

Install, Configure, and Troubleshoot International Numbering Plan (INNP)

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Introduction

This document describes how to install, configure and troubleshoot INNP.

Cisco Unified Communications Manager (CUCM) provides a default North American Numbering Plan (NANP). For countries with different dial plan requirements, you can install a Cisco International Dial Plan and use it to create a unique numbering plan that is specific to your requirements.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Call Routing
- Route Filter

Components Used

The information in this document is based on Cisco Unified CallManager 11.5.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Background Information

If you are installing a national numbering plan for countries outside of North America, download the Cisco Option Package (COP) file that contains the international dial plans for the current release.

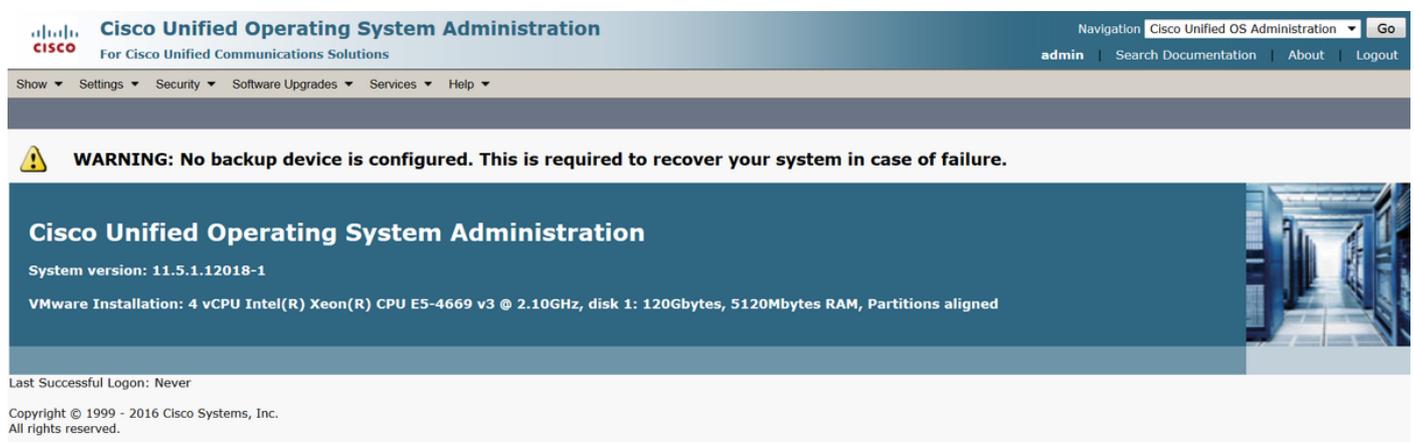
The COP file uses the naming convention and is available from the Cisco website:

<https://software.cisco.com/download/release.html?mdfid=278719042&softwareid=282074292&os=Linux&release=3.1.33-GB&relind=AVAILABLE&rellifecycle=&reltype=latest>

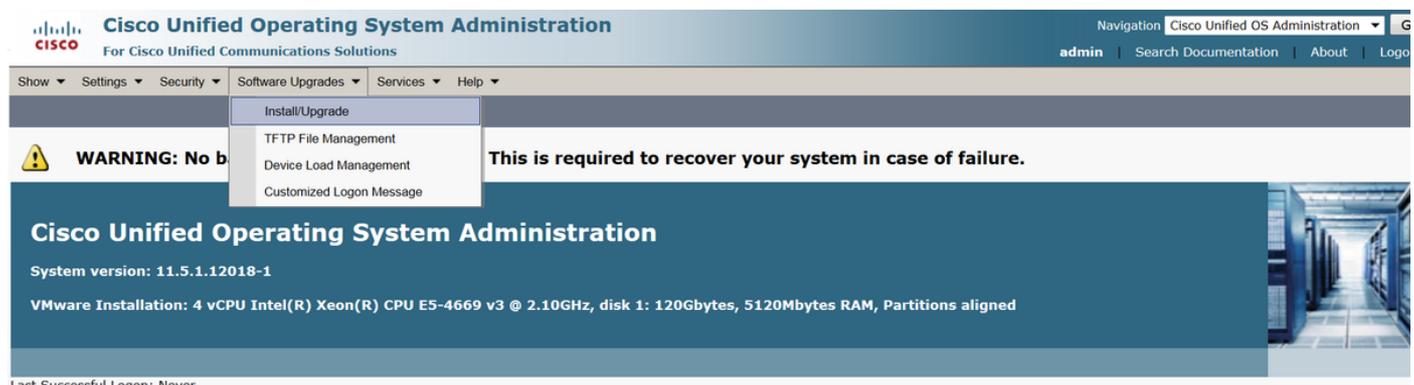
Configure

This is the procedure to install the INNP cop file.

Step 1. Login to OS Admin.



Step 2. Navigate to **Software Upgrade > Install/Upgrade**, as shown in the image:



Select the Source: Here we are using the SFTP server to perform the install/upgrade.

Source: Remote Filesystem

Directory: /

Server: Here you have to keep the SFTP application running laptop/desktop IP address.

User Name: SFTP user name.

User Password: Password of the SFTP user.

Transfer Protocol: SFTP

Show ▾ Settings ▾ Security ▾ Software Upgrades ▾ Services ▾ Help ▾

Software Installation/Upgrade

 Cancel  Next

Status

 Status: Ready

Software Location

Source*

Directory*

Server*

User Name*

User Password*

Transfer Protocol*

SMTP Server

Email Destination

Step 3. Select **Next** and then the screen as shown in the image appears.

You have to select the correct cop file for INNP and then Select **Next**.

Software Installation/Upgrade

 Cancel  Next

Status

 Status: Ready

Software Location

Options/Upgrades*

Invalid Upgrades

Option Names	Status
10.196.120.25_bulk_tftp.pkcs12	Name does not match any filter pattern.
Publisher_tomcat.pkcs12	Name does not match any filter pattern.
CUCM-PUB_tomcat.pkcs12	Name does not match any filter pattern.

You get screen as shown in the image. Select **Next**.

Software Installation/Upgrade

Cancel Next

Status

- Warning:** To ensure the integrity of the installation file, please verify the MD5 hash value against the Cisco Systems web site
- Warning:** To ensure the integrity of the installation file, please verify the SHA512 value against the Cisco Systems web site
- Warning:** You may need to stop some services before you install a locale. You may then restart those services after you complete the locale installation. Refer to your product-specific online help for locale installation details.

File Checksum Details

File dp-ffr.3-1-8.IN.k3.cop.sgn
 MD5 Hash Value 28:36:a4:74:45:48:32:c3:85:3e:3f:8b:b4:40:21:28
 SHA512 Value

Cancel Next

i *- indicates required item.

Step 4. Installation is in progress:

Cancel

Installation Status

File dp-ffr.3-1-8.IN.k3.cop.sgn
 Start Time Wed Dec 28 15:20:08 IST 2016
 Status Running

Installation Log

```

12/28/2016 15:20:08 sd_cancelInstall.sh|Canceling active side processes done
12/28/2016 15:20:08 sd_cancelInstall.sh|Canceling inactive side processes
12/28/2016 15:20:08 sd_cancelInstall.sh|Skipping IDS shared memory clean up since this is a COP
12/28/2016 15:20:09 sd_cancelInstall.sh|Canceling inactive side processes done
[16/12/28_15:20:14] locale_install.sh: Successful untarring of /common/download//dp-ffr.3-1-8.IN.k3.cop

Call manager version is : master-11.5.1.12018-1.i386
cp: cannot stat `/common/download/IDP': No such file or directory

cp: cannot stat `/common/download/INNP.xml': No such file or directory
  
```

Cancel

Step 5. Installation Complete.

Install Another

Installation Status

File dp-ffr.3-1-8.IN.k3.cop.sgn
 Start Time Wed Dec 28 15:20:08 IST 2016
 Status Complete

Installation Log

```

installCsv rc[0]
enablenotify dsn[DSN=ccm_super]
enablenotify rc[0]
installdb Success[-c]
[16/12/28_15:20:17] locale_install.sh: Publisher: Starting installdb...
/bin/su -l informix -s /bin/sh -c
"source /usr/local/cm/db/dblenv.bash /usr/local/cm ;
source /usr/local/cm/db/informix/local/ids.env ;
nice /usr/local/cm/bin/installdb -x /usr/local/cm/db/xml/xml"
  
```

Install Another

Perform the same operation for all the nodes in the cluster.

Setup of INNP

Step 1. Under **Cisco Unified CM Administration**, navigate to **Call Routing > Dial Plan Installer**.

Cisco Unified CM Administration
For Cisco Unified Communications Solutions

Navigation: Cisco Unified CM Administration

System | Call Routing | Media Resources | Advanced Features | Device | Application | User Management | Bulk Administration | Help

WARNING: No backup device is configured. This is required to recover your system in case of failure.

Cisco Unified CM Administration
System version: 11.5.1.12018-1
VMware Installation: 4 vCPU Intel(R) Xeon(R) CPU E5-4669 v3 @ 2.10GHz, disk 1: 120Gbytes, 5120Mbytes RAM, Partitions aligned

User c last logged in to this cluster on Wednesday, December 28, 2016 3:03:54 PM IST, to node 10.106.99.199, from 10.196.120.192 using HTTPS

System | Call Routing | Media Resources | Advanced Features | Device | Application | User Management | Bulk Administration | Help

- Route Filter
- Route/Hunt
- SIP Route Pattern
- Class of Control
- Intercom
- Client Matter Codes
- Forced Authorization Codes
- Emergency Location
- Translation Pattern
- Call Park
- Directed Call Park
- Call Pickup Group
- Directory Number
- Meet-Me Number/Pattern
- Conference Now
- Dial Plan Installer**
- Route Plan Report

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Step 2. Click on **Find** and Select **INNP**, as shown in the image:

System | Call Routing | Media Resources | Advanced Features | Device | Application | User Management | Bulk Administration | Help

Find and List Dial Plans

-Status
2 records found

Dial Plan (1 - 2 of 2) Rows

Find Dial Plan where: Dial Plan begins with

Dial Plan	Description	Installed Version	System Version
CHNP	Switzerland Numbering Plan	1.1(6)	1.1(6)
INNP	India Numbering Plan	1.1(8)	1.1(8)

Step 3. As shown in the image, click on **Install**.

Dial Plan Configuration

Dial Plan Information

Dial Plan*

Description

Installed Version

Available Version

Once the cop file installation done, restart the **CM service** on all the nodes.

Clauses in INNP

First understand the clauses in the INNP:

```
# P: Digit pattern -- PATTERN TAG
# T: Type of Number -- I(nternational) or N(ational)
# W: Network Specific Facilities -- OP or OPXXXX(alternate carriers)
# U: Urgent pattern? (Call extended immediately on match)
```

```
# [2-6]XXXXXX
P: [2-6]XXXXXX          LOCAL-6-DIGIT
```

```
# [2-6]XXXXXXX
P: [2-6]XXXXXXX        LOCAL-7-DIGIT
```

```
# [2-6]XXXXXXXX
P: [2-6]XXXXXXXX        LOCAL-8-DIGIT
```

Long Distance Calls

```
# 0+11+[2-6]XXXXXXXX
P: 0                    NATIONAL-ACCESS
P: 11                   AREA-CODE
P: [2-6]XXXXXXXX        LOCAL-8-DIGIT
T: N
```

```
# 0+2[02]+[2-6]XXXXXXXX
P: 0                    NATIONAL-ACCESS
P: 2[02]                AREA-CODE
P: [2-6]XXXXXXXX        LOCAL-8-DIGIT
T: N
```

```
# 0+33+[2-6]XXXXXXXX
P: 0                    NATIONAL-ACCESS
P: 33                   AREA-CODE
P: [2-6]XXXXXXXX        LOCAL-8-DIGIT
T: N
```

Services, Mobile & Non Geographic Calls

```
# 100
P: 100                  SERVICE
U: Y
```

```
# 101
P: 101                  SERVICE
U: Y
```

```
# 80[01589]X+XXX+XXX
P: 80[01589]X          LOCAL-PREFIX-8-MOBILE
P: XXX                 MOBILE-ACCESS
P: XXX                 MOBILE-SUBSCRIBER
T: N
```

```
# 81XX+XXX+XXX
P: 81XX                LOCAL-PREFIX-8-MOBILE
P: XXX                 MOBILE-ACCESS
P: XXX                 MOBILE-SUBSCRIBER
T: N
```

```
# 8128+XXX+XXX
P: 8128 LOCAL-PREFIX-8-MOBILE
P: XXX MOBILE-ACCESS
P: XXX MOBILE-SUBSCRIBER
T: N
```

```
# 8149+XXX+XXX
P: 8149 LOCAL-PREFIX-8-MOBILE
P: XXX MOBILE-ACCESS
P: XXX MOBILE-SUBSCRIBER
T: N
```

For more details please refer below link for INNP clauses:

<http://www.cisco.com/web/software/282074292/122537/INNP.txt>

On the basis of above information we will create the route filter.

Example:

Your requirement is to create Local calling filter which only allows local calling.

Scenario: Extension 3001 has to call to Local mobile number starting with 7,8 and 9.

Extension 3001 has to call local landline number (8 digit).

Extension 3001 has to block the STD and national call dialling.

Step 1. Create New Partition – PT-LOCAL

Navigate to **Call Routing > Class of Control > Partition.**

Partition Configuration

 Save  Delete  Reset  Apply Config  Add New

Status

 Status: Ready

Partition Information

Name*

Description

Time Schedule

Time Zone Originating Device Specific Time Zone

 *- indicates required item.

Step 2. Create New CSS – CSS-Local

Navigate to **Call Routing > Class of Control > Calling Search Space**.

In this CSS, you keep PT-LOCAL partition.

Calling Search Space Configuration

 Save  Delete  Copy  Add New

Status

 Status: Ready

Calling Search Space Information

Name*

Description

Route Partitions for this Calling Search Space

Available Partitions**

- Directory URI
- Global Learned E164 Numbers
- Global Learned E164 Patterns
- Global Learned Enterprise Numbers
- Global Learned Enterprise Patterns

▼ ▲

Selected Partitions

- PT-LOCAL

▼ ▲

Step 3. Create router filter.

Navigate to **Call Routing > Route Filter**.

Click on **Add New**, as shown in the image:

Find and List Route Filters

 Add New

Route Filter

Find Route Filter where Route Filter Name  

No active query. Please enter your search criteria using the options above.

As shown in the image, Select the Numbering Plan.

Route Filter Configuration

 Next

Status

 Status: Ready

Route Filter Information

Numbering Plan*

 *- indicates required item.

These filters are created as per the requirement.

Route Filter Name*	Local
Numbering Plan	India Numbering Plan
Clause	(LOCAL-PREFIX-7-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-PREFIX-8-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-PREFIX-9-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-8-DIGIT EXISTS)

Clause Information

To add a clause within this Route Filter, click Add Clause.

<input type="button" value="Edit Clause"/>	<input type="button" value="Remove Clause"/>	
LOCAL-PREFIX-7-MOBILE	<input type="text" value="EXISTS"/>	AND
MOBILE-ACCESS	<input type="text" value="EXISTS"/>	AND
MOBILE-SUBSCRIBER	<input type="text" value="EXISTS"/>	
OR		
<input type="button" value="Edit Clause"/>	<input type="button" value="Remove Clause"/>	
LOCAL-PREFIX-8-MOBILE	<input type="text" value="EXISTS"/>	AND
MOBILE-ACCESS	<input type="text" value="EXISTS"/>	AND
MOBILE-SUBSCRIBER	<input type="text" value="EXISTS"/>	
OR		
<input type="button" value="Edit Clause"/>	<input type="button" value="Remove Clause"/>	

LOCAL-PREFIX-8-MOBILE	EXISTS	▼	AND
MOBILE-ACCESS	EXISTS	▼	AND
MOBILE-SUBSCRIBER	EXISTS	▼	
OR			
Edit Clause	Remove Clause		
LOCAL-PREFIX-9-MOBILE	EXISTS	▼	AND
MOBILE-ACCESS	EXISTS	▼	AND
MOBILE-SUBSCRIBER	EXISTS	▼	
OR			
Edit Clause	Remove Clause		
LOCAL-8-DIGIT	EXISTS	▼	

Step 4. Create Route pattern.

Navigate to **Call Routing > Route/Hunt > Route Pattern.**

Pattern Definition

Route Pattern*	9.@	Here we have created the 9.@ pattern
Route Partition	PT-LOCAL	Keep the PT-LOCAL partition
Description		
Numbering Plan*	INNP	Select the numbering plan
Route Filter	Local	Select the Route Filter created for Local calling.
MLPP Precedence*	Default	
<input type="checkbox"/> Apply Call Blocking Percentage		
Resource Priority Namespace Network Domain	< None >	
Route Class*	Default	
Gateway/Route List*	Chandra-CUCM	(Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern No Error	
Call Classification*	OffNet	
External Call Control Profile	< None >	
<input type="checkbox"/> Allow Device Override	<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input type="checkbox"/> Allow Overlap Sending
	<input type="checkbox"/> Urgent Priority	

Connected Party Transformations

Connected Line ID Presentation*	Default
Connected Name Presentation*	Default

Called Party Transformations

Discard Digits	< None >
Called Party Transform Mask	
Prefix Digits (Outgoing Calls)	
Called Party Number Type*	Cisco CallManager
Called Party Numbering Plan*	Cisco CallManager

ISDN Network-Specific Facilities Information Element

Network Service Protocol	-- Not Selected --	
Carrier Identification Code		
Network Service	Service Parameter Name	Service Parameter Value
-- Not Selected --	< Not Exist >	

Please ensure that the testing extension has correct CSS (CSS-Local).

Directory Number* Urgent Priority

Route Partition

Description

Alerting Name

ASCII Alerting Name

External Call Control Profile

Allow Control of Device from CTI

Line Group [Edit Line Group](#)

Associated Devices
 [Edit Device](#)
[Edit Line Appearance](#)

Dissociate Devices

Directory Number Settings

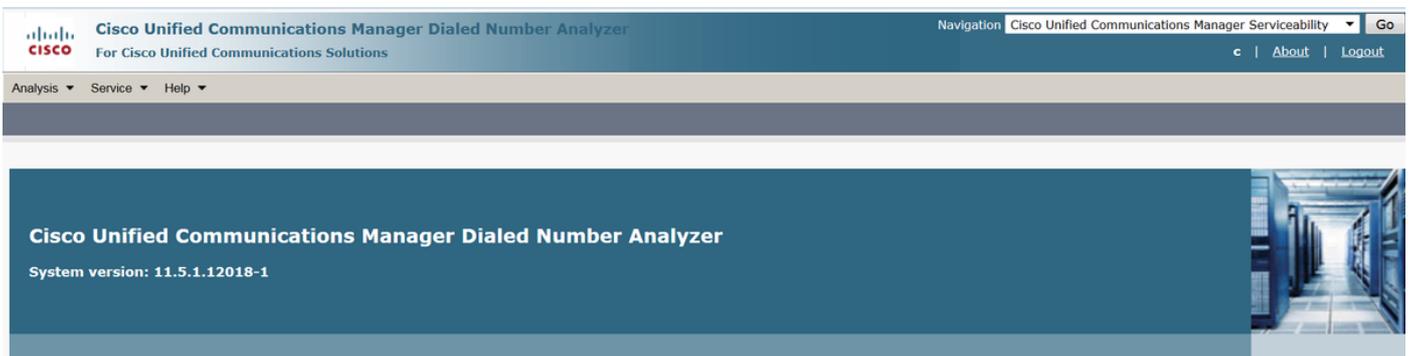
Voice Mail Profile (Choose <None> to use system default)

Calling Search Space

Verify

Verification of the configuration:

Step 1. Under **Dial Number Analyzer**, navigate to **Analysis > Phones**.



Enter the extension 3001 and click on **Find**.

Analysis Service Help

Find and List Phones

Status
i 1 records found

Search Options
 Find Phone where: Directory Number 3001 [Find](#) Search Within Results
 Select item or enter search text

Search Results

Device Name(Line)	Description	Device Pool	Extension	Partition	Device Protocol	Status	IP Address
SEP00E16DBA5FD5	Auto 3003	HQ	3001	PT-CUG	SIP	Registered	10.106.99.249

Rows per Page 50

- Device Information (Model = Cisco 7841)

Registration	Registered with Cisco Unified CallManager 10.106.99.199
IP Address	10.106.99.249
MAC Address	00E16DBA5FD5
Device Name	00E16DBA5FD5
Description	Auto 3003
Owner User ID	cisco3
Device Pool	HQ
Call Classification	OnNet
Calling Search Space	None
AAR Calling Search Space	None
Media Resource Group List	None
Device Time Zone	Etc/GMT

Association Information

-  Line [1] - 3001 in PT-CUG
-  Line [2] - 3006 in PT-CUG
-  Line [3] - 8888 (no partition)

- Analyzer Input

Dialed Digit Settings

- Directory URI
- Dialed Digits

Step 2. As you click on **Do Analysis**, a page appears with all the details and correct filter, as shown in the image:

Cisco Unified Communications Manager Dialed Number Analyzer Results

Expand All

Collapse All

Results Summary

Calling Party Information

- **Dialed Digits** = 944262527
- **Match Result** = RouteThisPattern

Matched Pattern Information

- **Pattern** = 9.@
- **Partition** = PT-LOCAL
- **Time Schedule** =
- **Called Party Number** = 944262527
- **Time Zone** = Etc/GMT
- **End Device** = Chandra-CUCM
- **Call Classification** = OffNet
- **InterDigit Timeout** = NO
- **Device Override** = Disabled
- **Outside Dial Tone** = NO

Call Flow

Route Pattern :Pattern= 9.@

- **Positional Match List** = 9:44262527
- **DialPlan** = India Numbering Plan

Route Filter

- **Filter Name** = Local
- **Filter Clause** = (LOCAL-PREFIX-7-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-PREFIX-8-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-PREFIX-9-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-8-DIGIT EXISTS)
- **Require Forced Authorization Code** = No
- **Authorization Level** = 0

Troubleshoot

The configured route filter works fine but it has one issue. If you dialed the STD number with two digit area code the call go through.

Example: If you dial number 080 26252728, it routes the call with local filter.

Cisco Unified Communications Manager Dialed Number Analyzer Results

Expand All Collapse All

Results Summary

Calling Party Information

- Dialed Digits = 908026252728
- Match Result = RouteThisPattern

Matched Pattern Information

- Pattern = 9.@
- Partition = PT-LOCAL
- Time Schedule =
- Called Party Number = 908026252728
- Time Zone = Etc/GMT
- End Device = Chandra-CUCM
- Call Classification = OffNet
- InterDigit Timeout = NO
- Device Override = Disabled
- Outside Dial Tone = NO

Call Flow

Route Pattern :Pattern= 9.@

- Positional Match List = 9:0:80:26252728
- DialPlan = India Numbering Plan

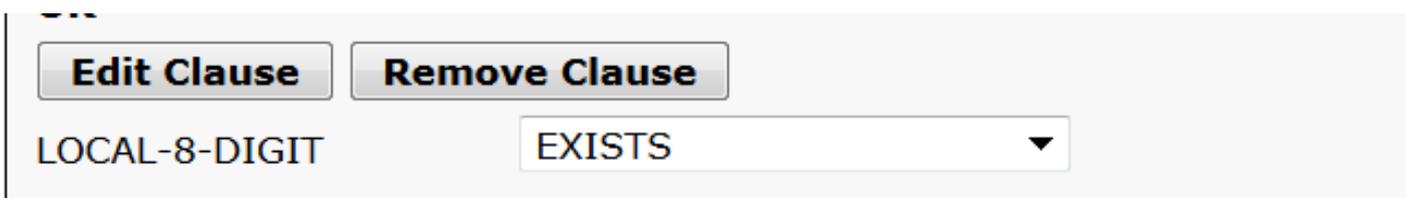
Route Filter

- Filter Name = Local
- Filter Clause = (LOCAL-PREFIX-7-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-PREFIX-8-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-PREFIX-9-MOBILE EXISTS AND MOBILE-ACCESS EXISTS AND MOBILE-SUBSCRIBER EXISTS) OR (LOCAL-8-DIGIT EXISTS)

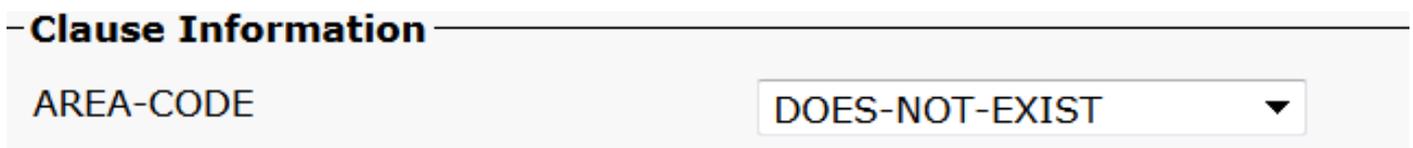
The reason behind it is that the calling for **Local-8-digit** number is allowed and it matches the 8 digit excluding the area code.

So here you have to explicitly define in the filter to block the area code in local filter.

Step 1. Navigate to **Router filter** and **Edit Clause** for **Local 8 Digit**.



Step 2. Select the AREA-CODE **DOES-NOT-EXIST** and **Save** the filter, as shown in the image:



The filter looks like below:

Edit Clause	Remove Clause		AND
AREA-CODE	DOES-NOT-EXIST		
LOCAL-8-DIGIT	EXISTS		

Step 3. Perform the DNA for STD number with two digit Area code.

Cisco Unified Communications Manager Dialed Number Analyzer Results

- ▼ **Results Summary**
 - ▶ **Calling Party Information**
 - **Dialed Digits** = 908026252728
 - **Match Result** = BlockThisPattern
 - **Route Block Cause** = Unallocated Number
 - **Called Party Number** =
 - ▼ **Matched Pattern Information**
 - **Pattern** =
 - **Partition** =
 - **Pattern Type** =
 - **Time Zone** = Etc/GMT
 - **Outside Dial Tone** = NO
- ▼ **Call Flow**
 - **Note: Information Not Available**
- ▼ **Alternate Matches**
 - **Note: Information Not Available**

Note: You have to explicitly block the pattern which is not required.