

Multilevel Precedence and Preemption

This document describes the Multilevel Precedence and Preemption (MLPP) service introduced in Cisco Unified Communications Manager Express 7.1 (Cisco Unified CME).

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Prerequisites for MLPP

- Cisco Unified CME 7.1
- Cisco IOS Release 12.4(24)T
- To use Cisco Unified CME basic automatic call distribution (B-ACD) and auto-attendant (AA) service as the MLPP attendant-console application, you must download and install the B-ACD scripts. These scripts are available from the Cisco Unified CME Software Download site at https://software.cisco.com/download/home/277641082.
- You can use your own audio files for the blocked precedence announcement and busy station not equipped for preemption announcement or you can use the audio files available from the Cisco Unified CME Software Download site at https://software.cisco.com/download/home/277641082.

Information About MLPP

Multilevel Precedence and Preemption (MLPP) service allows validated users to place priority calls, and if necessary, to preempt lower-priority calls. Precedence indicates the priority level of a call. Preemption is the process of terminating a lower-precedence call so a call of higher precedence can proceed. This capability assures high-ranking personnel can communicate with critical organizations and personnel during network stress situations, such as a national emergency or degraded network situation.

Precedence

Precedence indicates the priority level associated with an MLPP call. Phone users can apply a precedence level when making a call.

You define an MLPP access digit in Cisco Unified CME and assign a maximum precedence level to individual phones. Phone users request a precedence call by dialing the access code NP, where N specifies the pre-configured access digit and P specifies the requested precedence level, followed by the phone number.

Table 28-1 lists the precedence levels that can be associated with an MLPP call in the Defense Switched Network (DSN) domain.

Table 1: DSN Precedence Levels

Level	Precedence
0 (high)	Flash Override
1	Flash
2	Immediate
3	Priority
4 (low)	Routine

Table 28-2 lists the precedence levels that can be associated with an MLPP call in the Defense Red Switched Network (DRSN) domain.

Table 2: DRSN Precedence Levels

Level	Precedence
0 (high)	Flash Override Override
1	Flash Override
2	Flash
3	Immediate
4	Priority
5 (low)	Routine

A precedence call is any call with a precedence level higher than Routine. If precedence is not specifically invoked, the system processes a call using normal call processing and call forwarding.

Emergency 911 calls are automatically assigned precedence level 0.

Cisco Unified CME provides precedence indications to the source and destination of a precedence call, respectively, if either has MLPP indication enabled. For the source, this indication includes a precedence ringback tone and display of the precedence level of the call, if the device supports display. For the destination, the indication includes a precedence ringer tone and display of the precedence level of the call, if the device supports display.

Basic Precedence Call Setup

The following sequence of events occurs during the setup of a precedence call:

1. Phone user goes off hook and dials a precedence call. The call pattern is NP-xxxx, where N is the precedence access digit, P is the precedence level for the call, and xxx is the extension or phone number of the called party.
2. The calling party receives the precedence ringback tone and the precedence display while the call is processing.
3. The called party receives the precedence ringer tone and the precedence display that indicates the precedence call.

Example

Party 1000 makes a precedence call to party 1001. To do so, party 1000 dials the precedence call pattern, such as 80-1001.

While the call processes, the calling party (1000) receives the precedence ringback tone and precedence display on their Cisco Unified IP Phone. After acknowledging the precedence call, the called party (1001) receives a precedence ringer tone and a precedence display on their Cisco Unified IP Phone.

Preemption

Preemption is the process of terminating an active call of lower precedence so a call of higher precedence can proceed. Preemption includes the notification and acknowledgment of preempted users and the reservation of shared resources immediately after preemption and before call termination. Preemption can take one of the following two forms:

- User Access Preemption—This type of preemption applies to phones and other end-user devices. If a called party is busy with a lower precedence call, both the called party and the party to which it is connected, receive preemption notification and the existing call is cleared immediately.

  For calls to Cisco Unified IP phones, the called party can hang up immediately to connect to the new higher precedence call, or if the called party does not hang up, Cisco Unified CME forces the phone on-hook after the configured preemption tone timer expires and connects the call.

  For FXS ports, the called party must acknowledge the preemption by going on-hook, before being connected to the new higher precedence call.

- Common Network Facility Preemption—This type of preemption applies to trunks. If all channels of a PRI trunk are busy with calls of lower precedence, a call of lower precedence is preempted to complete the higher precedence call.

  Cisco Unified CME selects a trunk by first searching for an idle channel on all corresponding trunks (based on matching the called number in the dial peer).

  If an idle channel is not found, Cisco Unified CME performs a preemptive-search by searching one trunk at a time for an idle channel. If no idle-channel is available on a trunk, preemption is performed on the lowest of lower-precedence calls corresponding to the trunk. If none of the calls corresponding to the trunk is of lower precedence, the next trunk is searched and so on.

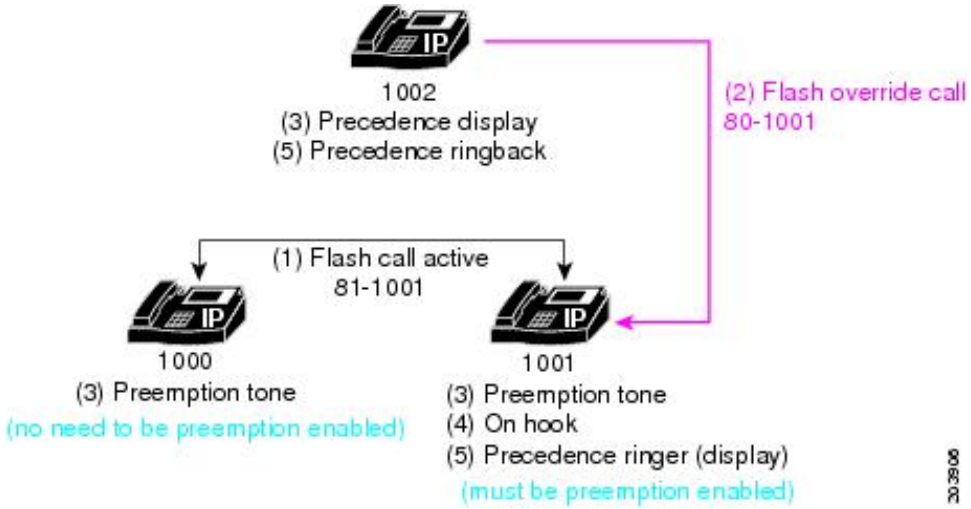
SCCP phones support up to eight calls per directory number. When all lines are busy and a higher precedence MLPP call comes in, Cisco Unified CME preempts a lower precedence call on one of the channels of the directory number.

The maximum precedence level that a user can assign to an MLPP call originating from a specific phone is set using ephone templates and applied to individual phones. Calls from directory numbers that are shared by SCCP phones can have different maximum precedence levels, based on the precedence level of the phone.

Basic Preemption Call

Figure 28-1 shows an example of user access preemption.

Figure 1: User Access Preemption Example



In this example, the following sequence of events occurs:

1. User 1000 places a call with precedence level 1 (flash) to user 1001, and preemption is enabled for user 1001. In this example, user 1000 dials 81-1001 to place the precedence call.
2. User 1002 places a precedence call to user 1001 by dialing 80-1001. This call, which is of precedence level 0 (flash override), is a higher precedence call than the active precedence call.
3. Phone 1002 receives precedence display (flash override display), and the phones that are involved in the existing lower precedence call both play preemption tones (users 1000 and 1001).
4. To complete preemption, the parties who are involved in the lower precedence call hang up (users 1000 and 1001).
5. The higher level precedence call is offered to user 1001, who receives a precedence ringer tone (if MLPP indication is enabled). The calling party, user 1002, receives precedence ringback.

DSN Dialing Format

Cisco Unified CME 8.0 and later releases provide complete support of the DSN dialing format, as outlined in Table 28-3.

Table 3: DSN Dialing Format

[Access-digit {Precedence-level |Service-digit}]	[Route-code]	[Area-code]	Switch-code	Line-number

[N {P | S}]			[1X]	[KXX]	KXX	XXXX
N is 2 - 9	P is 0 - 4	S is 5 - 9	X is 0 - 9	K is 2 - 8		

Service Digit

The service digit provides information to the switch for connecting calls to government or public telephone services or networks. The services are reached through the trunk or route that is selected based on the dialed digits. Phone users request a service by dialing the access code NS, where N specifies the pre-configured access digit and S specifies the requested service, followed by the phone number.

Table 28-4 lists the service digits supported in Cisco Unified CME 8.0 and later versions.

Table 4: Service Digit

Service Digit	Precedence
5	Off-net 700 services
6	Not assigned
7	DSN CONUS FTS
8	Not assigned
9	Local PSTN

In Cisco Unified CME, the route pattern is configured to supply secondary dial-tone and the remainder of the digits are collected and passed to the PSTN trunk as the called number. The digits that follow the access digit and service digit must be NANP compliant (E.164 number).

Cisco Unified CME provides secondary dial tone after the two digits and then routes the call based on the remaining collected digits (using the dial plan configuration). These services are assumed to be reached through the trunk (or route) selected based on the dialed digits (dialed after the route digits).

Route Code

The route code allows a phone user to inform the switch of special routing or termination requirements. The route code determines whether a call uses circuit-switched data or voice-grade trunking and can be used to disable echo suppressors and cancellers, and override satellite link control.

The first digit of the route code is 1. It is a required part of the dialing plan to inform the switch that the next digit, the route digit, provides network instructions for specialized routing. Phone users dial route codes in the form 1X, where X is the route digit. The supported route digits that a user can dial are 0 and 1.

Table 28-5 lists the route codes supported in Cisco Unified CME 8.0 and later versions:

Table 5: Route Codes

Route Code	Use	Description
10	Voice call (default)	Any codec that carries voice or voice band data, such as G.711, G.729, or fax or modem pass-through.

Route Code	Use	Description
11	Circuit-switched data	Any codec that carries unaltered DS0 traffic over IP (circuit emulation). For Cisco Unified CME, this is the audio/clearmode codec (RFC-4040).

Example for Dialing

If the first digit that the user dials is the configured access digit, this indicates an access code where the next digit is either a precedence digit or a service digit. If the next digit dialed is:

- 0-4—This is a precedence call. Cisco Unified CME sets the precedence indication, stores the precedence value, and discards the digits.
- 5-9—This is a call to a particular service. Cisco Unified CME passes the call to the designated trunk, discards the digits, and plays secondary dial tone.

If the first digit that the user dials or the next digit dialed after the access code is:

- 1—This is a route code and the next digit is a route digit. The supported route digits that a user can dial are 0 and 1. Cisco Unified CME stores the route code for use later in route selection, sets a trunk-type indication, and discards the route code digits.

If the first digit that the user dials or the next digit dialed after the access code or route code is:

- 2-8—This is the first digit of the area code or switch code. Area codes and switch codes in the DSN are allocated so there is no overlap. The area code and/or switch code are used for route selection.

MLPP Service Domains

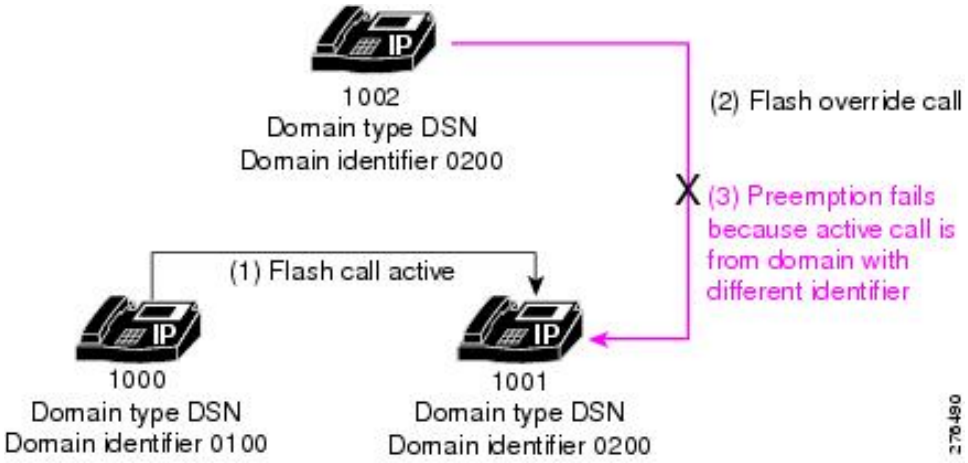
Cisco Unified CME 8.0 and later versions support MLPP service domains. A service domain consists of a group of MLPP subscribers and network resources. Calls and resources can only be preempted by higher-priority calls from MLPP subscribers within the same domain.

You can configure each device with a domain type, such as DSN or DRSN, and a domain identifier. You can assign a global MLPP domain type and identifier to the Cisco Unified CME router and assign different service domains to the individual phones registered to Cisco Unified CME through an ephone template. Calls from any phone that is not configured with a specific service domain use the global domain type and identifier.

The MLPP precedence and preemption applies only within the same domain. Only calls within the same domain can be preempted. If a call is placed between two subscribers with different MLPP service domains, Cisco Unified CME assigns the service domain of the originator to the call.

Figure 28-2 shows an example of preemption attempted across domains with different identifier numbers.

Figure 2: Service Domains with Different identifiers



In the example shown in Figure 28-2, the following sequence of events occurs:

1. User 1000, from service domain 0100, places a call with precedence level 1 (flash) to user 1001 in service domain 0200. The call is assigned domain number 0100 because that is the service domain of the call originator.
2. User 1002, from domain number 0200, places a precedence call to user 1001. This call, which is of precedence level 0 (flash override), is a higher precedence call than the active precedence call.
3. The active call is not preempted because the incoming call is from a different service domain than the active call; a call from domain 0200 cannot preempt a call from domain 0100.

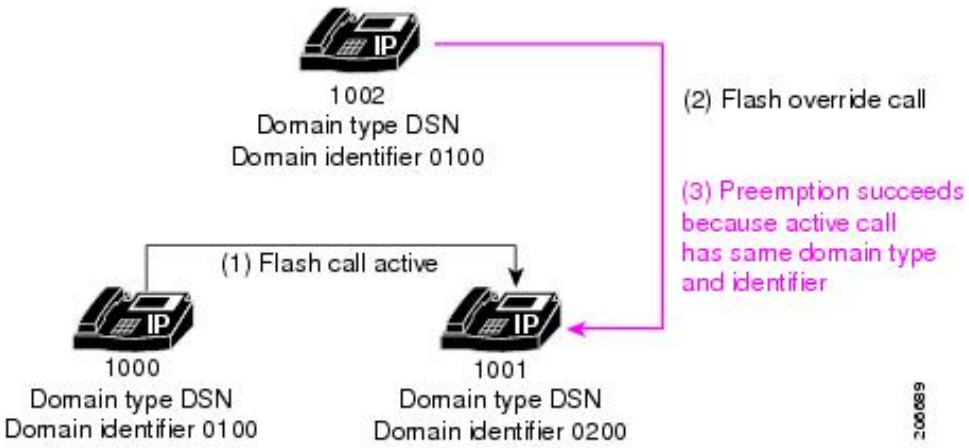
In the example shown in Figure 28-3, the active call is not preempted because the incoming call is from a different domain type than the active call; a call from the DSN cannot preempt a call from the DRSN.

Figure 3: Service Domains with Different Domain Types



In the example shown in Figure 28-4, the active call is successfully preempted because the incoming call has the same domain type and identifier as the active call.

Figure 4: Service Domains with Same Type and identifier



MLPP Indication

For basic MLPP calls with MLPP indication enabled, Cisco Unified CME instructs SCCP phones to play the precedence ringer tone and display the precedence level.

For basic MLPP calls with preemption involved and MLPP indication enabled, Cisco Unified CME instructs both parties to play the preemption tone and display the precedence level of the MLPP call on the phone.

For an MLPP call with call waiting, if MLPP indication is enabled, Cisco Unified CME instructs SCCP phones to play priority the call waiting tone instead of the regular call waiting tone.

Users receive an error tone if they attempt to make a call with a higher level of precedence than the highest precedence level that is authorized for their phone.

For example, user 1002 dials 80 to start a precedence call. Eight (8) represents the precedence access digit, and zero (0) specifies the precedence level that the user attempts to use. If this user is not authorized to make level 0 (flash override) precedence calls, the user receives an error tone.

MLPP Announcements

Users who are unable to place MLPP calls receive announcements that detail the reasons why a call was unsuccessful. Table 28-6 lists the supported MLPP announcements.

Table 6: MLPP Announcements

Announcement	Condition
Blocked Precedence Announcement (BPA)	

Announcement	Condition
(Switch name and Location). Equal or higher precedence calls have prevented completion of your call. Please hang up and try again. This is a recording. (Switch name and Location).	An equal or higher precedence call is in progress.
	Users receive the BPA if the destination party for the precedence call is off hook or if the destination party is busy with a precedence call of an equal or higher precedence. BPA is not played if the destination party is configured for Call Waiting or Call Forwarding, or uses automatic call diversion to an attendant-console service. Supported in Cisco Unified CME 7.1 and later versions.
Busy Not Equipped Announcement (BNEA)	
(Switch name and Location). A service disruption has prevented the completion of your call. Please wait 30 minutes and try again. In case of emergency call your operator. This is a recording. (Switch name and Location).	Busy station not equipped for preemption.
	Users receive the BNEA if the dialed number is busy and non-preemptable. BNEA is not played if the dialed number is configured for Call Waiting or Call Forwarding, or has alternate party designations. Supported in Cisco Unified CME 7.1 and later versions.
Isolated Code Announcement (ICA)	
(Switch name and Location). A service disruption has prevented the completion of your call. Please wait 30 minutes and try again. In case of emergency call your operator. This is a recording. (Switch name and Location).	Operating or equipment problems encountered.
	The complete trunk group including all routes is busied manually at either end of the circuit or the complete trunk group including all routes is in a carrier group alarm state (for example, Loss of Signal, Remote Alarm Indication, or Alarm Indication Signal). Supported in Cisco Unified CME 8.0 and later versions.
Loss of C2 Features Announcement (LOC2)	

Announcement	Condition
-	Call leaves DSN.
	Users receive the LOC2 announcement when the call leaves the Cisco Unified CME router on the trunk or when the user places a call to a different domain. For example, DSN callers who place calls to locations that permit off-net terminations may receive an announcement informing them that they have left the DSN. Supported in Cisco Unified CME 8.0 and later versions.
Unauthorized Precedence Level Announcement (UPA)	
(Switch name and Location). The precedence used is not authorized for your line. Please use an authorized precedence or ask your attendant for assistance. This is a recording. (Switch name and Location).	Unauthorized precedence level is attempted.
	Users receive the UPA when they attempt to make a precedence call by using a higher level of precedence than the highest precedence level that is authorized for their line. Supported in Cisco Unified CME 8.0 and later versions.
Vacant Code Announcement (VCA)	
(Switch name and Location). Your call cannot be completed as dialed. Please consult your directory and call again or ask your operator for assistance. This is a recording. (Switch name and Location).	No such service or invalid code.
	Users receive the VCA when they dial an invalid or unassigned number. Supported in Cisco Unified CME 8.0 and later versions.

Automatic Call Diversion (Attendant Console)

Cisco Unified CME supports automatic diversion of all unanswered precedence calls above Routine to a designated directory number or attendant console after a selected period of time.

If automatic call diversion of MLPP calls is configured in Cisco Unified CME, it overrides the Call Forward settings on the phone for all incoming precedence calls above Routine and forwards these calls to the attendant-console application specified in the MLPP configuration. Cisco Unified CME treats MLPP calls with a precedence level of Routine as normal calls and honors the Call Forward setting configured on the phone.

How Cisco Unified CME handles forwarded MLPP calls depends on the following Call Forward options:

- Call Forward All (CFA)—Precedence calls are routed to the target number of the attendant console immediately. The CFA target is not used for MLPP calls.

- Call Forward Busy (CFB)—Precedence calls are forwarded to the configured CFB destination. If the CFB destination is Voice Mail or an off-net endpoint, the call is forwarded to the target number of the attendant-console service.
- Call Forward No Answer (CFNA)—Precedence calls are forwarded to the configured CFNA destination. If the CFNA destination does not answer before the CFNA timer expires, or it is voice mail or an off-net endpoint, the call is forwarded to the target number of the attendant-console service.

Calls diverted to the attendant console are indicated by a visual signal and placed in the queue for attendant service by precedence and time interval. The call with the highest precedence and longest holding time is answered first. Attendant Queue Announcement is played to calls waiting in the queue for attendant service. Call distribution is performed to reduce excessive waiting time and each attendant position operates from a common queue. Cisco Unified CME supports attendant console service for MLPP using Basic Automatic Call Distribution (B-ACD) and auto-attendant (AA) service.

Configure MLPP

Enable MLPP Service Globally in Cisco Unified CME

This task covers the basic steps necessary to enable MLPP on the router.



Restriction

- SIP phones are not supported.
- Cisco Unified IP Phone 6900 Series phones are not supported.
- Cisco Unified CME in SRST Fallback mode is not supported.
- Supports only ISDN PRI E1 and T1interfaces.
- Supports MLPP service within the local Cisco Unified CME router only.
- Cisco Unified CME 7.1 supports only Basic Calls, Call Forward, Call Hold and Resume, Consultative Call-Transfer, and Call Waiting. Blind Transfer is not supported.
- Cisco Unified CME 8.0 and later versions support Three-Party Ad Hoc Conferencing and Call Pickup.
- Call Park Retrieval based on precedence level is not supported; Cisco Unified CME must be configured to accept only one call per park slot.

Before you begin

Trunks must belong to a trunk group and have preemption enabled. For configuration information, see Enabling Preemption on the Trunk Group in *Integrating Data and Voice Services for ISDN PRI Interfaces on Multiservice Access Routers*.

SUMMARY STEPS

1. **enable**
2. **configure terminal**

3. **voice mlpp**
4. **access-digit** *digit*
5. **bnea** *audio-url*
6. **bpa** *audio-url*
7. **upa** *audio-url*
8. **service-domain** { **drsn** | **dsn** } **identifier** *domain-number*
9. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**voice mlpp** **Example:** `Router(config)# voice mlpp`	Enters voice MLPP configuration mode.
Step 4	**access-digit** *digit* **Example:** `Router(config-voice-mlpp)# access-digit 8`	Defines the access digit that phone users dial to make an MLPP call. • *digit*—Single-digit number that users dial. Range: 0 to 9. Default: 0. **Note** Your domain type must support the access digit that you select. For example, the valid range for the DSN is 2 to 9.
Step 5	**bnea** *audio-url* **Example:** `Router(config-voice-mlpp)# bnea flash:bnea.au`	Specifies the audio file to play for the busy station not equipped for preemption announcement. • *audio-url*—Location of the announcement audio file in URL format. Valid storage locations are TFTP, FTP, HTTP, and flash memory.
Step 6	**bpa** *audio-url* **Example:** `Router(config-voice-mlpp)# bpa flash:bpa.au`	Specifies the audio file to play for the blocked precedence announcement.
Step 7	**upa** *audio-url* **Example:**	Specifies the audio file to play for the unauthorized precedence announcement.

	Command or Action	Purpose
	`Router(config-voice-mlpp)# upa flash:upa.au`	• This command is supported in Cisco Unified CME 8.0 and later versions.
Step 8	**service-domain** { **drsn** | **dsn** } **identifier** *domain-number* **Example:** `Router(config-voice-mlpp)# service-domain dsn 0010`	(Optional) Sets the global MLPP domain type and number. • **drsn**—Defense Red Switched Network (DRSN). • **dsn**—Defense Switched Network (DSN). This is the default value. • *domain-number*—Number to identify the global domain, in three-octet format. Range: 0x000000 to 0xFFFFFF. Default: 0. • A phone uses this global domain for MLPP calls if it is not configured with the **mlpp service-domain** command. • This command is supported in Cisco Unified CME 8.0 and later versions.
Step 9	**end** **Example:** `Router(config-voice-mlpp)# end`	Exits to privileged EXEC mode.

Example

The following example shows MLPP enabled on the Cisco Unified CME router.

```
voice mlpp
   access-digit 8
   bpa flash:bpa.au
   bnea flash:bnea.au
   upa flash:upa.au
   service-domain dsn identifier 000010
```

Enable MLPP Service on SCCP Phones

Restriction The **mlpp max-precedence** command is not supported in Cisco Unified CME 8.0 and later versions; it is replaced by the **mlpp service-domain** command.

Before you begin

MLPP must be enabled globally on the Cisco Unified CME router. See Enabling MLPP Service Globally in Cisco Unified CME.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ephone-template** *template-tag*
4. **mlpp service-domain**{**drsn** | **dsn**} **identifier** *domain-number* **max-precedence** *level*
5. **mlpp preemption**
6. **mlpp indication**
7. **exit**
8. **ephone** *phone-tag*
9. **ephone-template** *template-tag*
10. **restart**
11. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ephone-template** *template-tag* **Example:** `Router(config)# ephone-template 15`	Enters ephone-template configuration mode to create an ephone template. • *template-tag*—Unique identifier for the ephone template that is being created. Range: 1 to 20.
Step 4	**mlpp service-domain**{**drsn** | **dsn**} **identifier** *domain-number* **max-precedence** *level* **Example:** `Router(config-ephone-template)# mlpp service-domain dsn identifier 0010 max-precedence 0`	Sets the service domain and maximum precedence (priority) level for MLPP calls from this phone. • **drsn**—Phone belongs to the Defense Red Switched Network (DRSN). • **dsn**—Phone belongs to the Defense Switched Network (DSN). This is the default value. • *domain-number*—Number to identify the global domain, in three-octet format. Range: 0x000000 to 0xFFFFFF. • *level*—Maximum precedence level. Phone user can specify a precedence level that is less than or equal to this value.

	Command or Action	Purpose
		• DSN—Range: 0 to 4, where 0 is the highest priority. • DRSN—Range: 0 to 5, where 0 is the highest priority. • This command is supported in Cisco Unified CME 8.0 and later versions.
Step 5	**mlpp preemption** **Example:** `Router(config-ephone-template)# no mlpp preemption`	(Optional) Enables calls on the phone to be preempted. • Preemption is enabled by default. Skip this step unless you want to disable preemption with the **no mlpp preemption** command.
Step 6	**mlpp indication** **Example:** `Router(config-ephone-template)# no mlpp indication`	(Optional) Enables the phone to play precedence and preemption tones, and display the preemption level of calls. • MLPP indication is enabled by default. Skip this step unless you want to disable MLPP indication with the **no mlpp indication** command.
Step 7	**exit** **Example:** `Router(config-ephone-template)# exit`	Exits ephone-template configuration mode.
Step 8	**ephone** *phone-tag* **Example:** `Router(config)# ephone 36`	Enters ephone configuration mode. • *phone-tag*—Unique sequence number that identifies this ephone during configuration tasks.
Step 9	**ephone-template** *template-tag* **Example:** `Router(config-ephone)# ephone-template 15`	Applies an ephone template to the ephone that is being configured.
Step 10	**restart** **Example:** `Router(config-ephone)# restart`	Performs a fast reboot of this ephone. Does not contact the DHCP or TFTP server for updated information. **Note** Restart all ephones using the **restart all** command in telephony-service configuration mode.
Step 11	**end** **Example:** `Router(config-ephone)# end`	Returns to privileged EXEC mode.

Examples

The following example shows a basic configuration for three phones, all using template 1 with MLPP defined. Figure 28-5 shows an example of a precedence call using this configuration.

```
voice mlpp
   access-digit 8
   bpa flash:BPA.au
   bnea flash:BNEA.au
   upa flash:UPA.au

  ephone-template  1
   mlpp service-domain dsn identifier 000000 max-precedence 0
  !Configures MLPP domain as DSN, identifier as 000000, and max-precedence set to 0

  ephone-dn  1
   number  1001

  ephone-dn  2
   number 1002

  ephone-dn 3 dual-line
   number 1003
   huntstop channel

  ephone 1
   description Phone-A
   mac-address 1111.2222.0001
   button 1:1
   ephone-template 1
  ! MLPP configuration inherited from ephone-template 1

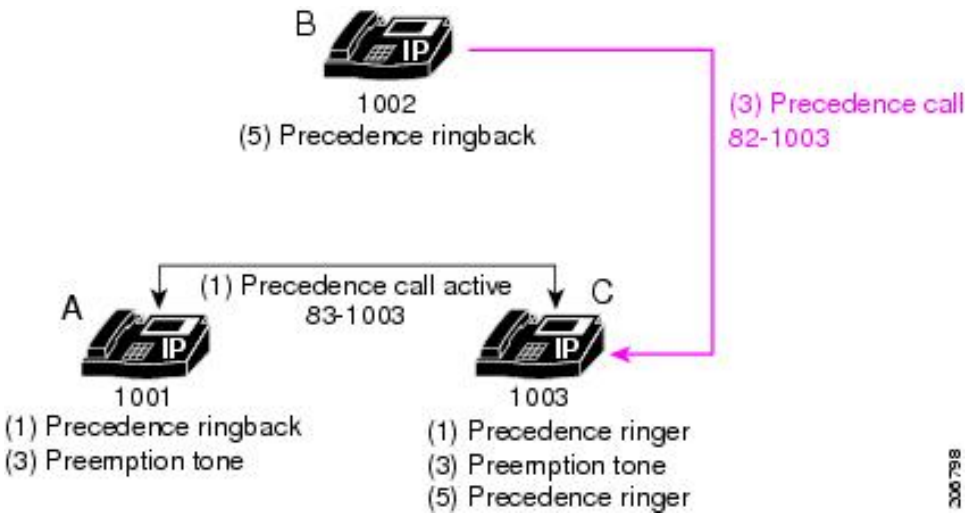
  ephone 2
   description Phone-B
   mac-address 1111.2222.0002
   button 1:2
   ephone-template 1

  ephone-3
   description Phone-C
   mac-address 1111.2222.0003
   button 1:3
   ephone-template 1
```



Note The **huntstop channel** command must be configured on dual-line and octo-line directory numbers to preempt a call on those types of lines. Otherwise the dual-line or octo-line receives Call Waiting indication and the call is not preempted.

Figure 5: Preemption Call Example



In this example, the following sequence of events occurs:

1. Phone A places a precedence call to Phone C by dialing 831003 (access digit 8 + precedence level 3 + destination number 1003).

   Phone C answers the call.
2. Phone C hears the precedence ringer tone and Phone A hears the precedence ringback.
3. Phone B places a higher precedence call to Phone C by dialing 821003. Phone A and Phone C both hear the preemption tone for the duration of the **preemption tone timer** command (default value is three seconds).
4. Phone A is preempted after three seconds.
5. Phone C starts ringing (precedence ringer) and Phone B hears the precedence ringback.
6. Phone C answers the call.

Enable MLPP Service on Analog FXS Phone Ports

Before you begin

MLPP must be enabled globally on the Cisco Unified CME router. See "Enabling MLPP Service Globally in Cisco Unified CME".

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice-port** *port*
4. **mlpp service-domain** {**drsn** | **dsn**} **identifier** *domain-number* **max-precedence** *level*
5. **mlpp preemption**

6. **mlpp indication**
7. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**voice-port** *port* **Example:** `Router(config)# voice-port 0/1/0`	Enters voice-port configuration mode. • *Port* argument is platform-dependent; type **?** to display syntax.

Step 4	**mlpp service-domain** {**drsn** | **dsn**} **identifier** *domain-number* **max-precedence** *level*
	Example:
	`Router(config-voiceport)# mlpp service-domain dsn identifier 0020 max-precedence 0`
		Sets the service domain and maximum precedence (priority) level for MLPP calls from this port.
		• **drsn**—Port belongs to the Defense Red Switched Network (DRSN).
		• **dsn**—Port belongs to the Defense Switched Network (DSN).
		• *domain-number*—Number to identify the global domain, in three-octet format. Range: 0x000000 to 0xFFFFFF.
		• *level*—Maximum precedence level. Phone user can specify a precedence level that is less than or equal to this value.
		  • DSN—Range: 0 to 4, where 0 is the highest priority.
		  • DRSN—Range: 0 to 5, where 0 is the highest priority.
		• This command is supported in Cisco Unified CME 8.0 and later versions.

Step 5	**mlpp preemption** **Example:** `Router(config-voiceport)# no mlpp preemption`	(Optional) Enables calls on the port to be preempted. • Preemption is enabled by default. Skip this step unless you want to disable preemption with the **no mlpp preemption** command.

	Command or Action	Purpose
Step 6	**mlpp indication** **Example:** `Router(config-voiceport)# no mlpp indication`	(Optional) Enables the phone to play precedence and preemption tones, and display the preemption level of calls. • MLPP indication is enabled by default. Skip this step unless you want to disable MLPP indication with the **no mlpp indication** command.
Step 7	**end** **Example:** `Router(config-voiceport)# end`	Returns to privileged EXEC mode.

Example

The following example shows that the analog FXS phone connected to voice port 0/1/0 can make MLPP calls with the highest precedence and its calls cannot be preempted.

```
voice-port 0/1/0
   mlpp service-domain dsn identifier 000020 max-precedence 0
   no mlpp preemption
   station-id name uut1-fxs1
   caller-id enable
```

Configure an MLPP Service Domain for Outbound Dial Peers

To assign a service domain to MLPP calls that must leave the Cisco Unified CME router through the trunk, perform the following steps for the corresponding dial peer.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice class mlpp** *tag*
4. **service-domain** {**drsn** | **dsn**}
5. **exit**
6. **dial-peer voice tag** {**pots** | **voip**}
7. **voice-class mlpp** *tag*
8. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:**	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	Purpose
	`Router> enable`	
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**voice class mlpp** *tag* **Example:** `Router(config)# voice class mlpp 1`	Creates a voice class for the MLPP service. • *tag*—Unique number to identify the voice class. Range: 1 to 10000.
Step 4	**service-domain** {**drsn** | **dsn**} **Example:** `Router(config-voice-class)# service-domain dsn`	Sets the network domain in the MLPP voice class. • **drsn**—Defense Red Switched Network (DRSN). • **dsn**—Defense Switched Network (DSN).
Step 5	**exit** **Example:** `Router(config-voice-class)# exit`	Exits voice-class configuration mode.
Step 6	**dial-peer voice tag** {**pots** | **voip**} **Example:** `Router(config)# dial-peer voice 101 voip`	Enters dial peer voice configuration mode.
Step 7	**voice-class mlpp** *tag* **Example:** `Router(config-dial-peer)# voice-class mlpp 1`	Assigns a previously configured MLPP voice class to a POTS or VoIP dial peer. • *tag*—Unique number of the voice class that you created in Step 3.
Step 8	**end** **Example:** `Router(config-dial-peer)# end`	Exits dial-peer voice configuration mode.

Example

The following example shows an MLPP voice class defined for the DSN service domain. This voice class is assigned to a POTS dial peer so that calls leaving port 0/1/0 use the DSN protocol.

```
voice class mlpp 1
   service-domain dsn
  !
  !
  dial-peer voice 1011 pots
   destination-pattern 19101
   voice-class mlpp 1
   port 0/1/0
```

Configure MLPP Options

To configure optional MLPP features or modify default settings, perform the following steps.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice mlpp**
4. **preemption trunkgroup**
5. **preemption user**
6. **preemption tone timer** *seconds*
7. **preemption reserve timer** *seconds*
8. **service-domain midcall-mismatch** { **method1** | **method2** | **method3** | **method4** }
9. **service-digit**
10. **route-code**
11. **attendant-console** *number* **redirect-timer** *seconds*
12. **ica** *audio-url*
13. **loc2** *audio-url*
14. **vca** *audio-url* **voice-class cause-code** *tag*
15. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**voice mlpp** **Example:** `Router(config)# voice mlpp`	Enters voice MLPP configuration mode.
Step 4	**preemption trunkgroup** **Example:** `Router(config-voice-mlpp)# preemption trunkgroup`	Enables preemption capabilities on a trunk group.
Step 5	**preemption user** **Example:**	Enables all supported phones to preempt calls.

	Command or Action	Purpose
	`Router(config-voice-mlpp)# preemption user`	
Step 6	**preemption tone timer** *seconds* **Example:** `Router(config-voice-mlpp)# preemption tone timer 15`	Sets the amount of time that the preemption tone plays on the called phone when a lower precedence call is being preempted. • *seconds*—Expiry time, in seconds. Range: 3 to 30. Default: 0 (disabled).
Step 7	**preemption reserve timer** *seconds* **Example:** `Router(config-voice-mlpp)# preemption reserve timer 10`	Sets the amount of time to reserve a channel for a preemption call. • *seconds*—Range: 3 to 30. Default: 0 (disabled).
Step 8	**service-domain midcall-mismatch** {**method1** | **method2** | **method3** | **method4**} **Example:** `Router(config-voice-mlpp)# service-domain midcall-mismatch method2`	Defines the behavior when there is a domain mismatch between the two legs of a call. • **method1**—Domain remains unchanged for each of the connections and the precedence level of the lower priority call changes to that of the higher priority call. This is the default value. • **method2**—Domain and precedence level of the lower priority call changes to that of the higher priority call. • **method3**—Domain remains unchanged for each of the connections and the precedence levels change to Routine for both calls. • **method4**—Domains change to that of the connection for which supplementary service was invoked (for example, transferee in case of transfer). Precedence levels change to Routine for both calls. • This command is supported in Cisco Unified CME 8.0 and later versions.
Step 9	**service-digit** **Example:** `Router(config-voice-mlpp)# service-digit`	Enables phone users to request off-net services by dialing a service digit. • This command is supported in Cisco Unified CME 8.0 and later versions.
Step 10	**route-code** **Example:** `Router(config-voice-mlpp)# route-code`	Enables phone users to specify special routing for a call by dialing a route code. • This command is supported in Cisco Unified CME 8.0 and later versions.

	Command or Action	Purpose
Step 11	**attendant-console** *number* **redirect-timer** *seconds* **Example:** `Router(config-voice-mlpp)# attendant-console 8100 redirect-timer 10`	Specifies the telephone number of the MLPP attendant-console service where calls are redirected if the phone does not answer. • *number*—Extension or E.164 telephone number of the Cisco Unified CME basic automatic call distribution (B-ACD) and auto-attendant (AA) service. • *seconds*—Number of seconds to wait for the phone to answer before redirecting the call.
Step 12	**ica** *audio-url* **Example:** `Router(config-voice-mlpp)# ica flash:ica.au`	(Optional) Specifies the audio file to play for the isolated code announcement. • This command is supported in Cisco Unified CME 8.0 and later versions.
Step 13	**loc2** *audio-url* **Example:** `Router(config-voice-mlpp)# loc2 flash:loc2.au`	(Optional) Specifies the audio file to play for the loss of C2 features announcement. • This command is supported in Cisco Unified CME 8.0 and later versions.
Step 14	**vca** *audio-url* **voice-class cause-code** *tag* **Example:** `Router(config-voice-mlpp)# vca flash:vca.au voice-class cause-code 29`	(Optional) Specifies the audio file to play for the vacant code announcement. • *tag*—Number of the voice class that defines the cause codes for which the VCA is played. Range: 1 to 64. • This command is supported in Cisco Unified CME 8.0 and later versions.
Step 15	**end** **Example:** `Router(config-voice-mlpp)# end`	Exits to privileged EXEC mode.

Examples

The following example shows an MLPP configuration with optional parameters.

```
voice mlpp
   preemption trunkgroup
   preemption user
   preemption tone timer 15
   preemption reserve timer 10
   access-digit 8
   attendant-console 8100 redirect-timer 10
   service-digit
   route-code
   bpa flash:bpa.au
   bnea flash:bnea.au
```

```
upa flash:upa.au
ica flash:ica.au
loc2 flash:loc2.au
vca flash:vca.au voice-class cause-code 29
service-domain midcall-mismatch method2
service-domain dsn identifier 000010
```

Troubleshooting MLPP Service

SUMMARY STEPS

1. **enable**
2. **debug ephone mlpp**
3. **debug voice mlpp**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**debug ephone mlpp** **Example:** `Router# debug ephone mlpp`	Displays debugging information for MLPP calls to phones in a Cisco Unified CME system.
Step 3	**debug voice mlpp** **Example:** `Router# debug voice mlpp`	Displays debugging information for the MLPP service.

Feature Information for MLPP

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to https://cfnng.cisco.com/. An account on Cisco.com is not required.

Table 7: Feature Information for MLPP

Feature Name	Cisco Unified CME Version	Feature Information
MLPP Enhancements	8.0	Adds support for the following: • Additional MLPP announcements • Multiple service domains • Route codes and service digits • Interaction with supplementary services, such as Three-Way Conference, Call Pickup, and Cancel Call Waiting on Analog FXS ports
MLPP for Cisco Unified CME	7.1	Allows validated users to place priority calls, and if necessary, to preempt lower-priority calls.