

Appendix D: IOS Dial-peer configuration via CLI

Introduction:

This appendix goes over a feature in the UC520 software (IOS) called dial peers which are the core for routing calls out the IP network (VoIP) or TDM interfaces (POTS) such as FXO, T1 / E1 PRI on the UC520. Essentially the dial-peers in the configuration define the dial plan for calls going through the UC520. The appendix will introduce this concept of dial-peers and some basics.

NOTE: This is not meant to be an in depth course on IOS voice dialplan and call routing. Only specific examples and configurations are covered here. For more in depth information please refer to online documentation below or a Cisco training partner class.

Reference:

http://www.cisco.com/en/US/tech/tk652/tk90/technologies_tech_note09186a0080147524.shtml

http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products_configuration_guide_chapter09186a0080080aec.html

Objective:

The default configuration on the UC520 as well as Cisco Configuration Assistant (CCA) does leverage dial-peers for a lot of the call routing / dial plan functionality. The objective is to show what the dial-peer CLI pushed down means to a certain extent. It will also go over a couple of examples of using dial-peers such as for least cost routing or translating digit strings. All configurations will be done using the command line interface (CLI). After completion of this lab – you should have a simplistic overview of dialplan and call routing in UC520 / SBCS.

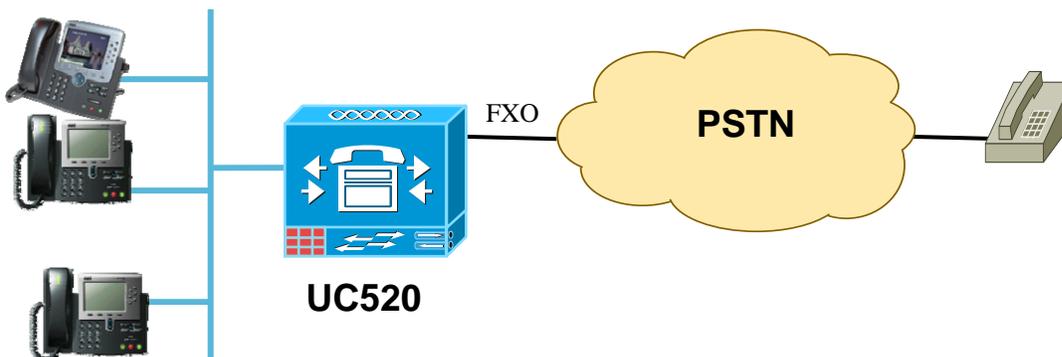
Overview:

o Types of Dial Peers

A dial peer is essentially a route to a particular destination. Dial peers establish logical connections, or call legs, to complete an end-to-end call. Cisco voice-enabled routers support five types of voice dial peers but two types are of greater significance for SBCS:

1. **POTS dial peers:** Used for traditional telephony network (TDM) including FXO, FXS, BRI, T1 / E1 PRI etc. Below is an example of how a POTS dial peer is used to route calls starting with 9 + 7 digits i.e. a Local call in North America. Also, using [2-9] implies that the 2nd digit dial will be between the range of 2 to 9 and the remaining 6 digits can be anything from 0 to 9.

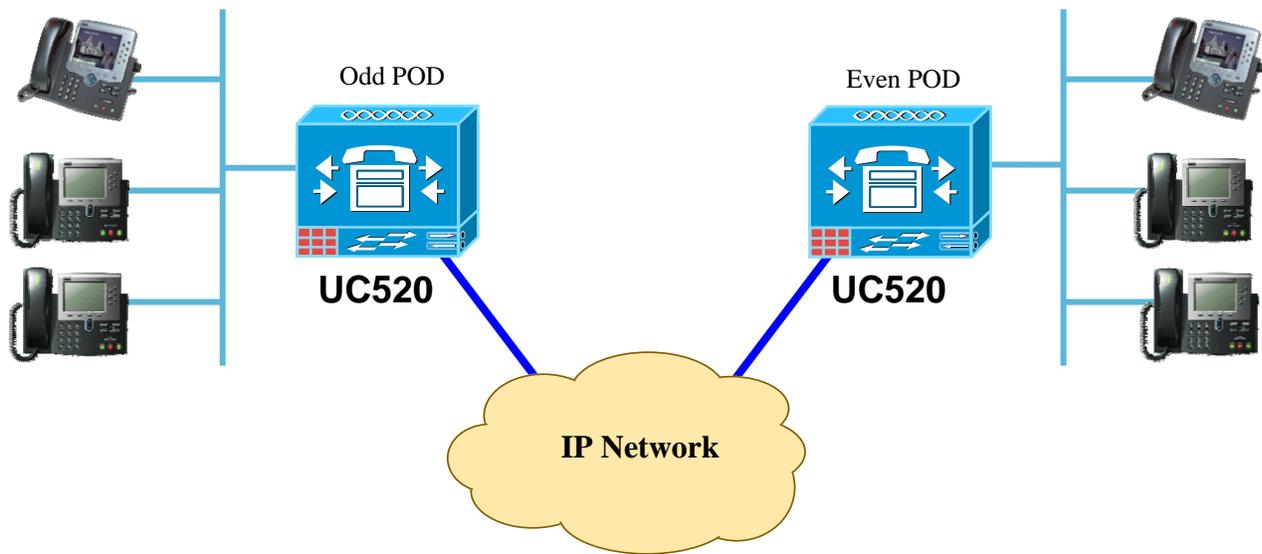
```
dial-peer voice 50 pots
destination-pattern 9[2-9].....
port 0/1/0
```



- VoIP dial peers:** Used for routing calls over the IP network to an IP address or DNS hostname. The 2 main VoIP protocols used are H.323 (default) or SIP (recommended). Typical examples for uses of VoIP dial-peers in UC520 are to route calls to voicemail / AA (via CUE), route calls over a SIP trunk to a provider or inter site dialing (as shown in Lab #6). Below is an example of a dial-peer on the Odd pod to route calls to the even pod using 82xxx.

```

dial-peer voice 10000 voip
destination-pattern 82...
session protocol sipv2 ←Using SIP as VOIP protocol
codec g711ulaw ← Using G711 as the VOIP codec
session target ipv4:10.10.10.2 ← Defines IP address to send VOIP call to
no vad
dtmf-relay rtp-nte
  
```



- Outbound Dial-peer matching patterns**

Dial-peers route on the value after the destination-pattern CLI under each dial-peer. Common destination pattern wildcards are

Pattern	Explanation
Digits such as 0-9, *, #	Digits one would dial on a phone
Period or dot (.)	Specifies any one wildcard digit
Comma (,)	Inserts a one-second pause
Square brackets [x-y]	Indicates a range of digits within the brackets
Percentage (%)	The preceding digit occurred zero or more times
T	Indicates a variable-length pattern

For the North American dial-plan, here is a typical example of what you would have
 Local 7-digit dialing → **destination-pattern 9[2-9].....**
 Long Distance 11-digit “1+” dialing → **destination-pattern 91[2-9].[2-9].....**
 International dialing → **destination-pattern 9011T**
 Emergency or 911 → **destination-pattern 9911**

Here is another exercise showing how dial-peer matching occurs based on the below config:
Destination pattern is matched based on longest number match.

```
Dial-peer voice 1 voip
Destination-pattern .T
Session target ipv4:10.1.1.1

Dial-peer voice 2 voip
Destination-pattern 555[2-3]...
Session target ipv4:10.2.2.2

Dial-peer voice 3 voip
Destination-pattern 5551...
Session target ipv4:10.3.3.3

Dial-peer voice 4 voip
Destination-pattern 5551234
Session target ipv4:10.4.4.4
```

Example 1: Dialed number 555-1234 will match dial peer 4.

Example 2: Dialed number 555-1235 will match dial peer 3.

Example 3: Dialed number 555-2000 will match dial peer 2.

Example 4: Dialed number 551-1234 will match dial peer 1.

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- **Least Cost routing**

Outbound dial-peer matching is primarily based on the called-number matching the destination-pattern as shown above. However in case the destination-pattern is EXACTLY the same, then the tie breaker used is something known as preference that is configured under the dial-peer. The lower the preference, the higher the priority of that dial-peer getting chosen.

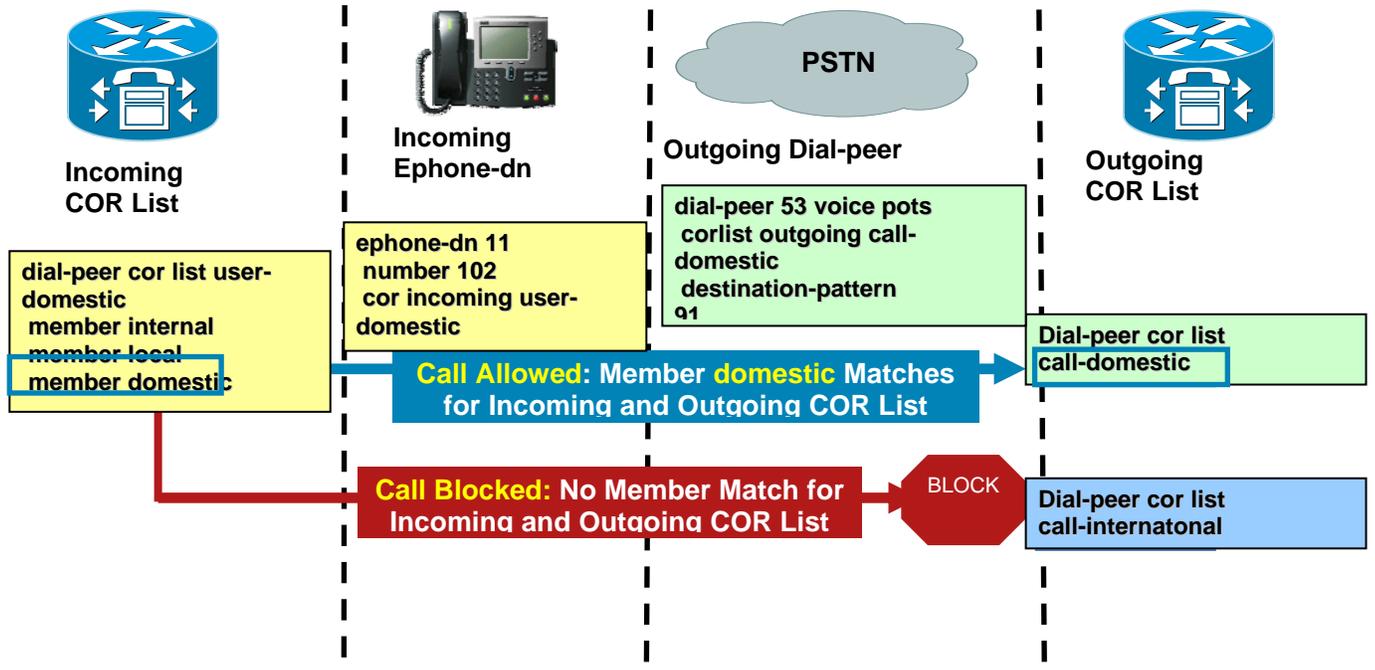
In the below example, let us assume that a customer has a primary route of the SIP trunk for long distance calls, in the event that the SIP trunk is down, they want to route calls over a backup analog line on FXO port 0/1/0.

```
dial-peer voice 1001 voip
description SIP Trunk dial-peer for Long Distance
destination-pattern 91[2-9]..[2-9].....
session protocol sipv2
codec g711ulaw
session target dns:sipconnect.cisco.com
no vad
dtmf-relay rtp-nte
translation-profile outgoing PSTN
!
dial-peer voice 50 pots
description Backup FXO dial-peer for Long Distance
destination-pattern 91[2-9]..[2-9].....
preference 5
port 0/1/0
!
```

The default preference is “0” (default CLIs will NOT show up in the config) and hence the primary route chosen is the SIP trunk dial-peer versus the FXO dial-peer.

o **Class of Restrictions (COR)**

COR provides a way to deny certain calls based upon the incoming and outgoing settings on dial peers and ephone-dns. Each dial peer and ephone-dn can have one incoming COR and one outgoing COR. The incoming COR list indicates the capacity of the dial peer to initiate certain classes of calls. The outgoing COR list indicates the capacity required for an incoming dial peer to deliver a call via this outgoing dial peer.



```

dial-peer cor custom
name internal
name local
name domestic
name international
name 900
name 976
!
dial-peer cor list call-domestic
member domestic
!
dial-peer cor list user-domestic
member internal
member local
member domestic
!
dial-peer voice 53 pots
corlist outgoing call-domestic
description ** FXO pots dial-peer **
preference 1

```

```
destination-pattern 91.....
port 0/1/0
prefix 1
!
ephone-dn 11 dual-line
number 102
corlist incoming user-domestic
```

Reference for further information:

http://www.cisco.com/en/US/tech/tk652/tk90/technologies_configuration_example09186a008019d649.shtml

- **Using Translation rules**

The UC500 allows for digit manipulation via a feature known as Voice Translation rules. The digit manipulation can be applied to called numbers or calling numbers (caller ID) and can be applied when the call is received or sent out to another destination by the UC500. For example, in Lab 6 during the inter site dial-plan an example was shown on how to setup inter site dialing with 5 digits – on each UC500 digit translation was done translate the called number from 5 digits to the 3 digit extension local to the UC500. The translation rules are typically applied on the basis of matching a given digit string and then manipulating that. This digit string & manipulation uses wildcard matching via regular expressions.

In the below example – the intent is to manipulate all caller ID going out the SIP trunk to match the main number (eg 408 555 1200):

1. Define the match pattern and digits that this should be manipulated to:

```
voice translation-rule 1111
rule 1 /^.* /4085551200/
```

2. Define what is being manipulated (meaning called or calling number)

```
voice translation-profile PSTN_Outgoing
translate calling 1111
```

3. Apply the profile to the outbound dial-peer in this case – it's the SIP Trunk dial-peer:

```
dial-peer voice 1001 voip
translation-profile outgoing PSTN_Outgoing
```

Another example would be converting the main number to the internal AA extension. In this example the inbound call comes in on a T1 PRI trunk as 4085551200 and the internal AA is 400

1. Define the match pattern and digits that this should be manipulated to:

```
voice translation-rule 2001
rule 1 /4085551200 /400/
```

2. Define what is being manipulated (meaning called or calling number)

```
voice translation-profile AA_Profile
translate called 2001
```

3. Apply the profile to the inbound dial-peer in this case – it's the POTS dial-peer:

```
dial-peer voice 100 pots
```

incoming called-number 4085551200
translation-profile incoming AA_Profile
direct-inward-dial

More complex examples are at:

http://www.cisco.com/en/US/tech/tk652/tk90/technologies_tech_note09186a0080325e8e.shtml