller Software Release 7 Installation and Configuration Guide*.

Exiting the CMM

You can exit the CMM at any time by performing one of these actions:

- From the Session menu, choose **Exit**. Click **Yes** at the prompt.
- From any tab, click **Exit**. Click **Yes** at the prompt.
- Click the close box in the upper right corner of the CMM main window.

**Note**

The CMM main window closes without you receiving any notification.

Provisioning the Dial Plan

The MGC enables you to create a dial plan to perform number analysis on both the A-number (calling number) and B-number (called number). For more information on creating a dial plan, refer to the “Creating a Dial Plan” section on page 2-5.

This section provides procedures for entering dial plan information into the CMM. You should already have your dial plan information recorded before beginning any data entry in the CMM.

This section contains the following subsections:

- Creating the Dial Plan File, page 3-7
- Provisioning Result Sets, page 3-8
- Provisioning Pre-Analysis, page 3-11
- Provisioning Digit Trees, page 3-15
- Provisioning Digit Modification, page 3-19
- Provisioning the Service Name, page 3-22
- Provisioning Location, page 3-24
- Provisioning Cause Codes, page 3-26
- Processing the Number Analysis File, page 3-27
- Provisioning Whitelist and Blacklist Screening, page 3-28

Creating the Dial Plan File

To enter your dial plan information into the CMM, you must first create the dial plan file.

To create a dial plan file, complete the following steps:

Step 1 Click the **Number Analysis** tab.

Step 2 Click **Number Analysis**.

Step 3 Enter the Customer Group ID.

The Customer Group ID is a 4-character alphanumeric name beginning with a letter.



Caution

Customer Group IDs should be created during the initial installation, configuration, and provisioning of your system. Each dial plan requires a Customer Group ID. Customer Group IDs must be assigned to an SS7 sigPath and the sigPath has to be in an out of service (OOS) status when the Customer Group ID assignment is made.

We suggest that you create a sufficiently large number of Customer Group IDs during the initial provisioning of your system to accommodate your anticipated needs, then assign Customer Group IDs to your users as they are needed.

Provisioning new Customer Group IDs for an operational system means that you have to take the SS7 sigPath OOS, which will result in a loss of service for any calls associated with that SS7 sigPath.

Step 4 Click **Create New**.

The Dial Plan component appears under the Customer Group ID you created in Step 3.

Step 5 Click the plus sign (+) next to the Dial Plan component.

The following dial plan components are displayed:

- Results
- Number_Plan_Indicator
- Nature_of_Address
- A_Digit_Tree (originating or terminating)
- B_Digit_Tree (originating or terminating)
- Digit_Modification
- Service_Name
- Location
- Cause
- NumAnFile

Depending on your dial plan, you can add information for only the types of analysis you want to perform.

For example, for A-number or B-number analysis, first enter the results you want to achieve in the Results window. Then enter the digits you want to analyze in either the A-digit tree or B-digit tree. The Cisco MGC analyzes the number one digit at a time and performs the results that you specify.

Provisioning Result Sets

A result set is a grouping of results that can be connected to an A-digit tree, a B-digit tree, pre-analysis, or cause analysis. Each result set consists of a grouping of one or more results. Each result set requires a unique name, and each result within a result set requires a unique name. However, the result names do not need to be unique across result sets. It is the combination of the result set name and the result name that must be unique.

You can have only one result set for each digit string; however, you can have multiple results in a result set. When determining the result types for a result set, enter them in logical order—for example, from screening to route. Once a result set has a result type with an endpoint analysis point, that is the end of the result set; however, you can have as many intermediate analysis point result types in a result set as you want. Refer to Table 2-4 on page 2-9 for a list of the analysis point result types.



Note

The result set table is used only to group result types for provisioning.

For the dial plan to perform an action on a called or calling number, you must add a result for the action you want to occur. You must first create a result set. Your result set can contain one or more results (result types) that you want to occur in the sequence that you want them to occur.

Adding a Result Set

To add a new result set, complete the following steps:

-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**.
- Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 5** Under the Dial Plan component, click **Results**.
The **Result Type Table** window is displayed.
- Step 6** Click **New Result Set**.
- Step 7** Enter the new result set name.
The result set name can be as many as 20 alphanumeric characters.
- Step 8** Click **Set**.
The **Result Set** window is displayed.
-

Adding Results to a Result Set

To add result types to your new result set, continue with the following steps:

-
- Step 1** Under the Dial Plan component, click **Results**.
The **Result Type Table** window is displayed.
- Step 2** Click **Add Result Type** to choose a result to add to the result set.
You can choose any result type from those listed:
- DIGIT_REQ
 - ROUTE
 - INC_NUMBERING
 - MODDIG_B
 - MODDIG_A
 - CAUSE
 - ANNOUNCEMENT
 - CPC_REQ
 - CLI_REQ
 - BSM_REQ
 - FSM_REQ
 - A_NUMBER_TYPE
 - B_NUMBER_TYPE
 - OTG_NUMBERING
 - BLACKLIST

- CLI_NBR_LENGTH
- ROUTE_PREF
- IN_TRIGGER
- SCREENING
- DATA_EXCHANGE

Step 3 Enter the result type and any desired values in the displayed window, then click **Set**.

For detailed information on any result type, refer to Table 1-3 on page 1-18 and the “Result Type Definitions” section on page 1-19.



Note Remember that the “end point” result types (CAUSE, ANNOUNCEMENT, WHITELIST, BLACKLIST, and CG_PRES_IND) must be the last result types in any result set.

Modifying a Result in a Result Set

To modify a result type entry in a result set, complete the following steps:

Step 1 Choose the result type from the list in the **Result Set** window and click **Modify Result**.

Step 2 Make desired changes to the fields in the **Result Set** window and click **Set**.

A dialog box appears requesting verification.

Step 3 Click **Yes** to modify the result.

Deleting a Result from a Result Set

To delete a result type entry from a result set, complete the following steps:

Step 1 Choose the result type from the list in the **Result Set** window and click **Delete Result**.

A dialog box appears requesting verification.

Step 2 Click **Yes** to delete the result.

Provisioning Pre-Analysis

Pre-analysis is an initial analysis request you can make on a digit string after receiving the IAM or Setup message. Pre-analysis also enables you to perform early analysis on the called number (B-number).

Pre-analysis can be performed on the following results:

- ROUTE
- INC_NUMBERING
- BMODDIG
- B_NUMBER_TYPE

Using the incoming values for the Nature of Address (NOA) and Numbering Plan Indicator (NPI), you can perform pre-analysis on the first digit in the B-digit string before any formal analysis is performed.

**Note**

The result is processed from either the NOA table or the NPI table.

Provisioning the NPI Table

Even though NOA pre-analysis is performed first, the NPI table must be provisioned first if the NOA table refers to an NPI block.

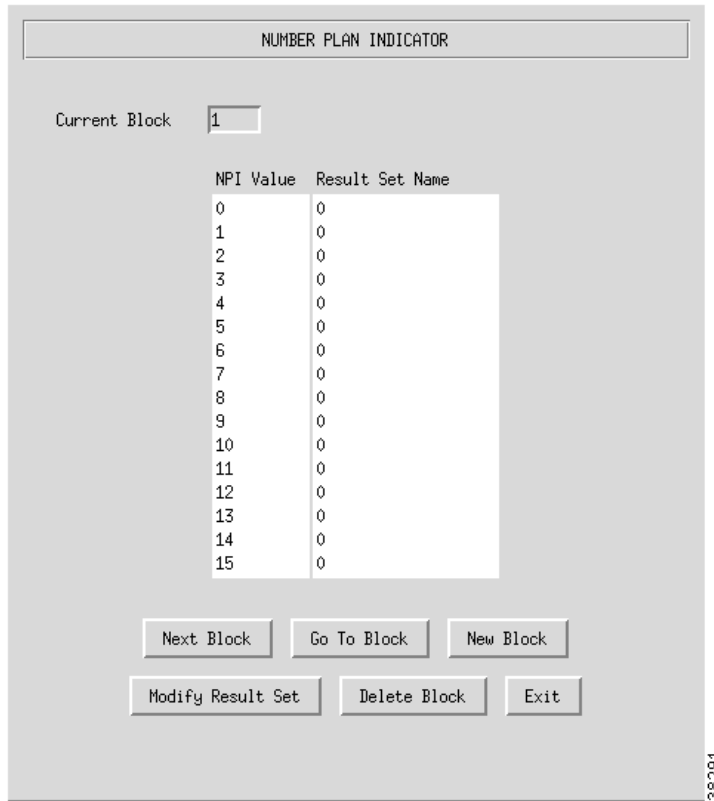
To perform NPI table provisioning, complete the following steps:

-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
 - Step 2** Click **Number Analysis**.
 - Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
 - Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
 - Step 5** Under the Dial Plan component, click **Number_Plan_Indicator**.
The **Numbering Plan Indicator** window is displayed (Figure 3-3 on the next page).
 - Step 6** Click **New Block** to add another block to the NPI table.
There are 16 values (0 through 15) displayed for each NPI block added to the NPI table.
 - Step 7** Enter a value for the number of new blocks to add to the NPI table and click **Set**.
The **Numbering Plan Indicator** window is redisplayed with the specified number of blocks added to the NPI table.

**Tip**

To keep the response time at a minimum, do not add any more NPI blocks than are necessary.

Figure 3-3 Numbering Plan Indicator Window



Modifying the NPI Table

To modify a specific NPI block in the NPI table, complete the following steps:

-
- Step 1** In the **Numbering Plan Indicator** window, enter the number of the NPI block you want to modify and click **Go To Block**. (Alternatively, you can also click **Next Block** to scan through the NPI blocks.)
The NPI block you specified should be displayed in the **Numbering Plan Indicator** window.
- Step 2** In the **Numbering Plan Indicator** window, click **Modify Result Set**.
- Step 3** Make the desired changes to the NPI block fields and click **Set**.
A dialog box appears requesting verification.
- Step 4** Click **Yes** to modify the selected NPI block.
The **Numbering Plan Indicator** window is redisplayed with the selected NPI block changed.
-

Deleting an NPI Block

To delete a specific NPI block from the NPI table, complete the following steps:

-
- Step 1** In the **Numbering Plan Indicator** window, enter the number of the NPI block you want to delete and click **Go To Block**. (Alternatively, you can also click **Next Block** to scan through the NPI blocks.)
The NPI block you specified should be displayed in the **Numbering Plan Indicator** window.

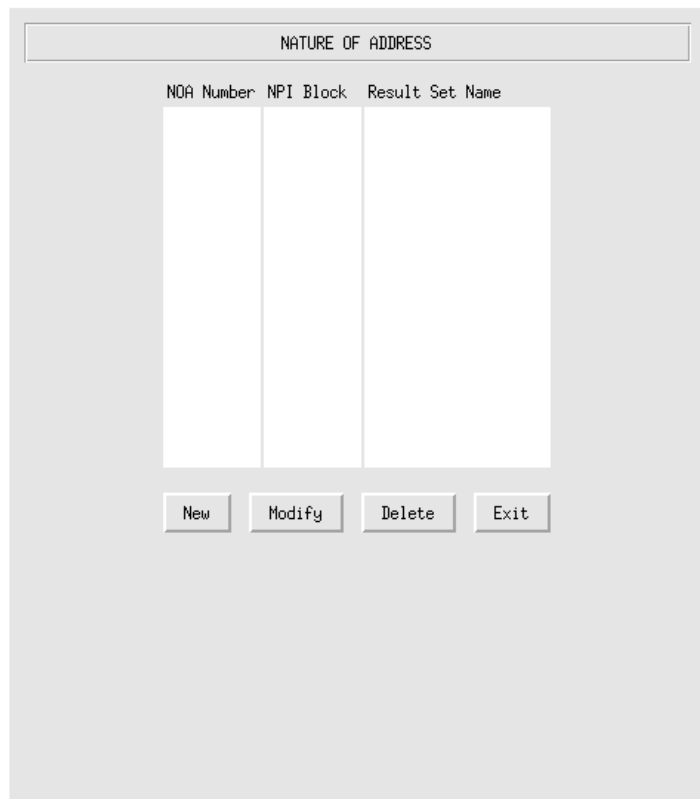
- Step 2** In the **Numbering Plan Indicator** window, click **Delete Block**.
A dialog box appears requesting verification.
- Step 3** Click **Yes** to delete the selected NPI block.
The **Numbering Plan Indicator** window is redisplayed with the selected NPI block deleted.
-

Provisioning the NOA Table

To perform NOA table provisioning, complete the following steps:

- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**.
- Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 5** Under the Dial Plan component, click **Nature_of_Address**.
The **Nature of Address** window is displayed (Figure 3-4).

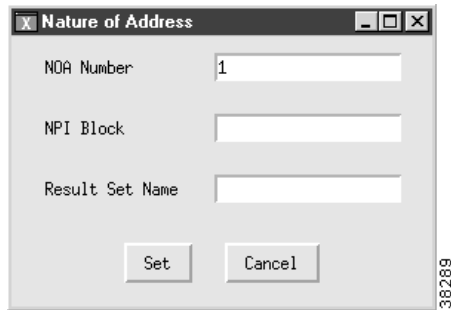
Figure 3-4 Nature of Address Window



Step 6 In the **Nature of Address** window, click **New**.

The new **Nature of Address** window is displayed (Figure 3-5).
The NOA number appears in the top block.

Figure 3-5 *New Nature of Address Window*



Step 7 Enter the NPI Block value and the Result Set Name and click **Set**.

The **Nature of Address** window is redisplayed with the data you just entered.



Note The NPI Block or the Result Set Name block must be filled in or an error message appears.

Modifying a NOA Table

To modify a specific NOA block in an NOA table, complete the following steps:

Step 1 Select the NOA block you want to modify in the **Nature of Address** window and click **Modify**.

Step 2 Make the desired changes to the fields in the NOA window and click **Set**.

A dialog box appears requesting verification.

Step 3 Click **Yes** to modify the selected NOA block.

The **Nature of Address** window is redisplayed with the selected NOA block changed.

Deleting a NOA Block

To delete a specific NOA block in an NOA table, complete the following steps:

Step 1 Select the NOA block you want to delete in the **Nature of Address** window and click **Delete**.

A dialog box appears requesting verification.

Step 2 Click **Yes** to delete the selected NOA block.

The **Nature of Address** window is redisplayed with the selected NOA block deleted.

Provisioning Digit Trees

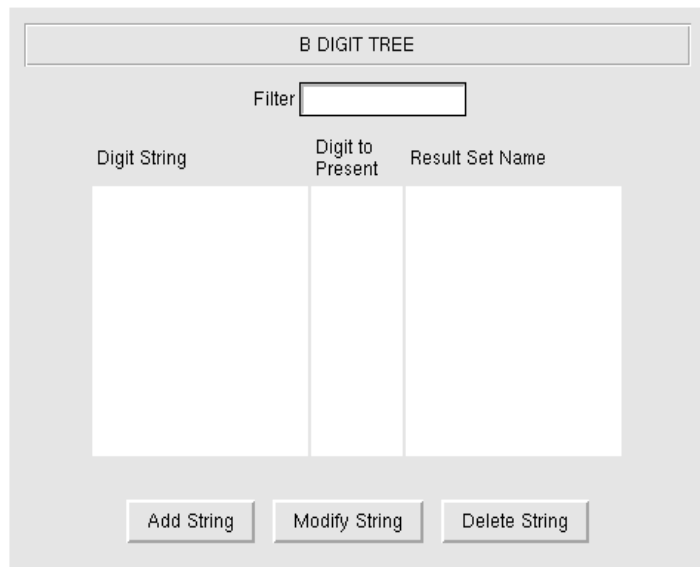
This section describes the procedures for provisioning the A-digit tree and B-digit tree.

Provisioning the B_Digit_Tree (Originating)

To provision the B-digit tree, complete the following steps:

-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**.
- Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 5** Under the Dial Plan component, click **B_Digit_Tree**.
Two branches, **Originating** and **Terminating**, are displayed.
- Step 6** Click **Originating**.
A warning message appears indicating that no filter is set and all configured digit strings are displayed.
- Step 7** Enter a digit string in the filter box or click **OK**.
- Entering a digit string in the filter box locates that string in the B Digit Tree window.
 - Clicking **OK** displays all the digit strings in the B Digit Tree window (Figure 3-6).

Figure 3-6 B-Digit Tree Window



- Step 8** In the B Digit Tree window, click **Add String**.
This displays the Add String box.

- Step 9** In the Add String box, enter the digit string, the Digits to Present value, and the Result Set Name, then click **Set**.
The B Digit Tree window is redisplayed with the information entered in the Add String box added.
- Step 10** Repeat Step 8 and Step 9 for all of the digit strings in your B-digit, originating dial plan.
-

Modifying a Digit String

To modify a digit string, complete the following steps:

- Step 1** Choose the digit string in the B Digit Tree window and click **Modify String**.
This displays the Modify String box.
- Step 2** Make the desired changes to the digit string, the Digits to Present value, and the Result Set Name, then click **Set**.
A dialog box appears requesting verification.
- Step 3** Click **Yes** to modify the selected digit string.
The B Digit Tree window is redisplayed with the information entered in the Modify String box changed.



Note This procedure is the same for all of the other digit trees, with the appropriate name changes.

Deleting a Digit String

To delete a digit string, complete the following steps:

- Step 1** Choose the digit string in the B Digit Tree window and click **Delete**.
A dialog box appears requesting verification.
- Step 2** Click **Yes** to delete the selected digit string.
The B Digit Tree window is redisplayed with the selected digit string deleted.



Note This procedure is the same for all of the other digit trees, with the appropriate name changes.

Provisioning the B_Digit_Tree (Terminating)

To provision the B-digit tree, complete the following steps:

-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**.
- Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 5** Under the Dial Plan component, click **B_Digit_Tree**.
Two branches, **Originating** and **Terminating**, are displayed.
- Step 6** Click **Terminating**.
A warning message appears indicating that no filter is set and all configured digit strings are displayed.
- Step 7** Enter a digit string in the filter box or click **OK**.
 - Entering a digit string in the filter box locates that string in the B Digit Tree window.
 - Clicking **OK** displays all the digit strings in the B Digit Tree window.
- Step 8** In the B Digit Tree window, click **Add String**.
This displays the Add String box.
- Step 9** Enter the digit string in the Add String box, the Digits to Present value, and the Result Set Name, then click **Set**.
The B Digit Tree window is redisplayed with the information entered in the Add String box added.
- Step 10** Repeat Step 8 and Step 9 for all of the digit strings in your B-digit, terminating dial plan.
-

Provisioning the A_Digit_Tree (Originating)

To provision the A-digit tree, complete the following steps:

-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**.
- Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 5** Under the Dial Plan component, click **A_Digit_Tree**.
Two branches, **Originating** and **Terminating**, are displayed.
- Step 6** Click **Originating**.
A warning message appears indicating that no filter is set and all configured digit strings are displayed.

- Step 7** Enter a digit string in the filter box or click **OK**.
- Entering a digit string in the filter box locates that string in the A Digit Tree window.
 - Clicking **OK** displays all the digit strings in the A Digit Tree window.
- Step 8** In the A Digit Tree window, click **Add String**.
This displays the Add String box.
- Step 9** Enter the digit string in the Add String box, the Digits to Present value, and the Result Set Name, then click **Set**.
The A Digit Tree window is redisplayed with the information entered in the Add String box added.
- Step 10** Repeat Step 8 and Step 9 for all of the digit strings in your A-digit, originating dial plan.
-

Provisioning the A_Digit_Tree (Terminating)

To provision the A-digit tree, complete the following steps:

-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**.
- Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 5** Under the Dial Plan component, click **A_Digit_Tree**.
Two branches, **Originating** and **Terminating**, are displayed.
- Step 6** Click **Terminating**.
A warning message appears indicating that no filter is set and all configured digit strings are displayed.
- Step 7** Enter a digit string in the filter box or click **OK**.
- Entering a digit string in the filter box locates that string in the A Digit Tree window.
 - Clicking **OK** displays all the digit strings on the A Digit Tree window.
- Step 8** In the A Digit Tree window, click **Add String**.
This displays the Add String box.
- Step 9** Enter the digit string in the Add String box, the Digits to Present value, and the Result Set Name, then click **Set**.
The A Digit Tree window is redisplayed with the information entered in the Add String box added.
- Step 10** Repeat Step 8 and Step 9 for all of the digit strings in your A-digit, terminating dial plan.
-

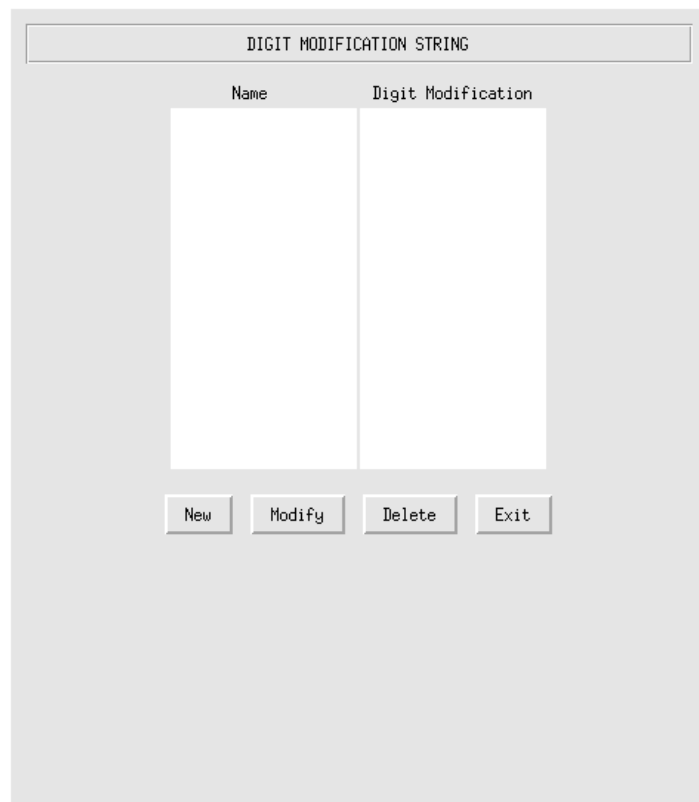
Provisioning Digit Modification

B-digit modification (BMODDIG) pre-analysis allows you to remove one or more digits from anywhere in the digit string and replace the removed digits with one or more digits.

To add a result set that performs digit modification, complete the following steps:

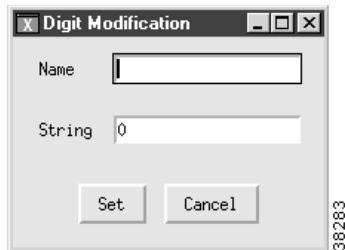
-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
 - Step 2** Click **Number Analysis**.
 - Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
 - Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
 - Step 5** Under the Dial Plan component, click **Digit_Modification**.
The Digit Modification String window is displayed (Figure 3-7).

Figure 3-7 Digit Modification String Window



- Step 6** In the Digit Modification String window, click **New**.
The Digit Modification window is displayed (Figure 3-8).

Figure 3-8 Digit Modification Window



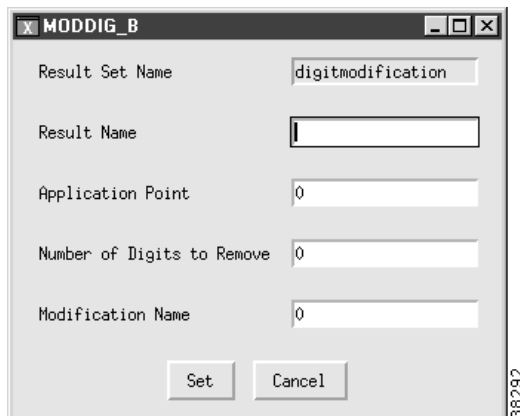
- Step 7** Enter the digit modification name in the Name box, enter a value in the String box, and click **Set**.
The Digit Modification String window is redisplayed with the name and value from the Digit Modification window added.



Note The string value indicates the number (or numbers) inserted at the application point of the MODDIG_B window associated with the named result set.

- Step 8** Under the Dial Plan component, click **Results**.
The Result Type table window appears.
- Step 9** Click **New Result Set**.
- Step 10** Enter the new result set name and click **Set**.
The Result Set window is redisplayed with the new result set name added.
- Step 11** Click **Add Result Type** and click **MODDIG_B** from the list of results.
The MODDIG_B window, with the Result Set Name added, is displayed (Figure 3-9).

Figure 3-9 MODDIG_B Window



- Step 12** Enter a Result Name, Application Point (where the digit modification is to start), Number of Digits to Remove, and a Modification Name, then click **Set**.
The Result Set window is redisplayed with the MODDIG_B information added.



Note The Modification Name entered is case sensitive and must match the name entered in Step 3 in the Digit Modification table.

Step 13 Click **Add Result Type** and click **ROUTE** from the list of results.
The Route window appears with the Result Set Name already added.

Step 14 Enter a Result Name, enter a Route Group Name, and click **Set**.
The Result Set window is redisplayed with another line with the ROUTE information added.



Note The Route Group Name must have been defined in the Routing file. If it has not been defined, an error message appears.

Modifying a Digit Modification String

To modify a Digit Modification string, complete the following steps:

-
- Step 1** Choose the digit modification name in the Digit Modification String window and click **Modify**.
The MODDIG_B window is displayed
- Step 2** Make the desired changes to the MODDIG_B window fields, then click **Set**.
A dialog box appears requesting verification.
- Step 3** Click **Yes** to modify the selected digit modification name.
The Digit Modification String window is redisplayed with the changes to the selected digit modification string.
-

Deleting a Digit Modification String

To delete a Digit Modification string, complete the following steps:

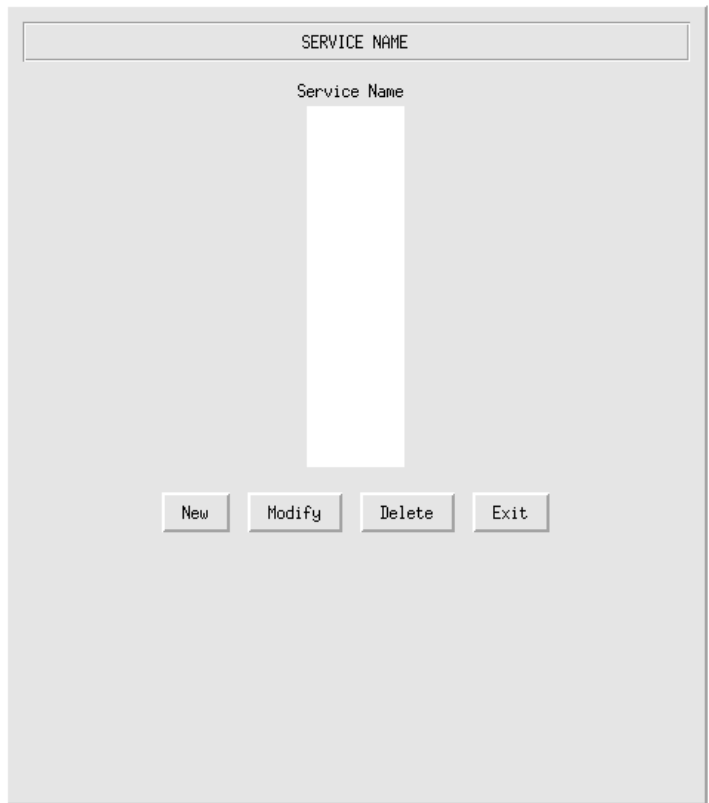
-
- Step 1** Choose the digit modification name in the Digit Modification String window and click **Delete**.
A dialog box appears requesting verification.
- Step 2** Click **Yes** to delete the selected digit modification name.
The Digit Modification String window is redisplayed with the selected digit modification string deleted.
-

Provisioning the Service Name

To provision a Service Name, complete the following steps:

- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**.
- Step 3** Select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 4** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 5** Under the Dial Plan component, select **Service_Name**.
The Service Name window is displayed (Figure 3-10).

Figure 3-10 Service Name Window



- Step 6** In the Service Name window, click **New**.
This displays the New Service Name window (Figure 3-11).

Figure 3-11 New Service Name Window



- Step 7** Enter a Service Name and click **Set**.
The Service Name window is redisplayed with the new Service Name listed in the Service Name column.
- Step 8** Repeat Step 6 and Step 7 for each of the service names required to support your dial plan.
-

Modifying a Service Name

To modify a service name, complete the following steps:

- Step 1** Choose the service name you want to modify in the Service Name window, then click **Modify**.
This displays the Modify Service Name window.
- Step 2** Make the desired changes to the service name, then click **Set**.
A dialog box appears requesting verification.
- Step 3** Click **Yes** to modify the selected service name.
The Service Name window is redisplayed with the selected service name changed.
-

Deleting a Service Name

To delete a service name, complete the following steps:

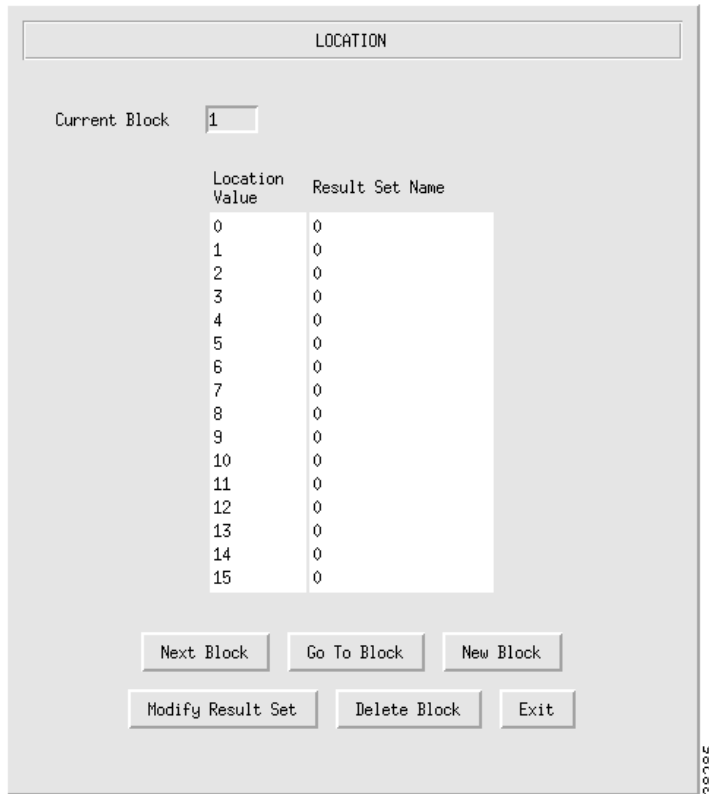
- Step 1** Choose the service name you want to delete in the Service Name window, then click **Delete**.
A dialog box appears requesting verification.
- Step 2** Click **Yes** to delete the selected service name.
The Service Name window is redisplayed with the selected service name deleted.
-

Provisioning Location

To provision the Location table, complete the following steps:

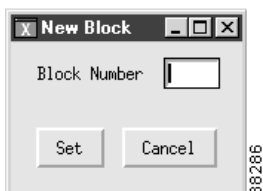
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**, then select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 3** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 4** Under the Dial Plan component, click **Location**.
The Location window is displayed (Figure 3-12).

Figure 3-12 Location Window



- Step 5** In the Location window, click **New Block**.
The New Block window is displayed (Figure 3-13).

Figure 3-13 New Block Window



- Step 6** Enter a value for the Block Number, then click **Set**. (Typically choose the next sequential number.)
This redisplay the Location window with the Current Block showing the value entered in Step 6 and 16 entries (0 through 15) in the Location Value column.
- Step 7** In the Location window, click **Modify Result Set**.
The Add String box is displayed.
- Step 8** Enter the desired result set names and click **Set**.
- Step 9** Repeat Step 7 and Step 8 to add result set names for each of the location values in this block.
- Step 10** Repeat Step 5 through Step 9 to add the new location blocks required to support your dial plan.
-

Modifying a Location

To modify a Location, complete the following steps:

- Step 1** Select the Location Value you want to modify in the Location window, then click **Modify Result Set**.
- Step 2** Make the desired changes to the Location window fields and click **Set**.

A dialog box appears requesting verification.



Note The Result Set Name must already exist in the Result Set table.

- Step 3** Click **Yes** to modify the selected Location.
The Location window is redisplayed with the changes that you just made.
-

Deleting a Location

To delete a Location, complete the following steps:

- Step 1** Select the Location Block that you want to delete in the Location window, then click **Delete Block**.
A dialog box appears requesting verification.

- Step 2** Click **Yes** to delete the selected Location.
The Location window is redisplayed with the selected Location Block deleted.
-

Provisioning Cause Codes

To provision Cause codes, complete the following steps:

-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- Step 2** Click **Number Analysis**, then select a Customer Group ID.
The Dial Plan component appears under the Customer Group ID you select.
- Step 3** Click the plus sign (+) next to the Dial Plan component.
The Dial Plan component section is expanded to display a list of choices.
- Step 4** Under the Dial Plan component, click **Cause**.
The Cause window is displayed (Figure 3-14).

Figure 3-14 Cause Window

Cause Number	Location Block	Result Set Name

New Modify Delete Exit

38280

- Step 5** Click **New**.
The Cause window is displayed with the Cause code number displayed in the top box.



Note The Location table must be provisioned before provisioning Cause codes.

- Step 6** Enter the Location Block value and the Result Set Block and click **Set**.
The Cause window is redisplayed with the data you just entered.
-

Modifying a Cause Code

To modify a Cause code, complete the following steps:

-
- Step 1** Choose the Cause code number you want to modify in the Cause window, then click **Modify Result Set**.
 - Step 2** Make the desired changes to the Cause window fields and click **Set**.
A dialog box appears requesting verification.
 - Step 3** Click **Yes** to modify the selected Cause code number.
The Cause window is redisplayed with the selected Cause code number changed.
-

Deleting a Cause Code

To delete a Cause code number, complete the following steps:

-
- Step 1** Choose the Cause code number you want to delete in the Cause window, then click **Delete**.
A dialog box appears requesting verification.
 - Step 2** Click **Yes** to delete the selected Cause code number.
The Cause window is redisplayed with the selected Cause code number deleted.
-

Processing the Number Analysis File

After you complete your dial plan, you must process the number analysis file. To process the number analysis file, complete the following steps:

-
- Step 1** Under the Dial Plan component, click **NumAnFile**.
 - Step 2** Enter the filename in the Filename field.
 - Step 3** Enter your user ID and password.
 - Step 4** Click **Set**.
The system opens an FTP session to the Cisco MGC host and copies the file. In addition, SNMP sets the filename in the management information base (MIB), and the file is post-processed.
-

**Note**

Only one filename can be set in the MIB. If you set a new filename using SNMP, the old name is overwritten.

**Tip**

If you receive an error message indicating that the file cannot be processed, your SNMP session might not be running. The SNMP session times out after 30 minutes of inactivity. Exit the CMM and restart it before trying to process the file again.

Provisioning Whitelist and Blacklist Screening

You can provision whitelists or blacklists to include or exclude calls from certain numbers. You can provision whitelists that allow calls from specified A-numbers or to specified B-numbers. Blacklists block calls from specified A-numbers or to specified B-numbers.

To provision a whitelist or blacklist, you must complete the following procedures:

- Create the list file
- Add numbers to the list file
- Process the list file

To create the list file, complete the following steps:

-
- Step 1** In the CMM Main Window (Figure 3-2 on page 3-4) click the **Number Analysis** tab.
- If you have already entered a Customer Group ID, it appears under the Number Analysis component. Continue with Step 2.
- If you have not entered a Customer Group ID, or want to enter a new one, complete the following steps:
- a. Click **Number Analysis**.
 - b. Enter the Customer Group ID.
 - c. Click **Create New**.



Caution

Customer Group IDs should be created during the initial installation, configuration, and provisioning of your system. Each dial plan requires a Customer Group ID. Customer Group IDs must be assigned to an SS7 sigPath and the sigPath has to be in an out of service (OOS) status when the Customer Group ID assignment is made.

We suggest that you create a sufficiently large number of Customer Group IDs during the initial provisioning of your system to accommodate your anticipated needs, then assign Customer Group IDs to your users as they are needed.

Provisioning new Customer Group IDs for an operational system means that you have to take the SS7 sigPath OOS, which will result in a loss of service for any calls associated with that SS7 sigPath.

- Step 2** Click the Customer Group ID component to continue.
- The Number Analysis File Types window is displayed.
- Step 3** Click **File Type** and choose one of the following:
- AWhiteList
 - BWhiteList
 - ABlackList
 - BBlackList
- Step 4** Click **Create File**.
- The file type you created appears in the directory under the Customer Group ID.
-

Adding Numbers for Screening

After you create the whitelist or blacklist file, you must set up screening for the list.

To provision the numbers for screening, complete the following steps:

-
- Step 1** Click the plus sign (+) next to the file type that you created.
- For example, if you are provisioning an A whitelist, click **AWhiteList**. The A WhiteList window appears on the right side of the window.
- Step 2** To add a new row to the screening table, click **New Row**.
- The Screening window is displayed.
- Step 3** Click **Action** and choose **Insert**.
- Step 4** Enter the calling party number to add to the whitelist.
- Step 5** Click **Set**.
- The number is displayed in the A WhiteList window.
- Step 6** Add more numbers using the previously described procedures.
-

Processing the White List or Black List File

After you complete your whitelist or blacklist file, you must process the file.

To process the whitelist or blacklist file, complete the following steps:

-
- Step 1** Under the AWhiteList, BWhiteList, ABlackList, or BBlackList component, select the file name that reflects the type of analysis you chose.
- Step 2** Enter the filename in the Filename field.
- Step 3** Enter your user ID and password.
- Step 4** Click **Set**.
- The system opens an FTP session to the Cisco MGC host and copies the file. In addition, SNMP sets the filename in the MIB and the file is post-processed.
-

**Note**

Only one filename can be set in the MIB. If you set a new filename using SNMP, the old name is overwritten.

**Tip**

If you receive an error message indicating that the file cannot be processed, your SNMP session might not be running. The SNMP session times out after 30 minutes of inactivity. Exit the CMM and restart it before trying to process the file.



Provisioning Dial Plans with VSPT

This chapter provides information and procedures for provisioning dial plans for Cisco Media Gateway Controller Software Release 7.4 using the Voice Services Provisioning Tool (VSPT).

This chapter contains the following sections:

- VSPT Overview, page 4-2
- Adding a Dial Plan, page 4-7
- Provisioning the Dial Plan, page 4-10
- Performing an Integrity Check, page 4-25
- Viewing Generated MML, page 4-26
- Deploying a New Dial Plan, page 4-27

VSPT provides a graphical user interface (GUI) that allows you to create dial plans and then deploy those dial plans to the Cisco MGC.

You can use the VSPT to perform a variety of provisioning tasks, including:

- Setting up your system
- Provisioning component properties
- Adding or deleting system components
- Setting up links and signaling services
- Setting up dial plans and routing plans

The VSPT can be used alone or with Man-Machine Language (MML) commands to provision dial plans for your system. For more information on using MML commands, refer to Chapter 5, “Provisioning Dial Plans with MML.”

You should have the information described in Chapter 2, “Preparing for Dial Plan Provisioning,” before beginning your dial plan provisioning session.

When provisioning dial plans, you must first ensure that all system components have been provisioned as described in the *Cisco Media Gateway Controller Software Release 7 Provisioning Guide*.

VSPT Overview

The VSPT provides a GUI that allows you to create dial plan provisioning sessions.

This section contains the following subsections:

- Entering MML Names, page 4-2
- Entering MML Descriptions, page 4-3
- Starting the VSPT, page 4-3
- Navigating the VSPT, page 4-4
- Defining Users and Permissions, page 4-5
- Exiting the VSPT, page 4-5

The VSPT provides the following capabilities:

- Lets you create configuration files across multiple devices, such as Cisco MGCs
- Eliminates having to repeatedly enter duplicate data
- Allows you to import and export dial plans to and from the Cisco MGC
- Lets you perform an integrity check prior to deployment, to prevent possible errors
- Creates the MML files used to provision the Cisco MGC

After you finish the provisioning session and click **File, Save, and As Working**, the VSPT saves your dial plan as the “active” dial plan. After creating the active dial plan, you cannot modify it. To make changes, save the dial plan with another name and commit or deploy the new provisioning session to make the revised dial plan active.

The number of dial plans you can store might be limited by available disk space. Consider deleting old or unwanted dial plans, or saving them to another machine if you do not have sufficient disk space.



Note

Only one active provisioning session is permitted to run on a host machine. The Cisco MGC software typically resides on a different host than the VSPT, but they can both reside on the same host.



Note

The current active provisioning data is stored in the `/opt/CiscoMGC/etc` directory on the Cisco MGC. If you change the default directory value, you must use the new value throughout this document where the `/opt/CiscoMGC/etc` directory is referred to.

Entering MML Names

The names you enter are used to generate MML commands. You must enter a name and a description for each dial plan you provision. In order for you to produce valid MML commands, your MML names must have the following characteristics:

- As many as 20 alphanumeric characters, including dashes
Customer Group IDs for dial plans are limited to 4 alphanumeric characters.
- No spaces, underscores, or special characters
- Must start with an alphabetic character
- Must be lowercase

Entering MML Descriptions

MML descriptions can have as many as 128 characters and can include spaces and symbols. You should use descriptions that help identify the components that you are provisioning. For more information about MML names and descriptions, see Chapter 5, “Provisioning Dial Plans with MML.”

Starting the VSPT

To start the VSPT, complete the following steps:

Step 1 You must be logged in to the VSPT server or access it from a machine with X Window System capability.

Step 2 In the terminal window, enter:

```
cd /opt/CSCOVsp15
```

The default directory is /opt/CSCOVsp15. If you installed the VSPT in a different location, navigate to the appropriate directory, then enter:

```
./dart
```

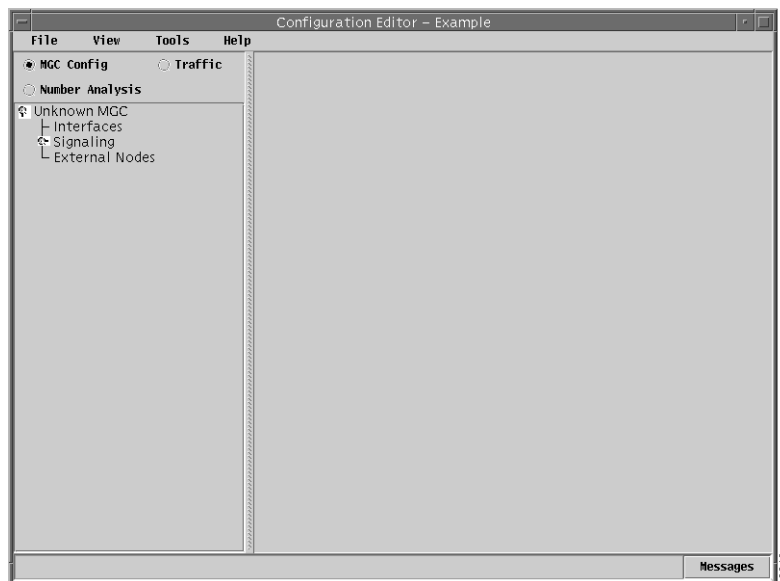
The system opens the X-windows interface and the login window is displayed.

Step 3 Enter your user name and password and click **OK**.

The preset User Name is admin and the Password is also admin. See the *Cisco Media Gateway Controller Software Release 7 Installation and Configuration Guide* for more information on setting up user access.

A Welcome window is displayed briefly during the login process, after which the main provisioning window is displayed. (It should be similar to the window shown in Figure 4-1.)

Figure 4-1 Main Provisioning Window



The VSPT main window has two panes. The left pane displays a list of components that you can select. To expand the component list, click the plus sign (+) next to the component name in the left pane. To select a component, click the component name. The right pane displays fields in which you can enter data for the selected component.

Navigating the VSPT

The following sections describe the methods of navigating the VSPT.

Buttons

The VSPT provides buttons and trees to navigate through the system. Click the buttons to add or change network components displayed in the trees. The top of the VSPT main window contains three buttons:

- **MGC Config**—Used to add components and provision component properties
- **Traffic**—Used to create customer-specific files, including trunk groups, trunks, and routing
- **Number Analysis**—Used to provision dial plans

Menu Bar

The VSPT menu bar contains four selections: File, View, Tools, and Help.

File Menu

The File menu provides the following options:

- **New**—Begin a new configuration session.
- **Open**—Open an existing configuration.
- **Import**—Import an existing configuration from another Cisco MGC, as well as import trunk group, trunk, routing, and dial plan files into the VSPT.
- **Export**—Export files from the VSPT.
- **Save**—Save the current configuration:
 - As Working
 - As Snapshot
 - As New Config
- **Exit**—Stop any open provisioning sessions and exit the VSPT.

View Menu

The View menu provides the following options:

- **MML**—Shows generated MML for the current configuration
- **MGX Commands**—Shows generated Cisco MGX 8850 commands for the current configuration
- **Trunk Group File**—Shows a generated trunk group file for the current configuration
- **Trunk File**—Shows a generated trunk file for the current configuration

Tools Menu

The Tools menu provides the following options:

- **Integrity Check**—Checks your configuration for inconsistencies, missing information, and so on
- **Deploy**—Moves the configuration to one or more target hosts and Cisco MGWs
- **Telnet**—Opens a telnet session
- **MGC Viewer**—Lets you view MGC configurations
- **MGX-8850 Wizard**—Lets you view and configure MGX-8850 hosts

Help Menu

The Help menu displays the “About VSPT” window with information about the current build

Defining Users and Permissions

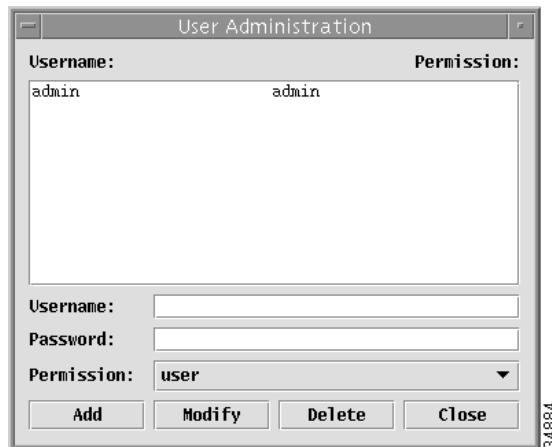
After you install the VSPT, you can define users and specify their respective permissions.

To define users and specify permissions, complete the following steps:

Step 1 Click **Tools**, then **User Admin**.

The VSPT User Administration window is displayed (Figure 4-2).

Figure 4-2 VSPT User Administration Window



Step 2 You can add, modify, or delete users as follows:

- **Add**—Enter a user name and password, click **Permission**, select the permission level, and click **Add**.
- **Modify**—Select the user name, change the password or permission level, and click **Modify**.
- **Delete**—Select the user name and click **Delete**.

Exiting the VSPT

You can exit the VSPT at any time by performing one of these actions:

- From the File menu, choose **Exit**. Click **OK** at the prompt.
- Click the close box in the upper right of the VSPT main window. Click **OK** at the prompt.

Adding a Dial Plan

You create the dial plan that the MGC node uses to direct the dialed digits to select a specific trunk group. To do so, you need information that you have added to the dial plan worksheet.



Note

You can add the dial plan information either by importing a dial plan that was created using a text editor or by creating a dial plan directly using the VSPT.

The following subsections describe the process of creating the dial plan. The resulting dial plan batch file is provided in the “Viewing Generated MML” section on page 4-26. After you have added your components and trunks, you can commit the session using either the **PROV-CPY** or the **PROV-DPLY** command.

Importing an Existing Dial Plan File

During initial provisioning, you can create a dial plan file as a text file using a text editor. Now you can import the text file into the VSPT.



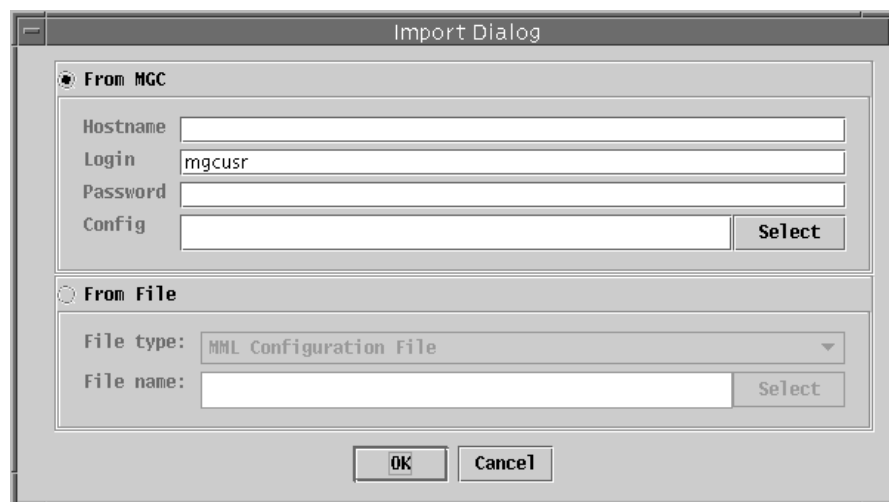
Caution

Consider importing a dial plan file *only* for initial provisioning. When you import a dial plan file, all the existing dial plan data is replaced by the dial plan data in the file you import.

To import a dial plan, complete the following steps:

- Step 1** From the File menu, select **Import**.
A dialog box, similar to the one shown in Figure 4-3, is displayed.

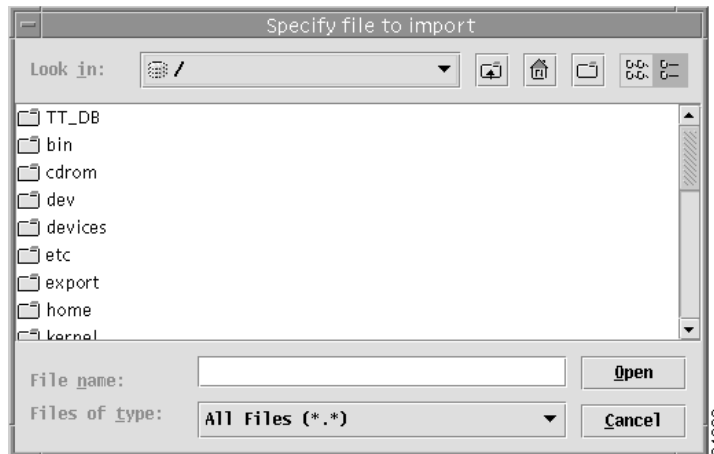
Figure 4-3 Importing Dial Plan Files



- Step 2** Click the **From File** radio button.
Step 3 From the File type drop-down menu, select **Dialplan File**.

- Step 4** Enter the name of the dial plan file you want to import in the File name field.
- If you do not know the name of the dial plan file you want to import, click **Select**.
A browser window, similar to the one shown in Figure 4-4, is displayed.

Figure 4-4 Selecting the Dial Plan File to Import



- Locate the file name of the dial plan file you want to import, click on the file name once to select it, and click **Open**.

You return to the window shown in Figure 4-3. The full pathname of the dial plan file you selected now appears in the File name box.

- Step 5** Click **OK**.
The dial plan file you indicated is imported.

Adding a Dial Plan File

A dial plan file defines a dial plan for a customer group. If you decide not to import a dial plan file created with a text editor, you can create the dial plan file using the VSPT.

You must first add the dial plan file, and then add the details to the dial plan.

To add a dial plan file, complete the following steps:

- Step 1** From the VSPT main provisioning window (Figure 4-1), click the **Number Analysis** button.
- Step 2** In the left-hand pane of the main provisioning window, click **Number Analysis**.
A window, similar to the one shown in Figure 4-5, is displayed.
- Step 3** Enter a Customer Group ID.
The Customer Group ID is a unique, four-character alphanumeric identifier (starting with a letter) that identifies your dial plan.

**Caution**

Customer Group IDs should be created during the initial installation, configuration, and provisioning of your system. Each dial plan requires a Customer Group ID. Customer Group IDs must be assigned to an SS7 sigPath and the sigPath has to be in an out of service (OOS) status when the Customer Group ID assignment is made.

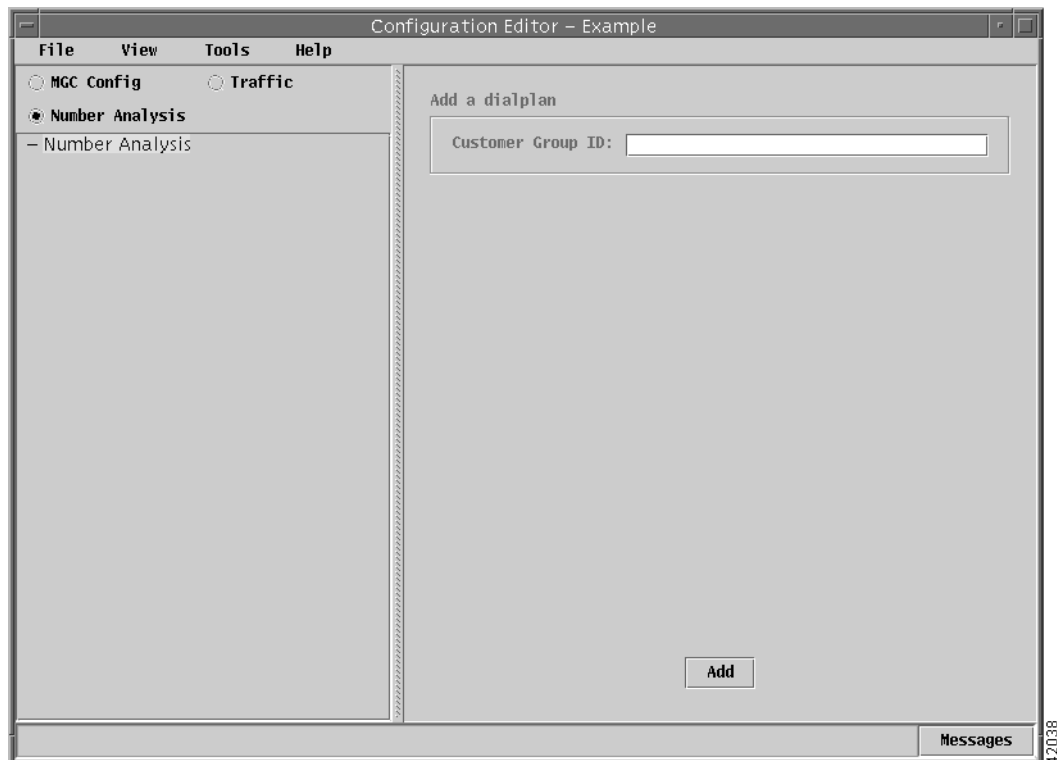
We suggest that you create a sufficiently large number of Customer Group IDs during the initial provisioning of your system to accommodate your anticipated needs, then assign Customer Group IDs to your users as they are needed.

Provisioning new Customer Group IDs for an operational system means that you have to take the SS7 sigPath OOS, which will result in a loss of service for any calls associated with that SS7 sigPath.

Step 4 Click the **Add** button.

The Customer Group ID you added appears under Number Analysis.

Figure 4-5 Adding a Dial Plan File



Provisioning the Dial Plan

You provision a dial plan by adding detailed information in two dial plan components:

- Results component
- Triggers component

The following sections describe the information you need to add to the Results component:

- Adding Digit Modification Strings, page 4-11
- Adding a Result Set, page 4-12
- Adding an IN_TRIGGER Result Type for LNP, page 4-13
- Adding a Default Result Set, page 4-14
- Adding a Screening File, page 4-15
- Adding a Service Name, page 4-16

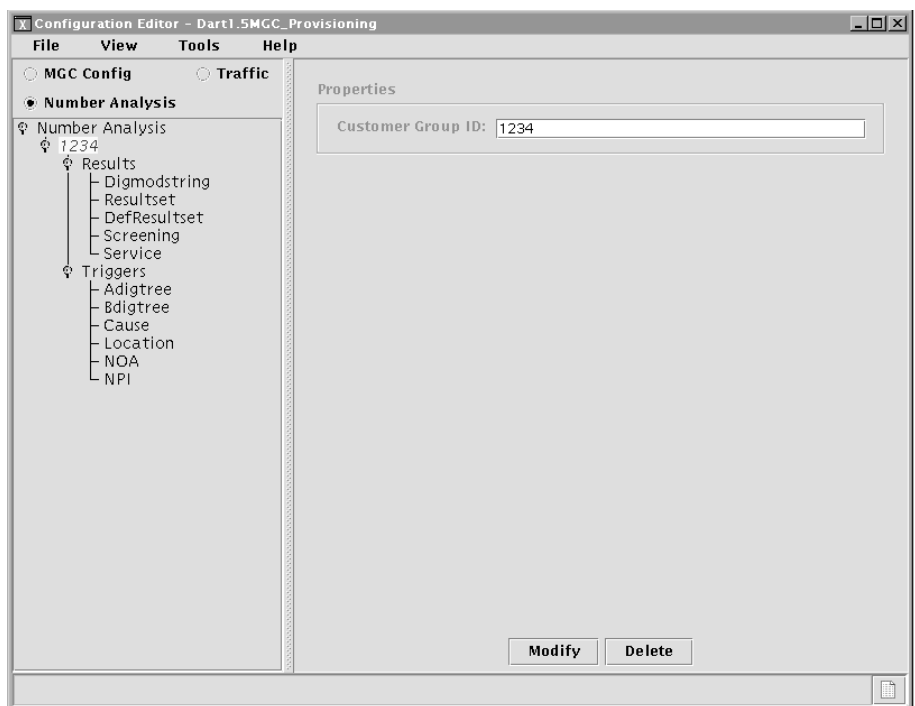
The sections that describe the information you need to add to the Triggers component start on page 4-16.

Accessing the Dial Plan File

To access the window for adding dial plan details, complete the following steps:

-
- Step 1** In the upper left corner of the VSPT main provisioning window (Figure 4-1), click **Number Analysis**.
- Step 2** In the left-hand pane of the main provisioning window, click **Number Analysis**.
- Step 3** Click the icon to the left of the customer group ID to expand the tree.
- A window, similar to the one shown in Figure 4-6, is displayed.
-

Figure 4-6 Adding Dial Plan Details



Adding Digit Modification Strings

The digit modification string is used to insert numbers into either the calling or called party number. To add a digit modification string, complete the following steps:

Step 1 In the VSPT main provisioning window (Figure 4-1), click **Results**.

The following dial plan components are displayed:

- Digmodstring
- Resultset
- Defresultset
- Screening
- Service

Step 2 Click **Digmodstring**.

A window, similar to the one shown in Figure 4-7, is displayed.

Step 3 Click the **Add** button.

A dialog box, similar to the one shown in Figure 4-8, is displayed.

Step 4 Enter the digit modification name and the digit modification string.

Step 5 Click **OK**.

The digit modification name and the digit modification string are added to the corresponding columns of the right-hand pane of the window shown in Figure 4-7.

Step 6 Repeat Step 3 through Step 5 until all of the digit modification strings are added.

Figure 4-7 Adding a Digit Modification String

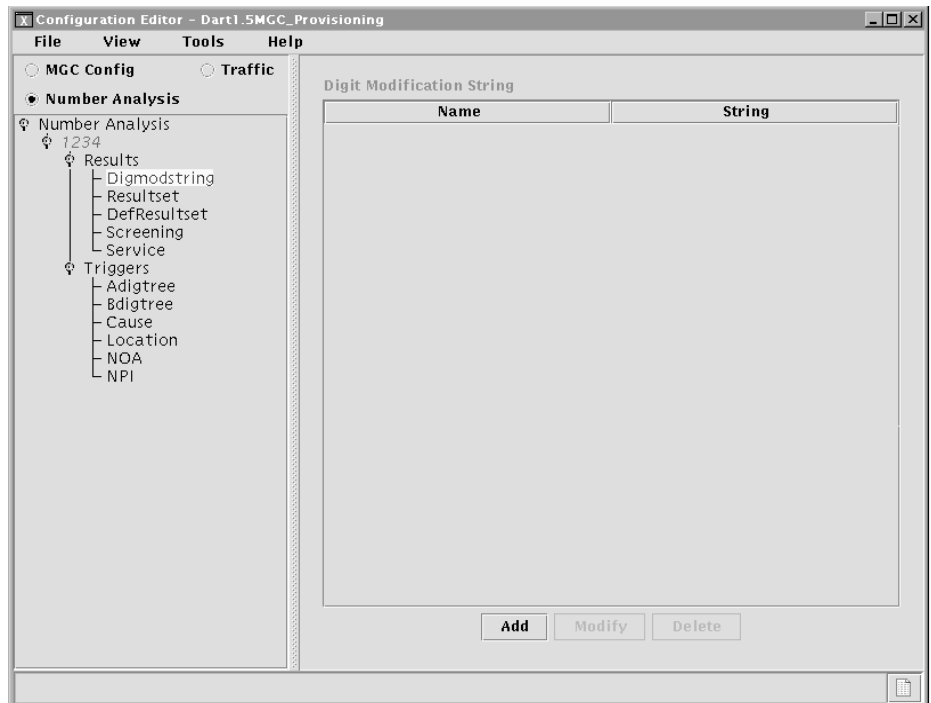
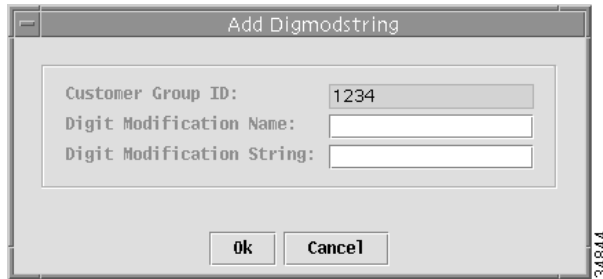


Figure 4-8 Defining a Digit Modification String



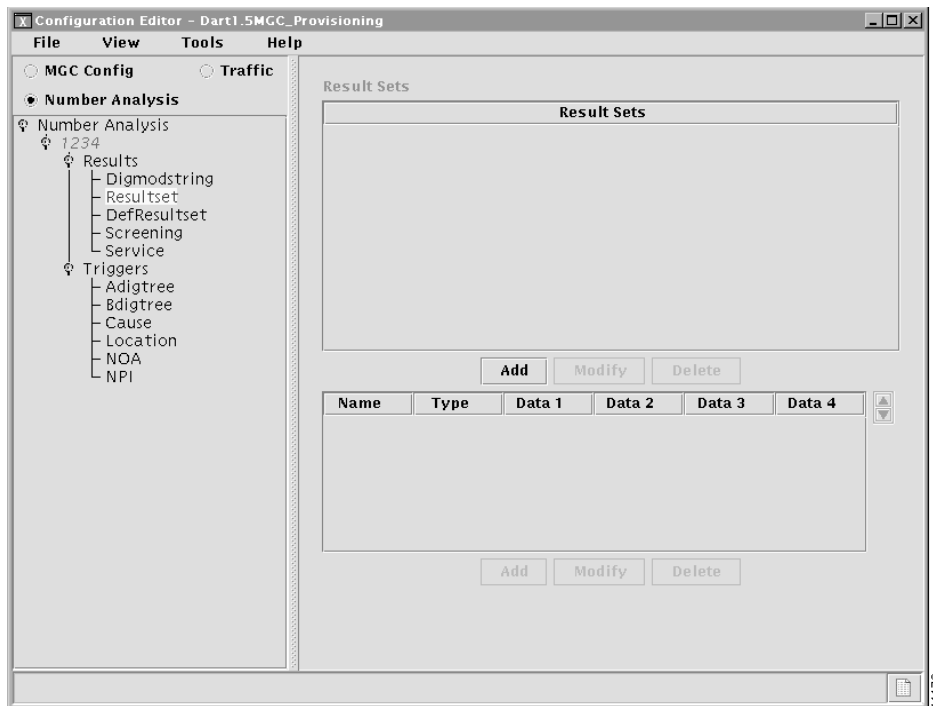
Adding a Result Set

A result set (or table) defines the action to be taken after analysis is performed on an incoming call.

To add a result set to your dial plan, complete the following steps:

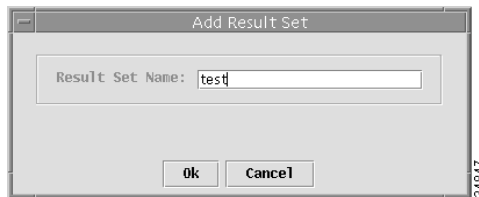
-
- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Results**.
A window, similar to the one shown in Figure 4-6, is displayed.
- Step 2** Under **Results**, click **Resultset**.
A window, similar to the one shown in Figure 4-9, is displayed.

Figure 4-9 Adding a Result Set



- Step 3** Click the **Add** button.
A dialog box, similar to the one shown in Figure 4-10, is displayed.

Figure 4-10 Result Set Name



Step 4 Enter the result set name, and click **OK**.

The result set name is added to the window shown in Figure 4-9.

Step 5 To define the result types that you want to include in the result set, select the result set you just added and click the **Add** button at the bottom of the Result Sets list box.

Step 6 In the Name field, enter the result set name exactly as it appears in the Result Sets list and click **OK**.

Step 7 From the Type drop-down menu, select the result type and click **OK**.

The data that is entered in the four datawords, if any, is dependent on the result type. For detailed information on the content of the datawords, refer to the “Result Type Definitions” section on page 1-19.



Note

If you define more than one result type for a result set, you can use the **Reorder** button to rearrange the order of the result types within the result set.

Adding an IN_TRIGGER Result Type for LNP

To add an IN_TRIGGER result type for LNP, complete the following steps:

Step 1 In the VSPT main provisioning window (Figure 4-1), click **Results**.

A window, similar to the one shown in Figure 4-6, is displayed.

Step 2 Under **Results**, click **Resultset**.

A window, similar to the one shown in Figure 4-9, is displayed.

Step 3 Click the **Add** button.

A dialog box, similar to the one shown in Figure 4-10, is displayed.

Step 4 Enter the result set name. Click **OK**.

The result set name is added to the window shown in Figure 4-9.

Step 5 To define the result type that you want to produce during number analysis, select the result set name you just added and click the **Add** button at the bottom of the window.

A window, similar to the one shown in Figure 4-9, is displayed.

Step 6 For the result type, choose IN_TRIGGER.

Step 7 Add a result type of Route.

Step 8 Add the digit string to the BDIGTREE and choose the result set name created in Step 1 through Step 5. For more information, see the “Adding a Default Result Set” section on page 4-14.

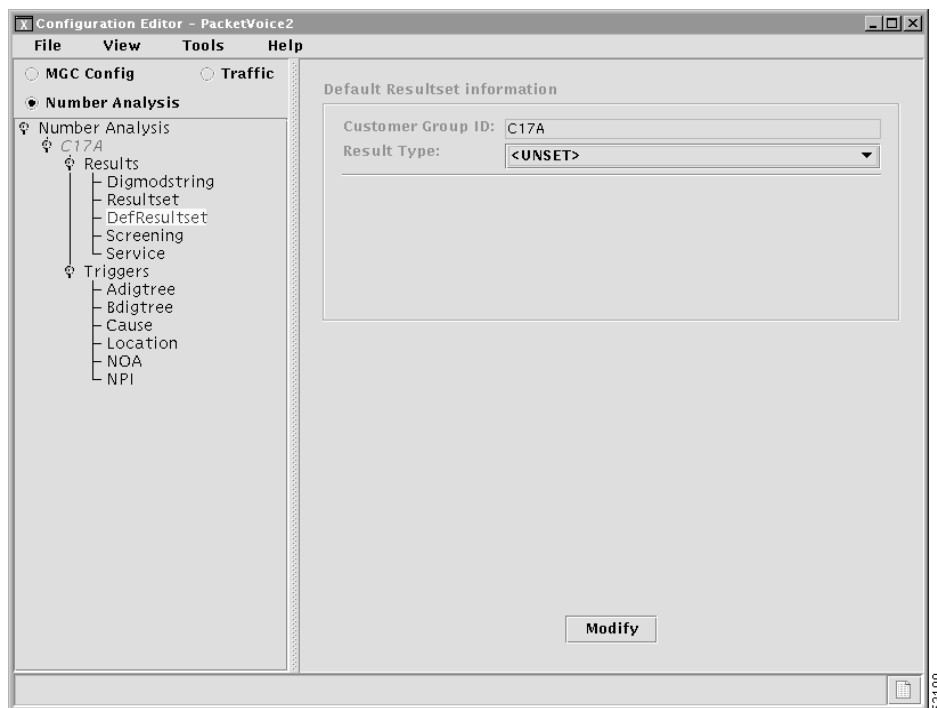
Adding a Default Result Set

The default result set is used in lieu of a specified result set at the end of call analysis.

To add a default result set, complete the following steps:

-
- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Results**.
A window, similar to the one shown in Figure 4-6, is displayed.
- Step 2** Under **Results**, click **DefResultset**.
A window, similar to the one shown in Figure 4-11, is displayed.
- Step 3** On the Result Type drop-down menu, select one of the following result types and its modifier:
- BLACKLIST
 - CLI (calling line identity)
 - CPC (called party code)
 - Dial Address
 - NOA (Nature of Address indicator)
 - CAUSE
 - Enter a cause code
 - ROUTE
 - Enter a route list name (for example, rtlist2)
- Step 4** Click **Modify**.
A window is displayed similar to the one shown in Figure 4-11.
-

Figure 4-11 Adding a Default Result Set



Adding a Screening File

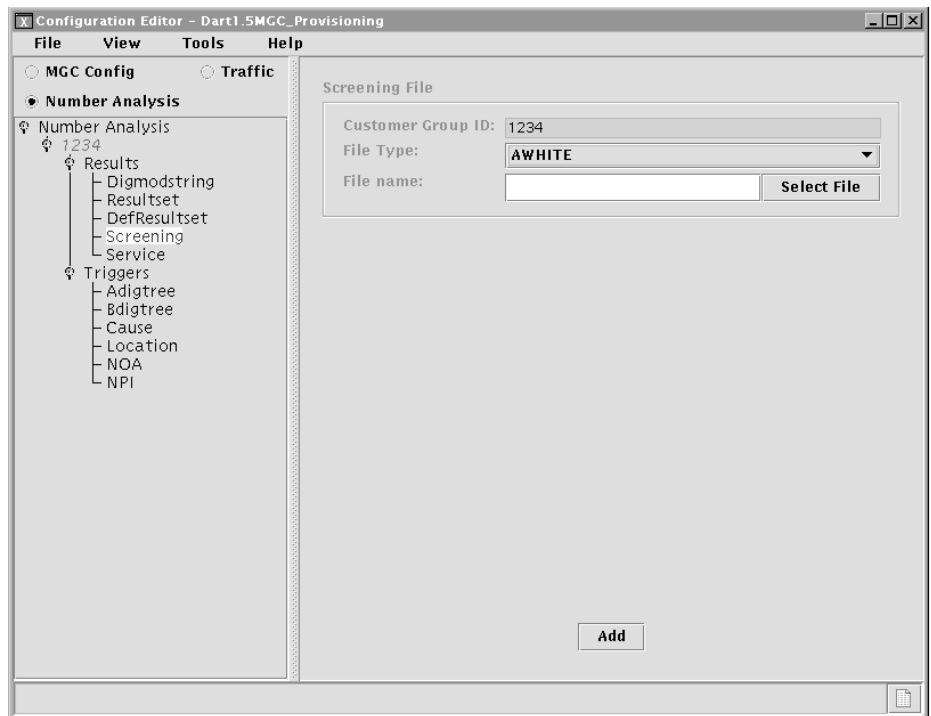
Call screening is a type of analysis done on the A-number to determine if a call is accepted or rejected.

To add a Screening file, complete the following steps:

-
- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Results**.
A window, similar to the one shown in Figure 4-6, is displayed.
- Step 2** Under **Results**, click **Screening**.
A window, similar to the one shown in Figure 4-12 on the next page, is displayed.
- Step 3** From the File Type drop-down menu, select the file type (AWHITE, ABLACK, BWHITE, or BBLACK).
- Step 4** Enter the file name or click **Select File** to see a pop-up menu with the names of the available files.
- Step 5** Click the **Add** button.

The Screening file is added to the hierarchical tree in the left-hand pane of the window.

Figure 4-12 Adding a Screening File



Adding a Service Name

Service names are defined to indicate the services that are available for screening purposes. A service name must be defined before a result type of Screening can be associated with a B-number.

To add a Service name, complete the following steps:

-
- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Results**.
A window, similar to the one shown in Figure 4-6, is displayed.
 - Step 2** Under **Results**, click **Service** to expand the Service hierarchical tree.
 - Step 3** Select the Service Name you want to add.
A window, similar to the one shown in Figure 4-13, is displayed.
 - Step 4** Click the **Add** button.
A dialog box, similar to the one shown in Figure 4-14, is displayed.
 - Step 5** Enter the Service name and click **OK**.
A window with the Service name added, similar to the one shown in Figure 4-13, is displayed.
-

Figure 4-13 Adding a Service Name

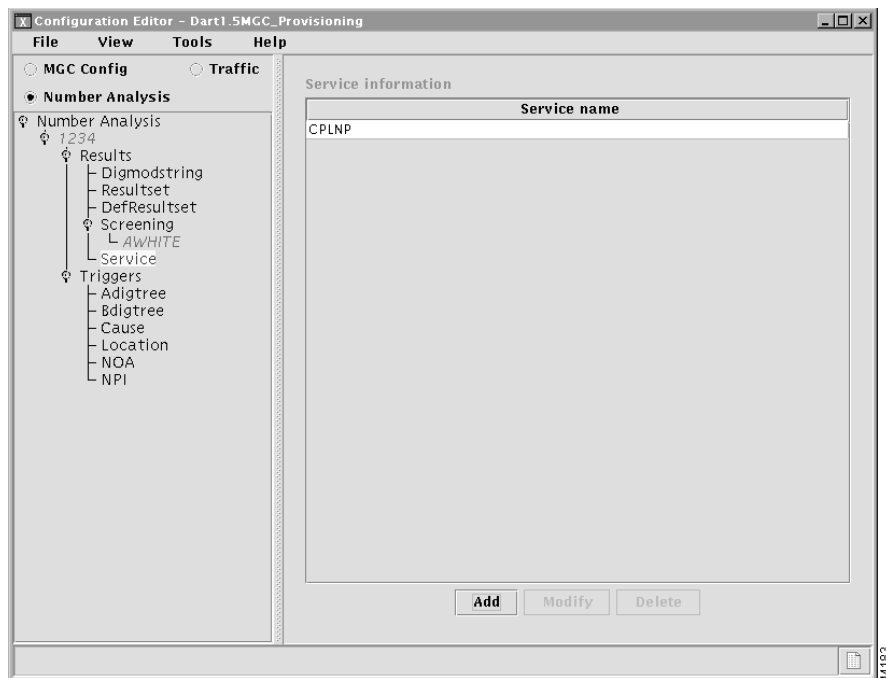


Figure 4-14 Defining a Service Name



Provisioning Triggers Components

The following sections describe the information you need to add to the Triggers components:

- Adding an A Digit Tree, page 4-17
- Adding a B Digit Tree, page 4-18
- Adding Cause Codes, page 4-20
- Adding a Location Table, page 4-21
- Adding a Nature of Address Table, page 4-22
- Adding a Numbering Plan Indicator Table, page 4-24

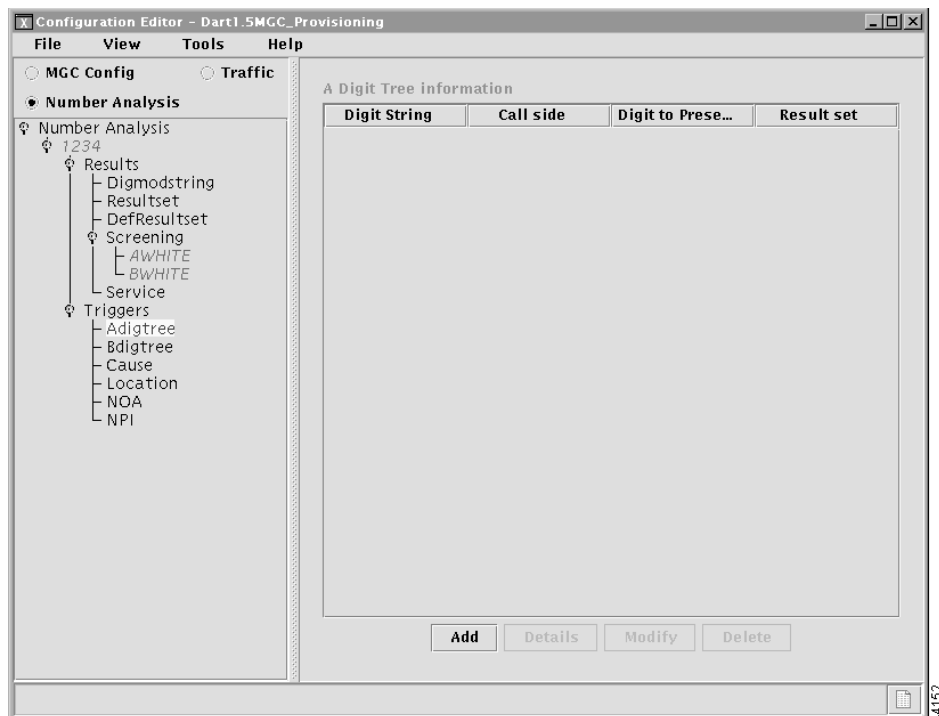
Adding an A Digit Tree

The Adigtrees table is the number analysis table for calling numbers (A-numbers).

To add an Adigtrees table, complete the following steps:

-
- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Triggers**.
A window, similar to the one shown in Figure 4-6, is displayed.
- Step 2** Under **Triggers**, click **Adigtrees** to expand the hierarchical tree.
A window, similar to the one shown in Figure 4-15, is displayed.

Figure 4-15 Adding an A Digit Tree



- Step 3** Click the **Add** button at the bottom of the right-hand pane.
A dialog box, similar to the one shown in Figure 4-16, is displayed.

Figure 4-16 Specifying Adigtree Data

- Step 4** Enter the digit string.
Step 5 On the Call side drop-down menu, select the call side (originating or terminating).
Step 6 Enter digits to present.
Step 7 On the Result set drop-down menu, select the result set.
Step 8 Click **OK**.
 A window with the Adigtree table added, similar to the one shown in Figure 4-15, is displayed.

Adding a B Digit Tree

The Bdigtree table is the number analysis table for called numbers (B-numbers).
To add a Bdigtree table, complete the following steps:

- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Triggers**.
A window, similar to the one shown in Figure 4-6, is displayed.
- Step 2** Under **Triggers**, click **Bdigtree** to expand the hierarchical tree.
A window, similar to the one shown in Figure 4-17, is displayed.
- Step 3** Click the **Add** button.
A dialog box, similar to the one shown in Figure 4-18, is displayed.
- Step 4** Enter the digit string.
Step 5 On the Call side drop-down menu, select the call side (originating or terminating).
Step 6 Enter digits to present.
Step 7 On the Result set drop-down menu, select the result set. Click **OK**.
 A window with the Bdigtree data added, similar to the one in Figure 4-17, is displayed.

Figure 4-17 Adding a B Digit Tree

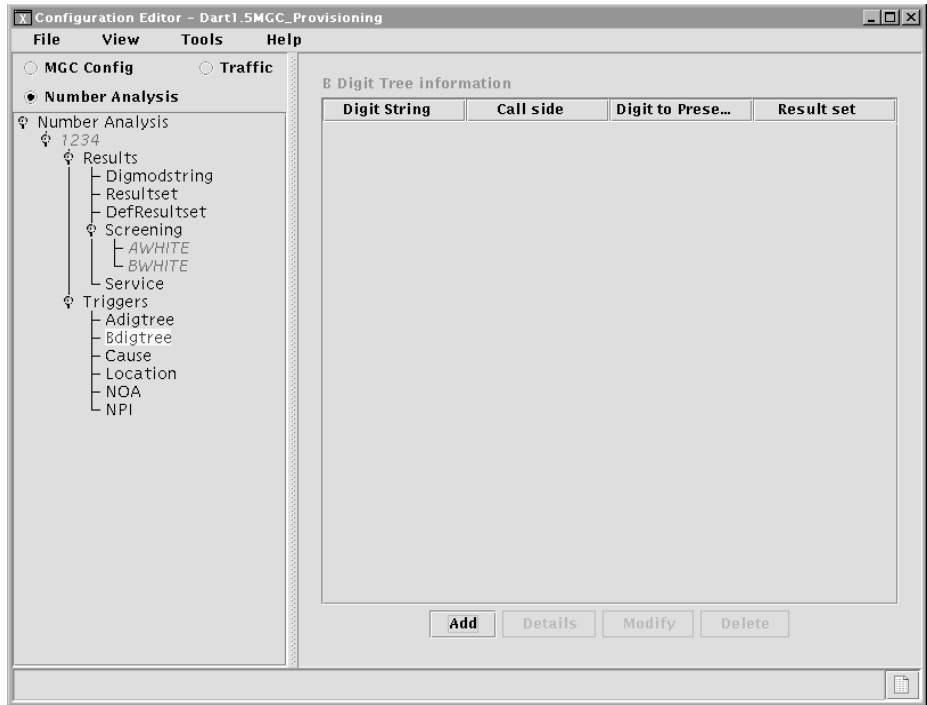


Figure 4-18 Specifying Bdigitree Data

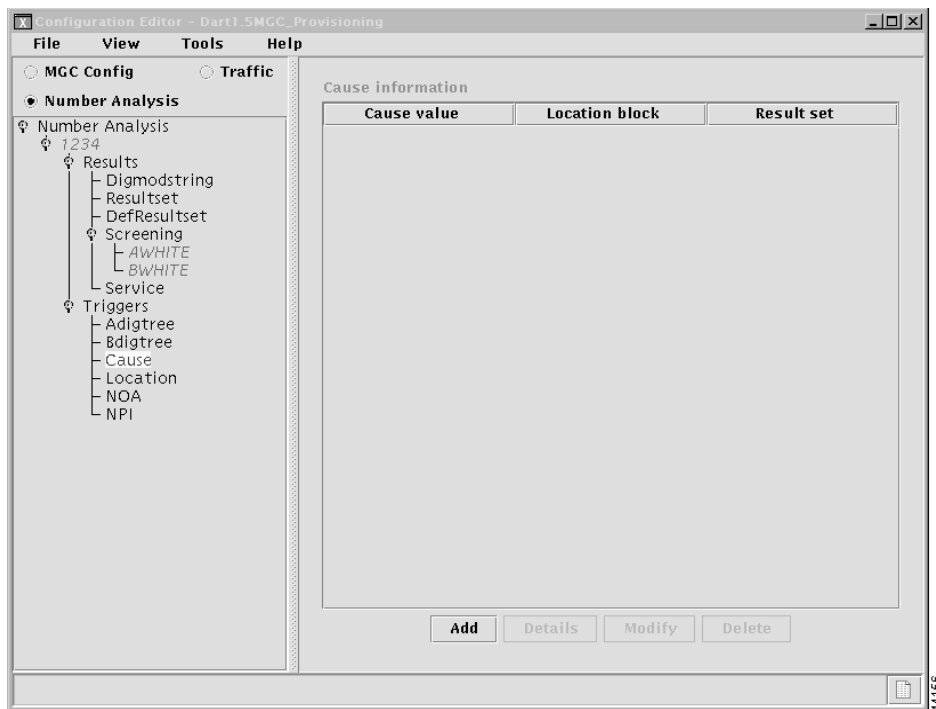


Adding Cause Codes

The cause table lists the cause codes generated when a call is rejected or cleared by the system. The cause for release can be from B-number analysis, cause analysis, or a failure generated during call processing. To add Cause codes to the cause table, complete the following steps:

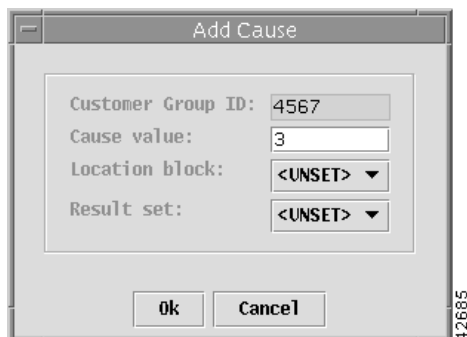
- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Triggers**.
A window, similar to the one shown in Figure 4-6, is displayed.
- Step 2** Under **Triggers**, click **Cause**.
A window, similar to the one shown in Figure 4-19, is displayed.

Figure 4-19 Adding Cause Codes



- Step 3** Click the **Add** button.
A dialog box, similar to the one shown in Figure 4-20, is displayed.

Figure 4-20 Specifying Cause Codes



- Step 4** Enter the cause value.
- Step 5** Do one of the following:
- On the Location block drop-down menu, select the location block.
 - On the Result set drop-down menu, select the result set.
- Step 6** Click **OK**.

A window with the cause information added, similar to the one shown in Figure 4-19, is displayed.

Adding a Location Table

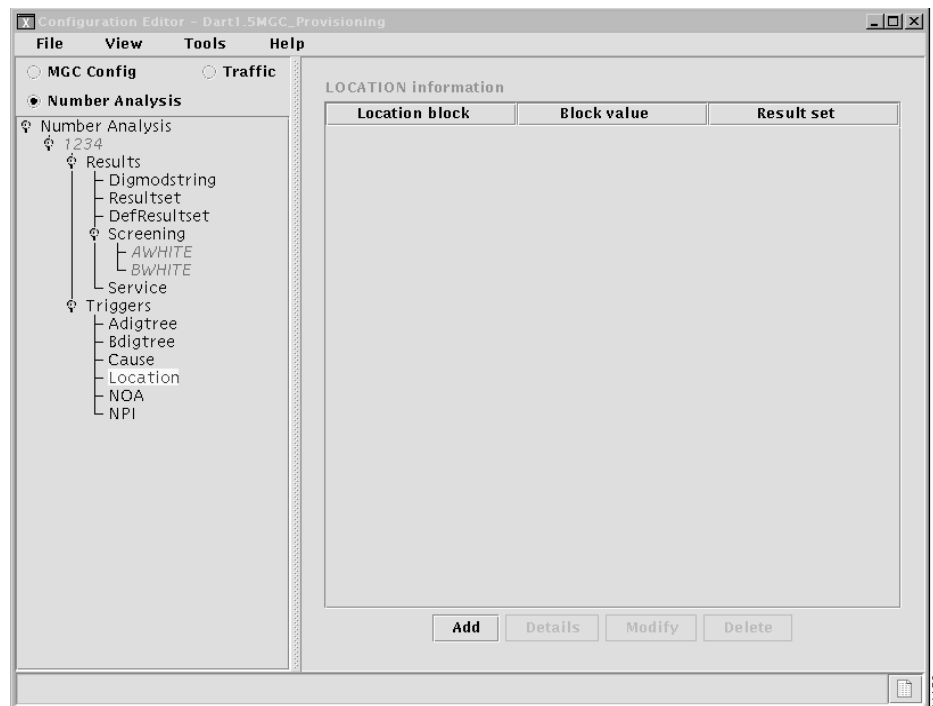
The Location table is used to identify an associated result set. This table is accessed from the cause table through the location index. The location index is used to refer to a block of 16 entries in the Location table. The location value is used as an offset into a specified location block. You can associate an action with a specific entry in a Location table by entering a result set name in the location block at that point.

For detailed information on the Location table, refer to the “Location Table” section on page 1-27.

To add Location data, complete the following steps:

- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Triggers**.
A window, similar to the one shown in Figure 4-6, is displayed.
- Step 2** Under **Triggers**, click **Location**.
A window, similar to the one shown in Figure 4-21, is displayed.

Figure 4-21 Adding a Location Table



Step 3 Click the **Add** button.

A dialog box, similar to the one shown in Figure 4-22, is displayed.

Figure 4-22 Defining Location Data

Step 4 Enter the location block.

Step 5 Enter the block value.

Step 6 On the Result set drop-down menu, select the result set. Click **OK**.

A window with the location data added, similar to the one shown in Figure 4-21, is displayed.

Adding a Nature of Address Table

The Nature of Address (NOA) table is used to define actions to be taken, based on the incoming NOA value. The NOA table includes two fields: the NPI index and the result set name. The NPI index value is used to indicate the offset into the unique NPI block. If the NPI index value is set to 0, no analysis is performed based on the NPI.

The result set name in the NOA table is used to associate a result set. If the result set name is set to 0, then no action is taken. It is possible to have only a result set name or only an NPI index value configured in the NOA table. If both the NPI index and the resultset name are set to 0, no analysis is performed.

For more information on creating the NOA table, refer to the “NOA and NPI Analysis” section on page 1-6.

To add a NOA table, complete the following steps:

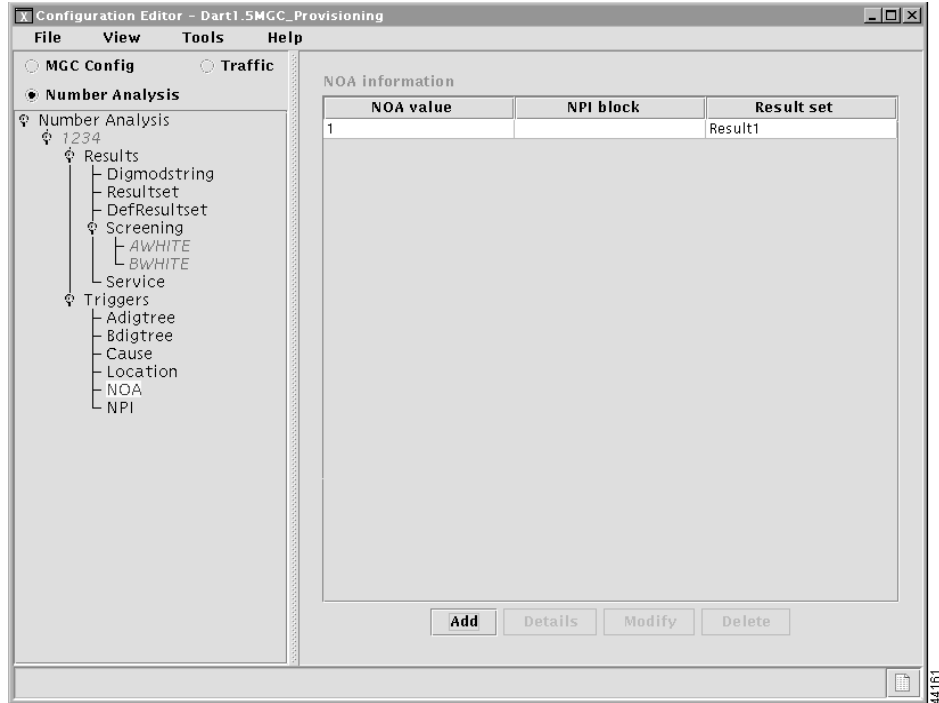
Step 1 In the VSPT main provisioning window (Figure 4-1), click **Triggers**.

A window, similar to the one shown in Figure 4-6, is displayed.

Step 2 Under **Triggers**, click **NOA**.

A window, similar to the one shown in Figure 4-23, is displayed.

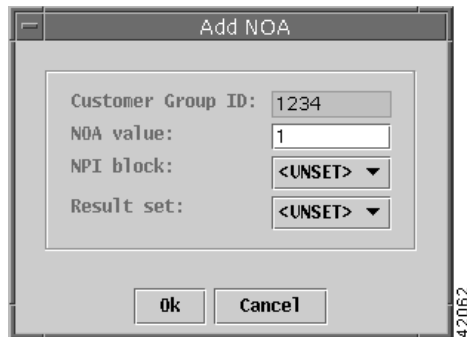
Figure 4-23 Adding a NOA Table



Step 3 Click the **Add** button.

A dialog box, similar to the one shown in Figure 4-24, is displayed.

Figure 4-24 Defining NOA Values



Step 4 Enter the NOA value.

Step 5 Do one of the following:

- On the NPI block drop-down menu, select the NPI block value.
- On the Result set drop-down menu, select the result set name.

Step 6 Click **OK**.

A window with the NOA data added, similar to the one shown in Figure 4-23, is displayed.

Adding a Numbering Plan Indicator Table

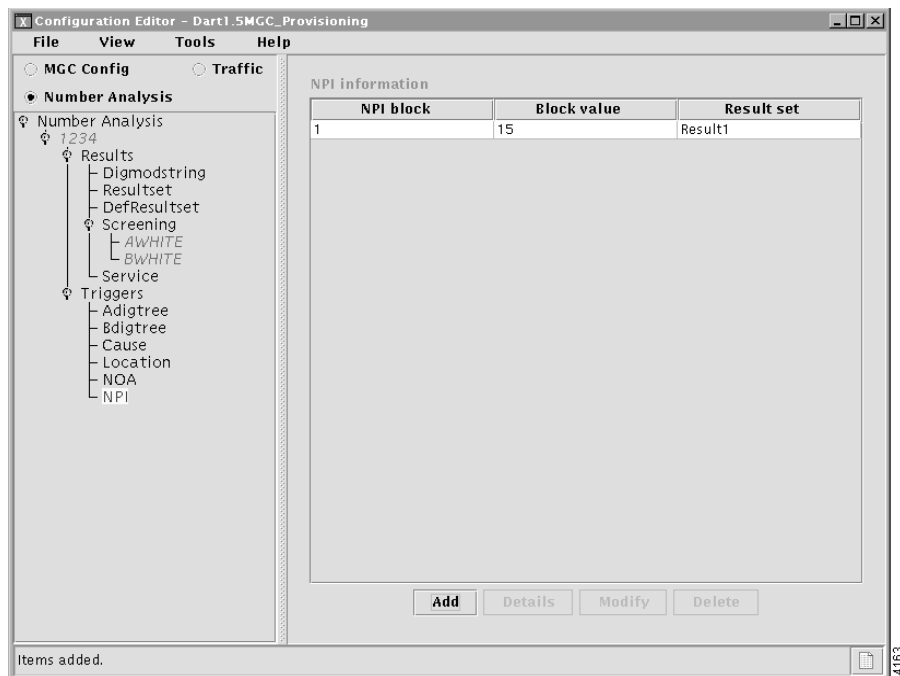
The Numbering Plan Indicator (NPI) table identifies an associated result set. The NPI table is accessed from the NOA table through the NPI index value. The NPI index refers to a specific block of 16 entries in the NPI table. The NPI value contained in the incoming IAM is an offset into the NPI block. An action is associated with a specific NPI value through the result set name at that location in the NPI block.

For detailed information on the NPI table, refer to the “NOA and NPI Analysis” section on page 1-6.

To add an NPI table, complete the following steps:

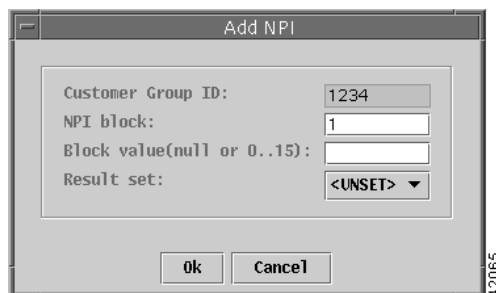
- Step 1** In the VSPT main provisioning window (Figure 4-1), click **Triggers**.
A window, similar to the one shown in Figure 4-6, is displayed.
- Step 2** Under **Triggers**, click **NPI**.
A window, similar to the one shown in Figure 4-25, is displayed.

Figure 4-25 Adding an NPI Table



- Step 3** Click the **Add** button.
A dialog box, similar to the one shown in Figure 4-26, is displayed.

Figure 4-26 Defining NPI Data



Step 4 Enter the NPI block.

Step 5 Enter the block value.

Step 6 On the Result set drop-down menu, select the result set. Click **OK**.

A window with the NPI data added, similar to the one shown in Figure 4-25, is displayed.

Dial Plan Text File

After creating your dial plan, you can produce a dial plan text file containing all the MML commands for use as a batch file.

Before running the dial plan, verify that the following parameters are set in the properties.dat file. These parameters define the start indexes (first node) in the originating and terminating digit trees.

- **BOrigStartIndex**—Identifies the entry point (start index) into the originating side of the dial plan. Possible values are 0 (no dial plan) or 1 (for the first node in the originating digit tree).
- **BTermStartIndex**—Identifies the entry point (start index) into the terminating side of the dial plan. Possible values are 0 (no dial plan) or 2 (for the first node in the terminating digit tree).

To use your dial plan, you must ensure that these two parameters are set as follows:

BOrigStartIndex = 1

BTermStartIndex = 2

Performing an Integrity Check

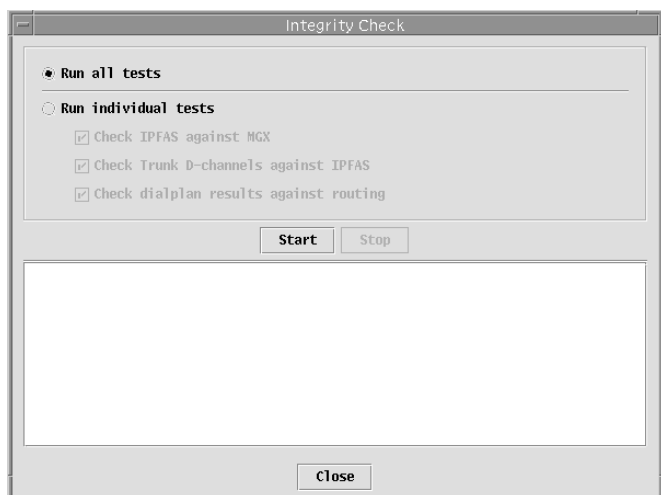
You can also perform an integrity check of your dial plan against the routing plan to alert you to any configuration errors.

To perform an integrity check of your dial plan, complete the following steps:

Step 1 From the **Tools** menu, select **Integrity Check**.

A dialog box, similar to the one shown in Figure 4-27, is displayed.

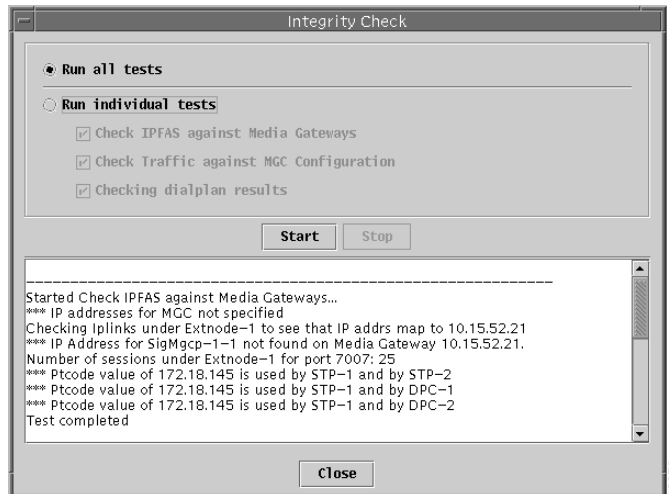
Figure 4-27 Integrity Check



Step 2 Indicate the tests you want to run and click **Start**.

When the tests finish, a dialog box similar to the one in Figure 4-28 is displayed.

Figure 4-28 Integrity Check Results

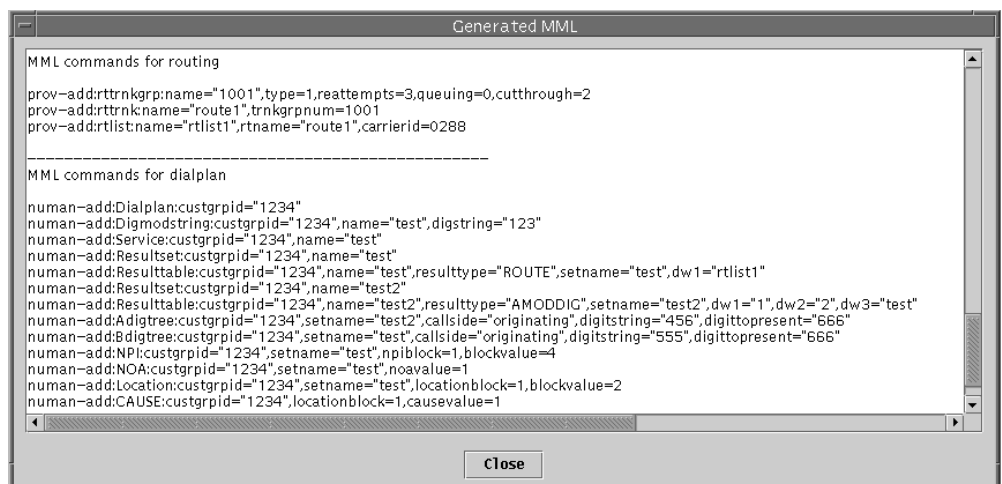


Viewing Generated MML

Viewing the generated MML allows you to scroll through the configuration to verify inputs, parameters, and defaults. To view the MML generated from your provisioning session, complete the following steps:

From the View menu, select **MML**. A dialog box with generated MML, similar to the one shown in Figure 4-29, is displayed.

Figure 4-29 Generated MML Commands



Deploying a New Dial Plan

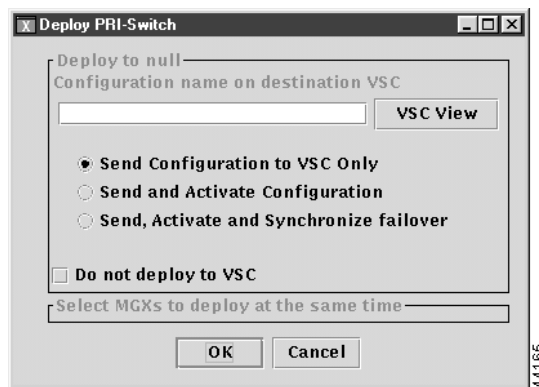
When you finish defining your dial plan, you must deploy it to the Cisco MGC host.

To deploy a new dial plan, complete the following steps:

Step 1 From the Tools menu, select **Deploy**.

A dialog box, similar to the one shown in Figure 4-30, is displayed.

Figure 4-30 Deploying a New Dial Plan



Step 2 Enter the dial plan name on the destination Cisco MGC.

You can click **VSC View** to browse the target Cisco MGC directories. This allows you avoid duplicating a dial plan name that might already exist.

Step 3 Indicate how you want to deploy the dial plan:

- If you want to send the dial plan to the Cisco MGC but not activate it, click the button next to **Send Configuration to VSC Only**.
- If you want to send the dial plan to the Cisco MGC and activate it, click the button next to **Send and Activate Configuration**.
- If you have a continuous-service configuration with two Cisco MGC hosts, click the button next to **Send, Activate and Synchronize failover**.

The dial plan is saved on the active host and copied to the standby host. To apply changes, you must restart the standby server after deployment.



Provisioning Dial Plans with MML

This chapter describes how to use Man-Machine Language (MML) commands to add dial plan components, describes how to verify the addition of the components, and gives tips that can help you solve problems. The Cisco Media Gateway Controller (MGC) uses dial plan information to perform different types of number analysis.

This chapter contains the following sections:

- Working with MML, page 5-1
- Creating a Batch File, page 5-6
- Adding Dial Plan Components, page 5-8

Before starting an actual dial plan, refer to Chapter 2, “Preparing for Dial Plan Provisioning,” for instructions on provisioning dial plans for your system.

Working with MML

MML interfaces with the Cisco MGC’s Provisioning Object Manager (POM). The POM requires an active provisioning session to make provisioning changes, except for the A and B whitelist and blacklist screening files. During an active provisioning session, the POM locks all the data files to prevent two users from making conflicting changes. A provisioning session that is inactive for 30 minutes results in a warning. If the session continues without activity for 5 more minutes, the session is terminated.

After starting a provisioning session, MML displays **COMPLD**, indicating successful completion of a command. MML displays **DENY** for failed commands.

The generic format of MML number analysis (dial plan) commands is as follows:

```
mml> numan-<verb>:<tid>:custgrpid=<customer_group_id>, <param_name>=<param_value>, ...
```

Where:

<verb> is one of the following actions:

- **add**—Adds an entry to a dial plan table
 - **ed**—Edits or modifies an entry in a dial plan table
- The verb **ed** cannot be used with the **dialplan** target ID (tid).

- **rtrv**—Retrieves an entry from a dial plan table

The verb **rtrv** can be used with the **dialplan** tid to determine all of the dial plans currently configured on your system for a specified customer group ID.

- **dlt**—Deletes an entry from a dial plan table

`<tid>` is one of the following target IDs:



Note

All tids, with the exception of **dialplan**, require a customer group ID and at least one parameter name. **dialplan** needs only a customer group ID.

- **dialplan**—Is the entire dial plan, including all the tables
- **adigtree**—Is the A Digit Tree table
- **bdigtree**—Is the B Digit Tree table
- **resulttable**—Is the Result table
- **resultset**—Is the Result Set table
- **digmodstring**—Is the Digit Modification String table
- **noa**—Is the Nature of Address (NOA) table
- **npi**—Is the Numbering Plan Indicator (NPI) table
- **cause**—Is the Cause table
- **location**—Is the Location table
- **service**—Is the Service table
- **awhite**—Is the A Whitelist screening file
- **ablack**—Is the A Blacklist screening file
- **bwhite**—Is the B Whitelist screening file
- **bblack**—Is the B Blacklist screening file

`<customer_group_id>`—Is the customer group ID (4 alphanumeric characters starting with a letter)

`<param_name>`—Is one (or more) of the dial plan parameters described in Table 2-3 on page 2-7.

Keep these factors in mind when you are working with MML commands:

- In general, MML commands are *not* case sensitive. However, file names *are* case sensitive when used as arguments in MML commands (for example, TKGFile, BCFFile, RoutingFile).
- Keywords do not need to be enclosed in quotes.
- Use only one MML command on each line. Long MML commands can “wrap” to successive lines.
- As many as 12 different MML sessions can exist on a Cisco MGC host at any time; however, only one provisioning session is allowed.
- You can create an ASCII text file and import it for batch processing of provisioning commands.
- You can also create ASCII text files for populating the screening database and import them. For more information see the “Maintaining the Screening Database” section on page 1-10.
- At the time of deploy/copy, dial plan files from the provisioning directory will be copied to the active directory. The active directory for dial plan files is `/opt/CiscoMGC/dialPlan`.
- The TIDs `dialplan`, `resulttable`, `digmodstring`, `NOA`, `NPI`, `cause`, `location`, `service`, and `resultset` support the ability to retrieve all entries in the table by specifying “all.” For example:

```
numan-rtrv:resultset:custgrpId="t001","all"
```

- The TIDs `adigtree` and `bdigtree` support the ability to retrieve all entries in the table by either not specifying a digitstring or specifying an empty digitstring. For example:

```
numan-rtrv:adigtree:custgrpId="t001",digitstring=""
```

Adding an Element to a Dial Plan Table

To add an element to a dial plan table, use the **NUMAN-ADD** command.

Syntax

The syntax of the **NUMAN-ADD** command is as follows:

```
numan-add:<tablename>:custgrpId=" <custgrpId>" ,name=" <name>"
```

Where:

tablename—Is the name of a specific dial plan table

custgrpId—Is the Customer Group ID associated with the dial plan

name—Is a parameter name, when applicable

Example

The following command adds a route element to the dial plan result table.

```
mml>numan-add:resulttable:custgrpId="t666",name="route",resulttype="2",
dwl="route1",nextresult="0",setname="set1"
Virtual Switch Controller 2001-05-02 11:54:46
M   COMPLD
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The element that you just added should be displayed in the table to which you added it.

Editing an Element in a Dial Plan Table

To edit an element in a dial plan table, use the **NUMAN-ED** command.

Syntax

The syntax of the **NUMAN-ED** command is as follows:

```
numan-ed:<tablename>:custgrpId=" <custgrpId>" ,npiblock=" <npiblocknum>" ,
setname=" <setname>"
```

Where:

tablename—Is the name of a dial plan table

custgrpId—Is the Customer Group ID associated with the dial plan

npiblocknum—Is the number of a specific block in the NPI table

setname—Is a recognized name of a result set

- The **numan-ed** command is not supported for the Service table. Service names can only be added or deleted, not modified.
- The **numan-ed** command is not supported for result sets. Modifications, if necessary, would be done at the result table level.

Example

The following command changes the result set name in the first block in the NPI table:

```
mml>numan-ed:npi:custgrpId="t666",npiblock=1,setname="ra2"
```

```
Virtual Switch Controller 2001-05-02 11:54:46
M  COMPLD
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command. The element that you just edited should be displayed as it was edited.

Retrieving an Element in a Dial Plan Table

To retrieve an element in a dial plan table, use the **NUMAN-RTRV** command.

Syntax

The syntax of the **NUMAN-RTRV** command is as follows:

```
numan-rtrv:<tablename>:custgrpid=<custgrpid>,index=<indexnum>
```

Where:

tablename—Is the name of a dial plan table

custgrpid—Is the Customer Group ID associated with the dial plan

indexnum—Is the index number of a block in the specified dial plan table

Example

The following command retrieves an element from the Bdigtree table in the dial plan.

```
mml> numan-rtrv:bdigtree:custgrpid="t246",index=39
Virtual Switch Controller 2001-05-02 11:54:46
M  COMPLD
```

Verify

Verify that the correct element was retrieved from the bdigtree table.

Deleting an Element from a Dial Plan Table

To delete an element from a dial plan table, use the **NUMAN-DLT** command.

Syntax

The syntax of the **NUMAN-DLT** command is as follows:

```
numan-dlt:<tablename>:custgrpid=<custgrpid>,name=<componentname>
```

Where:

tablename—Is the name of a dial plan table

custgrpid—Is the Customer Group ID associated with the dial plan

componentname—Is a recognized dial plan component name

Example

The following command removes a result set component from the Result set table:

```
mml>numan-dlt:resultset:custgrpid="t246",name="set4"
Virtual Switch Controller 2001-05-02 11:54:46
```

M COMPLD

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The element that you just deleted should *not* be displayed.

Updating a Change in a Dial Plan Table

After adding, deleting, or editing an element in a dial plan table, use the **CHG-DPL** command to deploy the changes.

Syntax

The syntax of the **CHG-DPL** command is as follows:

```
chg-dpl::custgrpid=<custgrpid>
```

Where:

custgrpid—Is the Customer Group ID associated with the dial plan

Example

The following command updates the dial plan for customer group t246:

```
mml>chg-dpl::custgrpid="t246"
Virtual Switch Controller 2001-05-02 11:54:46
M  COMPLD
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The dial plan that you just deployed should now be the active dial plan.

Creating a Batch File

You can create an ASCII text file of MML provisioning commands for use as a batch file. All commands go into a single file, and when the file is read by MML the commands are executed sequentially. MML provisioning commands must be in the correct provisioning sequence based on dial plan component dependencies. For example, result sets cannot be provisioned before result types.

There are advantages to using an MML provisioning batch file. You can cut and paste commands and the batch files can be used repeatedly to “re-provision” the Cisco MGC or to quickly provision multiple Cisco MGCs, if necessary.

You can create an MML batch file by using any ASCII text editor. Simply enter each MML provisioning command on a single line, ending with a carriage return. You can use any name for the file (use the UNIX file naming convention), and you can copy and paste components.



Note

When performing batch provisioning, be sure no call processing is ongoing, so that call processing performance is not affected.

To create a batch file, use an ASCII text editor program to create a new file with one MML command on each line, as shown in Example 5-1. You can use any name for the file, and you can store it in any location; however, the file must be accessible on the machine where you run MML sessions.

Example 5-1 Sample MML Provisioning Batch File

```
prov-sta::srcver="new",dstver="oldyella"
prov-add:ptcode:name="opc",netaddr="111.111.666",netind=1,desc="originating Pointcode"
prov-add:ptcode:name="dpc1",netaddr="444.777.444",netind=2,desc="TDMSwitch dpc1 Pointcode"
prov-add:ptcode:name="dpc2",netaddr="555.333.555",netind=3,desc="HostNode dpc2 Pointcode"
```

```
prov-add:apc:name="apc1",netaddr="666.222.222",desc="STP1 APC pointcode",netind=1
prov-add:apc:name="apc2",netaddr="777.333.333",desc="STP2 APC pointcode",netind=2
prov-add:apc:name="apc3",netaddr="888.777.777",desc="STP3 APC pointcode",netind=3
prov-cpy
```

Notice that the first command starts a provisioning session, and the last command terminates and commits the provisioning session. If you are not ready to commit a session, use the **prov-stp** command to save and stop the provisioning session.

The **prov-cpy** or **prov-dply** command makes the provisioning session active and then automatically stops the provisioning session.

Also notice that the commands in the file do not configure a complete system. You can create batch files to define complete systems or to modify parts of an existing system.

**Note**

If you want to test the batch file before you use it, use the **prov-stp** command.

If you plan to run the batch file multiple times on the same host, plan the source and destination directories carefully. The example shown above would fail if run twice, because the destination directory already exists.

In this example, you could edit the batch file after the first execution and replace the source version name with the destination version name. Future executions of the batch file would then replace the previous configuration.

For more information on the source and destination directories, refer to the next section “Starting a Batch File” which follows.

**Note**

If any of the provisioning commands fail in batch mode, the changes do not become active. The **prov-cpy** and **prov-dply** commands fail, indicating that some of the provisioning commands in the batch file have failed.

**Note**

Due to interdependencies between objects, all dial plan provisioning components should be defined in one provisioning session. If multiple batch files are used, each batch file except the last one should start with **prov-sta** and end with **prov-stp**. End *only* the last batch file with the **prov-cpy** command.

Starting a Batch File

To start executing the batch file, use the following UNIX command.

Syntax

The syntax of the command to execute the MML commands in the batch file is as follows:

```
mml> -b path/filename.ext
```

Where:

path—Is the absolute path to the file

filename.ext—Is the filename of the batch file containing the dial plan provisioning commands

Verify

After you enter the command, MML displays the result of each command as it is executed. When the batch file is done, the MML session is closed.

**Tip**

MML provides a log function that records the MML commands and responses for you in a log file. If you start this function before you start the provisioning session and stop it after you stop the provisioning session, you can let the batch file run unattended and then check the log file later for any error messages. The log command is **diaglog**. For more information on using this command, refer to the *Cisco Media Gateway Software Release 7 MML Command Reference Guide*.

The **diaglog** commands to start and stop can be placed at the beginning and end of an MML batch file. All MML commands are automatically logged to the `mml.log` file located in the `/opt/CiscoMGC/var/log` directory. A sample log file is shown in Example 5-2.

Example 5-2 Sample Log File

```
va-cerulean% more mml.log.4
Sat May 2 04:10:01:694 2001 | mml11 (PID 24954) <Info>
MML_INFO_COMMAND: MML Command
Sat May 2 04:10:06:218 2001 | mml11 (PID 24954) <Info>
MML_INFO_COMMAND: MML Command
mml> sta-aud
  Virtual Switch Controller - VSC-01 2001-05-02 04:10:06
M  RTRV
  SABT
  /* Status, Command Aborted - Command has timed out
    without successful completion of operation
    Some operations may have completed successfully */
va-cerulean%
```

Adding Dial Plan Components

You can add dial plan components using the procedures in the following sections:

- Adding a Dial Plan File, page 5-9
- Adding to the DIGMODSTRING Table, page 5-9
- Adding to the SERVICE Table, page 5-11
- Adding to the RESULTSET Table, page 5-11
- Adding to the DEFRESULTSET Table, page 5-12
- Adding to the RESULTTABLE, page 5-14
- Adding to the ADIGTREE Table, page 5-16
- Adding to the BDIGTREE Table, page 5-16
- Adding to the NOA Table, page 5-17
- Adding to the NPI Table, page 5-19
- Adding to the CAUSE Table, page 5-20
- Adding to the LOCATION Table, page 5-21
- Adding to the AWHITE Table, page 5-22
- Adding to the ABLACK List Table, page 5-22
- Adding to the BWHITE Table, page 5-23
- Adding to the BBLACK Table, page 5-23

**Note**

Configure the dial plan components in the order shown above.

All dial plan components are tables that have a name parameter, which is the MML name, and a description, which is a text description. The parameter's values are either integer or string. The dial plan provisioning is contained in the file *CustGrpId.dialPlan*, where the *CustGrpId* is four alphanumeric characters beginning with a letter.

For more information on dial plan component parameters, refer to Table 2-3 on page 2-7.

Adding a Dial Plan File

The dial plan component is a file that contains dial plan component parameters. Its MML name is DIALPLAN and it resides in the dial plan production directory, */opt/CiscoMGC/dialPlan*.

Syntax

To add a dial plan, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpId=<custgrpId>
```

Where:

component—is the dial plan

custgrpId—is the Customer Group ID associated with the dial plan

Example

In this example, the **numan-add** command adds the dial plan component and the required parameter:

```
mml> numan-add:dialplan:custgrpId="t778"
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

A file should be present in the dial plan production directory, */opt/CiscoMGC/dialPlan*, with the filename *CustGrpId.dialplan*.

Adding to the DIGMODSTRING Table

The Digit Modification table is accessed by the RESULTTABLE to yield a string of numbers to apply to an A-number or B-number. Its MML name is DIGMODSTRING.

Syntax

To add appropriate values to a DIGMODSTRING table in a dial plan, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpId=<custgrpId>,name=<digmodname>,digstring=<digstring>
```

Where:

component—Is the digmodstring component

custgrpId—Is the Customer Group ID associated with the dial plan

digmodname—Is the MML name of the digit modification string

The *digmodname* parameter can be as many as 20 alphanumeric characters and must be unique within a DIGMODSTRING table in a particular dial plan.

digstring—Is the digit string to be applied to an A-number or B-number

Example

In this example, the **numan-add** command adds the digmodstring component and the required parameters:

```
mml>numan-add:digmodstring:custgrpId="t778",name="digmod1",digstring="1045"
```

Notes

A digit modification string cannot be deleted if there is a digit modification result type (AMODDIG or BMODDIG) in the result table that is associated with the digmodstring entry. The digit modification entry in the result table must be changed before the digstring can be deleted.

When a digit modification string has not been assigned, it is defaulted to a value of 'x' or 'X'.

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The DIGMODSTRING table section of the dial plan file should contain the *digmodname* and the *digstring* values that you entered.

Adding to the SERVICE Table

The Service table contains user-defined services for screening. Its MML name is SERVICE.

Syntax

To build a service table, use the **NUMAN-ADD** command.

```
mml>numan-add:component:custgrpid=<custgrpid>,name=<svcname>
```

Where:

component—Is the service table component

custgrpid—Is the Customer Group ID associated with the dial plan

svcname—Is the name associated with a particular service

The *svcname* parameter can be as many as 20 alphanumeric characters and must be unique within a SERVICE table in a particular dial plan.

Example

In this example, the **numan-add** command adds the Service table component and required parameters:

```
mml>numan-add:service:custgrpid="t778",name="TollLine"
```

Notes

A screening entry cannot be deleted if there is a screening result type in the result table that is associated with the service name entry. The entry in the result table must be changed before deleting the service name.

When a service name has not been assigned, it is defaulted to a value of 'x' or 'X'.

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The SERVICE table section of the dial plan file should contain the *svcname* that you just entered.

Adding to the RESULTSET Table

The Result Set table contains the names of the result sets that are applied at the conclusion of number analysis. The Result Set table's MML name is RESULTSET.

Syntax

To build a RESULTSET table section in a dial plan, enter the result set name parameters using the **NUMAN-ADD** command.

```
mml>numan-add:component:custgrpid=<custgrpid>,name=<setname>
```

Where:

component—Is the result set table component

custgrpid—Is the Customer Group ID associated with the dial plan

setname—Is the result set name used in the result set table

Example

In this example, the **numan-add** command adds two result set names to the result set table component:

```
mml>numan-add:resultsettable:custgrpId="t778",name="set1"
mml>numan-add:resultsettable:custgrpId="t778",name="set2"
```

Notes

The **numan-add:resultsettable** commands would continue until the Result Set table is complete.

The RESULTSET table is used only for configuration and not by the real time system. When the real time system reads in the dial plan tables it ignores the RESULTSET table.

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The RESULTSET table section of the dial plan file should contain the result set names that you entered.

Adding to the DEFRESULTSET Table

The Default Result Set table contains the definitions of three result types, which are applied when a digit string is not configured in the B digit tree.

The Default Result Set table's MML name is DEFRESULTSET table.

Syntax

To build a DEFRESULTSET table section in a dial plan, enter the individual result types and data word parameter values to be associated with the default result set using the **NUMAN-ADD** command.

```
mml>numan-add:component:custgrpId=<custgrpId>,resulttype=<resulttype>,
      dw1=<dw1>,dw2=<dw2>,dw3=<dw3>,dw4=<dw4>
```

Where:

component—Is the default result set table component

custgrpId—Is the Customer Group ID associated with the dial plan

resulttype—Is one of the following result types (refer to Table 1-3 on page 1-18)

- BLACKLIST
- CAUSE
- ROUTE

dw1—Is the value associated with dataword 1 for the specified result type

dw2—Is the value associated with dataword 2 for the specified result type

dw3—Is the value associated with dataword 3 for the specified result type

dw4—Is the value associated with dataword 4 for the specified result type

Example

In this example, the **numan-add** command adds a default result set using the result type "blacklist" and specifies the values of the required parameters:

```
mml>numan-add:defresultset:custgrpId="t778",resulttype="blacklist",
      dw1="CPC",dw2=0,dw3=0,dw4=0
```

Verify

To verify that the changes were accomplished, use the **NUMAN-RTRV** command.

The DEFRESULTSET table section of the dial plan file should contain the defined default result set with the assigned result type and datawords as you entered them.

Adding to the RESULTTABLE

The result table contains the definitions of the result sets, which include the result types and their associated parameters that are applied at the conclusion of number analysis. A result set in the table could, for example, point to a SCREENING result type or to an SCP/STP index. The Result table's MML name is RESULTTABLE.

Syntax

To build a RESULTTABLE section in a dial plan, enter the individual result types and data word parameter values to be associated with a specific result set using the **NUMAN-ADD** command.

```
mml>numan-add:component:custgrpid=<custgrpid>,name=<name>,resulttype=<resulttype>,
      dw1=<dw1>,dw2=<dw2>,dw3=<dw3>,dw4=<dw4>,nextresult=<nextresult>,setname=<setname>
```

Where:

component—Is the result table component

custgrpid—Is the Customer Group ID associated with the dial plan

name—Is the user-assigned name for the result, such as “result1.”

resulttype—Is the name of a result type as listed in Table 1-3 on page 1-18

dw1—Is the value associated with dataword 1 for the specified result type

dw2—Is the value associated with dataword 2 for the specified result type

dw3—Is the value associated with dataword 3 for the specified result type

dw4—Is the value associated with dataword 4 for the specified result type

nextresult—Is the user-assigned name for the result type that follows this one, such as “result2”

Enter a value of “0” to indicate the end of the result set—there is no next result type.

setname—Is the name of the result set with which the specified result type is to be associated



Note

A result type can be associated with many different result sets.

Example 1

In this example, the **numan-add** command adds a result named “result1” to the result set named “set1” and specifies the values of the required parameters:

```
mml>numan-add:resulttable:custgrpid="t778",name="result1",resulttype="more_digits_required",
      dw1="5",dw2="0",dw3="0",dw4="0",nextresult="result2",setname="set1"
```

Example 2

In this example, the **numan-add** command adds a result named “result2” to the result set named “set1” and specifies the values of the required parameters:

```
mml>numan-add:resulttable:custgrpid="t778",name="result2",resulttype="route",
      dw1="route1",dw2="0",dw3="0",dw4="0",nextresult="result3",setname="set1"
```

Example 3

In this example, the **numan-add** command adds the last result, named “result3,” to the result set named “set1” and specifies the values of the required parameters:

```
mml>numan-add:resulttable:custgrpid="t778",name="result3",resulttype="cause",
      dw1="31",dw2="0",dw3="0",dw4="0",nextresult="0",setname="set1"
```

**Note**

The **numan-add** commands would continue until all of the result sets that you added in the “Adding to the RESULTSET Table” section on page 5-11 are completely specified.

Verify

To verify that the changes were accomplished, use the **NUMAN-RTRV** command.

The RESULTTABLE section of the dial plan file should contain the defined result sets with the assigned result types as you entered them.

Adding to the ADIGTREE Table

The A-digit tree table contains entries, in blocks of ten, for each A-number. Its output is the name of a result set in the result set table or an indication that no further action is necessary. Its MML name is ADIGTREE.

Syntax

To build an ADIGTREE table, use the **NUMAN-ADD** command.

```
mml> numan-add:<component>:custgrpid=<custgrpid>,setname=<setname>,
    digittopresent=<digittopresent>,callside=<callside>,digitstring=<digitstring>
```

Where:

component—Is the adigittree table

custgrpid—Is the Customer Group ID associated with the dial plan

setname—Is the result set name in the result set table

digittopresent—If it is set to 0, it is the next digit in the incoming digit string; otherwise, it is the digit application point, which is an offset into the incoming digit string

callside—Is either *originating* or *terminating*

digitstring—Is the incoming digit string, which can contain the decadic digits [0 through 9] and the over-decadic digits [A through F].

Example

In this example, the **numan-add** command adds the adigtree component and the required parameters:

```
mml> numan-add:adigittree:custgrpid="t778",setname="set1",digittopresent="4",
    callside="originating",digitstring="7757824"
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The ADIGTREE table section of the dial plan file should contain the values that you just entered.

Adding to the BDIGTREE Table

The B-digit tree table contains entries, in blocks of ten, for each B-number. Its output is the name of a result set in the result set table or an indication that no further action is necessary. Its MML name is BDIGTREE.

Syntax

To build an BDIGTREE table, use the **NUMAN-ADD** command.

```
mml> numan-add:<component>:custgrpid=<custgrpid>,setname=<setname>,
    digittopresent=<digittopresent>,callside=<callside>,digitstring=<digitstring>
```

Where:

component—Is the bdigittree table

custgrpid—Is the Customer Group ID associated with the dial plan

setname—Is the result set name in the result set table

digittopresent—If it is set to 0, it is the next digit in the incoming digit string; otherwise, it is the digit application point, which is an offset into the incoming digit string

callside—Is either *originating* or *terminating*

digitstring—Is the incoming digit string, which can contain the decadic digits [0 through 9] and the over-decadic digits [A through F].

Example

In this example, the **numan-add** command adds the adigtree component and the required parameters:

```
mml> numan-add:bdigittree:custgrpId="t778",setname="set2",digittopresent="0",
      callside="terminating",digitstring="7757825"
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The BDIGTREE table section of the dial plan file should contain the values that you just entered.

Adding to the NOA Table

The Nature of Address (NOA) table provides the capability to carry out early or preanalysis before formal A-number and B-number analyses are requested. Its MML name is NOA.

The two fields in the NOA table are the NPI Block, which is an index to a specific block in the NPI table, and a result set name in the Result Set table that defines the actions to be taken based on the NOA value in the incoming call. The NPI Block value always points to the start of an NPI block, so the value is always $(16(n-1)+1)$ as each NPI block contains sixteen values.

Syntax

To build a NOA table, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpId=<custgrpId>,noaValue=<noaValue>,
      npiblock=<npiblock>,setname=<setname>
```

Where:

component—Is the NOA table

custgrpId—Is the Customer Group ID associated with the dial plan

noaValue—Is the offset into the NOA table, which is provided by the NOA value in the incoming IAM or Setup message

npiblock—Is the value located at the offset into the NOA table specified by the incoming *noaValue* that also designates a specific block in the NPI table

- If the *npiblock* value is set to 0, no analysis is performed in the NPI table.
- If the *npiblock* value is set to any value other than 0, analysis is performed in the NPI block indicated by the *npiblock* value

setname—Is the result set name in the Result Set table associated with the incoming *noaValue*

- If the result set name is set to 0, then no action is taken in the NOA table.
- If the result set name is set to any value other than 0, the action taken is based on the result types included in the Result Set table under the specified result set name

Example

In this example, the **numan-add** command adds the NOA table component and the required parameters:

```
mm1> numan-add:noa:custgrpId="t778",noaValue="3",npiblock="1",setName="set3"
```

Notes

As entries are added to the NOA table, there is validation to ensure that the NPI block and the result set name are defined in the appropriate tables.

If a NOA entry is not assigned, both the NPI block and the result set name default to zero.

A result set name (*setName*) can be configured in the NOA table only if you have an *npiblock* value other than 0. If both the *npiblock* value and the result set name (*setName*) are set to 0, no analysis is performed.

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The NOA table section of the dial plan file should contain the *noaValue*, *npiblock*, and *setName* that you just entered.

Adding to the NPI Table

The Number Plan Indicator (NPI) table provides the capability to carry out early analysis before formal A-number and B-number analyses are requested. Its MML name is NPI.

Syntax

To build an NPI table, use the **NUMAN-ADD** command.

```
mm1> numan-add:component:custgrpId=<custgrpId>,npiblock=<npiblock>,  
      blockvalue=<blockvalue>,setname=<setname>
```

Where:

component—Is the NPI table

custgrpId—Is the Customer Group ID associated with the dial plan

npiblock—Is the number of the block in the NPI table

blockvalue—Is the offset into the NPI block (0 through 15), which is provided by the NPI value in the incoming IAM or Setup message

setname—Is a result set name in the Result Set table

Example

In this example, the **numan-add** command adds the NPI table component and the required parameters:

```
mm1> numan-add:npi:custgrpId="t778",npiblock="1",blockvalue="1",setname="set1"
```

Notes

An NPI table entry cannot be deleted if it is referred to by the NPI block value in the NOA table.

If an NPI entry is not assigned, the result set name (*setname*) defaults to zero.

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The NPI table section of the dial plan file should show the specified result set name at the specified *blockvalue* (or offset) in the specified *npiblock*.

Adding to the CAUSE Table

The Cause table is based on the cause codes generated when a call is rejected or cleared by the system. Its MML name is CAUSE.

The cause for a call release can be a result type, from either B-number analysis or cause analysis, or a failure generated during call processing. The cause codes are used as the release message for internal causes.

The received Cause code (*causevalue*) provides an offset into the Cause table, and the *locationblock* and *setname* values located at that offset provide an offset into the Location table and determine the result types associated with the result set name.

Syntax

To build a Cause table, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpid=<custgrpid>,causevalue=<causevalue>,
      locationblock=<locationblock>,setname=<setname>
```

Where:

component—Is the Cause table

custgrpid—Is the Customer Group ID associated with the dial plan

causevalue—Is the offset into the Cause table that is provided by the Cause code received in a release message.

locationblock—Is the specified block in the Location table

setname—Is a result set name in the Result Set table

Example

In this example, the **numan-add** command adds the Cause table component and the required parameters:

```
mml> numan-add:cause:custgrpid="t778",causevalue=31,locationblock=1,setname="set2"
```

Notes

As entries are added to the Cause table, there is validation to ensure that the Location block and the result set name are defined in the appropriate tables.

If a Cause entry is not assigned, both the Location block and the result set name default to zero.

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The Cause table section of the dial plan file should contain the *locationvalue*, *locationblock*, and *setname* that you just entered.

Adding to the LOCATION Table

The Location table identifies the type of network that originated a call. Its MML name is LOCATION. Each block in the Location table can contain as many as 16 entries. The Cisco MGC uses values from the Cause and Location tables to determine result actions.

Syntax

To build a Location table, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpid=<custgrpid>,locationblock=<locationblock>,  
                blockvalue=<blockvalue>,setname=<setname>
```

Where:

component—Is the Location table

custgrpid—Is the Customer Group ID associated with the dial plan

locationblock—Is a specified block in the Location table as determined from the Cause table

blockvalue—Is the offset into the specified block in the Location table as received in the incoming IAM or Setup message.

setname—Is a result set name in the Result Set table

Example

In this example, the **numan-add** command adds the Location table component and required parameters:

```
mml> numan-add:location:custgrpid="t778",locationblock=1,blockvalue=1,setname="set1"
```

Notes

As entries are added to the Location table, there is validation to ensure that the result set name is defined in the Result Set table.

The location block cannot be deleted if it is referred to in the Location Block column in the Cause table.

When a specific location entry (*locationblock* plus *blockvalue*) has not been assigned, the result set name (*setname*) defaults to zero.

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The Location table section of the dial plan file should contain the *locationblock*, *blockvalue*, and *setname* that you just entered.

Adding to the AWHITE Table

The AWhitelist table contains calling numbers that will be processed. If the calling number is not found in the database, the screening has failed and the call is released. The AWhitelist table's MML name is AWHITE.

Syntax

To build an AWhitelist table, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpId=<custgrpId>,cli=<cli>
```

Where:

component—Is the awhite table

custgrpId—Is the Customer Group ID associated with the dial plan

cli—Is the calling line identifier

Example

In this example, the **numan-add** command adds the awhite table component and the required parameters:

```
mml> numan-add:awhite:custgrpId="t778",cli="9194721234"
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The AWhitelist table section of the dial plan file should contain the *cli* that you just entered.

Adding to the ABLACK List Table

The ABlacklist table contains calling numbers that will not be processed. If the calling number is found in the database, the call is released. The ABlacklist table's MML name is ABLACK.

Syntax

To build an ABlacklist table, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpId=<custgrpId>,cli=<cli>
```

Where:

component—Is the ablack table

custgrpId—Is the Customer Group ID associated with the dial plan

cli—Is the calling line identifier

Example

In this example, the **numan-add** command adds the ablack component and the required parameters:

```
mml> numan-add:ablack:custgrpId="t778",cli="9194724321"
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The ABlacklist table section of the dial plan file should contain the *cli* that you just entered.

Adding to the BWHITE Table

The BWhite list table contains calling numbers to be processed. If the called number is not found in the database, the screening has failed and the call is released. The BWhitelist table's MML name is BWHITE.

Syntax

To build a BWhitelist table, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpid=<custgrpid>,cli=<cli>,svcname=<svcname>
```

Where:

component—Is the bwhite table

custgrpid—Is the Customer Group ID associated with the dial plan

cli—Is the calling line identifier

svcname—Is the service name

Example

In this example, the **numan-add** command adds the bwhite component and the required parameters:

```
mml> numan-add:bwhite:custgrpid="t778",cli="9194721234",svcname="FreePhone"
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The BWhitelist table section of the dial plan file should contain the *cli* and *svcname* that you just entered.

Adding to the BBLACK Table

The BBlack list table contains calling numbers that will not be processed. If the called number is found in the database, the call is released. The BBlacklist table's MML name is BBLACK.

Syntax

To build a BBlacklist table, use the **NUMAN-ADD** command.

```
mml> numan-add:component:custgrpid=<custgrpid>,cli=<cli>,svcname=<svcname>
```

Where:

component—Is the bblack table

custgrpid—Is the Customer Group ID associated with the dial plan

cli—Is the calling line identifier

svcname—Is the service name

Example

In this example, the **numan-add** command adds the bblack component and the required parameters:

```
mml> numan-add:bblack:custgrpid="t778",cli="9194724321",svcname="FreePhone"
```

Verify

To verify that the change was accomplished, use the **NUMAN-RTRV** command.

The BBlacklist table section of the dial plan file should contain the *cli* and *svcname* that you just entered



NOA and NPI Codes

The following sections contain the nature of address (NOA) and numbering plan indicator (NPI) codes for the result types listed in Table 1-3 on page 1-18.

NOA Codes

The NOA codes listed in the following sections define protocol-specific NOA values and the unique mappings to numerical values supported by each protocol. An “X” in any of the variant cells in the following tables indicates that the specified mapping is supported by that protocol variant.

The NOA codes described in the following tables include:

- Internal Call Context NOA Values—Table A-1 on pages A-1 and A-2
- ANSI SS7 NOA Values—Table A-2 on page A-3
- PRI NOA Values—Table A-3 on page A-4
- Q.761 NOA Values—Table A-4 on pages A-4 and A-5
- Q.767 Call Context NOA Values—Table A-5 on page A-6

Internal Call Context NOA Values

Table A-1 describes the internal Call Context NOA values and corresponding numerical values.

Table A-1 Internal Call Context NOA Values

Call Context NOA Mnemonic	Numerical Value
NOA_NONE	1
NOA_UNKNOWN	2
NOA_SUBSCRIBER	3
NOA_NATIONAL	4
NOA_INTERNATIONAL	5
NOA_NETWORK	6
NOA_MERIDIAN	7
NOA_ABBR	8

Table A-1 Internal Call Context NOA Values (continued)

Call Context NOA Mnemonic	Numerical Value
NOA_UNIQUE_3DIG_NAT_NUM	9
NOA_ANI	10
NOA_NO_ANI_REC'D	11
NOA_NON_UNIQUE_SUBSCRIBER	12
NOA_NON_UNIQUE_NATIONAL	13
NOA_NON_UNIQUE_INTERNATIONAL	14
NOA_OPRREQ_TREATED	15
NOA_OPRREQ_SUBSCRIBER	16
NOA_OPRREQ_NATIONAL	17
NOA_OPRREQ_INTERNATIONAL	18
NOA_OPRREQ_NO_NUM	19
NOA_CARRIER_NO_NUM	20
NOA_950_CALL	21
NOA_TEST_LINE_CODE	22
NOA_INT_INBOUND	23
NOA_NAT_OR_INTL_CARRIER_ACC_CODE_INC	24
NOA_CELL_GLOBAL_ID_GSM	25
NOA_CELL_GLOBAL_ID_NMT_900	26
NOA_CELL_GLOBAL_ID_NMT_450	27
NOA_CELL_GLOBAL_ID_AUTONET	28
NOA_PORTED_NUMBER	29
NOA_PISN_SPECIFIC_NUMBER	30
NOA_UK_SPECIFIC_ADDRESS	31
NOA_SPARE	32
NOA_MCI_VNET	33
NOA_INTERNATIONAL_OPERATOR_TO_OPERATOR_OUTSIDE_WZI	34
NOA_INTERNATIONAL_OPERATOR_TO_OPERATOR_INSIDE_WZI	35
NOA_DIRECT_TERMINATION_OVERFLOW	36
NOA_ISN_EXTENDED_INTERNATIONAL_TERMINATION	37
NOA_TRANSFER_ISN_TO_ISN	38
NOA_CREDIT_CARD	39
NOA_DEFINED_IN_SSUTR	40
NOA_DEFINED_IN_SSUTR2	41
RESERVED	42 and above

ANSI SS7 NOA Values

Table A-2 describes the NOA values and corresponding bit code patterns for the ANSI SS7 protocol.

Table A-2 ANSI SS7 NOA Values

ANSI Call Context NOA Value	Protocol Specific Binary Code Pattern	Standard			
		Bell	MCI	Sprint	
NOA_950_CALL	1110110	X	X	X	X
NOA_ABBR	0000110		X	X	X
NOA_ANI	1100111		X		
NOA_CARRIER_NO_NUM	1110101	X	X	X	X
NOA_CREDIT_CARD	1100110		X		
NOA_DIRECT_TERMINATION_OVERFLOW	1111100		X		
NOA_INTERNATIONAL	0000100	X	X	X	X
NOA_INTERNATIONAL_OPERATOR_TO_OPERATOR_INSIDE_WZI	1111011		X		
NOA_INTERNATIONAL_OPERATOR_TO_OPERATOR_OUTSIDE_WZI	1111010		X		
NOA_ISN_EXTENDED_INTERNATIONAL_TERMINATION	1111101		X		
NOA_MCI_VNET	1111000		X		
NOA_NATIONAL_DEFAULT	0000011	X	X	X	X
NOA_NO_ANI_REC'D	1101000		X		
NOA_NON_UNIQUE_INTERNATIONAL	1111001		X		
NOA_NON_UNIQUE_INTERNATIONAL	1110100		X	X	X
NOA_NON_UNIQUE_NATIONAL	1110011		X	X	X
NOA_NON_UNIQUE_NATIONAL	1111000		X		
NOA_NON_UNIQUE_SUBSCRIBER	1110001		X	X	X
NOA_NONE	0000000	X	X	X	X
NOA_OPRREQ_INTERNATIONAL	1110011	X	X	X	X
NOA_OPRREQ_NATIONAL	1110010	X	X	X	X
NOA_OPRREQ_NO_NUM	1110100	X	X	X	X
NOA_OPRREQ_SUBSCRIBER	1110001	X	X	X	X
NOA_SUBSCRIBER	0000001	X	X	X	X
NOA_TEST_LINE_CODE	1110111	X	X	X	X
NOA_TRANSFER_ISN_TO_ISN	1111110		X		

PRI NOA Values

Table A-3 describes the NOA values and corresponding bit code patterns related to the PRI protocol. In keeping with the PRI's MDL program definition, the bit codes are listed with decimal values.

Table A-3 PRI NOA Values

PRI Call Context NOA Value	Protocol Specific Code	ETSI 300-102	ETSI 300-172 (OSIG)	AT&T TR41459	Bell	INSNet
NOA_UNKNOWN	0	X	X	X	X	X
NOA_INTERNATIONAL	1	X	X	X	X	
NOA_NATIONAL DEFAULT	2	X	X	X	X	
NOA_NETWORK	3	X	X	X		
NOA_SUBSCRIBER	4	X	X	X	X	
NOA_MERIDIAN	5	X	X			
NOA_ABBR	6	X	X			

PRI DEFAULT: NOA_NATIONAL

INSNet DEFAULT: NOA_UNKNOWN

Q.761 NOA Values

Table A-4 describes the NOA values and corresponding bit code patterns for the Q.761 protocol.

Table A-4 Q.761 NOA Values

Q.761 Call Context NOA Value	Protocol Specific Binary Code Pattern	Standard Q.761	Australian Q.761	Finnish Q.761	Japanese Q761	Japanese ETS_300_356	Hong_Kong Q761	Belgian Mobistar	Korean Q761	ETS_300_356 and Japan	ETS_300_356 and Spanish	ETS_300_356_V3 and UK
NOA_950_CALL	1110110											
NOA_UNIQUE_3DIG_NAT_NUM	0000011	X	X									
NOA_ANI	1100111											
NOA_NO_ANI_REC'D	0000010	X	X									
NOA_CARRIER_NO_NUM	0000010	X	X									
NOA_CREDIT_CARD	1100110											
NOA_DIRECT_TERMINATION_OVERFLOW	1111100											

Table A-4 Q.761 NOA Values (continued)

Q.761 Call Context NOA Value	Protocol Specific Binary Code Pattern	Standard Q.761	Australian Q.761	Finnish Q.761	Japanese Q761	Japanese ETS_300_356 HONG_KONG Q761	Belgian Mobistar Korean Q761	ETS_300_356 and Japan	ETS_300_356 and Spanish	ETS_300_356_V3 and UK
NOA_INT_INBOUND	0000100	X								X
NOA_INTERNATIONAL	0000100	X	X	X				X	X	
NOA_INTERNATIONAL_OPERATOR_TO_OPERATOR_NSIDE_WZI	1111011									
NOA_INTERNATIONAL_OPERATOR_TO_OPERATOR_OUTSIDE_WZI	1111010									
NOA_ISN_EXTENDED_INTERNATIONAL_TERMINATION	1111101									
NOA_MCI_VNET	1111000									
NOA_NATIONAL_DEFAULT	0000011	X	X	X	X	X		X	X	
NOA_NAT_OR_INTL_CARRIER_ACC_CODE_INC	0000010			X				X		
NOA_NETWORK	1111110					X			X	
NOA_NO_ANI_REC'D	1101000									
NOA_NON_UNIQUE_INTERNATIONAL	1111001									
NOA_NON_UNIQUE_INTERNATIONAL	0000100	X	X							
NOA_NON_UNIQUE_INTERNATIONAL	1110100									
NOA_NON_UNIQUE_NATIONAL	0000011	X	X							
NOA_NON_UNIQUE_NATIONAL	1110011									
NOA_NON_UNIQUE_NATIONAL	1111000									
NOA_NON_UNIQUE_SUBSCRIBER	0000001	X	X							
NOA_NON_UNIQUE_SUBSCRIBER	1110001									
NOA_NONE	0000000	X	X							X
NOA_OPRREQ_INTERNATIONAL	0000100	X	X							
NOA_OPRREQ_NATIONAL	0000011			X						
NOA_OPRREQ_NO_NUM	0000010	X	X							
NOA_OPRREQ_SUBSCRIBER	0000001	X	X							
NOA_SUBSCRIBER	0000001	X				X		X	X	
NOA_TEST_LINE_CODE	1110111									
NOA_TRANSFER_ISN_TO_ISN	1111110									
NOA_UK_SPECIFIC_ADDRESS	1111110									X

Table A-4 Q.761 NOA Values (continued)

NOA_UNKNOWN	1110000	X		X		
NOA_UNKNOWN	0000010	X	X	X		

Q.767 NOA Values

Table A-5 describes the NOA values and corresponding bit code patterns related to the Q.767 protocol.

Table A-5 Q.767 Call Context NOA Values

Q.767 Call Context NOA Value	Protocol Specific Binary Code Pattern	Standard	Italian	Russian	Spanish	Swedish	Polish ¹
NOA_950_CALL	1110110						
NOA_ANI	1100111						
NOA_NO_ANI_REC'D	0000000	X			X		
NOA_CARRIER_NO_NUM	0000000	X					
NOA_CREDIT_CARD	1100110						
NOA_DIRECT_TERMINATION_OVERFLOW	1111100						
NOA_INT_INBOUND	0000100	X					
NOA_INTERNATIONAL	0000100	X				X	
NOA_INTERNATIONAL_OPERATOR_TO_OPERATOR_INSIDE_WZI	1111011						
NOA_INTERNATIONAL_OPERATOR_TO_OPERATOR_OUTSIDE_WZI	1111010						
NOA_ISN_EXTENDED_INTERNATIONAL_TERMINATION	1111101						
NOA_MCI_VNET	1111000						
NOA_NATIONAL_DEFAULT	0000011						
NOA_NATIONAL_DEFAULT	0000011	X	X	X	X	X	X
NOA_NO_ANI_REC'D	1101000						
NOA_UNIQUE_3DIG_NAT_NUM	0000011	X					
NOA_NON_UNIQUE_INTERNATIONAL	0000100	X					
NOA_NON_UNIQUE_INTERNATIONAL	1110100						
NOA_NON_UNIQUE_NATIONAL	0000011	X			X		
NOA_NON_UNIQUE_NATIONAL	1111000						
NOA_NON_UNIQUE_SUBSCRIBER	0000001				X		
NOA_NONE	0000000	X					
NOA_OPRREQ_NATIONAL	0000011	X			X		
NOA_OPRREQ_NO_NUM	0000000	X					
NOA_OPRREQ_SUBSCRIBER	0000001				X		

Table A-5 Q.767 Call Context NOA Values (continued)

NOA_SUBSCRIBER	0000001	X	X	X
NOA_TEST_LINE_CODE	1110111			
NOA_TRANSFER_ISN_TO_ISN	1111110			
NOA_UNKNOWN	0000010			X

1. ETS-300_121 Polish

NPI Codes

The numbering plan indicator (NPI) codes listed in the following sections define protocol-specific NPI values and the unique mappings to numerical values supported by each protocol. An “X” in any of the variant cells in these tables indicates that the specified mapping is supported by that protocol variant.

The NPI codes described in the following tables include:

- Internal NPI Values—Table A-6 on page A-8
- ANSI SS7 NPI Values—Table A-7 on page A-8
- PRI NPI Values—Table A-8 on page A-9

Internal NPI Code Values

Table A-6 describes the internal (Call Context) NPI code values.

Table A-6 Internal NPI Values

Call Context NPI Mnemonic	Numerical Value
NPI_NONE	100
NPI_E164	101
NPI_DATA	102
NPI_TELEX	103
NPI_PNP	104
NPI_NATIONAL	105
NPI_TELEPHONY	106
NPI_MARITIME_MOBILE	107
NPI_LAND_MOBILE	108
NPI_ISDN_MOBILE	109

ANSI SS7 NPI Values

Table A-7 describes the received protocol-specific bit code patterns to internal (Call Context) NPI value mappings supported by the ANSI SS7 protocol.

Table A-7 ANSI SS7 NPI Values

ANSI Call Context NPI Value	Bit Pattern				
		Standard	Bell	MCI	Sprint
NPI_NONE	000		X	X	X
NPI_E164	001		X	X	X
NPI_PNP	101		X	X	X

NAPI2: NPI_E164 DEFAULT

NAPI1: NPI_NONE DEFAULT

PRI NPI Values

Table A-8 describes the received protocol-specific bit code patterns to internal (Call Context) NPI value mappings supported by the PRI protocol.

Table A-8 PRI NPI Values

PRI Call Context NPI Value	Bit Pattern	ETSI 300-102	ETSI 300-172 (OSIG)	AT&T TR41459	Bell	INS Net
NOA_UNKNOWN	0000	X	X	X	X	X
NPI_E164 DEFAULT	0001	X	X	X	X	
NPI_DATA	0011	X	X		X	
NPI_TELEX	0100	X	X			
NOA_NATIONAL	1000	X	X			
NPI_PNP	1001	X	X	X		

DEFAULT: NPI_E164

NAPI1: NPI_NONE DEFAULT



Cause and Location Codes

This appendix contains the cause and location codes for the result types listed in Table 1-3 on page 1-18.

- Internal Cause Codes, page B-1
- DPNSS Cause Codes, page B-4
- ISDN Cause Codes, page B-10
- ISDN PRI Cause Codes, page B-15
- Q.761 Cause Codes, page B-23
- ANSI SS7 Cause Codes, page B-31
- Release Cause Location Codes, page B-37

Each of the cause codes listed in these sections are followed by an explanation.

Internal Cause Codes

The cause codes listed in Table B-1 are generated internally when a call is rejected by, or clearance is initiated by, the system. For more information, see the “Cause Table” section on page 1-26.

Table B-1 Internally Generated Cause Codes

Internal Cause Code	Explanation
IC_ADDRESS_INCOMPLETE	Sending Complete received from originating side, or overlap digit timer expired, with insufficient digits received to route call.
IC_BLACKLIST_BNUMBER_MATCHED	Called Number matches blacklist settings.
IC_BLACKLIST_CLI_LENGTH_INVALID	Received CLI has invalid length.
IC_BLACKLIST_CLI_MATCHED	CLI of incoming call matches black list settings.
IC_BLACKLIST_CPC_RESTRICTED	Calling party category (CPC) of incoming call matches black list settings, or it is missing.
IC_BLACKLIST_NO_CLI	No CLI present with CLIP Essential parameter set.
IC_BLACKLIST_NOA_RESTRICTED	Calling/Called NOA matches black list settings.
IC_CONGESTION	All terminating circuits are currently busy.
IC_INTERWORK_UNSPEC	BSM or FSM required, but not supplied.
IC_NO_CIRCUIT_AVAILABLE	No available trunks.

Table B-1 Internally Generated Cause Codes (continued)

Internal Cause Code	Explanation
IC_NORMAL_CLEARING	Unsupported Suspend/Resume events.
IC_SERVICE_UNAVAILABLE	Receipt of virtual call, with no ASC channel possible.
IC_TEMPORARY_FAILURE	Internal processing has produced an unexpected event, such as a failure to determine the validity of the call, an unimplemented service request, or an ASC failure.
IC_VACANT_CODE	System configuration error.

Internal Cause Code Values

Table B-2 lists the internal cause codes in numerical order by their corresponding numerical values.

Table B-2 Internal Cause Code Values

Internal Cause Code	Value	Internal Cause Code	Value
IC_ACCESS_INFO_DISCARDED	1	IC_MSG_TYPE_NOT_IMP_OR_WRONG_STATE	25
IC_BEARCAP_NOT_AUTHORIZED	2	IC_NETWORK_OUT_OF_ORDER	26
IC_BEARCAP_NOT_AVAIL	3	IC_NO_CALL_SUSPENDED	27
IC_BEARCAP_NOT_IMP	4	IC_NO_ANSWER_ALERTED_USER	28
IC_CALL_AWARDED_DELIVERED_EST_CH	5	IC_NO_CIRCUIT_AVAILABLE	29
IC_CALL_ID_HAS_BEEN_CLEARED	6	IC_NON_SELECTED_USER_CLEARING	30
IC_CALL_ID_IN_USE	7	IC_NORMAL_CLEARING	31
IC_CALL_REJECTED	8	IC_NORMAL_UNSPECIFIED	32
IC_CH_ID_NOT_EXIST	9	IC_NO_ROUTE_TO_DEST	33
IC_CH_TYPE_NOT_IMP	10	IC_NO_ROUTE_TO_TNS	34
IC_CH_UNACCEPTABLE	11	IC_NO_USER_RESPONDING	35
IC_DEST_OUT_OF_ORDER	12	IC_NUMBER_CHANGED	36
IC_ELEM_TYPE_NOT_IMP	13	IC_ONLY_RESTRICT_DIG_INFO_BEARER	37
IC_FACILITY_REJECTED	14	IC_PROTOCOL_ERROR_UNSPEC	38
IC_INCOMPATIBLE_DEST	15	IC_QUALITY_UNAVAIL	39
IC_INTERWORK_UNSPEC	16	IC_RECOVERY_ON_TIMER_EXPIRY	40
IC_INVALID_CALL_REFERENCE_VALUE	17	IC_REQ_CIRCUIT_UNAVAIL	41
IC_INVALID_ELEM_CONTENTS	18	IC_REQ_FACILITY_NOT_IMP	42
IC_INVALID_MSG_UNSPEC	19	IC_REQ_FACILITY_NOT_SUBSCR	43
IC_INVALID_NUMBER_FORMAT	20	IC_RESOURCES_UNAVAIL_UNSPEC	44
IC_INVALID_TNS	21	IC_RESPONSE_TO_STATUS_ENQUIRY	45
IC_MANDATORY_ELEMENT_MISSING	22	IC_SERVICE_OR_OPTION_NOT_IMP_UNSPEC	46
IC_MSG_IN_WRONG_STATE	23	IC_SERVICE_OR_OPTION_NOT_AVAIL	47
IC_MSG_TYPE_NOT_IMP	24	IC_SUSPEND_EXIST_BUT_NOT_THIS_ID	48

Table B-2 Internal Cause Code Values (continued)

Internal Cause Code	Value	Internal Cause Code	Value
IC_SWITCHING_EQUIP_CONGESTION	49	IC_PARAM_UNREC_PASSED	85
IC_TEMPORARY_FAILURE	50	IC_PROPRIETARY	86
IC_UNALLOCATED_NUMBER	51	IC_PREEMPTION	87
IC_USER_BUSY	52	IC_PREEMPTION_CCT_UNAVAILABLE	88
IC_INTERCEPTED_SUBSCRIBER	53	IC_UNALLOCATED_DEST_NUMBER	89
IC_ACCESS_BARRED	54	IC_UNREC_ELEM_PASSED_ON	90
IC_ACKNOWLEDGEMENT	55	IC_SUB_ABSCENT	91
IC_ADDRESS_INCOMPLETE	56	IC_UNDEFINED_BG	92
IC_BUSY	57	IC_ROUTING_ERROR	93
IC_CHANNEL_OUT_OF_SERVICE	58	IC_PRECEDENCE_BLOCKED	94
IC_DTE_CONTROLLED_NOT_READY	59	IC_CALL_TYPE_INCOMPATIBLE	95
IC_CONGESTION	60	IC_GROUP_RESTRICIONS	96
IC_CALL_TERMINATION	61	IC_CALLING_PARTY_OFF_HOLD	97
IC_FACILITY_NOT_REGISTERED	62	IC_CALLING_DROPPED_WHILE_ON_HOLD	98
IC_INCOMING_CALLS_BARRED	63	IC_NEW_DESTINATION	99
IC_SERVICE_INCOMPATIBLE	64	IC_OUTGOING_CALLS_BARRED	100
IC_MESSAGE_NOT_UNDERSTOOD	65	IC_SUB_CONTROLLED_ICB	101
IC_NETWORK_ADDRESS_EXTENSION_ERROR	66	IC_CALL_REJECT_CALL_GAPPING	102
IC_NETWORK_TERMINATION	67	IC_REJECTED_DIVERTED_CALL	103
IC_NUMBER_UNOBTAINABLE	68	IC_SELECTIVE_CALL_BARRING	104
IC_PRIORITY_FORCED_RELEASE	69	IC_REMOTE_PROC_ERROR	105
IC_REJECT	70	IC_TEMPORARY_OOS	106
IC_ROUTE_OUT_OF_SERVICE	71	IC_OPERATOR_PRIORITY_ACCESS	107
IC_SUBSCRIBER_INCOMPATIBLE	72	IC_CUG_ACCESS_BARRED	108
IC_SIGNAL_NOT_UNDERSTOOD	73	IC_SUBSCRIBER_CALL_TERMINATE	109
IC_SIGNAL_NOT_VALID	74	IC_FLOW_CONTROLLED_CONGESTION	110
IC_SUBSCRIBER_OUT_OF_SERVICE	75	IC_OUT_OF_CATCHMENT_AREA	111
IC_SIGNALLING_SYSTEM_INCOMPATIBLE	76	IC_TRANSLATION_OOS	112
IC_SERVICE_TEMPORARILY_UNAVAILABLE	77	IC_PERMANENT_ICB	113
IC_SERVICE_UNAVAILABLE	78	IC_SUBSCRIBER_MOVED	114
IC_DTE_UNCONTROLLED_NOT_READY	79	IC_SUB_NOT_FOUND_DLE	115
IC_TRANSFERRED	80	IC_ANONYMOUS_CALL_REJECTION	116
IC_INCOMING_CALLS_BARRED_IN_CUG	81	IC_TERMINAL_CONGESTION	117
IC_SPECIAL_INFORMATION_TONE	82	IC_REPEAT_ATTEMPT	118
IC_USER_NOT_MEMBER_OF_CUG	83	IC_VACANT_CODE	119
IC_MISDIALLED_TK_PREFIX	84	IC_PREFIX_0_DIALLED_IN_ERROR	120

Table B-2 Internal Cause Code Values (continued)

Internal Cause Code	Value	Internal Cause Code	Value
IC_PREFIX_1_DIALLED_IN_ERROR	121	IC_BLACKLIST_CLI_LENGTH_INVALID	133
IC_PREFIX_1_NOT_DIALLED	122	IC_BLACKLIST_CLI_MATCHED	134
IC_EXCESSIVE_DIG_CALL_PROCEEDING	123	IC_BLACKLIST_CPC_RESTRICTED	135
IC_PROT_ERR_THRESHOLD_EXCEEDED	124	IC_BLACKLIST_NOA_RESTRICTED	136
IC_OUTGOING_CALLS_BARRED_IN_CUG	125	IC_BLACKLIST_BNUMBER_MATCHED	137
IC_INCON_OUTGOING_ACC_AND_SUB_CLASS	126	IC_WHITELIST_CLI_NOT_MATCHED	138
IC_NON_EXISTENT_CUG	127	IC_PORTED_NUMBER	139
IC_MESG_WITH_UNREC_ELEM_DISCARDED	128	IC_REDIRECTION_TO_NEW_DEST	140
IC_PREEMPTION_CCT_RES	129	IC_COT_FAILURE	141
IC_PERMANENT_FRAME_MODE_OOS	130	IC_MISRouted_CALL_PORTED_NUM	142
IC_PERMANENT_FRAME_MODE_OPERATIONAL	131	IC_INVALID_CALL_REF	143
IC_BLACKLIST_NO_CLI	132	IC_UNKNOWN	144

DPNSS Cause Codes

The next two tables provide received DPNSS cause code to internal cause code mappings and internal cause code to transmitted DPNSS cause code mappings.

Received DPNSS Cause Code Mappings

Table B-3 lists received DPNSS cause codes in alphabetical order with their associated hexadecimal values and maps each of them to the corresponding internal cause code and its associated value.

Table B-3 Received DPNSS Cause Code to Internal Cause Code Mappings

Received DPNSS Cause Code	Value	Internal Cause Code	Value
ICP_ACCESS_BARRED	29H	IC_ACCESS_BARRED	54
ICP_ACKNOWLEDGEMENT	14H	IC_ACKNOWLEDGEMENT	55
ICP_ADDRESS_INCOMPLETE	01H	IC_ADDRESS_INCOMPLETE	56
ICP_BUSY	08H	IC_BUSY	57
ICP_CALL_TERMINATION	30H	IC_CALL_TERMINATION	61
ICP_CHANNEL_OUT_OF_SERVICE	23H	IC_CHANNEL_OUT_OF_SERVICE	58
ICP_CONGESTION	07H	IC_CONGESTION	60
ICP_DTE_CONTROLLED_NOT_READY	2DH	IC_DTE_CONTROLLED_NOT_READY	59
ICP_DTE_UNCONTROLLED_NOT_READY	2EH	IC_DTE_UNCONTROLLED_NOT_READY	79
ICP_FACILITY_NOT_REGISTERED	18H	IC_FACILITY_NOT_REGISTERED	62
ICP_INCOMING_CALLS_BARRED	0AH	IC_INCOMING_CALLS_BARRED	63
ICP_MESSAGE_NOT_UNDERSTOOD	1AH	IC_MESSAGE_NOT_UNDERSTOOD	65

Table B-3 Received DPNSS Cause Code to Internal Cause Code Mappings (continued)

Received DPNSS Cause Code	Value	Internal Cause Code	Value
ICP_NETWORK_ADDRESS_EXTENSION_ERROR	1EH	IC_NETWORK_ADDRESS_EXTENSION_ERROR	66
ICP_NETWORK_TERMINATION	02H	IC_NETWORK_TERMINATION	67
ICP_NUMBER_UNOBTAINABLE	00H	IC_NUMBER_UNOBTAINABLE	68
ICP_PRIORITY_FORCED_RELEASE	24H	IC_PRIORITY_FORCED_RELEASE	69
ICP_REJECT	19H	IC_REJECT	70
ICP_ROUTE_OUT_OF_SERVICE	1CH	IC_ROUTE_OUT_OF_SERVICE	71
ICP_SERVICE_INCOMPATIBLE	13H	IC_SERVICE_INCOMPATIBLE	64
ICP_SERVICE_TEMPORARILY_UNAVAILABLE	17H	IC_SERVICE_TEMPORARILY_UNAVAILABLE	77
ICP_SERVICE_UNAVAILABLE	03H	IC_SERVICE_UNAVAILABLE	78
ICP_SIGNALLING_SYSTEM_INCOMPATIBLE	1BH	IC_SIGNALLING_SYSTEM_INCOMPATIBLE	76
ICP_SIGNAL_NOT_UNDERSTOOD	15H	IC_SIGNAL_NOT_UNDERSTOOD	73
ICP_SIGNAL_NOT_VALID	16H	IC_SIGNAL_NOT_VALID	74
ICP_SUBSCRIBER_INCOMPATIBLE	04H	IC_SUBSCRIBER_INCOMPATIBLE	72
ICP_SUBSCRIBER_OUT_OF_SERVICE	09H	IC_SUBSCRIBER_OUT_OF_SERVICE	75
ICP_TRANSFERRED	1DH	IC_TRANSFERRED	80

Transmitted DPNSS Cause Code Mappings

Table B-4 lists internal cause codes in alphabetical order with their associated numerical values and maps each of them to the corresponding transmitted DPNSS cause code and its hexadecimal value.

Table B-4 Internal Cause Code to Transmitted DPNSS Cause Code Mappings

Internal Cause Code	Value	Transmitted DPNSS Cause Code	Value
IC_ACCESS_BARRED	54	ICP_ACCESS_BARRED	29H
IC_ACCESS_INFO_DISCARDED	1	ICP_CALL_TERMINATION	30H
IC_ACKNOWLEDGEMENT	55	ICP_ACKNOWLEDGEMENT	14H
IC_ADDRESS_INCOMPLETE	56	ICP_ADDRESS_INCOMPLETE	01H
IC_ANONYMOUS_CALL_REJECTION	116	ICP_CALL_TERMINATION	30H
IC_BEARCAP_NOT_AUTHORIZED	2	ICP_CALL_TERMINATION	30H
IC_BEARCAP_NOT_AVAIL	3	ICP_CALL_TERMINATION	30H
IC_BEARCAP_NOT_IMP	4	ICP_SERVICE_INCOMPATIBLE	13H
IC_BLACKLIST_BNUMBER_MATCHED	137	ICP_CALL_TERMINATION	30H
IC_BLACKLIST_CLI_LENGTH_INVALID	133	ICP_ACCESS_BARRED	29H
IC_BLACKLIST_CLI_MATCHED	134	ICP_ACCESS_BARRED	29H
IC_BLACKLIST_CPC_RESTRICTED	135	ICP_ACCESS_BARRED	29H
IC_BLACKLIST_NO_CLI	132	ICP_ACCESS_BARRED	29H
IC_BLACKLIST_NOA_RESTRICTED	136	ICP_ACCESS_BARRED	29H

Table B-4 Internal Cause Code to Transmitted DPNSS Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted DPNSS Cause Code	Value
IC_BUSY	57	ICP_BUSY	08H
IC_CALL_AWARDED_DELIVERED_EST_CH	5	ICP_CALL_TERMINATION	30H
IC_CALL_ID_HAS_BEEN_CLEARED	6	ICP_CALL_TERMINATION	30H
IC_CALL_ID_IN_USE	7	ICP_CALL_TERMINATION	30H
IC_CALL_REJECT_CALL_GAPPING	102	ICP_CONGESTION	07H
IC_CALL_REJECTED	8	ICP_CALL_TERMINATION	30H
IC_CALL_TERMINATION	61	ICP_CALL_TERMINATION	30H
IC_CALL_TYPE_INCOMPATIBLE	95	ICP_SUBSCRIBER_INCOMPATIBLE	04H
IC_CALLING_DROPPED_WHILE_ON_HOLD	98	ICP_CALL_TERMINATION	30H
IC_CALLING_PARTY_OFF_HOLD	97	ICP_CALL_TERMINATION	30H
IC_CH_ID_NOT_EXIST	9	ICP_CALL_TERMINATION	30H
IC_CH_TYPE_NOT_IMP	10	ICP_CALL_TERMINATION	30H
IC_CH_UNACCEPTABLE	11	ICP_CALL_TERMINATION	30H
IC_CHANNEL_OUT_OF_SERVICE	58	ICP_CHANNEL_OUT_OF_SERVICE	23H
IC_CONGESTION	60	ICP_CONGESTION	07H
IC_COT_FAILURE	141	ICP_CALL_TERMINATION	30H
IC_CUG_ACCESS_BARRED	108	ICP_ACCESS_BARRED	29H
IC_DEST_OUT_OF_ORDER	12	ICP_SUBSCRIBER_OUT_OF_SERVICE	09H
IC_DTE_CONTROLLED_NOT_READY	59	ICP_DTE_CONTROLLED_NOT_READY	2DH
IC_DTE_UNCONTROLLED_NOT_READY	79	ICP_DTE_UNCONTROLLED_NOT_READY	2EH
IC_ELEM_TYPE_NOT_IMP	13	ICP_CALL_TERMINATION	30H
IC_EXCESSIVE_DIG_CALL_PROCEEDING	123	ICP_CALL_TERMINATION	30H
IC_FACILITY_NOT_REGISTERED	62	ICP_FACILITY_NOT_REGISTERED	18H
IC_FACILITY_REJECTED	14	ICP_CALL_TERMINATION	30H
IC_FLOW_CONTROLLED_CONGESTION	110	ICP_NETWORK_TERMINATION	02H
IC_GROUP_RESTRICTIONS	96	ICP_SUBSCRIBER_INCOMPATIBLE	04H
IC_INCOMING_CALLS_BARRED	63	ICP_INCOMING_CALLS_BARRED	0AH
IC_INCOMING_CALLS_BARRED_IN_CUG	81	ICP_INCOMING_CALLS_BARRED	0AH
IC_INCOMPATIBLE_DEST	15	ICP_SUBSCRIBER_INCOMPATIBLE	04H
IC_INCON_OUTGOING_ACC_AND_SUB_CLASS	126	ICP_CALL_TERMINATION	30H
IC_INTERCEPTED_SUBSCRIBER	53	ICP_CALL_TERMINATION	30H
IC_INTERWORK_UNSPEC	16	ICP_CALL_TERMINATION	30H
IC_INVALID_CALL_REF	143	ICP_CALL_TERMINATION	30H
IC_INVALID_CALL_REFERENCE_VALUE	17	ICP_CALL_TERMINATION	30H
IC_INVALID_ELEM_CONTENTS	18	ICP_CALL_TERMINATION	30H
IC_INVALID_MSG_UNSPEC	19	ICP_CALL_TERMINATION	30H

Table B-4 Internal Cause Code to Transmitted DPNSS Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted DPNSS Cause Code	Value
IC_INVALID_NUMBER_FORMAT	20	ICP_ADDRESS_INCOMPLETE	01H
IC_INVALID_TNS	21	ICP_CALL_TERMINATION	30H
IC_MANDATORY_ELEMENT_MISSING	22	ICP_CALL_TERMINATION	30H
IC_MESG_WITH_UNREC_ELEM_DISCARDED	128	ICP_CALL_TERMINATION	30H
IC_MESSAGE_NOT_UNDERSTOOD	65	ICP_MESSAGE_NOT_UNDERSTOOD	1AH
IC_MISDIALLED_TK_PREFIX	84	ICP_NUMBER_UNOBTAINABLE	00H
IC_MISROUTED_CALL_PORTED_NUM	142	ICP_CALL_TERMINATION	30H
IC_MSG_IN_WRONG_STATE	23	ICP_CALL_TERMINATION	30H
IC_MSG_TYPE_NOT_IMP	24	ICP_CALL_TERMINATION	30H
IC_MSG_TYPE_NOT_IMP_OR_WRONG_STATE	25	ICP_CALL_TERMINATION	30H
IC_NETWORK_ADDRESS_EXTENSION_ERROR	66	ICP_NETWORK_ADDRESS_EXTN_ERROR	1EH
IC_NETWORK_OUT_OF_ORDER	26	ICP_ROUTE_OUT_OF_SERVICE	1CH
IC_NETWORK_TERMINATION	67	ICP_NETWORK_TERMINATION	02H
IC_NEW_DESTINATION	99	ICP_CALL_TERMINATION	30H
IC_NO_ANSWER_ALERTED_USER	28	ICP_NETWORK_TERMINATION	02H
IC_NO_CALL_SUSPENDED	27	ICP_CALL_TERMINATION	30H
IC_NO_CIRCUIT_AVAILABLE	29	ICP_CONGESTION	07H
IC_NO_ROUTE_TO_DEST	33	ICP_CALL_TERMINATION	30H
IC_NO_ROUTE_TO_TNS	34	ICP_CALL_TERMINATION	30H
IC_NO_USER_RESPONDING	35	ICP_NETWORK_TERMINATION	02H
IC_NON_EXISTENT_CUG	127	ICP_CALL_TERMINATION	30H
IC_NON_SELECTED_USER_CLEARING	30	ICP_CALL_TERMINATION	30H
IC_NORMAL_CLEARING	31	ICP_CALL_TERMINATION	30H
IC_NORMAL_UNSPECIFIED	32	ICP_CALL_TERMINATION	30H
IC_NUMBER_CHANGED	36	ICP_NUMBER_UNOBTAINABLE	00H
IC_NUMBER_UNOBTAINABLE	68	ICP_NUMBER_UNOBTAINABLE	00H
IC_ONLY_RESTRICT_DIG_INFO_BEARER	37	ICP_SERVICE_INCOMPATIBLE	13H
IC_OPERATOR_PRIORITY_ACCESS	107	ICP_PRIORITY_FORCED_RELEASE	24H
IC_OUT_OF_CATCHMENT_AREA	111	ICP_NUMBER_UNOBTAINABLE	00H
IC_OUTGOING_CALLS_BARRED	100	ICP_ACCESS_BARRED	29H
IC_OUTGOING_CALLS_BARRED_IN_CUG	125	ICP_CALL_TERMINATION	30H
IC_PARAM_UNREC_PASSED	85	ICP_CALL_TERMINATION	30H
IC_PERMANENT_FRAME_MODE_OOS	130	ICP_CALL_TERMINATION	30H
IC_PERMANENT_FRAME_MODE_OPERATIONAL	131	ICP_CALL_TERMINATION	30H
IC_PERMANENT_ICB	113	ICP_INCOMING_CALLS_BARRED	0AH
IC_PORTED_NUMBER	139	ICP_CALL_TERMINATION	30H

Table B-4 Internal Cause Code to Transmitted DPNSS Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted DPNSS Cause Code	Value
IC_PRECEDENCE_BLOCKED	94	ICP_CALL_TERMINATION	30H
IC_PREEMPTION	87	ICP_CALL_TERMINATION	30H
IC_PREEMPTION_CCT_RES	129	ICP_CALL_TERMINATION	30H
IC_PREEMPTION_CCT_UNAVAILABLE	88	ICP_CALL_TERMINATION	30H
IC_PREFIX_0_DIALLED_IN_ERROR	120	ICP_CALL_TERMINATION	30H
IC_PREFIX_1_DIALLED_IN_ERROR	121	ICP_CALL_TERMINATION	30H
IC_PREFIX_1_NOT_DIALLED	122	ICP_CALL_TERMINATION	30H
IC_PRIORITY_FORCED_RELEASE	69	ICP_PRIORITY_FORCED_RELEASE	24H
IC_PROPRIETARY	86	ICP_CALL_TERMINATION	30H
IC_PROT_ERR_THRESHOLD_EXCEEDED	124	ICP_CALL_TERMINATION	30H
IC_PROTOCOL_ERROR_UNSPEC	38	ICP_CALL_TERMINATION	30H
IC_QUALITY_UNAVAIL	39	ICP_CALL_TERMINATION	30H
IC_RECOVERY_ON_TIMER_EXPIRY	40	ICP_NETWORK_TERMINATION	02H
IC_REDIRECTION_TO_NEW_DEST	140	ICP_CALL_TERMINATION	30H
IC_REJECT	70	ICP_REJECT	19H
IC_REJECTED_DIVERTED_CALL	103	ICP_CONGESTION	07H
IC_REMOTE_PROC_ERROR	105	ICP_NETWORK_TERMINATION	02H
IC_REPEAT_ATTEMPT	118	ICP_CALL_TERMINATION	30H
IC_REQ_CIRCUIT_UNAVAIL	41	ICP_CONGESTION	07H
IC_REQ_FACILITY_NOT_IMP	42	ICP_CALL_TERMINATION	30H
IC_REQ_FACILITY_NOT_SUBSCR	43	ICP_CALL_TERMINATION	30H
IC_RESOURCES_UNAVAIL_UNSPEC	44	ICP_CALL_TERMINATION	30H
IC_RESPONSE_TO_STATUS_ENQUIRY	45	ICP_CALL_TERMINATION	30H
IC_ROUTE_OUT_OF_SERVICE	71	ICP_ROUTE_OUT_OF_SERVICE	1CH
IC_ROUTING_ERROR	93	ICP_NUMBER_UNOBTAINABLE	00H
IC_SELECTIVE_CALL_BARRING	104	ICP_ACCESS_BARRED	29H
IC_SERVICE_INCOMPATIBLE	64	ICP_SERVICE_INCOMPATIBLE	13H
IC_SERVICE_OR_OPTION_NOT_AVAIL	47	ICP_CALL_TERMINATION	30H
IC_SERVICE_OR_OPTION_NOT_IMP_UNSPEC	46	ICP_CALL_TERMINATION	30H
IC_SERVICE_TEMPORARILY_UNAVAILABLE	77	ICP_SERVICE_TEMPORARILY_UNAVAILABLE	17H
IC_SERVICE_UNAVAILABLE	78	ICP_SERVICE_UNAVAILABLE	03H
IC_SIGNAL_NOT_UNDERSTOOD	73	ICP_SIGNAL_NOT_UNDERSTOOD	15H
IC_SIGNAL_NOT_VALID	74	ICP_SIGNAL_NOT_VALID	16H
IC_SIGNALING_SYSTEM_INCOMPATIBLE	76	ICP_SIGNALING_SYSTEM_INCOMPATIBLE	1BH
IC_SPECIAL_INFORMATION_TONE	82	ICP_CALL_TERMINATION	30H
IC_SUB_ABSCENT	91	ICP_CALL_TERMINATION	30H

Table B-4 Internal Cause Code to Transmitted DPNSS Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted DPNSS Cause Code	Value
IC_SUB_CONTROLLED_ICB	101	ICP_INCOMING_CALLS_BARRED	0AH
IC_SUB_NOT_FOUND_DLE	115	ICP_NUMBER_UNOBTAINABLE	00H
IC_SUBSCRIBER_CALL_TERMINATE	109	ICP_CALL_TERMINATION	30H
IC_SUBSCRIBER_INCOMPATIBLE	72	ICP_SUBSCRIBER_INCOMPATIBLE	04H
IC_SUBSCRIBER_MOVED	114	ICP_NUMBER_UNOBTAINABLE	00H
IC_SUBSCRIBER_OUT_OF_SERVICE	75	ICP_SUBSCRIBER_OUT_OF_SERVICE	09H
IC_SUSPEND_EXIST_BUT_NOT_THIS_ID	48	ICP_CALL_TERMINATION	30H
IC_SWITCHING_EQUIP_CONGESTION	49	ICP_CONGESTION	07H
IC_TEMPORARY_FAILURE	50	ICP_CONGESTION	07H
IC_TEMPORARY_OOS	106	ICP_SUBSCRIBER_OUT_OF_SERVICE	09H
IC_TERMINAL_CONGESTION	117	ICP_CALL_TERMINATION	30H
IC_TRANSFERRED	80	ICP_TRANSFERRED	1DH
IC_TRANSLATION_OOS	112	ICP_ROUTE_OUT_OF_SERVICE	1CH
IC_UNALLOCATED_DEST_NUMBER	89	ICP_CALL_TERMINATION	30H
IC_UNALLOCATED_NUMBER	51	ICP_NUMBER_UNOBTAINABLE	00H
IC_UNDEFINED_BG	92	ICP_CALL_TERMINATION	30H
IC_UNKNOWN	144	ICP_CALL_TERMINATION	30H
IC_UNREC_ELEM_PASSED_ON	90	ICP_CALL_TERMINATION	30H
IC_USER_BUSY	52	ICP_BUSY	08H
IC_USER_NOT_MEMBER_OF_CUG	83	ICP_CALL_TERMINATION	30H
IC_VACANT_CODE	119	ICP_CALL_TERMINATION	30H
IC_WHITELIST_CLI_NOT_MATCHED	138	ICP_CALL_TERMINATION	30H

ISDN Cause Codes

This section explains how to interpret the Integrated Services Digital Network (ISDN) disconnect cause codes to identify the reason a call was disconnected.

Table B-5 provides a breakdown of the ISDN Q931 disconnect cause code.

Table B-5 Q931 Disconnect Cause Code Explanation

Cause i =		0x829F08	
Parsed Hex Digits	0x82	9F	08
Description	Cause Code origination point	Disconnect Cause Code	Optional Diagnostic field

The leading **0x** in the disconnect code indicates the digits that follow are in hexadecimal.

The first two digits after **0x** indicate the point in the circuit path where the disconnected cause code was generated. In the example above, **0x82** indicates that the call was disconnected from the local telco switch.

You can use this list to determine where a call was disconnected:

- **0x80**—From the router
- **0x81**—From the private network near the local user (possibly a local private branch exchange [PBX])
- **0x82**—From the public network near the local user (local telco switch)
- **0x83**—From the transit network (in the ISDN cloud)
- **0x84**—From the public network near the remote user (remote telco switch)
- **0x85**—From the private network near the remote user (possibly a remote PBX)
- **0x87**—From the international network
- **0x8A**—From a network beyond the internetworking point

The two hexadecimal digits that follow the cause code digits above are significant in troubleshooting (**9F** in Table B-5). Table B-6 shows the cause value field and description.

The last two hexadecimal digits (**08** in Table B-5) are optional and are not commonly used for diagnostic purposes. Use Table B-6 to associate a disconnect cause code and the reason for the disconnect.

Table B-6 Q931 Disconnect Cause Codes

Code	Cause Description	Additional Information
81	Unallocated or unassigned number	The ISDN number is sent to the switch in the correct format. However, the number is not assigned to destination equipment.
82	No route to specified network	The ISDN exchange is asked to route the call through an unrecognized intermediate network.
83	No route to destination	The call routes through an intermediate network that does not serve the destination address.
86	Channel unacceptable	The service quality of the specified channel is insufficient for the connection to be accepted.

Table B-6 Q931 Disconnect Cause Codes (continued)

87	Call awarded and delivered in established channel	The user assigns an incoming call that is connecting to an already established call channel.
Code	Cause Description	Additional Information
90	Normal call clearing	Normal call clearing occurs. No action is required.
91	User busy	Called system acknowledges the connection request, but cannot accept the call because all B-channels are in use.
92	No user responding	Destination does not respond to the call.
93	No answer from user	Destination responds to the connection request, but fails to complete the connection within the prescribed time. The problem is at the remote end of the connection.
95	Call rejected	Destination can accept call, but rejects it for an unknown reason.
96	Number changed	ISDN number used to set up the call is not assigned to a system.
9A	Non-selected user clearing	Destination can accept the call, but rejects it because it is not assigned to the user.
9B	Destination out of order	Destination cannot be reached because of an interface malfunction, and a signaling message cannot be delivered. This can be a temporary condition, but it could last for an extended period. (The remote equipment might be turned off.)
9C	Invalid number format	Connection fails because destination address is presented in an unrecognizable format, or destination address is incomplete.
9D	Facility rejected	Facility requested by user cannot be provided by the network.
9E	Response to STATUS ENQUIRY	Status message is generated in direct response to the reception of a status inquiry message.
9F	Normal, unspecified	Reports the occurrence of a normal event when no standard cause applies. No action required.
A2	No channel available	Connection fails because no appropriate channel is available to take the call.
A6	Network out of order	Destination cannot be reached because of network malfunction, and the condition can last for an extended period. An immediate reconnect attempt is likely to fail.
A9	Temporary failure	Error occurs because of a network malfunction. The problem is resolved shortly.
AA	Switching equipment congestion	Destination cannot be reached because the network switching equipment is temporarily overloaded.
AB	Access information discarded	Network cannot provide the requested access information.
AC	Requested channel not available	Remote equipment cannot provide the requested channel for an unknown reason. This can be a temporary problem.
AF	Resources unavailable, unspecified	Requested channel or service is unavailable for an unknown reason. This can be a temporary problem.
B1	Quality of service unavailable	Requested quality of service cannot be provided by the network. This can be a subscription problem.

Table B-6 Q931 Disconnect Cause Codes (continued)

B2	Requested facility not subscribed	Remote equipment supports requested supplementary service by subscription only.
B9	Bearer capability not authorized	User requests a bearer capability that the network provides, but the user is not authorized to use it. This can be a subscription problem.
Code	Cause Description	Additional Information
BA	Bearer capability not presently available	Network normally provides the requested bearer capability, but it is unavailable at the present time. This can be a temporary network problem or a subscription problem.
BF	Service/option not available, unspecified	Network or remote equipment cannot provide the requested service option for an unspecified reason. This can be a subscription problem.
C1	Bearer capability not implemented	Network cannot provide bearer capability requested by the user.
C2	Channel type not implemented	Network or destination equipment does not support requested channel type.
C5	Requested facility not implemented	Remote equipment does not support requested supplementary service.
C6	Only restricted digital info bearer capability available	Network cannot provide unrestricted digital information bearer capability.
CF	Service/option not implemented, unspecified	Network or remote equipment cannot provide requested service option for an unspecified reason. This can be a subscription problem.
D1	Invalid call reference value	Remote equipment receives a call with a call reference that is not currently in use on the user-network interface.
D2	Channel does not exist	Receiving equipment is requested to use a channel that is not activated on the interface for calls.
D3	Suspended call exists, but call id does not	Network receives a call resume request that contains a Call Identify that indicates it is being used for a suspended call.
D4	Call ID in use	Network receives a call resume request that contains a Call ID that indicates the resume request is in use for a suspended call.
D5	No call suspended	Network receives a call resume request when there is not a suspended call pending. This can be a transient error that will be resolved by successive call retries.
D6	Call with requested call ID has been cleared	Network receives a call resume request that contains a Call ID that once indicated a suspended call. However, the suspended call was cleared either by time-out or by remote user.
D8	Incompatible destination	Indicates that an attempt is made to connect to non-ISDN equipment. (For example, an analog line.)
DB	Invalid transit network selection	ISDN exchange is asked to route the call through an unrecognized intermediate network.
DF	Invalid message, unspecified	An invalid message is received with no standard cause. This is usually due to a D-channel error. If error occurs systematically, report it to your ISDN service provider.

Table B-6 Q931 Disconnect Cause Codes (continued)

E0	Mandatory IE missing	Receiving equipment receives a message that does not include a mandatory information element. This is due to a D-channel error. Ensure that the switch type is configured correctly. A Cisco IOS Software upgrade on the router can alleviate this issue. If error occurs systematically, report it to your ISDN service provider.
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Table B-6 Q931 Disconnect Cause Codes (continued)

Code	Cause Description	Additional Information
E1	Message type not implemented	Receiving equipment receives an unrecognized message, because the message type is invalid or the message type is valid, but not supported. The cause is a problem with the remote configuration or with the local D-channel.
E2	Message not compatible with call state or not implemented	Remote equipment receives an invalid message with no standard cause. The cause is a D-channel error. If the error occurs systematically, report it to ISDN service provider.
E3	IE not implemented	Remote equipment receives a message that includes unrecognized information elements. This is a D-channel error. If the error occurs systematically, report it to your ISDN service provider.
E4	Invalid IE contents	Remote equipment receives a message that includes invalid information elements. This is due to a D-channel error.
E5	Message not compatible with call state	Remote equipment receives an expected message that does not correspond to the current state of the connection. This is a D-channel error.
EF	Protocol error, unspecified	An unspecified D-channel error with no other standard cause.
FF	Interworking, unspecified	An event occurs, but the network does not provide causes for the action it takes. The precise problem is unknown.
??	Unknown Cause value	The cause value is unknown.

ISDN PRI Cause Codes

The next four tables provide received ISDN PRI cause code to internal cause code mappings, and the fifth table provides internal cause code to transmitted ISDN PRI cause code mappings.

Received ISDN PRI Cause Code Mappings

Table B-7 lists received ISDN PRI cause codes in alphabetical order along with their associated values and maps each of them to the corresponding internal cause code and its associated value.

Table B-7 Received PRI Cause Code to Internal Cause Code Mappings

Received PRI Cause Code	Value	Internal Cause Code	Value
ICPAccessInfoDiscarded	43	IC_ACCESS_INFO_DISCARDED	1
ICPBearCapNotAuthorized	57	IC_BEARCAP_NOT_AUTHORIZED	2
ICPBearCapNotAvail	58	IC_BEARCAP_NOT_AVAIL	3
ICPBearCapNotImp	65	IC_BEARCAP_NOT_IMP	4
ICPCallAwardedDeliveredEstCh	7	IC_CALL_AWARDED_DELIVERED_EST_CH	5
ICPCallIdHasBeenCleared	86	IC_CALL_ID_HAS_BEEN_CLEARED	6
ICPCallIdInUse	84	IC_CALL_ID_IN_USE	7
ICPCallRejected	21	IC_CALL_REJECTED	8
ICPChIdNotExist	82	IC_CH_ID_NOT_EXIST	9
ICPChTypeNotImp	66	IC_CH_TYPE_NOT_IMP	10
ICPChUnacceptable	6	IC_CH_UNACCEPTABLE	11
ICPDestOutOfOrder	27	IC_DEST_OUT_OF_ORDER	12
ICPElemTypeNotImp	99	IC_ELEM_TYPE_NOT_IMP	13
ICPFacilityRejected	29	IC_FACILITY_REJECTED	14
ICPIncompatibleDest	88	IC_INCOMPATIBLE_DEST	15
ICPInterworkUnspec	127	IC_INTERWORK_UNSPEC	16
ICPInvalidCallReferenceValue	81	IC_INVALID_CALL_REFERENCE_VALUE	17
ICPInvalidElemContents	100	IC_INVALID_ELEM_CONTENTS	18
ICPInvalidMsgUnspec	95	IC_INVALID_MSG_UNSPEC	19
ICPInvalidNumberFormat	28	IC_INVALID_NUMBER_FORMAT	20
ICPInvalidTNS	91	IC_INVALID_TNS	21
ICPMandatoryElementMissing	96	IC_MANDATORY_ELEMENT_MISSING	22
ICPMsgInWrongState	101	IC_MSG_IN_WRONG_STATE	23
ICPMsgTypeNotImp	97	IC_MSG_TYPE_NOT_IMP	24
ICPMsgTypeNotImpOrWrongState	98	IC_MSG_TYPE_NOT_IMP_OR_WRONG_STATE	25
ICPNetworkOutOfOrder	38	IC_NETWORK_OUT_OF_ORDER	26
ICPNoAnswerAlertedUser	19	IC_NO_ANSWER_ALERTED_USER	28
ICPNoCallSuspended	85	IC_NO_CALL_SUSPENDED	27

Table B-7 Received PRI Cause Code to Internal Cause Code Mappings (continued)

Received PRI Cause Code	Value	Internal Cause Code	Value
ICPNoCircuitAvailable	34	IC_NO_CIRCUIT_AVAILABLE	29
ICPNonSelectedUserClearing	26	IC_NON_SELECTED_USER_CLEARING	30
ICPNormalClearing	16	IC_NORMAL_CLEARING	31
ICPNormalUnspecified	31	IC_NORMAL_UNSPECIFIED	32
ICPNoRouteToDest	3	IC_NO_ROUTE_TO_DEST	33
ICPNoRouteToTNS	2	IC_NO_ROUTE_TO_TNS	34
ICPNoUserResponding	18	IC_NO_USER_RESPONDING	35
ICPNumberChanged	22	IC_NUMBER_CHANGED	36
ICPOnlyRestrictDigInfoBearer	70	IC_ONLY_RESTRICT_DIG_INFO_BEARER	37
ICPProtocolErrorUnspec	111	IC_PROTOCOL_ERROR_UNSPEC	38
ICPQualityUnavail	49	IC_QUALITY_UNAVAIL	39
ICPRecoveryOnTimerExpiry	102	IC_RECOVERY_ON_TIMER_EXPIRY	40
ICPReqCircuitUnavail	44	IC_REQ_CIRCUIT_UNAVAIL	41
ICPReqFacilityNotImp	69	IC_REQ_FACILITY_NOT_IMP	42
ICPReqFacilityNotSubscr	50	IC_REQ_FACILITY_NOT_SUBSCR	43
ICPResourcesUnavailUnspec	47	IC_RESOURCES_UNAVAIL_UNSPEC	44
ICPResponseToStatusEnquiry	30	IC_RESPONSE_TO_STATUS_ENQUIRY	45
ICPServiceOrOptionNotAvail	63	IC_SERVICE_OR_OPTION_NOT_AVAIL	47
ICPServiceOrOptionNotImpUnspec	79	IC_SERVICE_OR_OPTION_NOT_IMP_UNSPEC	46
ICPSuspendExistButNotThisId	83	IC_SUSPEND_EXIST_BUT_NOT_THIS_ID	48
ICPSwitchingEquipCongestion	42	IC_SWITCHING_EQUIP_CONGESTION	49
ICPTemporaryFailure	41	IC_TEMPORARY_FAILURE	50
ICPUnallocatedNumber	1	IC_UNALLOCATED_NUMBER	51
ICPUserBusy	17	IC_USER_BUSY	52

Received AT&T TR41459 Specific PRI Cause Code Mappings

Table B-8 lists received AT&T TR41459 specific PRI cause codes in alphabetical order along with their associated values and maps each of them to the corresponding internal cause code and its value.

Table B-8 Received AT&T TR41459 Specific PRI Cause Code to Internal Cause Code Mappings

Received AT&T TR41459 PRI Cause Codes	Value	Internal Cause Code	Value
ICPCallingDroppedWhileOnHold	3	IC_CALLING_DROPPED_WHILE_ON_HOLD	97
ICPCallingPartyOffHold	2	IC_CALLING_PARTY_OFF_HOLD	96
ICPIncomingCallsBarred	54	IC_INCOMING_CALLS_BARRED	62
ICPNewDestination	47	IC_NEW_DESTINATION	98
ICPOutgoingCallsBarred	52	IC_OUTGOING_CALLS_BARRED	99

Received BELL 1268 Specific PRI Cause Code Mappings

Table B-9 lists received Bell 1268 specific PRI cause codes in alphabetical order along with their associated values, and maps each of them to the corresponding internal cause code and its associated value.

Table B-9 Received Bell 1268 Specific PRI Cause Code to Internal Cause Code Mappings

Received Bell 1268 PRI Cause Codes	Value	Internal Cause Code	Value
ICPExcessiveDigCallProceeding	11	IC_EXCESSIVE_DIG_CALL_PROCEEDING	122
ICPPrefix0DialledInError	8	IC_PREFIX_0_DIALLED_IN_ERROR	119
ICPPrefix1DialledInError	9	IC_PREFIX_1_DIALLED_IN_ERROR	120
ICPPrefix1NotDialled	10	IC_PREFIX_1_NOT_DIALLED	121
ICPProtErrThresholdExceeded	101	IC_PROT_ERR_THRESHOLD_EXCEEDED	123
ICPVacantCode	4	IC_VACENT_CODE	118

Received INS 1500 Specific Cause Code Mappings

Table B-10 lists received INS 1500 specific PRI cause codes in alphabetical order along with their associated values, and maps each of them to the corresponding internal cause code and its associated value.

Table B-10 INS 1500 Specific PRI Cause Code to Internal Cause Code Mappings

Received INS 1500 PRI Cause Codes	Value	Internal Cause Code	Value
ICPIncomingCallsBarredWithinCUG	55	IC_INCOMING_CALLS_BARRED_IN_CUG	80
ICPInconsistencyInOGAccess	62	IC_INCON_OUTGOING_ACC_AND_SUB_CLASS	125
ICPMisDialledTrunkPrefix	5	IC_MISDIALLED_TK_PREFIX	83
ICPMsgWithUnreqParamDiscarded	110	IC_MESG_WITH_UNREC_ELEM_DISCARDED	127
ICPNonExistentCUG	90	IC_NON_EXISTENT_CUG	126
ICPOutgoingCallsBarredWithinCUG	53	IC_OUTGOING_CALLS_BARRED_IN_CUG	124
ICPParameterNonExistentPassedOn	103	IC_PARAM_UNREC_PASSED	84
ICPPermFrameModeOOS	39	IC_PERMANENT_FRAME_MODE_OOS	129
ICPPermFrameModeOperational	40	IC_PERMANENT_FRAME_MODE_OPERATIONAL	130
ICPPrecedenceCallBlocked	46	IC_PRECEDENCE_BLOCKED	93
ICPPreemption	8	IC_PREEMPTION	86
ICPPreemptionCircuitReserved	9	IC_PREEMPTION_CCT_RES	128
ICPSendSpecialInformationTone	4	IC_SPECIAL_INFORMATION_TONE	81
ICPSubscriberAbsent	20	IC_SUB_ABSCENT	90
ICPUserNotMemberOfCUG	87	IC_USER_NOT_MEMBER_OF_CUG	82

Transmitted ISDN PRI Cause Code Mappings

Table B-11 shows the mapping performed if a transmitted ISDN PRI cause code is supported by one or more of the protocol variants listed in the columns on the right. If the transmitted ISDN PRI cause code is not supported by a protocol variant, then that variant's column is not checked. If no transmitted ISDN PRI cause code value is mapped to the internal cause code, the ISDN PRI cause code value transmitted is NormalUnspecified (31).

Table B-11 Internal Cause Code to Transmitted PRI Cause Code Mappings

Internal Cause Code	Value	Transmitted PRI Cause Code	Value	ETSI 300-102	ETSI 300-172 (OSIG)	AT&T TR41459	BELL 1268	INS 1500 (INSNet)
IC_ACCESS_BARRED	54	ICPNormalClearing	16	X	X	X	X	X
IC_ACCESS_INFO_DISCARDED	1	ICPAccessInfoDiscarded	43	X			X	X
IC_ACKNOWLEDGEMENT	55	ICPNormalClearing	16	X	X	X	X	X
IC_ADDRESS_INCOMPLETE	55	ICPInvalidNumberFormat	28	X	X		X	X
IC_ADDRESS_INCOMPLETE	56	ICPNormalClearing	16			X		
IC_ANONYMOUS_CALL_REJECTION	116	ICPNormalUnspecified	31	X	X	X	X	X
IC_BEARCAP_NOT_AUTHORIZED	2	ICPBearCapNotAuthorized	57	X	X		X	X
IC_BEARCAP_NOT_AVAIL	3	ICPBearCapNotAvail	58	X	X	X		X
IC_BEARCAP_NOT_IMP	4	ICPBearCapNotImp	65	X	X	X	X	X
IC_BLACKLIST_BNUMBER_MATCHED	137	ICPServiceOrOptionNotAvail	63	X	X	X	X	X
IC_BLACKLIST_CLI_LENGTH_INVALID	133	ICPServiceOrOptionNotAvail	63	X	X	X	X	X
IC_BLACKLIST_CLI_MATCHED	134	ICPServiceOrOptionNotAvail	63	X	X	X	X	X
IC_BLACKLIST_CPC_RESTRICTED	135	ICPServiceOrOptionNotAvail	63	X	X	X	X	X
IC_BLACKLIST_NO_CLI	132	ICPServiceOrOptionNotAvail	63	X	X	X	X	X
IC_BLACKLIST_NOA_RESTRICTED	136	ICPServiceOrOptionNotAvail	63	X	X	X	X	X
IC_BUSY	57	ICPUserBusy	17	X	X	X	X	X
IC_CALL_AWARDED_DELIVERED_EST_CH	5	ICPCallAwardedDeliveredEstCh	7	X			X	X
IC_CALL_ID_HAS_BEEN_CLEARED	6	ICPCallIdHasBeenCleared	86	X				X
IC_CALL_ID_IN_USE	7	ICPCallIdInUse	84	X				X
IC_CALL_REJECT_CALL_GAPPING	102	ICPNormalUnspecified	31	X	X	X	X	X
IC_CALL_REJECTED	8	ICPCallRejected	21	X	X	X	X	X
IC_CALL_TERMINATION	61	ICPNormalClearing	16	X	X	X	X	X
IC_CALL_TYPE_INCOMPATIBLE	95	ICPNormalUnspecified	31	X	X	X	X	X
IC_CALLING_DROPPED_WHILE_ON_HOLD	98	ICPCallingDroppedWhileOnHold	3			X		
IC_CALLING_PARTY_OFF_HOLD	97	ICPCallingPartyOffHold	2			X		
IC_CH_ID_NOT_EXIST	9	ICPChIdNotExist	82	X	X	X		X

Table B-11 Internal Cause Code to Transmitted PRI Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted PRI Cause Code	Value					
				ETSI 300-102	ETSI 300-172 (OSIG)	AT&T TR41459	BELL 1268	INS 1500 (INSNet)
IC_CH_TYPE_NOT_IMP	10	ICPChTypeNotImp	66	X	X	X		X
IC_CH_UNACCEPTABLE	11	ICPChUnacceptable	6	X	X	X	X	X
IC_CHANNEL_OUT_OF_SERVICE	58	ICPTemporaryFailure	41	X	X	X	X	X
IC_CONGESTION	60	ICPNoCircuitAvailable	34	X	X	X	X	X
IC_COT_FAILURE	141	ICPNormalUnspecified	31	X	X	X	X	X
IC_CUG_ACCESS_BARRED	108	ICPNormalUnspecified	31	X	X	X	X	X
IC_DEST_OUT_OF_ORDER	12	ICPDestOutOfOrder	27	X	X			X
IC_DTE_CONTROLLED_NOT_READY	59	ICPNormalClearing	16	X	X	X	X	X
IC_DTE_UNCONTROLLED_NOT_READY	79	ICPNormalClearing	16	X	X	X	X	X
IC_ELEM_TYPE_NOT_IMP	13	ICPElemTypeNotImp	99	X	X	X	X	X
IC_EXCESSIVE_DIG_CALL_PROCEEDING	123	ICPExcessiveDigCallProceeding	11					X
IC_FACILITY_NOT_REGISTERED	62	ICPNormalClearing	16	X	X	X	X	X
IC_FACILITY_REJECTED	14	ICPFacilityRejected	29	X		X		X
IC_FLOW_CONTROLLED_CONGESTION	110	ICPNormalUnspecified	31	X	X	X	X	X
IC_GROUP_RESTRICTIONS	96	ICPNormalUnspecified	31	X	X	X	X	X
IC_INCOMING_CALLS_BARRED	62	ICPCallRejected	21	X	X		X	X
IC_INCOMING_CALLS_BARRED	63	ICPIncomingCallsBarred	54			X		
IC_INCOMING_CALLS_BARRED_IN_CUG	81	ICPIncomingCallsBarredWithinCUG	55					X
IC_INCOMPATIBLE_DEST	15	ICPIncompatibleDest	88	X	X	X	X	X
IC_INCON_OUTGOING_ACC_AND_SUB_CLASS	126	ICPInconsistencyInOGAccess	62					X
IC_INTERCEPTED_SUBSCRIBER	53	ICPNormalUnspecified	31	X	X	X	X	X
IC_INTERWORK_UNSPEC	16	ICPInterworkUnspec	127	X		X	X	X
IC_INVALID_CALL_REF	143	ICPNormalUnspecified	31	X	X	X	X	X
IC_INVALID_CALL_REFERENCE_VALUE	17	ICPInvalidCallReferenceValue	81	X	X	X	X	X
IC_INVALID_ELEM_CONTENTS	18	ICPInvalidElemContents	100	X	X	X	X	X
IC_INVALID_MSG_UNSPEC	19	ICPInvalidMsgUnspec	95	X				X
IC_INVALID_NUMBER_FORMAT	20	ICPInvalidNumberFormat	28	X	X	X	X	X
IC_INVALID_TNS	21	ICPInvalidTNS	91	X				X
IC_MANDATORY_ELEMENT_MISSING	22	ICPMandatoryElementMissing	96	X	X	X	X	X
IC_MESG_WITH_UNREC_ELEM_DISCARDED	128	ICPMsgWithUnreqParamDiscarded	110					X
IC_MESSAGE_NOT_UNDERSTOOD	65	ICPNormalClearing	16	X	X	X	X	X
IC_MISDIALLED_TK_PREFIX	84	ICPMisDialedTrunkPrefix	5					X

Table B-11 Internal Cause Code to Transmitted PRI Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted PRI Cause Code	Value					
				ETSI 300-102	ETSI 300-172 (QSIG)	AT&T TR41459	BELL 1268	INS 1500 (INSNet)
IC_MISROUTED_CALL_PORTED_NUM	142	ICPNormalUnspecified	31	X	X	X	X	X
IC_MSG_IN_WRONG_STATE	23	ICPMsgInWrongState	101	X	X		X	X
IC_MSG_TYPE_NOT_IMP	24	ICPMsgTypeNotImp	97	X	X	X	X	X
IC_MSG_TYPE_NOT_IMP_OR_WRONG_STATE	25	ICPMsgTypeNotImpOrWrongState	98	X	X	X		X
IC_NETWORK_ADDRESS_EXTENSION_ERROR	66	ICPNormalClearing	16	X	X	X	X	X
IC_NETWORK_OUT_OF_ORDER	26	ICPNetworkOutOfOrder	38	X				X
IC_NETWORK_TERMINATION	67	ICPNormalUnspecified	31	X	X	X	X	X
IC_NEW_DESTINATION	99	ICPNewDestination	47			X		
IC_NO_ANSWER_ALERTED_USER	28	ICPNoAnswerAlertedUser	19	X	X	X	X	X
IC_NO_CALL_SUSPENDED	27	ICPNoCallSuspended	85	X				X
IC_NO_CIRCUIT_AVAILABLE	29	ICPNoCircuitAvailable	34	X	X	X	X	X
IC_NO_ROUTE_TO_DEST	33	ICPNoRouteToDest	3	X	X		X	X
IC_NO_ROUTE_TO_TNS	34	ICPNoRouteToTNS	2	X			X	X
IC_NO_USER_RESPONDING	35	ICPNoUserResponding	18	X	X	X	X	X
IC_NON_EXISTENT_CUG	127	ICPNonExistentCUG	90					X
IC_NON_SELECTED_USER_CLEARING	30	ICPNonSelectedUserClearing	26	X				X
IC_NORMAL_CLEARING	31	ICPNormalClearing	16	X	X	X	X	X
IC_NORMAL_UNSPECIFIED	32	ICPNormalUnspecified	31	X	X	X	X	X
IC_NUMBER_CHANGED	36	ICPNumberChanged	22	X	X	X		X
IC_NUMBER_UNOBTAINABLE	68	ICPUnallocatedNumber	1	X	X	X	X	X
IC_ONLY_RESTRICT_DIG_INFO_BEARER	37	ICPOnlyRestrictDigInfoBearer	70	X				X
IC_OPERATOR_PRIORITY_ACCESS	107	ICPNormalUnspecified	31	X	X	X	X	X
IC_OUT_OF_CATCHMENT_AREA	111	ICPNormalUnspecified	31	X	X	X	X	X
IC_OUTGOING_CALLS_BARRED	100	ICPOutgoingCallsBarred	52			X		
IC_OUTGOING_CALLS_BARRED_IN_CUG	125	ICPOutgoingCallsBarredWithinCUG	53					X
IC_PARAM_UNREC_PASSED	85	ICPPParameterNonExistentPassedOn	103					X
IC_PERMANENT_FRAME_MODE_OOS	130	ICPPermFrameModeOOS	39					X
IC_PERMANENT_FRAME_MODE_OPERATIONAL	131	ICPPermFrameModeOperational	40					X
IC_PERMANENT_ICB	113	ICPNormalUnspecified	31	X	X	X	X	X
IC_PORTED_NUMBER	139	ICPNormalUnspecified	31	X	X	X	X	X
IC_PRECEDENCE_BLOCKED	94	ICPPrecedenceCallBlocked	46					X
IC_PREEMPTION	87	ICPPreemption	8					X

Table B-11 Internal Cause Code to Transmitted PRI Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted PRI Cause Code	Value						
				ETSI 300-102	ETSI 300-172 (OSIG)	AT&T TR41459	BELL 1268	INS 1500 (INSNet)	
IC_PREEMPTION_CCT_RES	129	ICPPreemption Circuit Reserved	9						X
IC_PREEMPTION_CCT_UNAVAILABLE	88	ICPPreemptionCircuitReserved	9						X
IC_PREFIX_0_DIALLED_IN_ERROR	120	ICPPrefix0DialledInError	8				X		
IC_PREFIX_1_DIALLED_IN_ERROR	121	ICPPrefix1DialledInError	9				X		
IC_PREFIX_1_NOT_DIALLED	122	ICPPrefix1NotDialed	10				X		
IC_PRIORITY_FORCED_RELEASE	69	ICPNormalClearing	16	X	X	X	X	X	X
IC_PROPRIETARY	86	ICPNormalUnspecified	31	X	X	X	X	X	X
IC_PROT_ERR_THRESHOLD_EXCEEDED	124	ICPProtErrorThresholdExceeded	101				X		
IC_PROTOCOL_ERROR_UNSPEC	38	ICPProtocolErrorUnspec	111	X	X		X	X	
IC_QUALITY_UNAVAIL	39	ICPQualityUnavail	49	X					X
IC_RECOVERY_ON_TIMER_EXPIRY	40	ICPRecoveryOnTimerExpiry	102	X	X	X	X	X	X
IC_REDIRECTION_TO_NEW_DEST	140	ICPNormalUnspecified	31	X	X	X	X	X	X
IC_REJECT	70	ICPNormalClearing	16	X	X	X	X	X	X
IC_REJECTED_DIVERTED_CALL	103	ICPNormalUnspecified	31	X	X	X	X	X	X
IC_REMOTE_PROC_ERROR	105	ICPNormalUnspecified	31	X	X	X	X	X	X
IC_REPEAT_ATTEMPT	118	ICPNormalUnspecified	31	X	X	X	X	X	X
IC_REQ_CIRCUIT_UNAVAIL	41	ICPReqCircuitUnavail	44	X	X	X	X	X	X
IC_REQ_FACILITY_NOT_IMP	42	ICPReqFacilityNotImp	69	X		X			X
IC_REQ_FACILITY_NOT_SUBSCR	43	ICPReqFacilityNotSubscr	50	X		X			X
IC_RESOURCES_UNAVAIL_UNSPEC	44	ICPResourcesUnavailUnspec	47	X					X
IC_RESPONSE_TO_STATUS_ENQUIRY	45	ICPResponseToStatusEnquiry	30	X	X	X	X	X	X
IC_ROUTE_OUT_OF_SERVICE	70	ICPNetworkOutOfOrder	38	X	X				X
IC_ROUTE_OUT_OF_SERVICE	70	ICPSwitchingEquipCongestion	42				X		
IC_ROUTE_OUT_OF_SERVICE	71	ICPDestOutOfOrder	27					X	
IC_ROUTING_ERROR	93	ICPNormalUnspecified	31	X	X	X	X	X	X
IC_SELECTIVE_CALL_BARRING	104	ICPNormalUnspecified	31	X	X	X	X	X	X
IC_SERVICE_INCOMPATIBLE	64	ICPBearCapNotImp	65	X	X	X	X	X	X
IC_SERVICE_OR_OPTION_NOT_AVAIL	47	ICPServiceOrOptionNotAvail	63	X	X	X			X
IC_SERVICE_OR_OPTION_NOT_IMP_UNSPEC	46	ICPServiceOrOptionNotImpUnspec	79	X					X
IC_SERVICE_TEMPORARILY_UNAVAILABLE	77	ICPNormalClearing	16	X	X	X	X	X	X
IC_SERVICE_UNAVAILABLE	78	ICPNormalClearing	16	X	X	X	X	X	X
IC_SIGNAL_NOT_UNDERSTOOD	73	ICPNormalClearing	16	X	X	X	X	X	X

Table B-11 Internal Cause Code to Transmitted PRI Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted PRI Cause Code	Value	ETSI 300-102	ETSI 300-172 (QSIG)	AT&T TR41459	BELL 1268	INS 1500 (INSNet)
IC_SIGNAL_NOT_VALID	74	ICPNormalClearing	16	X	X	X	X	X
IC_SIGNALLING_SYSTEM_INCOMPATIBLE	76	ICPNormalClearing	16	X	X	X	X	X
IC_SPECIAL_INFORMATION_TONE	82	ICPSendSpecialInformationTone	4					X
IC_SUB_ABSCENT	91	ICPSubscriberAbsent	20					X
IC_SUB_CONTROLLED_ICB	101	ICPNormalUnspecified	31	X	X	X	X	X
IC_SUB_NOT_FOUND_DLE	115	ICPNormalUnspecified	31	X	X	X	X	X
IC_SUBSCRIBER_CALL_TERMINATE	109	ICPNormalClearing	16	X	X	X	X	X
IC_SUBSCRIBER_INCOMPATIBLE	72	ICPIncompatibleDest	88	X	X	X	X	X
IC_SUBSCRIBER_MOVED	114	ICPNormalUnspecified	31	X	X	X	X	X
IC_SUBSCRIBER_OUT_OF_SERVICE	74	ICPDestOutOfOrder	27	X	X		X	X
IC_SUBSCRIBER_OUT_OF_SERVICE	75	ICPSwitchingEquipCongestion	42			X		
IC_SUSPEND_EXIST_BUT_NOT_THIS_ID	48	ICPSuspendExistButNotThisId	83	X				X
IC_SWITCHING_EQUIP_CONGESTION	49	ICPSwitchingEquipCongestion	42	X		X	X	X
IC_TEMPORARY_FAILURE	50	ICPTemporaryFailure	41	X	X	X	X	X
IC_TEMPORARY_OOS	106	ICPNormalUnspecified	31	X	X	X	X	X
IC_TERMINAL_CONGESTION	117	ICPNormalUnspecified	31	X	X	X	X	X
IC_TRANSFERRED	80	ICPNormalUnspecified	31	X	X	X	X	X
IC_TRANSLATION_OOS	112	ICPNormalUnspecified	31	X	X	X	X	X
IC_UNALLOCATED_DEST_NUMBER	89	ICPNormalUnspecified	31	X	X	X	X	X
IC_UNALLOCATED_NUMBER	51	ICPUnallocatedNumber	1	X	X	X	X	X
IC_UNDEFINED_BG	92	ICPNormalUnspecified	31	X	X	X	X	X
IC_UNKNOWN	144	ICPNormalUnspecified	31	X	X	X	X	X
IC_UNREC_ELEM_PASSED_ON	90	ICPNormalUnspecified	31	X	X	X	X	X
IC_USER_BUSY	52	ICPUserBusy	17	X	X	X	X	X
IC_USER_NOT_MEMBER_OF_CUG	83	ICPUserNotMemberOfCUG	87					X
IC_VACANT_CODE	119	ICPVacantCode	4				X	
IC_WHITELIST_CLI_NOT_MATCHED	138	ICPNormalUnspecified	31	X	X	X	X	X

Q.761 Cause Codes

The next two tables provide received Q.761 cause code to internal cause code mappings and internal cause code to transmitted Q.7661 cause code mappings.

Received Q.761 Cause Code Mappings

Table B-12 lists received Q.761 cause codes in alphabetical order, along with their associated values, and maps each of them to the corresponding internal cause code and its associated value.

Table B-12 Received Q.761 Cause Code to Internal Cause Code Mappings

Received Q.761 Cause Code	Value	Internal Cause Code	Value
ACCESS_INFO_DISCARD	43	IC_ACCESS_INFO_DISCARDED	1
ADDRESS_INCOMP	28	IC_ADDRESS_INCOMPLETE	55
BC_NOT_AUTH	57	IC_BEARCAP_NOT_AUTHORIZED	2
BC_NOT_AVAIL	58	IC_BEARCAP_NOT_AVAIL	3
BC_NOT_IMP	65	IC_BEARCAP_NOT_IMP	4
CALL_REJECTED	21	IC_CALL_REJECTED	8
CHAN_NOT_AVAIL	44	IC_REQ_CIRCUIT_UNAVAIL	41
DEST_OOO	27	IC_DEST_OUT_OF_ORDER	12
ELEM_UNREC_DISCARDED	99	IC_ELEM_TYPE_NOT_IMP	13
FAC_REJECTED	29	IC_FACILITY_NOT_REGISTERED	61
INCOMP_DEST	88	IC_INCOMPATIBLE_DEST	15
INTERWORK_UNSP	127	IC_INTERWORK_UNSPEC	16
INVALID_MESSAGE	95	IC_INVALID_MSG_UNSPEC	19
INVALID_TNS	91	IC_INVALID_TNS	21
MISDIALLED_TK_PREFIX	5	IC_MISDIALLED_TK_PREFIX	83
MSG_NOT_EXIST	97	IC_MSG_TYPE_NOT_IMP	24
MSG_UNREC_ELEM_DIS	110	IC_MESG_WITH_UNREC_ELEM_DISCARDED	127
NETWORK_OOO	38	IC_NETWORK_OUT_OF_ORDER	26
NO_ANSWER	19	IC_NO_ANSWER_ALERTED_USER	28
NO_CIRCUIT	34	IC_NO_CIRCUIT_AVAILABLE	29
NO_RESPONSE	18	IC_NO_USER_RESPONDING	35
NO_ROUTE_TO_DEST	3	IC_NO_ROUTE_TO_DEST	33
NO_ROUTE_TO_TRANSIT	2	IC_NO_ROUTE_TO_TNS	34
NORMAL_REL	16	IC_NORMAL_CLEARING	31
NORMAL_UNSPEC	31	IC_NORMAL_UNSPECIFIED	32
NUMBER_CHANGED	22	IC_NUMBER_CHANGED	36
PARAM_UNREC_PASSED	103	IC_PARAM_UNREC_PASSED	84

Table B-12 Received Q.761 Cause Code to Internal Cause Code Mappings (continued)

Received Q.761 Cause Code	Value	Internal Cause Code	Value
PROT_ERROR_UNSP	111	IC_PROTOCOL_ERROR_UNSPEC	38
REQ_FAC_NOT_IMP	69	IC_REQ_FACILITY_NOT_IMP	42
RES_DIG_BEARCAP_ONLY	70	IC_ONLY_RESTRICT_DIG_INFO_BEARER	37
RES_UNAVAIL	47	IC_RESOURCES_UNAVAIL_UNSPEC	44
SEND_SIT	4	IC_SPECIAL_INFORMATION_TONE	81
SERV_NOT_AVAIL	63	IC_SERVICE_OR_OPTION_NOT_AVAIL	47
SERV_NOT_IMP	79	IC_SERVICE_OR_OPTION_NOT_IMP_UNSPEC	46
SWITCH_CONG	42	IC_SWITCHING_EQUIP_CONGESTION	49
TEMP_FAILURE	41	IC_TEMPORARY_FAILURE	50
UNALLOCATED_NUM	1	IC_UNALLOCATED_NUMBER	51
USER_BUSY	17	IC_USER_BUSY	52

Transmitted Q.761 Cause Code Mappings

Table B-13 shows the mapping performed if a transmitted Q.761 cause code is supported by one or more of the protocol variants listed in the 17 columns on the right. If the transmitted Q.761 cause code is not supported by a protocol variant, then that variant's column is not checked. If there is no transmitted Q.761 cause code value mapped to the internal cause code, the Q.761 cause code value that is transmitted is NormalUnspecified (31). For definitions of the Q.761 cause code values see Q.850, section 2.2.7.

Variants are:

1. Standard Q.761
2. Australian Q.761
3. Finnish Q.761
4. Japanese Q.761
5. Japanese ETS_300_356
6. Hong_Kong Q.761
7. Belgian Mobistar
8. Korean Q.761
9. ETS_300_356 and NTT
10. ETS_300_356 and Spanish
11. ETS_300_356_V3 and UK

- 12. Taiwan Q.761
- 13. German Q.761
- 14. Thailand Q.761
- 15. KPNPB Q.761
- 16. Swiss Q.761
- 17. China Q.761

Table B-13 Internal Cause Code to Transmitted Q.761 Cause Code Mappings

Internal Cause Code	Value	Transmitted Q.761 Cause	Value	Standard Q.761	Australian Q.761	Finish Q.761	Japanese Q.761	Japanese ETS_300_356	Hong Kong Q.761	Belgian Mobistar	Korean Q761	ETS_300_356 & NT	ETS_300_356 Spanish	ETS_300_356 V3 & UK	Taiwan Q.761	German Q.761	Thailand Q.761	KPNPB Q.761	Swiss Q.761	China Q.761
IC_ACCESS_INFO_DISCARDED	1	ACCESSINFODISCARDED	43	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_BEARCAP_NOT_AUTHORIZED	2	BEARCAPNOTAUTHORIZED	57	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_BEARCAP_NOT_AVAIL	3	BEARCAPNOTAVAIL	58	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_BEARCAP_NOT_IMP	4	BEARCAPNOTIMP	65	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALL_AWARDED_DELIVERED_EST_CH	5	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALL_ID_HAS_BEEN_CLEARED	6	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALL_ID_IN_USE	7	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALL_ID_IN_USE	7	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALL_REJECTED	8	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CH_ID_NOT_EXIST	9	INTERWORKUNSPEC	127	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CH_TYPE_NOT_IMP	10	INTERWORKUNSPEC	127	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CH_UNACCEPTABLE	11	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_DEST_OUT_OF_ORDER	12	DESTOUTOFORDER	27	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_ELEM_TYPE_NOT_IMP	13	ELEMUNRECDISCARDED	99	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_FACILITY_REJECTED	14	SERVNOTAVAIL	63	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_FACILITY_REJECTED	14	FACILITYREJECTED	29	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INCOMPATIBLE_DEST	15	INCOMP_DEST	88	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INTERWORK_UNSPEC	16	INTERWORKUNSPEC	127	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INVALID_CALL_REFERENCE_VALUE	17	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INVALID_ELEM_CONTENTS	18	MSGUNRECELEMENTDISCARDED	110	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INVALID_MSG_UNSPEC	19	INVALIDMESSAGE	95	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table B-13 Internal Cause Code to Transmitted Q.761 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted Q.761 Cause	Value	Standard Q.761	Australian Q.761	Finnish Q.761	Japanese Q.761	Japanese ETS_300_356	Hong Kong Q.761	Belgian Mobistar	Korean Q.761	ETS_300_356 Spanish	ETS_300_356_V3 & UK	Taiwan Q.761	German Q.761	Thailand Q.761	KPNPB Q.761	Swiss Q.761	China Q.761
IC_INVALID_NUMBER_FORMAT	20	ADDRESSINCOMPLETE	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INVALID_TNS	21	INVALIDTNS	91	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INVALID_TNS	21	NOROUTETODESTINATION	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_MANDATORY_ELEMENT_MISSING	22	PROTOCOLERRORUNSPECIFIED	111	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_MSG_IN_WRONG_STATE	23	PROTOCOLERRORUNSPECIFIED	111	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_MSG_IN_WRONG_STATE	23	MSG_IN_WRONG_STATE	101	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_MSG_TYPE_NOT_IMP	24	MSGNOTEXIST	97	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_MSG_TYPE_NOT_IMP_OR_WRONG_STATE	25	PROTOCOLERRORUNSPECIFIED	111	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NETWORK_OUT_OF_ORDER	26	NETWORKOUTOFORDER	38	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NO_CALL_SUSPENDED	27	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NO_ANSWER_ALERTED_USER	28	NOANSWER	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NO_CIRCUIT_AVAILABLE	29	NOCIRCUIT	34	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NON_SELECTED_USER_CLEARING	30	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NORMAL_CLEARING	31	NORMALRELEASE	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NORMAL_UNSPECIFIED	32	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NO_ROUTE_TO_DEST	33	NOROUTETODEST	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NO_ROUTE_TO_TNS	34	NOROUTETOTRANSIT	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NO_USER_RESPONDING	35	NORESPONSE	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NUMBER_CHANGED	36	NUMBERCHANGED	22	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_ONLY_RESTRICT_DIG_INFO_BEARER	37	RESTRICTDIGBEARERCAPONLY	70	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PROTOCOL_ERROR_UNSPEC	38	PROTOCOLERRORUNSPECIFIED	111	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_QUALITY_UNAVAIL	39	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_RECOVERY_ON_TIMER_EXPIRY	40	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_REQ_CIRCUIT_UNAVAIL	41	CHANNELNOTAVAILABLE	44	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_REQ_FACILITY_NOT_IMP	42	REQFACILITYNOTIMP	69	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_REQ_FACILITY_NOT_IMP	42	SERVICENOTIMP	79	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_REQ_FACILITY_NOT_SUBSCR	43	SERVICENOTAVAILABLE	63	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_RESOURCES_UNAVAIL_UNSPEC	44	RESOURCESUNAVAILABLE	47	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table B-13 Internal Cause Code to Transmitted Q.761 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted Q.761 Cause	Value	Standard Q.761	Australian Q.761	Finsh Q.761	Japanese Q.761	Japanese ETS_300_356	Hong Kong Q.761	Belgian Mobistar	Korean Q.761	ETS_300_356 & NTT	ETS_300_356 Spanish	ETS_300_356 V3 & UK	Taiwan Q.761	German Q.761	Thailand Q.761	KPNP Q.761	Swiss Q.761	China Q.761	
IC_RESPONSE_TO_STATUS_ENQUIRY	45	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SERVICE_OR_OPTION_NOT_IMP_UNSPEC	46	SERVICENOTIMPLEMENTED	79	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SERVICE_OR_OPTION_NOT_AVAIL	47	SERVICENOTAVAILABLE	63	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SUSPEND_EXIST_BUT_NOT_THIS_ID	48	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SWITCHING_EQUIP_CONGESTION	49	SWITCHCONGESTION	42	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_TEMPORARY_FAILURE	50	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_UNALLOCATED_NUMBER	51	UNALLOCATEDNUMBER	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_USER_BUSY	52	USERBUSY	17	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INTERCEPTED_SUBSCRIBER	53	(No Q.761 cause code listed)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_ACCESS_BARRED	54	NORMALRELEASE	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_ACKNOWLEDGEMENT	55	NORMALRELEASE	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_ADDRESS_INCOMPLETE	56	ADDRESSINCOMPLETE	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_BUSY	57	USERBUSY	17	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CHANNEL_OUT_OF_SERVICE	58	NETWORKOUTOFORDER	38	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_DTE_CONTROLLED_NOT_READY	59	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CONGESTION	60	SWITCHCONGESTION	42	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALL_TERMINATION	61	NORMALRELEASE	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_FACILITY_NOT_REGISTERED	62	FACILITYREJECTED	29	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_INCOMING_CALLS_BARRED	63	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SERVICE_INCOMPATIBLE	64	SERVICENOTAVAILABLE	63	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_MESSAGE_NOT_UNDERSTOOD	65	PROTOCOLERRORUNSPECIFIED	111	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NETWORK_ADDRESS_EXTENSION_ERROR	66	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NETWORK_TERMINATION	67	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NUMBER_UNOBTAINABLE	68	UNALLOCATEDNUMBER	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PRIORITY_FORCED_RELEASE	69	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_REJECT	70	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_ROUTE_OUT_OF_SERVICE	71	NETWORKOUTOFORDER	38	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SUBSCRIBER_INCOMPATIBLE	72	INCOMPATIBLEDEST	88	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table B-13 Internal Cause Code to Transmitted Q.761 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted Q.761 Cause	Value	Standard Q.761	Australian Q.761	Finnish Q.761	Japanese Q.761	Japanese ETS_300_356	Hong Kong Q.761	Belgian Mobistar	Korean Q.761	ETS_300_356 Spanish	ETS_300_356_V3 & UK	Taiwan Q.761	German Q.761	Thailand Q.761	KPNPB Q.761	Swiss Q.761	China Q.761	
IC_SIGNAL_NOT_UNDERSTOOD	73	PROTOCOLERRORUNSPECIFIED	111	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SIGNAL_NOT_VALID	74	PROTOCOLERRORUNSPECIFIED	111	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SUBSCRIBER_OUT_OF_SERVICE	75	DESTOUTOFORDER	27	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SIGNALLING_SYSTEM_INCOMPATIBLE	76	INTERWORKINGUNSPECIFIED	127	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SERVICE_TEMPORARILY_UNAVAILABLE	77	SERVICENOTAVAILABLE	63	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SERVICE_UNAVAILABLE	78	SERVICENOTAVAILABLE	63	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_DTE_UNCONTROLLED_NOT_READY	79	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_TRANSFERRED	80	(No Q.761 cause code listed)		X																
IC_INCOMING_CALLS_BARRED_IN_CUG	81	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SPECIAL_INFORMATION_TONE	82	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SPECIAL_INFORMATION_TONE	82	SENDSIT	4	X																
IC_USER_NOT_MEMBER_OF_CUG	83	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_USER_NOT_MEMBER_OF_CUG	83	USERNOTMEMBEROFCUG	87	X																
IC_MISDIALLED_TK_PREFIX	84	MISDIALEDTRUNKPREFIX	5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PARAM_UNREC_PASSED	85	PARAMETERUNRECAPSED	103	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PARAM_UNREC_PASSED	85	PROTOCOLERRORUNSPECIFIED	111	X																
IC_PROPRIETARY	86	NORMALRELEASE	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PREEMPTION	87	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PREEMPTION_CCT_UNAVAILABLE	88	NOCIRCUIT	34	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_UNALLOCATED_DEST_NUMBER	89	UNALLOCATEDNUMBER	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_UNREC_ELEM_PASSED_ON	90	PARAMETERUNRECAPSED	103	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_UNREC_ELEM_PASSED_ON	90	PROTOCOLERRORUNSPECIFIED	111	X																
IC_SUB_ABSENT	91	NORESPONSE	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_UNDEFINED_BG	92	UNALLOCATEDNUMBER	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_ROUTING_ERROR	93	NOROUTETODESTINATION	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PRECEDENCE_BLOCKED	94	NOROUTETODESTINATION	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALL_TYPE_INCOMPATIBLE	95	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_GROUP_RESTRICTIONS	96	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table B-13 Internal Cause Code to Transmitted Q.761 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted Q.761 Cause	Value	Standard Q.761	Australian Q.761	Finnish Q.761	Japanese Q.761	Japanese ETS_300_356	Hong Kong Q.761	Belgian Mobistar	Korean Q.761	ETS_300_356 & NTT	ETS_300_356 Spanish	ETS_300_356 V3 & UK	Taiwan Q.761	German Q.761	Thailand Q.761	KPNP Q.761	Swiss Q.761	China Q.761
IC_CALLING_PARTY_OFF_HOLD	97	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALLING_DROPPED_WHILE_ON_HOLD	98	NORMALRELEASE	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_NEW_DESTINATION	99	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_OUTGOING_CALLS_BARRED	100	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SUB_CONTROLLED_ICB	101	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CALL_REJECT_CALL_GAPPING	102	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_REJECTED_DIVERTED_CALL	103	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SELECTIVE_CALL_BARRING	104	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_REMOTE_PROC_ERROR	105	TEMPORARYFAILURE	41	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_TEMPORARY_OOS	106	UNALLOCATEDNUMBER	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_OPERATOR_PRIORITY_ACCESS	107	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CUG_ACCESS_BARRED	108	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_CUG_ACCESS_BARRED	108	USERNOTMEMOFCUG	87																	
IC_SUBSCRIBER_CALL_TERMINATE	109	NORMALRELEASE	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_FLOW_CONTROLLED_CONGESTION	110	SWITCHCONGESTION	42	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_OUT_OF_CATCHMENT_AREA	111	NORESPONSE	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_TRANSLATION_OOS	112	UNALLOCATEDNUMBER	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PERMANENT_ICB	113	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SUBSCRIBER_MOVED	114	NORESPONSE	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_SUBSCRIBER_MOVED	114	SUBSCRIBERABSENT	20																	
IC_SUB_NOT_FOUND_DLE	115	UNALLOCATEDNUMBER	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_ANONYMOUS_CALL_REJECTION	116	CALLREJECTED	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_TERMINAL_CONGESTION	117	SWITCHCONGESTION	42	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_REPEAT_ATTEMPT	118	(No Q.761 cause code listed)																		
IC_VACANT_CODE	119	UNALLOCATEDNUMBER	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PREFIX_0_DIALLED_IN_ERROR	120	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PREFIX_1_DIALLED_IN_ERROR	121	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IC_PREFIX_1_NOT_DIALLED	122	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table B-13 Internal Cause Code to Transmitted Q.761 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted Q.761 Cause	Value	Standard Q.761	Australian Q.761	Finnish Q.761	Japanese Q.761	Japanese ETS_300_356	Hong_Kong Q.761	Belgian Mobistar	Korean Q761	ETS_300_356 & NTT	ETS_300_356 Spanish	ETS_300_356 V3 & UK
IC_EXCESSIVE_DIG_CALL_PROCEEDING	123	NORMALUNSPECIFIED	31	X	X	X	X	X	X	X	X	X	X	X
IC_PROT_ERR_THRESHOLD_EXCEEDED	124	PROTOCOLERRORUNSPECIFIED	111	X	X	X	X	X	X	X	X	X	X	X
IC_OUTGOING_CALLS_BARRED_IN_CUG	125	CALLREJECTED	21	X	X	X	X	X	X	X				X
IC_INCON_OUTGOING_ACC_AND_SUB_CLASS	126	INTERWORKINGUNSPECIFIED	127	X	X		X	X	X	X	X			X
IC_INCON_OUTGOING_ACC_AND_SUB_CLASS	126	INCON_OUT_ACC_SUB	62			X								
IC_NON_EXISTENT_CUG	127	CALLREJECTED	21	X	X	X	X	X	X	X				X
IC_MSG_WITH_UNREC_ELEM_DISCARDED	128	MSGUNRECELEMDISCARDED	110	X	X		X	X	X	X				
IC_MSG_WITH_UNREC_ELEM_DISCARDED	128	PROTOCOLERRORUNSPECIFIED	111				X							
IC_PREEMPTION_CCT_RES	129	NORMALUNSPECIFIED	31	X	X	X	X	X		X	X			X
IC_PREEMPTION_CCT_RES	129	PREEMPTION	8								X	X	X	
IC_PERMANENT_FRAME_MODE_OOS	130	(No Q.761 cause code listed)												
IC_PERMANENT_FRAME_MODE_OPERATIONAL	131	(No Q.761 cause code listed)												
IC_BLACKLIST_NO_CLI	132	(No Q.761 cause code listed)												
IC_BLACKLIST_CLI_LENGTH_INVALID	133	(No Q.761 cause code listed)												
IC_BLACKLIST_CLI_MATCHED	134	(No Q.761 cause code listed)												
IC_BLACKLIST_CPC_RESTRICTED	135	(No Q.761 cause code listed)												
IC_BLACKLIST_NOA_RESTRICTED	136	(No Q.761 cause code listed)												
IC_BLACKLIST_BNUMBER_MATCHED	137	(No Q.761 cause code listed)												
IC_WHITELIST_CLI_NOT_MATCHED	138	(No Q.761 cause code listed)												
IC_PORTED_NUMBER	139	(No Q.761 cause code listed)												
IC_REDIRECTION_TO_NEW_DEST	140	(No Q.761 cause code listed)												
IC_COT_FAILURE	141	(No Q.761 cause code listed)												
IC_MISROUTED_CALL_PORTED_NUM	142	(No Q.761 cause code listed)												
IC_INVALID_CALL_REF	143	(No Q.761 cause code listed)												
IC_UNKNOWN	144	(No Q.761 cause code listed)												

ANSI SS7 Cause Codes

The next two tables provide received ANSI SS7 cause code to internal cause code mappings and internal cause code to transmitted ANSI SS7 cause code mappings.

Received ANSI SS7 Cause Code Mappings

Table B-14 lists received ANSI SS7 cause codes (CCITT Coding Standard), along with their associated values, and maps each of them to the corresponding internal cause code and its associated value.

Table B-14 Received ANSI SS7 Cause Code to Internal Cause Code Mappings

Received ANSI SS7 Cause Code	Value	Internal Cause Code	Value
UNALLOCATED_NUM	1	IC_UNALLOCATED_NUMBER	51
NO_ROUTE_TO_TRANSIT	2	IC_NO_ROUTE_TO_TNS	34
NO_ROUTE_TO_DEST	3	IC_NO_ROUTE_TO_DEST	33
SEND_SIT	4	IC_SPECIAL_INFORMATION_TONE	81
MISDIALLED_TRUNK_PREFIX	5	IC_NORMAL_UNSPECIFIED	32
PREEMPTION	8	IC_PREEMPTION	86
NORMAL_REL	16	IC_NORMAL_CLEARING	31
USER_BUSY	17	IC_USER_BUSY	52
NO_RESPONSE	18	IC_NO_USER_RESPONDING	35
NO_ANSWER	19	IC_NO_ANSWER_ALERTED_USER	28
SUB_ABSCENT	20	IC_SUB_ABSCENT	90
CALL_REJECTED	21	IC_CALL_REJECTED	8
NUMBER_CHANGED	22	IC_NUMBER_CHANGED	36
DEST_OOO	27	IC_DEST_OUT_OF_ORDER	12
ADDRESS_INCOMP	28	IC_ADDRESS_INCOMPLETE	55
FAC_REJECTED	29	IC_FACILITY_REJECTED	14
NORMAL_UNSPEC	31	IC_NORMAL_UNSPECIFIED	32
NO_CIRCUIT	34	IC_NO_CIRCUIT_AVAILABLE	29
NETWORK_OOO	38	IC_NETWORK_OUT_OF_ORDER	26
TEMP_FAILURE	41	IC_TEMPORARY_FAILURE	50
SWITCH_CONG	42	IC_SWITCHING_EQUIP_CONGESTION	49
ACCESS_INFO_DISCARD	43	IC_ACCESS_INFO_DISCARDED	1
CHAN_NOT_AVAIL	44	IC_REQ_CIRCUIT_UNAVAIL	41
PRECEDENCE_BLOCKED	46	IC_PRECEDENCE_BLOCKED	93
RES_UNAVAIL	47	IC_RESOURCES_UNAVAIL_UNSPEC	44
FACILITY_NOT_SUBSC	50	IC_REQ_FACILITY_NOT_SUBSCR	43
OUT_CALLS_BARRED	53	IC_SERVICE_OR_OPTION_NOT_AVAIL	47

Table B-14 Received ANSI SS7 Cause Code to Internal Cause Code Mappings (continued)

Received ANSI SS7 Cause Code	Value	Internal Cause Code	Value
IN_CALLS_BARRED	55	IC_SERVICE_OR_OPTION_NOT_AVAIL	47
BC_NOT_AUTH	57	IC_BEARCAP_NOT_AUTHORIZED	2
BC_NOT_AVAIL	58	IC_BEARCAP_NOT_AVAIL	3
SERV_NOT_AVAIL	63	IC_SERVICE_OR_OPTION_NOT_AVAIL	47
BC_NOT_IMP	65	IC_BEARCAP_NOT_IMP	4
FAC_NOT_IMP	69	IC_REQ_FACILITY_NOT_IMP	42
RES_DIG_BEARCAP_ONLY	70	IC_ONLY_RESTRICT_DIG_INFO_BEARER	37
SERV_NOT_IMP	79	IC_SERVICE_OR_OPTION_NOT_IMP_UNSPEC	46
NOT_MEMBER_CUG	87	IC_INVALID_MSG_UNSPEC	19
INCOMP_DEST	88	IC_INCOMPATIBLE_DEST	15
NON_EXISTENT_CUG	90	IC_INVALID_MSG_UNSPEC	19
INVALID_TNS	91	IC_INVALID_TNS	21
INVALID_MESSAGE	95	IC_INVALID_MSG_UNSPEC	19
MSG_NOT_EXIST	97	IC_MSG_TYPE_NOT_IMP	24
ELEM_UNREC_DISCARDED	99	IC_ELEM_TYPE_NOT_IMP	13
PARAM_WITH_INVALID_CODING	100	IC_INVALID_ELEM_CONTENTS	18
RECOVERY_ONTIMER	102	IC_RECOVERY_ON_TIMER_EXPIRY	40
PARAM_UNREC_PASSED	103	IC_UNREC_ELEM_PASSED_ON	89
MSG_UNREC_PARAM_DISC	110	IC_INVALID_ELEM_CONTENTS	18
PROT_ERROR_UNSP	111	IC_PROTOCOL_ERROR_UNSPEC	38
INTERWORK_UNSP	127	IC_INTERWORK_UNSPEC	16

Transmitted ANSI SS7 Cause Code Mappings

Table B-15 lists the internal cause codes, along with their associated values, and maps each of them to the corresponding transmitted ANSI SS7 cause code and its associated value.

Table B-15 Internal Cause Code to Transmitted ANSI SS7 Cause Code Mappings

Internal Cause Code	Value	Transmitted ANSI SS7 Cause Code	Value
IC_ACCESS_INFO_DISCARDED	1	ACCESS_INFO_DISCARD	43
IC_BEARCAP_NOT_AUTHORIZED	2	BC_NOT_AUTH	57
IC_BEARCAP_NOT_AVAIL	3	BC_NOT_AVAIL	58
IC_BEARCAP_NOT_IMP	4	BC_NOT_IMP	65
IC_CALL_AWARDED_DELIVERED_EST_CH	5	TEMP_FAILURE	41
IC_CALL_ID_HAS_BEEN_CLEARED	6	TEMP_FAILURE	41
IC_CALL_ID_IN_USE	7	TEMP_FAILURE	41
IC_CALL_REJECTED	8	CALL_REJECTED	21

Table B-15 Internal Cause Code to Transmitted ANSI SS7 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted ANSI SS7 Cause Code	Value
IC_CH_ID_NOT_EXIST	9	INTERWORK_UNSP	127
IC_CH_TYPE_NOT_IMP	10	INTERWORK_UNSP	127
IC_CH_UNACCEPTABLE	11	TEMP_FAILURE	41
IC_DEST_OUT_OF_ORDER	12	DEST_OOO	27
IC_ELEM_TYPE_NOT_IMP	13	ELEM_UNREC_DISCARDED	99
IC_FACILITY_REJECTED	14	FAC_REJECTED	29
IC_INCOMPATIBLE_DEST	15	INCOMP_DEST	88
IC_INTERWORK_UNSPEC	16	INTERWORK_UNSP	127
IC_INVALID_CALL_REFERENCE_VALUE	17	TEMP_FAILURE	41
IC_INVALID_ELEM_CONTENTS	18	MSG_UNREC_PARAM_DISCARDED	110
IC_INVALID_MSG_UNSPEC	19	INVALID_MESSAGE	95
IC_INVALID_NUMBER_FORMAT	20	ADDRESS_INCOMPLETE	28
IC_INVALID_TNS	21	INVALID_TNS	91
IC_MANDATORY_ELEMENT_MISSING	22	PROT_ERROR_UNSPEC	111
IC_MSG_IN_WRONG_STATE	23	PROT_ERROR_UNSPEC	111
IC_MSG_TYPE_NOT_IMP	24	MSG_NOT_EXIST	97
IC_MSG_TYPE_NOT_IMP_OR_WRONG_STATE	25	PROT_ERROR_UNSPEC	111
IC_NETWORK_OUT_OF_ORDER	26	NETWORK_OOO	38
IC_NO_CALL_SUSPENDED	27	TEMP_FAILURE	41
IC_NO_ANSWER_ALERTED_USER	28	NO_ANSWER	19
IC_NO_CIRCUIT_AVAILABLE	29	NO_CIRCUIT	34
IC_NON_SELECTED_USER_CLEARING	30	NORMAL_UNSPEC	31
IC_NORMAL_CLEARING	31	NORMAL_REL	16
IC_NORMAL_UNSPECIFIED	32	NORMAL_UNSPEC	31
IC_NO_ROUTE_TO_DEST	33	NO_ROUTE_TO_DEST	3
IC_NO_ROUTE_TO_TNS	34	NO_ROUTE_TO_TRANSIT	2
IC_NO_USER_RESPONDING	35	NO_RESPONSE	18
IC_NUMBER_CHANGED	36	NUMBER_CHANGED	22
IC_ONLY_RESTRICT_DIG_INFO_BEARER	37	RES_DIG_BEARCAP_ONLY	70
IC_PROTOCOL_ERROR_UNSPEC	38	PROT_ERROR_UNSP	111
IC_QUALITY_UNAVAIL	39	NORMAL_UNSPEC	31
IC_RECOVERY_ON_TIMER_EXPIRY	40	RECOVERY_ONTIMER	102
IC_REQ_CIRCUIT_UNAVAIL	41	CHAN_NOT_AVAIL	44
IC_REQ_FACILITY_NOT_IMP	42	FAC_NOT_IMP	69
IC_REQ_FACILITY_NOT_SUBSCR	43	FACILITY_NOT_SUBSC	50
IC_RESOURCES_UNAVAIL_UNSPEC	44	RES_UNAVAIL	47

Table B-15 Internal Cause Code to Transmitted ANSI SS7 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted ANSI SS7 Cause Code	Value
IC_RESPONSE_TO_STATUS_ENQUIRY	45	NORMAL_UNSPEC	31
IC_SERVICE_OR_OPTION_NOT_IMP_UNSPEC	46	SERV_NOT_IMP	79
IC_SERVICE_OR_OPTION_NOT_AVAIL	47	SERV_NOT_AVAIL	63
IC_SUSPEND_EXIST_BUT_NOT_THIS_ID	48	TEMP_FAILURE	41
IC_SWITCHING_EQUIP_CONGESTION	49	SWITCH_CONG	42
IC_TEMPORARY_FAILURE	50	TEMP_FAILURE	41
IC_UNALLOCATED_NUMBER	51	UNALLOCATED_NUM	1
IC_USER_BUSY	52	USER_BUSY	17
IC_INTERCEPTED_SUBSCRIBER	53	(No cause code listed.)	
IC_ACCESS_BARRED	54	NORMAL_REL	16
IC_ACKNOWLEDGEMENT	55	NORMAL_REL	16
IC_ADDRESS_INCOMPLETE	56	ADDRESS_INCOMP	28
IC_BUSY	57	USER_BUSY	17
IC_CHANNEL_OUT_OF_SERVICE	58	NETWORK_OOO	38
IC_DTE_CONTROLLED_NOT_READY	59	NORMAL_UNSPEC	31
IC_CONGESTION	60	SWITCH_CONG	42
IC_CALL_TERMINATION	61	NORMAL_REL	16
IC_FACILITY_NOT_REGISTERED	62	FAC_REJECTED	29
IC_INCOMING_CALLS_BARRED	63	NORMAL_REL	16
IC_SERVICE_INCOMPATIBLE	64	SERV_NOT_AVAIL	63
IC_MESSAGE_NOT_UNDERSTOOD	65	PROT_ERROR_UNSPEC	111
IC_NETWORK_ADDRESS_EXTENSION_ERROR	66	NORMAL_UNSPEC	31
IC_NETWORK_TERMINATION	67	NORMAL_UNSPEC	31
IC_NUMBER_UNOBTAINABLE	68	UNALLOCATED_NUM	1
IC_PRIORITY_FORCED_RELEASE	69	NORMAL_UNSPEC	31
IC_REJECT	70	NORMAL_UNSPEC	31
IC_ROUTE_OUT_OF_SERVICE	71	NETWORK_OOO	38
IC_SUBSCRIBER_INCOMPATIBLE	72	NORMAL_UNSPEC	31
IC_SIGNAL_NOT_UNDERSTOOD	73	PROT_ERROR_UNSPEC	111
IC_SIGNAL_NOT_VALID	74	PROT_ERROR_UNSPEC	111
IC_SUBSCRIBER_OUT_OF_SERVICE	75	NORMAL_UNSPEC	31
IC_SIGNALLING_SYSTEM_INCOMPATIBLE	76	INTERWORK_UNSPEC	127
IC_SERVICE_TEMPORARILY_UNAVAILABLE	77	SERV_NOT_AVAIL	63
IC_SERVICE_UNAVAILABLE	78	SERV_NOT_AVAIL	63
IC_DTE_UNCONTROLLED_NOT_READY	79	NORMAL_UNSPEC	31
IC_TRANSFERRED	80	NORMAL_UNSPEC	31

Table B-15 Internal Cause Code to Transmitted ANSI SS7 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted ANSI SS7 Cause Code	Value
IC_INCOMING_CALLS_BARRED_IN_CUG	81	NORMAL_UNSPEC	31
IC_SPECIAL_INFORMATION_TONE	82	SEND_SIT	4
IC_USER_NOT_MEMBER_OF_CUG	83	NORMAL_UNSPEC	31
IC_MISDIALLED_TK_PREFIX	84	MISDIALLED_TRUNK_PREFIX	5
IC_PARAM_UNREC_PASSED	85	NORMAL_UNSPEC	31
IC_PROPRIETARY	86	NORMAL_UNSPEC	31
IC_PREEMPTION	87	PREEMPTION	8
IC_PREEMPTION_CCT_UNAVAILABLE	88	NORMAL_UNSPEC	31
IC_UNALLOCATED_DEST_NUMBER	89	UNALLOCATED_NUM	1
IC_UNREC_ELEM_PASSED_ON	90	PARAM_UNREC_PASSED	103
IC_SUB_ABSCENT	91	SUB_ABSCENT	20
IC_UNDEFINED_BG	92	UNDEFIND_BG	
IC_ROUTING_ERROR	93	ROUTING_ERROR	
IC_PRECEDENCE_BLOCKED	94	PRECEDENCE_BLOCKED	46
IC_CALL_TYPE_INCOMPATIBLE	95	CALL_TYPE_INCOMP	
IC_GROUP_RESTRICTIONS	96	GROUP_RESTRICT	
IC_CALLING_PARTY_OFF_HOLD	97	NORMAL_UNSPEC	31
IC_CALLING_DROPPED_WHILE_ON_HOLD	98	NORMAL_UNSPEC	31
IC_NEW_DESTINATION	99	NORMAL_UNSPEC	31
IC_OUTGOING_CALLS_BARRED	100	NORMAL_UNSPEC	31
IC_SUB_CONTROLLED_ICB	101	NORMAL_UNSPEC	31
IC_CALL_REJECT_CALL_GAPPING	102	NORMAL_UNSPEC	31
IC_REJECTED_DIVERTED_CALL	103	NORMAL_UNSPEC	31
IC_SELECTIVE_CALL_BARRING	104	NORMAL_UNSPEC	31
IC_REMOTE_PROC_ERROR	105	NORMAL_UNSPEC	31
IC_TEMPORARY_OOS	106	NORMAL_UNSPEC	31
IC_OPERATOR_PRIORITY_ACCESS	107	NORMAL_UNSPEC	31
IC_CUG_ACCESS_BARRED	108	NORMAL_UNSPEC	31
IC_SUBSCRIBER_CALL_TERMINATE	109	NORMAL_UNSPEC	31
IC_FLOW_CONTROLLED_CONGESTION	110	NORMAL_UNSPEC	31
IC_OUT_OF_CATCHMENT_AREA	111	NORMAL_UNSPEC	31
IC_TRANSLATION_OOS	112	NORMAL_UNSPEC	31
IC_PERMANENT_ICB	113	NORMAL_UNSPEC	31
IC_SUBSCRIBER_MOVED	114	NORMAL_UNSPEC	31
IC_SUB_NOT_FOUND_DLE	115	NORMAL_UNSPEC	31
IC_ANONYMOUS_CALL_REJECTION	116	NORMAL_UNSPEC	31

Table B-15 Internal Cause Code to Transmitted ANSI SS7 Cause Code Mappings (continued)

Internal Cause Code	Value	Transmitted ANSI SS7 Cause Code	Value
IC_TERMINAL_CONGESTION	117	NORMAL_UNSPEC	31
IC_REPEAT_ATTEMPT	118	NORMAL_UNSPEC	31
IC_VACENT_CODE	119	NORMAL_UNSPEC	31
IC_PREFIX_0_DIALLED_IN_ERROR	120	NORMAL_UNSPEC	31
IC_PREFIX_1_DIALLED_IN_ERROR	121	NORMAL_UNSPEC	31
IC_PREFIX_1_NOT_DIALLED	122	NORMAL_UNSPEC	31
IC_EXCESSIVE_DIG_CALL_PROCEEDING	123	NORMAL_UNSPEC	31
IC_PROT_ERR_THRESHOLD_EXCEEDED	124	NORMAL_UNSPEC	31
IC_OUTGOING_CALLS_BARRED_IN_CUG	125	NORMAL_UNSPEC	31
IC_INCON_OUTGOING_ACC_AND_SUB_CLASS	126	NORMAL_UNSPEC	31
IC_NON_EXISTENT_CUG	127	NORMAL_UNSPEC	31
IC_MESG_WITH_UNREC_ELEM_DISCARDED	128	NORMAL_UNSPEC	31
IC_PREEMPTION_CCT_RES	129	NORMAL_UNSPEC	31
IC_PERMANENT_FRAME_MODE_OOS	130	NORMAL_UNSPEC	31
IC_PERMANENT_FRAME_MODE_OPERATIONAL	131	NORMAL_UNSPEC	31
IC_BLACKLIST_NO_CLI	132	NORMAL_UNSPEC	31
IC_BLACKLIST_CLI_LENGTH_INVALID	133	NORMAL_UNSPEC	31
IC_BLACKLIST_CLI_MATCHED	134	NORMAL_UNSPEC	31
IC_BLACKLIST_CPC_RESTRICTED	135	NORMAL_UNSPEC	31
IC_BLACKLIST_NOA_RESTRICTED	136	NORMAL_UNSPEC	31
IC_BLACKLIST_BNUMBER_MATCHED	137	NORMAL_UNSPEC	31
IC_WHITELIST_CLI_NOT_MATCHED	138	NORMAL_UNSPEC	31
IC_PORTED_NUMBER	139	NORMAL_UNSPEC	31
IC_REDIRECTION_TO_NEW_DEST	140	NORMAL_UNSPEC	31
IC_COT_FAILURE	141	NORMAL_UNSPEC	31
IC_MISROUTED_CALL_PORTED_NUM	142	NORMAL_UNSPEC	31
IC_INVALID_CALL_REF	143	NORMAL_UNSPEC	31
IC_UNKNOWN	144	NORMAL_UNSPEC	31

Release Cause Location Codes

The following section lists the internal and protocol-specific release cause location values associated with Cisco Media Gateway Controller Software Release 7.4(x) and later.

Internal Release Cause Location Codes

Table B-16 lists the internal release cause location binary values for Release 7.4(x) and later.

Table B-16 Internal Release Cause-Location Values

Cause Location	Binary Value
LOCATION_USER	0001
LOCATION_PRIVATE_LOCAL	0010
LOCATION_PUBLIC_LOCAL	0011
LOCATION_TRANSIT	0100
LOCATION_PUBLIC_REMOTE	0101
LOCATION_PRIVATE_REMOTE	0110
LOCATION_INTERNATIONAL	0111
LOCATION_INTERWORKING	1000
LOCATION_LOCAL_INTERFACE	1001
LOCATION_LOCAL_LOCAL	1010
LOCATION_LOCAL_REMOTE	1011
LOCATION_PACKET_MANAGER	1100
LOCATION_UNKNOWN	1101

Protocol Specific Release Cause Location Codes

The following sections list the protocol-specific release cause location values for the protocols supported in Cisco Media Gateway Controller Software Release 7.3(x) and later.

The release cause location values for each protocol are listed with their variants in a separate column on the right side of the following tables. Note that an “X” in any column indicates that the mapping in question is supported by that particular protocol.

ANSI SS7 Protocol to Internal Mapping

Described in this section are the protocol-specific release cause location values, pertinent to the ANSI SS7 protocol. The received values are in binary.

Table B-17 Protocol-specific Release Cause Location Values

Received Binary Value	Cause Location	Standard	Bellcore	MCI	Sprint
0000	LOCATION_USER	X	X	X	X
0010	LOCATION_LOCAL_LOCAL	X	X	X	X
0110	LOCATION_LOCAL_INTERFACE	X	X		
0001	LOCATION_PRIVATE_LOCAL	X		X	X
0011	LOCATION_TRANSIT_DEFAULT	X		X	X
0100	LOCATION_LOCAL_REMOTE	X		X	X
0101	LOCATION_PRIVATE_REMOTE	X		X	X
0110	LOCATION_LOCAL_INTERFACE	X		X	X
0111	LOCATION_INTERNATIONAL	X		X	X
1010	LOCATION_INTERWORKING	X		X	X

MCI and Sprint default location on no map for received value:
LOCATION_TRANSIT ANSI STANDARD

Bellcore default location on no map for received value:
LOCATION_LOCAL_INTERFACE

Internal to ANSI SS7 Protocol Mapping

Table B-18 describes the internal-to-protocol location mappings supported in the ANSI SS7 protocol. The transmitted bit code values are in binary.

Table B-18 Internal-to-ANSI SS7 Protocol Location Mappings

Transmitted Binary Value	Cause Location	Standard	Bellcore	MCI	Sprint
0000	LOCATION_USER	X	X	X	X
0010	LOCATION_LOCAL_LOCAL	X	X	X	X
0110	LOCATION_LOCAL_INTERFACE	X	X		
0001	LOCATION_PRIVATE_LOCAL	X		X	X
0011	LOCATION_TRANSIT_DEFAULT	X		X	X
0100	LOCATION_LOCAL_REMOTE	X		X	X
0101	LOCATION_PRIVATE_REMOTE	X		X	X
0110	LOCATION_LOCAL_INTERFACE	X		X	X
0111	LOCATION_INTERNATIONAL	X		X	X
1010	LOCATION_INTERWORKING	X		X	X

Q.767 Protocol to Internal Mapping

Table B-19 describes the protocol-specific release cause location values pertinent to the Q767 protocol. The received values are in binary.

Table B-19 Release Cause Location Values for the Q.767 Protocol

Received Binary Value	Cause Location	Standard	Italian	Russian	Spanish	Swedish	Mexican	Italian and Interconnect	ETS_300_121 and Polish	ETS_300_121
0000	LOCATION_USER	X	X	X	X	X	X	X	X	X
0010	LOCATION_LOCAL_LOCAL									
0110	LOCATION_LOCAL_INTERFACE									
0010	LOCATION_PUBLIC_LOCAL		X		X		X	X		
0001	LOCATION_PRIVATE_LOCAL		X		X		X	X		
0011	LOCATION_TRANSIT	X	X	X	X	X	X	X	X	X
0100	LOCATION_LOCAL_REMOTE									
0100	LOCATION_PUBLIC_REMOTE	X	X	X	X	X	X	X	X	X
0101	LOCATION_PRIVATE_REMOTE	X	X	X	X	X	X	X	X	X
0110	LOCATION_LOCAL_INTERFACE									
0111	LOCATION_INTERNATIONAL	X	X	X	X	X	X	X	X	X
1010	LOCATION_INTERWORKING	X	X	X	X	X	X	X	X	X

Default location on no map for received value ITALIAN:
LOCATION_INTERWORKING. All others: LOCATION_INTERNATIONAL.

Internal to Q.767 Protocol Mapping

Table B-20 describes the internal to protocol location mappings supported in the Q.767 protocol. The transmitted values are in binary.

Table B-20 Internal to Protocol Location Mappings for the Q.767 Protocol

Transmitted Binary Value	Cause Location	Standard	Italian	Russian	Spanish	Swedish	Mexican	Italian and Interconnect	ETS_300_121 and Polish	ETS_300_121
0000	LOCATION_USER	X	X	X	X	X	X	X	X	X
0010	LOCATION_LOCAL_LOCAL									
0110	LOCATION_LOCAL_INTERFACE									
0010	LOCATION_PUBLIC_LOCAL		X		X		X	X		
0001	LOCATION_PRIVATE_LOCAL		X		X		X	X		
0011	LOCATION_TRANSIT	X	X	X	X	X	X	X	X	X
0100	LOCATION_LOCAL_REMOTE									
0100	LOCATION_PUBLIC_REMOTE	X	X	X	X	X	X	X	X	X
0101	LOCATION_PRIVATE_REMOTE	X	X	X	X	X	X	X	X	X
0110	LOCATION_LOCAL_INTERFACE									
0111	LOCATION_INTERNATIONAL	X	X	X	X	X	X	X	X	X
1010	LOCATION_INTERWORKING	X	X	X	X	X	X	X	X	X

Q.761 Protocol to Internal Mapping

Table B-21 describes the protocol specific release cause location values pertinent to the Q.761 protocol.

Table B-21 Release Cause Location Values for the Q.761 Protocol

Received Binary Value	Cause Location	Standard Q.761	Australian Q.761	Finnish Q.761	Japanese Q.761	Korean Q.761	Q.761 Korean	Hong Kong Q.761	Taiwan Q.761	Belgian Mobistar	Spanish ETS_300_356	Swiss ETS_300_356	ETS_300_356_V3 and UK	Japanese ETS_300_356	ETS_300_356 and Japan
0000	LOCATION_USER	X	X	X	X	X	X	X	X	X	X	X	X	X	X
0010	LOCATION_LOCAL_LOCAL														
0110	LOCATION_LOCAL_INTERFACE														
0010	LOCATION_PUBLIC_LOCAL	X	X	X	X	X	X	X	X	X	X	X	X		X
0001	LOCATION_PRIVATE_LOCAL	X	X	X	X	X	X	X	X	X	X	X	X		X
0011	LOCATION_TRANSIT	X		X	X	X	X	X	X	X	X	X	X	X	X
0100	LOCATION_LOCAL_REMOTE														
0100	LOCATION_PUBLIC_REMOTE	X	X	X	X	X	X	X	X	X	X		X	X	X
0101	LOCATION_PRIVATE_REMOTE	X	X	X	X	X	X	X	X	X	X		X	X	X
0110	LOCATION_LOCAL_INTERFACE														
0111	LOCATION_INTERNATIONAL	X	X	X	X	X	X	X	X	X	X		X	X	X
1110	LOCATION_PACKET_MANAGER										X				
1010	LOCATION_INTERWORKING	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Default location on no map for received value: KOREAN: LOCATION_INTERWORKING

Internal to Q.761 Protocol Mapping

Table B-22 describes the internal to protocol location mappings supported in the Q.761 protocol. The transmitted values are in binary.

Table B-22 Internal to Protocol Location Mappings for the Q.761 Protocol

Transmitted Binary Value	Cause Location	Standard Q.761	Australian Q.761	Finnish Q.761	Japanese Q761	Korean Q.761	Q.761 Korean	Hong Kong Q761	Taiwan Q.761	Belgian Mobistar	Spanish ETS_300_356	Swiss ETS_300_356	ETS_300_356_V3 and UK	Japanese ETS_300_356	ETS_300_356 and Japan
0000	LOCATION_USER	X	X	X	X	X	X	X	X	X	X	X	X	X	X
0010	LOCATION_LOCAL_LOCAL														
0110	LOCATION_LOCAL_INTERFACE														
0010	LOCATION_PUBLIC_LOCAL	X	X	X	X	X	X	X	X	X	X	X	X		X
0001	LOCATION_PRIVATE_LOCAL	X	X	X	X	X	X	X	X	X	X	X	X		X
0011	LOCATION_TRANSIT	X	X	X	X	X	X	X	X	X	X	X	X	X	X
0100	LOCATION_LOCAL_REMOTE														
0100	LOCATION_PUBLIC_REMOTE	X	X	X	X	X	X	X	X	X	X		X	X	X
0101	LOCATION_PRIVATE_REMOTE	X	X	X	X	X	X	X	X	X	X		X	X	X
0110	LOCATION_LOCAL_INTERFACE														
0111	LOCATION_INTERNATIONAL	X	X	X	X	X	X	X	X	X	X		X	X	X
1110	LOCATION_PACKET_MANAGER										X				
1010	LOCATION_INTERWORKING	X	X	X	X	X	X	X	X	X	X	X	X	X	X



Dial Plan Worksheets

This appendix contains page-size copies of all the worksheets contained in this dial plan guide.

This includes the following worksheets:

- Table C-1, Trunk Worksheet on page C-2
- Table C-2, Nature of Address (NOA) Table Worksheet on page C-3
- Table C-3, Number Plan Indicator (NPI) Table Worksheet on page C-4
- Table C-4, Digit Modification Table Worksheet on page C-5
- Table C-5, Service Name Table Worksheet on page C-6
- Table C-6, Result Set Table Worksheet on page C-7
- Table C-7, Cause Table Worksheet on page C-8
- Table C-8, Location Table Worksheet on page C-9

Table C-3 Number Plan Indicator (NPI) Table Worksheet

Customer Group ID =	
BlockValue	Result Set Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

NPI Blocks through	
BlockValue	Result Set Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

BlockValue	Result Set Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
12	
13	
14	
15	
16	

BlockValue	Result Set Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
12	
13	
14	
15	
16	

Table C-8 Location Table Worksheet

Customer Group ID =	
BlockValue	Result Set Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Location Blocks through	
BlockValue	Result Set Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

BlockValue	Result Set Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
12	
13	
14	
15	
16	

BlockValue	Result Set Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
12	
13	
14	
15	
16	

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