



A-Number Country Code Digit Remove Property

Document Release History

Publication Date	Comments
March 12, 2007	Initial version of the document.

Feature History

Release	Modification
9.7(3)	The A-Number Country Code Digit Remove Property feature was introduced on the Cisco MGC software.

This document describes the A-Number Country Code Digit Remove Property feature.

This feature is described in the following sections:

- [Feature Overview, page 1](#)
- [Supported Platforms, page 3](#)
- [Supported Standards, MIBs, and RFCs, page 3](#)
- [Prerequisites for Using This Feature, page 3](#)
- [Provisioning Procedures, page 3](#)
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- [Obtaining Documentation, Obtaining Support, and Security Guidelines, page 19](#)
- [Glossary, page 19](#)

Feature Overview

This feature introduces the property ADigitCCrm of an outgoing trunk group to the Cisco MGC 2200. This property will affect the following five parameters in Cisco MGC 2200 outgoing messages.

- Calling Party Number (CgPN)
- Generic Number Additional Calling Party Number (GN_ACgPN)
- Redirecting Number (RDN)
- Original Called Number (OCN)

- Presentation Number (PN)

If the A-number Nature of Address (NOA) of any above number is international, then the MGC can remove from 1 up to 5 leading digits that match the ADigitCCrm property value (that is, the country code). In addition to removing the country code, the NOA value in the ISUP message is modified from international to national.

Benefits

This feature provides the following benefits:

Remove Country Code digits from A-number Digit String

With the addition of the trunk group property ADigitCCrm, the Cisco MGC 2200 can remove from 1 to 5 digits from the outgoing A-number digit string.

Related Features and Technologies

The following feature is related to this feature:

- Redirection number modification and advanced A-Number(s) normalization

Related Documents

This document contains information that is related strictly to this feature. The documents that contain additional information related to the Cisco Media Gateway Controller (MGC) are show below.

Cisco Media Gateway Controller Hardware Installation Guide

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_installation_guide_book09186a00805daff7.html

Cisco Media Gateway Controller Software Release 9 Installation and Configuration Guide

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_installation_and_configuration_guide_book09186a008007df76.html

Release Notes for the Cisco Media Gateway Controller Software Release 9.x(.x)

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/prod_release_notes_list.html

Cisco Media Gateway Controller Software Release 9 Provisioning Guide

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_configuration_guide_book09186a008007ddbd.html

Cisco Media Gateway Controller Software Release 9 Dial Plan Guide

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_configuration_guide_book09186a008007e020.html

Cisco Media Gateway Controller Software Release 9 Operations, Maintenance, and Troubleshooting Guide

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_maintenance_guide_book09186a008007e563.html

Regulatory Compliance and Safety Information for the Cisco Media Gateway

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_regulatory_approvals_and_compliance09186a008021c72f.html

Cisco Media Gateway Controller Software Release 9 Billing Interface Guide

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_technical_reference_book09186a008009b07b.html

Cisco Media Gateway Controller Software Release 9 MML Command Reference

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_command_reference_book09186a00806e24ae.html

Cisco Media Gateway Controller Software Release 9 Messages Reference Guide

http://www.cisco.com/en/US/products/sw/voicesw/ps1913/products_technical_reference_book09186a008007dcb8.html

Supported Platforms

The hardware platforms supported for the Cisco MGC software Release 9.7(3) are described in the *Cisco Media Gateway Controller Hardware Installation Guide*.

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

For more information on the MIBs used in the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Management Information Base Guide*.

RFCs

No new or modified RFCs are supported by this feature.

Prerequisites for Using This Feature

The Cisco PGW 2200 must be running Cisco MGC software Release 9.7(3). Prerequisites for this release can be found in the *Release Notes for the Cisco Media Gateway Controller Software Release 9.7(3)* at:

<http://www.cisco.com/univercd/cc/td/doc/product/access/sc/re19/relnote/rn973.htm>.

Provisioning Procedures

You must modify the provisioning data of your system to enable this feature. Before you begin provisioning this feature, we recommend that you plan your provisioning changes as described in the “[Planning for Provisioning](#)” section on page 6.

**Tip**

You can find information on starting and ending provisioning sessions and retrieving provisioning data in the [“Provisioning Basics” section on page 6](#).

The following section describes the provisioning tasks related to this feature:

- [Provisioning This Feature, page 4](#)

Provisioning This Feature

Provision the ADigitCCrm trunk group property to remove from 1 through 5 digits from the outgoing A-number digit string.

The trunk group property provisioning is performed when digits are to be removed from the outgoing A-number digit string and the NOA changed from International to National when a match is made of the A-number. This section covers the following provisioning topics:

- [Provisioning the ADigitCCrm Property, page 4](#)

Provisioning the ADigitCCrm Property

This section contains the procedures that you must perform to remove digits from the outgoing A-number digit string.

To remove digits from the outgoing A-number digit string, perform the following steps:

-
- Step 1** Start a provisioning session, as described in the [“Starting a Provisioning Session” section on page 6](#).
- Step 2** Enter the following command to remove digits 12345 from the outgoing A-number digit string:
- ```
mml> prov-add:trnkgrpprop:adigitccrm="12345",name="8000"
```
- Where:
- *name*—MML name of a previously configured trunk group.
  - *adigitccrm*—The number of country code digits to remove. It can be as many as 5 digits in length.
- Step 3** Repeat Step 2 for each outgoing A-number digit string you want to remove from your provisioning data.
- Step 4** If there are no other components that you need to provision, end your provisioning session as described in the [“Saving and Activating Your Provisioning Changes” section on page 7](#).
- 

## Command Reference

This section documents new, modified, or deleted Man-Machine Language (MML) commands. All other MML commands are documented in the *Cisco Media Gateway Controller Software Release 9 MML Command Reference Guide*.

## Modified MML Commands

This section contains the MML commands that were modified for this feature.

### PROV-ADD:trnkgrpprop:adigitccrm—Indicates the A-Number Digits to Remove

**Purpose:** This MML command indicates the number of leading digits to remove from matching A-numbers.

**Syntax:** `prov-add:trnkgrpprop:adigitccrm="12345",name="8000"`  
`prov-rtrv:trnkgrpprop:name="8000"`

**Input Description:**

- *adigitccrm*—The matching digits to remove from the A-number.
- *name*—MML name of a previously configured trunk group.

**Output Description:** name—MML name of the specified trunk group.

**Example:** The MML command shown in the following example retrieves the state of trunk group properties for a specific trunk group.

```
mml> prov-rtrv:trnkgrpprop:name="8000"

MGC-01 - Media Gateway Controller 2005-09-22 11:22:27.176 EDT
M RTRV
'session=adigitccrm1:trnkgrpprop''
/*
ACCRspCatName = default
ACCRspCntlInhibit = 0
ACLDur = 5
ADigitCCPrefix = 0
ADigitCCrm = 12345
AInternationalPrefix = NULL
...
...
...
```

**Comments:** Performance Impact Category: A

## Reference Information

The following sections contain reference material related to this feature. Information is included on the following areas:

- [Planning for Provisioning, page 6](#)
- [Provisioning Basics, page 6](#)
- [Dial Plan Basics, page 9](#)
- [Properties, page 18](#)

## Planning for Provisioning

This section lists the data that you must gather to successfully provision this feature. For more information on planning the provisioning for the rest of the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

### Collecting A-number Digit String Data

The A-number digit string represents outgoing A-numbers from which the matching digits are to be removed. Collect the following information for A-number digit strings from which digits will be removed.

- MML name of the specified trunk group
- Digits to remove

## Provisioning Basics

Use the procedures in this section to start a provisioning session, save, and activate the changes you have made.

- [Starting a Provisioning Session, page 6](#)
- [Saving and Activating Your Provisioning Changes, page 7](#)
- [Ending a Provisioning Session Without Activating Your Changes, page 7](#)
- [Retrieving Provisioning Data, page 8](#)

For more detailed information about provisioning your Cisco MGC, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

### Starting a Provisioning Session

You might need to start a provisioning session as part of your system operations. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
prov-sta::srcver="curr_ver",dstver="mod_ver"
```

Where:

- *curr\_ver*—The name of the current configuration version. In place of the name of the current configuration version, you can also enter:
  - new—A new default session configuration; no existing source configuration is available.
  - active—Selects the active configuration as the source for configuration changes.



**Note** If you do not know the name of your current configuration session, you can use the procedure described in the [“Retrieving Data on the Current Provisioning Session” section on page 7](#).

- *mod\_ver*—A new configuration version name that contains your provisioning changes.

For example, to use a configuration version called ver1 as the basis for a version to be called ver2, you would enter the following command:

```
prov-sta::srcver="ver1",dstver="ver2"
```

Once a provisioning session is underway, you may use the **prov-add**, **prov-ed**, and **prov-dlt** MML commands to add, modify, and delete components on your system. This document describes how to provision this feature. For more information on provisioning other components on your Cisco MGC, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

There are two ways to close your provisioning session: saving and activating your provisioning changes, as described in the [“Saving and Activating Your Provisioning Changes” section on page 7](#) or ending your provisioning session without saving and activating your changes, as described in the [“Ending a Provisioning Session Without Activating Your Changes” section on page 7](#).

## Saving and Activating Your Provisioning Changes

When you have completed making provisioning changes in your session, you must enter a command to save and activate your changes. There are two different provisioning MML commands that do this: **prov-cpy** and **prov-dply**.



### Caution

Using the **prov-cpy** or **prov-dply** MML command can severely impact your system’s call processing performance, depending on the extent of your provisioning changes. We recommend that these commands be issued during a maintenance window when traffic is minimal.

The **prov-cpy** MML command is used to save and activate your changes on simplex Cisco MGC (single-host) systems.



### Note

When you enter the **prov-cpy** command, your provisioning session is also automatically ended. If you want to make additional provisioning changes, you must start a new provisioning session, as described in the [“Starting a Provisioning Session” section on page 6](#).



### Caution

Do not use the **prov-cpy** command to save and activate your changes on a continuous-service Cisco MGC (active and standby hosts) system. Saving and activating using **prov-cpy** on such a system would require using the **prov-sync** MML command to synchronize the provisioning data on the active and standby hosts. The system does not indicate when the synchronization process fails, which would create problems when a switchover operation occurs.

The **prov-dply** MML command is used to save and activate your changes on the active and standby Cisco MGCs in a continuous-service system. This command should not be used on a Cisco MGC in a simplex configuration.



### Note

When you enter the **prov-dply** command, your provisioning session is also automatically ended, unless an error occurs during execution. If you want to make additional provisioning changes, you must start a new provisioning session, as described in the [“Starting a Provisioning Session” section on page 6](#).

## Ending a Provisioning Session Without Activating Your Changes

If you want to end a provisioning session without saving and activating the changes you have entered, enter the **prov-stp** MML command. This command ends your current provisioning session and your changes are not entered.

## Retrieving Provisioning Data

You can use the **prov-rtrv** MML command to retrieve information about your current provisioning settings. The ways you can use this command to retrieve provisioning data are described in the following sections:

- [Retrieving Data for an Individual Component, page 8](#)
- [Retrieving Data for All Components, page 8](#)
- [Retrieving Data for All Components of a Particular Type, page 8](#)
- [Retrieving Data on the Current Provisioning Session, page 9](#)
- [Retrieving Data on Supported Signaling Protocols, page 9](#)

### Retrieving Data for an Individual Component

You can retrieve provisioning data for any individual component on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
prov-rtrv:component:name=MML_name
```

Where:

- *component*—The MML component type associated with the desired component. You can find a complete list of MML component types in the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.
- *MML\_name*—The MML name for the desired component. You can determine the MML names for the various components using the **prov-rtrv:all** MML command.

For example, to view the provisioning data for a SS7 signaling service called `ss7svc1`, you would enter the following command:

```
prov-rtrv:ss7path:name="ss7svc1"
```

The response to the command is dependent upon the component type associated with the desired component. For example, to view the properties for an Signaling Control Connection Part (SCCP) User Adaptation (SUA) routing key called `suakey1`, you would enter the following command:

```
prov-rtrv:suakey:name="suakey1"
```

### Retrieving Data for All Components

You can retrieve data for all of the components provisioned on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
prov-rtrv:all
```

### Retrieving Data for All Components of a Particular Type

You can retrieve provisioning data for all components of a particular type on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
prov-rtrv:component:"all"
```

Where: *component* is the MML component type associated with the desired component group. You can find a complete list of MML component types in the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

For example, to view the provisioning data for all SS7 signaling services, you would enter the following command:



```
prov-rtrv:ss7path:"all"
```

## Retrieving Data on the Current Provisioning Session

You can retrieve data on the current provisioning session. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
prov-rtrv:session
```

The system returns a response similar to the following:

```
MGC-02 - Media Gateway Controller 2003-01-13 13:39:19
M RTRV
 "session=jtest:session"
 /*
Session ID = mml1
SRCVER = active
DSTVER = jtest
*/
```

## Retrieving Data on Supported Signaling Protocols

You can retrieve protocol data for the current provisioning session. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
prov-rtrv:variants
```

## Dial Plan Basics

The procedures in this section describe how to add, modify, and delete dial plan data and how to retrieve that data.

- [Adding Dial Plan Data, page 9](#)
- [Modifying an Element of Your Dial Plan Data, page 10](#)
- [Ending a Provisioning Session Without Activating Your Changes, page 7](#)
- [Retrieving Provisioning Data, page 8](#)

For more detailed information about creating a dial plan for your Cisco MGC, refer to the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.

## Adding Dial Plan Data

The order in which you provision dial plan tables is important. Many tables refer to other tables that must be defined first. The following list identifies the recommended sequence for dial plan provisioning:

1. Create the dial plan file (unique CustGrpID)
2. Provision digit modification
3. Provision the service
4. Provision the result and result sets
5. Provision the A-numbers and B-numbers
6. Provision CPC
7. Provision TMR analysis
8. Provision B-number NOA and NPI analysis

9. Provision TNS
10. Provision NANP B-number normalization
11. Provision the location value
12. Provision the cause value
13. Provision the A and B whitelist and blacklist screening files

To begin the process of creating a dial plan, log into the active Cisco MGC, start an MML session, and enter the following command:

```
mml> numan-add:component:custgrpID=cust_groupID,param_name="param_value",...
```

Where:

- *component*—The name of the component type you want to add to your dial plan. A complete list of the valid dial plan component types can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.
- *cust\_groupID*—Customer group ID number associated with your dial plan.
- *param\_name*—The name of the parameter you want to configure for the selected component in your dial plan. A complete list of the valid parameters for each dial plan component type can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.
- *param\_value*—The value of the parameter you want to configure for the selected component in your dial plan. A complete list of the valid values for the parameters of each dial plan component type can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.

For example, to provision a route result type called *resulttone*, you would enter the following command:

```
mml> numan-add:resulttable:custgrpID="t777",resulttype="route",setname="setone",
name="resulttone",dw1="rtlistone"
```

## Modifying an Element of Your Dial Plan Data

To modify an element of your dial plan, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> numan-ed:component:custgrpID="cust_groupID",param_name="param_value",...
```

Where:

- *component*—The name of the component type you want to modify in your dial plan. A complete list of the valid dial plan component types can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.
- *cust\_groupID*—Customer group ID number associated with your dial plan.
- *param\_name*—The name of the parameter you want to configure for the selected component in your dial plan. A complete list of the valid parameters for each dial plan component type can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.
- *param\_value*—The value of the parameter you want to configure for the selected component in your dial plan. A complete list of the valid values for the parameters of each dial plan component type can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.

For example, to modify a result table, you would enter the following command:

```
mml> numan-ed:resulttable:custgrpID="t777",resulttype="route",setname="setone",
name="resulttwo",dw1="rtlistone"
```

## Deleting an Element from Your Dial Plan Data

To delete an element from your dial plan, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> numan-dlt:component:custgrpid="cust_groupID",name="MML_name"
```

Where:

- *component*—The name of the component type you want to delete from your dial plan. A complete list of the valid dial plan component types can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.
- *cust\_groupID*—Customer group ID number associated with your dial plan.
- *MML\_name*—The MML name of the selected component you want to delete from your dial plan.

For example, to delete a result set called *setone*, you would enter the following command:

```
mml> numan-dlt:resultset:custgrpid="t001",name="setone"
```

## Retrieving Dial Plan Data

You can use the **numan-rtrv** MML command to retrieve information about your current dial plan settings. The ways in which you can use this command to retrieve dial plan data are described in the following sections:

- [Retrieving Data for an Individual Component, page 11](#)
- [Retrieving Data for All Components of a Particular Type, page 12](#)



### Note

You can verify dial plans using the translation verification viewer on the Cisco MGC toolbar. For information on using the translation verification viewer, refer to the *Cisco Media Gateway Controller Software Release 9 Operations, Maintenance, and Troubleshooting Guide*.

## Retrieving Data for an Individual Component

You can retrieve dial plan data for any individual component on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> numan-rtrv:component:custgrpid="cust_groupID",name="MML_name"
```

Where:

- *component*—The name of the component type you want to retrieve from your dial plan. A complete list of the valid dial plan component types can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.
- *cust\_groupID*—Customer group ID number associated with your dial plan.
- *MML\_name*—The MML name of the selected component you want to retrieve from your dial plan.

For example, to retrieve the settings for a result set called *setone*, you would enter the following command:

```
mml> numan-rtrv:resultset:custgrpid="t001",name="setone"
```

## Retrieving Data for All Components of a Particular Type

You can retrieve dial plan data for all components of a particular type on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> numan-rtrv:component:custgroupid="cust_groupID","all"
```

Where:

- *component*—The name of the component type you want to retrieve from your dial plan. A complete list of the valid dial plan component types can be found in the *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*.
- *cust\_groupID*—Customer group ID number associated with your dial plan.

For example, to retrieve the settings for all result sets in your dial plan, you would enter the following command:

```
mml> numan-rtrv:resultset:custgroupid="t001","all"
```

## Adding or Removing Country Code

Existing trunk group properties provide national and international prefix digits (such as 0 and 00), which can be used to prepend a national or international format number. However, you might also have a requirement to route calls for a given destination to different carriers, which might require only a national format, and not a country code. Other carriers might require an international format that includes a country code. When switching between the national and international formats, it is necessary to enhance the existing properties by adding the capability to selectively add or remove the country code.



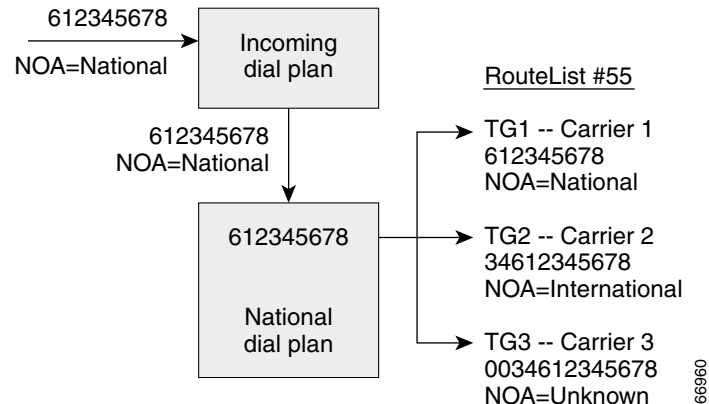
### Note

A slight performance impact can be expected if you are using this function, but it should typically not exceed 5 percent on call processing if the properties described here are provisioned for use.

## National Switching Node Operation

Trunk group properties are already present for conversion from both national and international formats to the NOA Unknown format. However, it is also necessary to be able to change between the national and international formats by selectively adding the country code, depending on what the country code is, and changing the NOA code on a per trunk group (TG) basis.

[Figure 1](#) shows an incoming call for a mobile number arrives from the originating carrier in national format, and the incoming dial plan points to the national dial plan. The national dial plan gives a route result of RouteList #55.

**Figure 1** Operation of a National Switching Node

The first route in RouteList #55 contains three trunk groups, each routed to a different carrier:

- **TG1, Carrier 1**—Is the first choice for mobile calls because it is the least expensive of the three carriers. Carrier 1 accepts national calls only in the national number format; however, it also accepts calls to other countries in the international number format.
- **TG2, Carrier 2**—Is the second choice because it is less expensive than Carrier 3, but it accepts calls only in the international number format.
- **TG3, Carrier 3**—Is the last choice because it is the most expensive of the three carriers, and it accepts calls only to international numbers in the Unknown format.

From the previous example, it can be seen that the following items are needed to solve this problem:

- **CC\_DIG**—Is the result type used in B-number analysis to record the destination country code for the call. A digmodstring is created so it can be connected to the result in dataword1.
- **BDigitCCPrefix**—A trunk group-based property which, if enabled, prepends the destination Country code for the call to the B-number (called number) and changes the incoming NOA code to international.
- **CCOrigin**—An incoming trunk group property to record the originating country code for the call.
- **ADigitCCPrefix**—Another trunk group-based property which, if enabled and the NOA code is set to national, prepends the country code from CCOrigin to the A-number (calling number) and changes the incoming NOA code to international.



**Note** If there is no CCOrigin value present when required, then the A-number is left unchanged.

Existing trunk group properties are used to insert digits (A/BnationalPrefix, A/BinternationalPrefix) in the digit string. The digit strings are checked after the above properties to determine if additional digits can be prepended to the digit string. For example, adding 00 to the front of the country code and changing the NOA code to Unknown format.

For additional information on trunk group properties, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

When the MGC is processing a B-number (called number), digits can be added to the front of the B-number as a prefix. When more than one prefix is added to the B-number, digits are added in the following order:

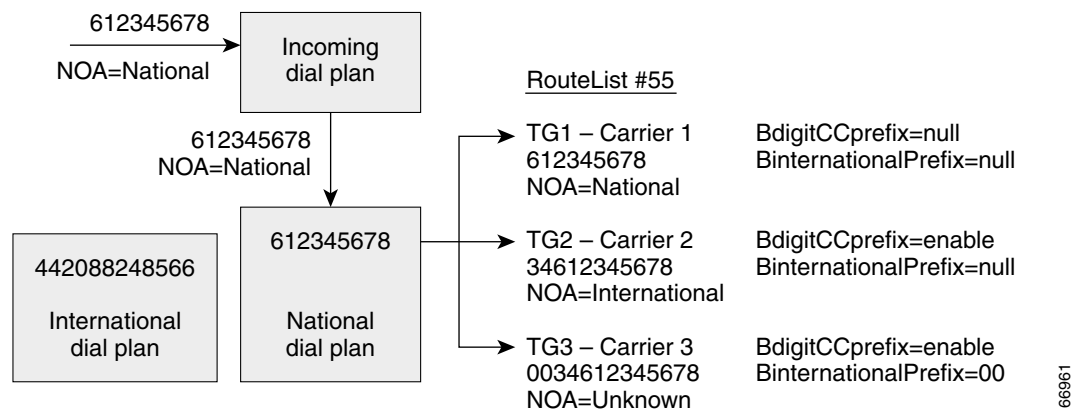
- **CC\_DIG**—The country code to be prefixed to the B-number, if the BDigitCCPrefix property value is set to 1 (enabled)

- BInternationalPrefix (00) or BNationalPrefix (0)
- BTechPrefix

For example, a UK-style national number with a national prefix and a BTechPrefix is 901444234567 (where BTechPrefix=9, BNationalPrefix=0, and the national number=1444234567). Similarly, the same UK-style national number fully prefixed with country code, international prefix, and a BTechPrefix is 900441444234567 (where BTechPrefix=9, BInternationalPrefix=00, country code=44, and the national number=1444234567).

Figure 2 shows how these capabilities are used to handle B-number (called number) formats.

**Figure 2** Operation of a National Switching Node with Country Code Addition Capability



As shown in Figure 2, in the national dial plan the result type CC\_DIG is set for the national mobile number (CC\_DIG=34), so for the calls being routed to each carrier the following occurs:

- **TG1, Carrier 1**—Is the first choice for national mobile calls because it is the least expensive of the three carriers. Carrier 1 accepts national calls only in the national number format. In this instance the number format is national and needs no modification.
- **TG2, Carrier 2**—Is the second choice because it is less expensive than Carrier 3, but it accepts calls only in the international number format. For you to use Carrier 2, the BdigitCCprefix property is enabled, the result for CC\_DIG is prepended to the B-number (called number), and the incoming NOA code is changed to international format.
- **TG3, Carrier 3**—Is the last choice because it is the most expensive carrier, and it accepts calls only to international numbers in the Unknown format. For you to use Carrier 3, the BdigitCCprefix property is enabled and performed first, changing the number to international format as was done with TG2.

The BinternationalPrefix property is also enabled and is performed next. It takes the resulting number (34612345678) and detects the international NOA code, so it prepends 00 to the number and sets the NOA code to Unknown.

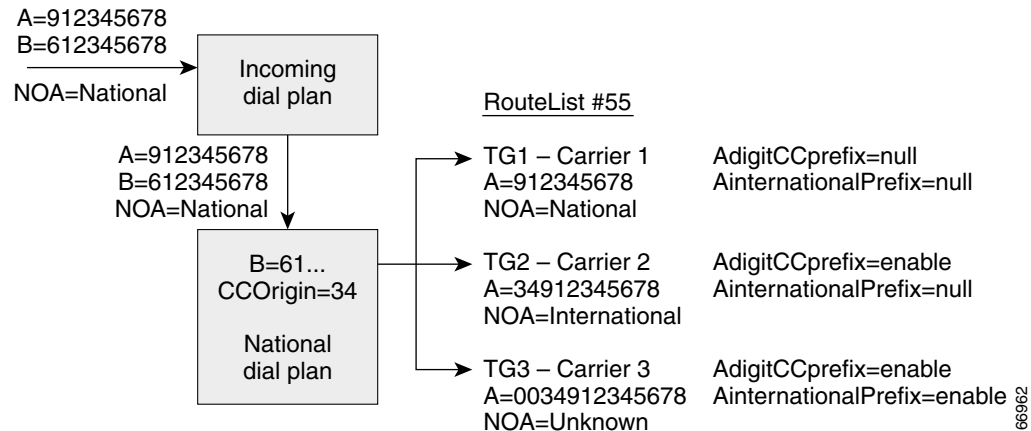


**Note**

Calls routed to Carrier 2 (TG2) from the international dial plan do not have CC\_DIG set, so no modification occurs when international calls get routed to this carrier; they are already in International format with the country code. Calls routed to Carrier 3 (TG3) from the international dial plan are still modified to Unknown format.

The example in Figure 3 shows how these capabilities are used to handle A-number (calling number) formats.

**Figure 3** Operation of a National Switching Node with A-Number Formats



As shown in Figure 3, the CCOOrigin trunk group property is 34 as set in the properties.dat file for the incoming trunk group. For calls being routed to each of the three carriers the following occurs:

- **TG1, Carrier 1**—Is the first choice for national mobile calls because it is the least expensive of the three carriers. Carrier 1 accepts national calls only in the national number format. In this instance the number format is national and needs no modification.
- **TG2, Carrier 2**—Is the second choice because it is less expensive than Carrier 3, but it accepts calls only in the international number format. For you to use Carrier 2, the AdigitCCprefix property is enabled, and so the value of CCOOrigin for the call (34) is prepended to the A-number (calling number), and the incoming NOA code is changed to international format.
- **TG3, Carrier 3**—Is the last choice because it is the most expensive, and it accepts calls only to international numbers in the Unknown format. For you to use Carrier 3, the AdigitCCprefix property is enabled and performed first, changing the number to international format, as was done with TG2.

The AinternationalPrefix property is also enabled and is performed next. It takes the resulting number (34612345678) and detects the international NOA code, so it prepends 00 to the number and sets the NOA code to Unknown.



#### Note

Calls exiting down trunk groups that already have their A-number in international format are unchanged, regardless of the state of the AdigCCprefix trunk group property. This also applies to international transit calls where the A-number has already been normalized into international format.

## International Switching Node Operation

The requirements for an international switching function are slightly different from those for national switching. In an international switching node, all numbers are normalized into international format (typically the A- and B-numbers), and numbers are switched primarily according to analysis of the country code and area code, such as a country's mobile code.

However, many carriers (such as PTTs) require numbers routed to destinations within their country to be presented in their national format, with the country code removed, and numbers routed to destinations in another country to be presented in an international format, with the country code still intact.

To provide this capability, the trunk group property `BDigitCCrm` is required to selectively remove the country code from the B-number (called number) on a per trunk group basis. Or, the trunk group property `ADigitCCrm` is required to selectively remove the country code from the A-number (calling number) on a per trunk group basis.

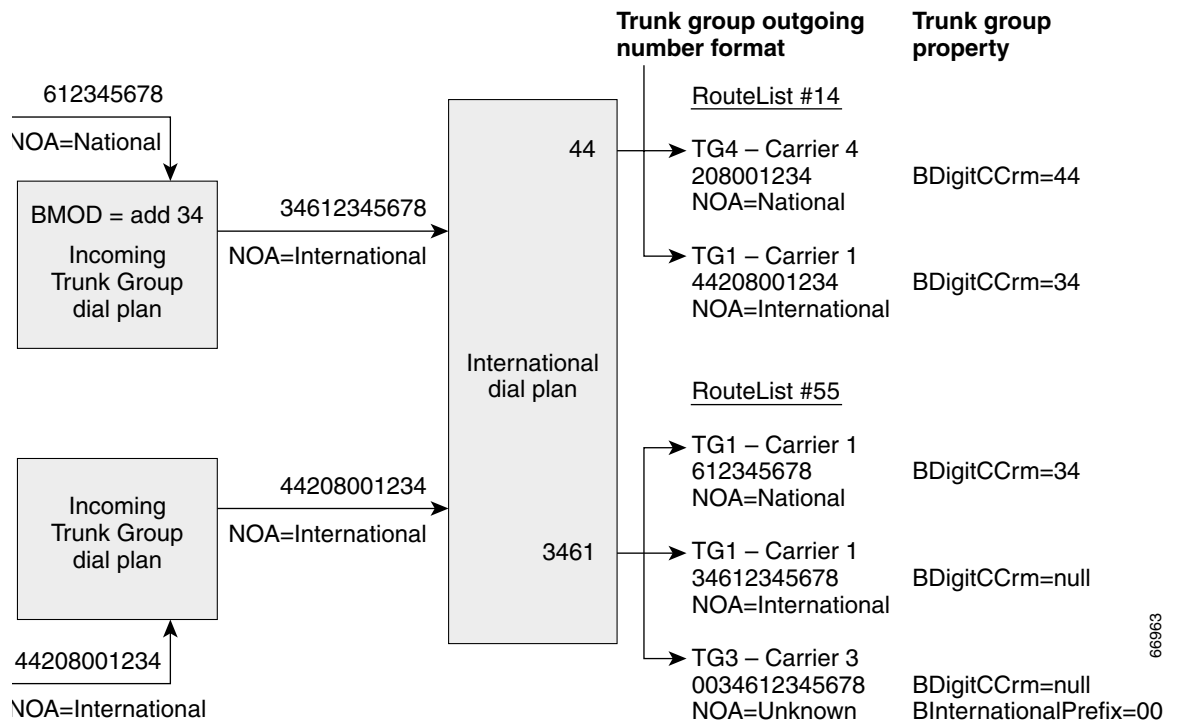
If the `BDigitCCrm` property is set to a non-null value (a country code) and the NOA code is set to international, the initial digits are removed from the B-number if they match the value of `BDigitCCrm` (that is, if the B-number contains the same country code as `BDigitCCrm`). The NOA code is also reset to national.

Similarly, if the `ADigitCCrm` property is set to a non-null value (a country code) and the NOA code of any following number is set to international, the initial digits are removed from the number if they match the value of `ADigitCCrm` (that is, if the number contains the same country code as `ADigitCCrm`). The NOA code of that number is also reset to national.

- CgPN
- GN\_ACgPN
- RDN
- OCN
- PN

Figure 4 illustrates the operation of the `BDigitCCrm` property in an international switching node.

**Figure 4 International Switching Node Operation**



In the incoming trunk group dial plans, the country code is prepended for incoming numbers that are presented in national format to normalize them into international format. Other modifications can also be made; for example, inserting the country code in the front of the A-number (calling number) for that trunk group and changing its NOA code to international.



The generic international dial plan determines the destination route lists for calls. For calls to national mobile numbers beginning with 61, the routing priority is Carrier 1, Carrier 2, and Carrier 3. The international dial plan selects RouteList #55 for numbers beginning with 3461, a number range that is owned by Carrier 1. For each trunk group in Routing List #55 the following treatment is given:

- **TG1, Carrier 1**—Is the first choice for national number format calls for their mobile number range. The trunk group property BDigitCCrm is set to 34; therefore, calls with NOA code set to international and prefixed with 34 have the country code deleted and the NOA code set to national. All other international numbers are unaffected.
- **TG2, Carrier 2**—Is the second choice, but accepts calls only in the international number format. Property BDigitCCrm is set to null and calls are routed without modification from international format.
- **TG3, Carrier 3**—Is the third choice and accepts calls only to international numbers in the Unknown format. So property BDigitCCrm is set to null and the BInternationalPrefix property is also enabled and is performed next. The dial plan takes the resulting number (34612345678) and detects the international NOA code, so it prepends 00 to the number and sets the NOA code to Unknown.

For numbers sent to Route List #14, Carrier 4 is the first choice and Carrier 1 is the second choice:

- **TG4, Carrier 4**—Is the first choice, but this carrier requires the B-number (called number) to be presented in national format. The trunk group property BDigitCCrm is set to 44; therefore, calls with the NOA code set to international and prefixed with 44 have the country code deleted and the NOA code reset to national. All other international numbers are unaffected.
- **TG1, Carrier 1**—Is the second choice and accepts calls only for Country code 44 in international format. With property BDigitCCrm equal to 34, the only called numbers that have their country code prefix removed are those with prefix digits of 34.

There are two ways of routing calls to country code 44:

- On TG4 by sending national format (by deleting the country code 44)
- On TG1 by sending international format (by leaving the country code 44 intact)




---

**Note** Setting property BDigitCCrm to 34 has no effect on calls to country code 44.

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## Failing to Find Country Code Digits

The actions taken if an error occurs can jeopardize call completion if the call fails for any reason. In the unexpected event that a country code is not present when it is required, one of the following events occurs:

- **A-Number handling**—If a country code prefix is directed to be applied by the ADigitCCPrefix property but the digits are not available from the CCOrigin trunk group property, then the A-number and NOA code are not changed. No action is taken and the call is allowed to continue.
- **B-Number handling**—If the CC\_DIG result is expected during processing, but it is not retrieved due to an error (such as a configuration error), one of the following incorrect actions can result:
  - If only the country code prefix is required, it is not applied and the egress IAM contains the numbers in the received national format and the NOA code is national format.
  - If both the international number and country code prefix are required, the international prefix is applied without the country code and an incorrect number is sent forward to the next switch.

If the BDigitCCPrefix trunk group property is set to enable country code addition functionality, but the processing fails due to absence of the required country code digits, the call is forced to fail by setting an IC\_TEMPORARY\_FAILURE cause and proceeding to Cause analysis.

To ensure that this occurrence is noted, an internal alarm is raised and an associated log message is issued, indicating that a prefix addition has failed.

### Action Taken If Country Code Removal Leaves the B-Number Empty

When operating in Overlap mode, it is possible that the number of digits received is sufficient to enable onward routing, but is not sufficient to leave digits in the B-number if the country code is removed. This is a case where the country code digits are routed against, but are then removed. This case must be guarded against when calls are being processed.

Consider the following example:

- B-number as received in an overlap operation is 34 621 345678.
- B-number analysis with only the initial digits (34) present yields a ROUTE result.
- The trunk group property setting for the designated route is BDigitCCrm = 34.

When the MGC is operating in overlap mode and analyzing the B-number, call routing is made using the initial set of digits (34), then the trunk group property BDigitCCrm requires these leading digits (34) to be removed before the IAM is sent to the next switch, leaving no digits in the B-number.

The terminating call control (TCC) protocol rejects this call because it fails the 0 digits check, but to inform the user of the root cause of the failed call (a configuration error), the call clear down is invoked internally, an alarm (CCodeModfailed) is generated, and the associated message log indicating “prefix removal failure” is issued.

The no digit problem can be avoided when you are configuring an overlap system by ensuring that any Route result is provisioned after the country code digits, allowing for their potential removal. For example, taking the number used in the previous example:

- B-number as received in an overlap operation is 34 621 345678.
- B-number analysis with the digits 34621 present yields a ROUTE result.
- The trunk group property setting for the designated route is BDigitCCrm = 34.

Routing is performed only after analysis receives overlap digits 34621. After country code removal, the IAM sends forward a B-number of 621. All other digits of the B-number are received and forwarded in subsequent address messages (SAMs).

## Properties

The property in this section is used for this feature. For information on other properties for the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

The parent object for the property involved in this feature are found in [Table 1](#).

**Table 1** Software Property Related to This Feature

| Property Name | Parent Object |       |       |      |         |      |     |         |      |          |           |         |           |        |           |            |            |     |    |         |  |
|---------------|---------------|-------|-------|------|---------|------|-----|---------|------|----------|-----------|---------|-----------|--------|-----------|------------|------------|-----|----|---------|--|
|               | AVM           | DPNSS | EISUP | IOCC | ISDNPRI | MGCP | RLM | SESSION | SGCP | SS7-ANSI | SS7-China | SS7-ITU | SS7-Japan | SS7-UK | TALI-IOCC | TCAPOverIP | TrunkGroup | VSI | LI | CTI-QBE |  |
| ADigitCCrm    |               |       |       |      |         |      |     |         |      |          |           |         |           |        |           |            | X          |     |    |         |  |

The property used for this feature is described in [Table 2](#).

**Table 2** *Added Property*

| Property   | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADigitCCrm | Provides a country code digit string to which leading digits of CgPN, GN_ACgPN, RDN, OCN and PN can be compared. If the digits match, those digits are removed from the front of that number. The NOA codes of that number is set to National. This modification is made before the call is sent forward. Values are NULL (default) or null, or a maximum 5-digit string.<br><br>Valid values: 1 through 99999.<br><br>Default value: NULL or null |

[Table 3](#) lists the property that can be provisioned and indicates if the modified property value takes effect without stopping and restarting the MGC software.

**Table 3** *Provisionable Properties*

| Property   | Modified Value Takes Effect Without Restart |
|------------|---------------------------------------------|
| ADigitCCrm | Yes                                         |

## Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly What's New in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation at:

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## Glossary

[Table 4](#) contains definitions of acronyms used in this feature module.

**Table 4 Acronyms and Definitions**

| <b>Acronym</b> | <b>Definition</b>              |
|----------------|--------------------------------|
| MGC            | Cisco Media Gateway Controller |
| PGW            | PSTN Gateway                   |
| SC             | Signaling Controller           |
| VSC            | Virtual Switch Controller      |

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