



# Call Restriction Regulations

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## Prerequisites for LPCOR

- Cisco IOS Release 15.0(1)XA or a later release.
- Cisco Unified CME 8.0 or a later version.

## Information About LPCOR

### LPCOR Overview

The Telecom Regulatory Authority of India (TRAI) has regulations that restrict the mixing of voice traffic between the PSTN and VoIP networks. Previously, this required a user to have two phones to handle both PSTN and VoIP calls; an IP phone connected to the Electronic Private Automatic Branch Exchange (EPABX) for intra-office and inter-office VoIP calls and a separate phone connected to a PABX for PSTN calls, as shown in [Figure 1: Separate PBX and EPABX Systems, on page 2](#).

New regulations allow for a single network infrastructure and single EPABX to connect to both the PSTN and VoIP networks by using a logical partitioning between the PSTN and IP leased lines.

The logical partitioning class of restriction (LPCOR) feature enables a single directory number on an IP phone or analog phone registered to Cisco Unified CME to connect to both PSTN and VoIP calls according to the connection restrictions specified by TRAI regulations. Cisco Unified CME can support both VoIP and PSTN calls while restricting the mixing of voice traffic between the PSTN and VoIP networks and preventing PSTN calls from connecting to remote locations over an IP trunk, as shown in [Figure 2: Single EPAPX System with PSTN and VoIP Calls Partitioning, on page 2](#).

Figure 1: Separate PBX and EPABX Systems

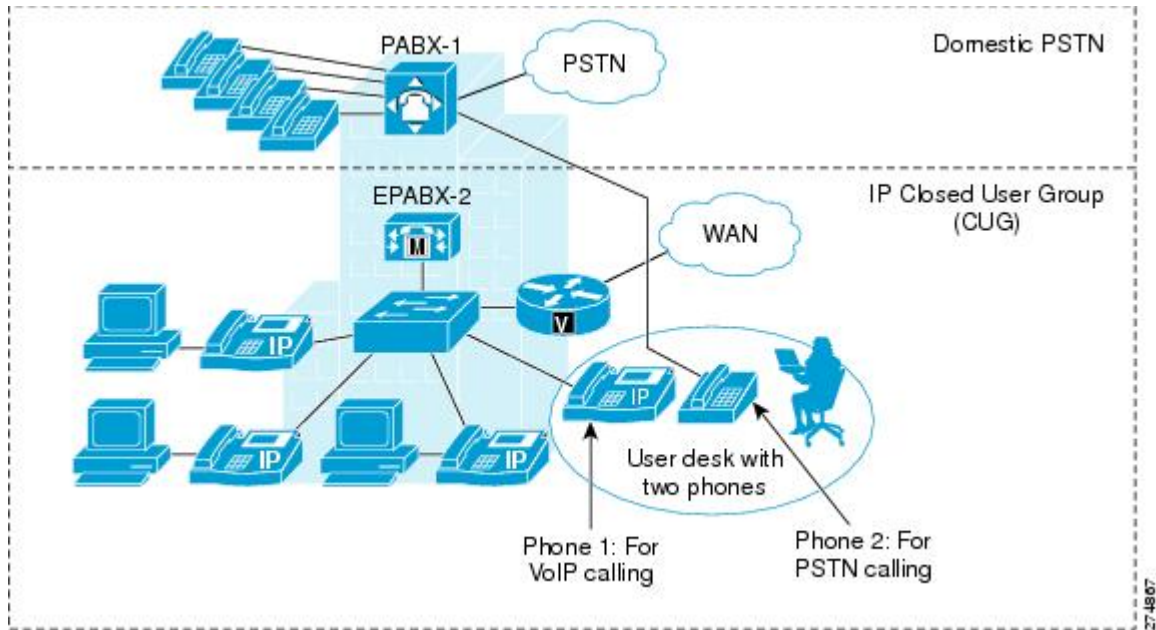
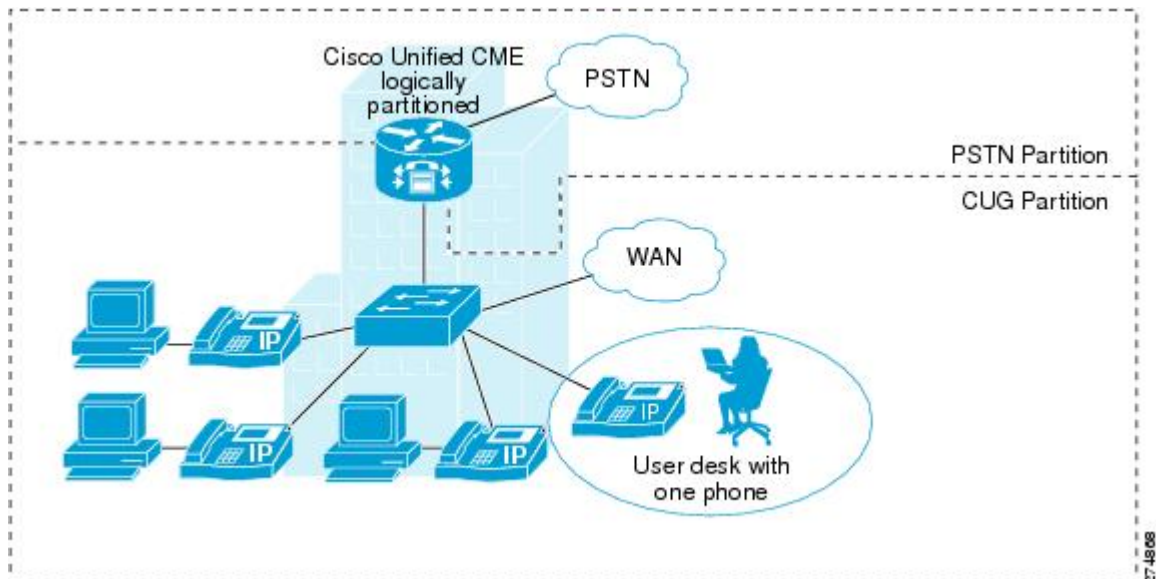


Figure 2: Single EPAPX System with PSTN and VoIP Calls Partitioning



## LPCOR Policy and Resource Groups

Cisco Unified CME supports a high-level class of restriction by allowing you to logically partition its resources (PSTN trunks, IP trunks, IP phones, and analog phones) into different groups. The resources of each group are scalable based on the voice interface, trunk group, or IP address subnet. In general, you should not have to modify your existing dial plan to support LPCOR functionality. The dial peer class of restriction (COR) feature remains unchanged when the LPCOR feature is added to Cisco Unified CME.

LPCOR control is based on the location of resources, where calls are originating and terminating. You must partition the resources of the Cisco Unified CME router into different resource groups and then create a LPCOR policy for each group to which you want to apply call restrictions.

You create a LPCOR policy matrix for individual resource groups by defining its LPCOR policy to either accept or reject calls that originate from any of the other resource groups. You can define one LPCOR policy for each resource group.

The same LPCOR policy is applied to multiple directory numbers from the same resource. For example, if multiple directory numbers are defined for a SCCP phone, the same LPCOR policy is enforced for all calls to the different directory numbers on the SCCP phone.

In the following example, PSTN trunks, IP trunks (H.323 and SIP), analog FXS phones, and IP phones for a Cisco Unified CME router are partitioned into five different resource groups (RG1 to RG5).

**Table 1: LPCOR Policy Matrix Example**

Resource Groups	RG1	RG2	RG3	RG4	RG5
RG1	<b>Yes</b>	No	Yes	No	Yes
RG2	Yes	Yes	<b>No</b>	Yes	No
RG3	Yes	<b>Yes</b>	Yes	Yes	No
RG4	No	No	No	Yes	Yes
RG5	No	Yes	Yes	Yes	<b>No</b>

LPCOR validation is done at the target destination based on the configured LPCOR policy matrix. For example:

- Call from RG1 to target RG1 is allowed
- Call from RG2 to target RG3 is not allowed
- Call from RG3 to target RG2 is allowed
- Call from RG5 to target RG5 is not allowed

## Default LPCOR Policy

The default LPCOR policy means that there are no restrictions between the call source and its target destination. When a call is presented to a target destination, Cisco Unified CME bypasses LPCOR validation if either the incoming call is not associated with a LPCOR policy or the LPCOR policy is not defined for the target destination.

TRAI regulations allow the same directory number on a local IP phone or SCCP analog Foreign Exchange Station (FXS) phone in Cisco Unified CME to handle both PSTN and VoIP calls. Locally connected phones do not have to be associated with any resource group.

## How LPCOR Policies are Associated with Resource Groups

Call restrictions are applied to LPCOR resource groups based on the location of the resources. You create LPCOR policies that define the call restrictions to apply to calls that originate or terminate at the following types of resources.

### Analog Phones

TRAI regulations allow an analog FXS phone to accept both PSTN and VoIP calls if the phone is locally registered to Cisco Unified CME. Locally connected phones do not have to be associated with any resource group; the default LPCOR policy is applied to this phone type.

A specific LPCOR policy can be defined through the voice port or trunk group. For configuration information, see [Associate a LPCOR Policy with Analog Phone or PSTN Trunk Calls, on page 11](#).

### IP Phones

LPCOR supports both SCCP and SIP IP phones. TRAI regulations allow an IP phone to accept both PSTN and VoIP calls if the IP phone is registered locally to Cisco Unified CME through the LAN. If the IP phone is registered to Cisco Unified CME through the WAN, PSTN calls must be blocked from the remote IP phones.

If an IP phone always registers to Cisco Unified CME from the same local or remote region, the phone is provisioned with a static LPCOR policy. For configuration information, see [Associate a LPCOR Policy with IP Phone or SCCP FXS Phone Calls, on page 16](#).

If the phone is a mobile-type IP phone and moves between the local and remote regions, such as an Extension Mobility phone, Cisco IP Communicator softphone, or a remote teleworker phone, the LPCOR policy is provisioned dynamically based on the IP phone's currently registered IP address. For configuration information, see [Associate LPCOR with Mobile Phone Calls, on page 20](#).

### PSTN Trunks

An incoming LPCOR resource group is associated with a PSTN trunk (digital or analog) through the voice port or trunk group.

When a call is routed to the PSTN network, the LPCOR policy of the target PSTN trunk can block calls from any resource group it is not explicitly configured to accept. Outgoing calls from a PSTN trunk are associated with a LPCOR policy based on either the voice port or trunk group, whichever is configured in the outbound POTS dial-peer.

For configuration information, see [Associate a LPCOR Policy with Analog Phone or PSTN Trunk Calls, on page 11](#).

### VoIP Trunks

An incoming VoIP trunk call (H.323 or SIP) is associated with a LPCOR policy based on the remote IP address as follows:

#### Incoming H.323 trunk call

- IP address of the previous hub or originating gateway

**Incoming SIP trunk call**

- IP address of the originating gateway
- Hostname from the earliest Via header of an incoming INVITE message. If the hostname is in domain name format, a DNS query is performed to resolve the name into an IP address.

Cisco Unified CME uses the resolved hostname or resolved IP address to determine the LPCOR policy based on the entries in the IP-trunk subnet table. If the LPCOR policy cannot be found through the IP address or hostname, the incoming H.323 or SIP trunk call is associated with the incoming LPCOR policy configured in voice service configuration mode.

The LPCOR policy of the VoIP target is determined through the configuration of the outbound VoIP dial-peer. The default LPCOR policy is applied to the VoIP target if an outgoing LPCOR policy is not defined in the target VoIP dial-peer.

For configuration information, see [Associate a LPCOR Policy with VoIP Trunk Calls, on page 14](#).

## LPCOR Support for Supplementary Services

[Table 2: Supplementary Services Support with LPCOR, on page 5](#) describes LPCOR support for calls using supplementary services.

**Table 2: Supplementary Services Support with LPCOR**

Feature	Description	SCCP Phone	SIP Phone
Basic Call	Cisco Unified CME invokes the LPCOR policy validation if both the incoming call and target destination are associated with a LPCOR policy.  If the LPCOR policy validation fails, cause-code 63 (no service available) or the user-defined cause-code is returned to the remote switch. The call can hunt to the next destination.	Yes	Yes
Call Forward	When a call is forwarded to a new destination, Cisco Unified CME invokes the LPCOR policy validation between the source and the forwarding target. The call is not forwarded to the target if the LPCOR policy is restricted.	Yes	Yes
Call Transfer	Blind and Consultative Call Transfer is restricted if the LPCOR policy validation fails between the transferee and transfer-to parties.  For consultative call transfers, the reorder tone plays and an error message displays on the transferor phone. The call is not disconnected between the transferee and transferor.	Yes	Yes

Feature	Description	SCCP Phone	SIP Phone
Ad Hoc Conference (software-based, 3-party)	Cisco Unified CME invokes the LPCOR policy validation for each call joined to a conference. A call is blocked from joining the conference if the LPCOR policy validation fails.	Yes	No
Ad Hoc Conference (hardware-based)	The reorder tone plays and the conference cannot complete message displays on the IP phone that initiated the conference. The call is resumed by the transferor who initiated the conference.  <b>Note</b> If the LPCOR policy validation fails during a blind transfer setup to a conference bridge, the call is released.  <b>Note</b> LPCOR validation is not supported for additional call transfer or conference operations from a 3-party software conference call.	Yes	Yes
Meet-Me Conference	LPCOR policy of each conference party is validated when a new call is joined to a conference. The call is blocked from joining the conference if the LPCOR policy validation fails.  The reorder tone plays and the conference cannot complete message displays on the IP phone that initiated the Meet-Me conference.	Yes	Yes (join only)
Call Pickup/Group Pickup (Cisco Unified CME 7.1 and later versions)	Call Pickup and Pickup Groups enable phone users to answer a call that is ringing on a different extension. The pickup is blocked if the LPCOR policy validation between the call and the pickup phone fails.  The reorder tone plays and the unknown number message displays on the IP phone that attempts the call pickup.	Yes	Yes
Call Park (Cisco Unified CME 7.1 and later versions)	Phone users can place a call on hold at a special extension so it can be retrieved by other phones.  A phone is not allowed to retrieve a parked call if the LPCOR policy validation fails. The reorder tone plays and the unknown number message displays on the IP phone that attempts to retrieve the parked call. The call remains parked at the call-park slot.	Yes	Yes
Call Park Retrieval		Yes	Yes
Hunt Group Pilot (ephone hunt group)	Supported for sequential and longest idle hunt groups. The LPCOR policy validation is performed when a call is directed to a SCCP endpoint through the ephone hunt-group.	Yes	No
Hunt Group Pilot (voice hunt group)	Supported for parallel hunt groups only. A hunt target can be a SCCP phone, SIP phone, VoIP trunk, or PSTN trunk. The LPCOR policy validation is performed between the call and the pilot hunt target. A call is blocked from a target if the LPCOR policy is restricted.	Yes	Yes

Feature	Description	SCCP Phone	SIP Phone
Shared Line	Phones with a shared directory number must have the same LPCOR policy.	Yes	Yes
CBarge	Phone users who share a directory number can join an active call on the shared line. Phones must have the same LPCOR policy.	Yes	Yes
Third-Party Call Control	Cisco Unified CME supports out-of-dialog refer (OOD-R) by a remote call-control system. The LPCOR validation is performed during the second outbound call setup after the first outbound call is established. The OOD-R request fails if the LPCOR policy between the first and second outbound call is restricted.	Yes	Yes

## Phone Display and Warning Tone for LPCOR

Cisco Unified CME plays the reorder tone to callers when it blocks calls due to LPCOR policy authentication. [Table 3: Message Display for Blocked LPCOR Calls, on page 7](#) lists the message that displays on the phone when a call is blocked.

**Table 3: Message Display for Blocked LPCOR Calls**

Call Block Type	Phone Display Message	
	SCCP Phone	SIP Phone
Call Transfer	Unable to Transfer	Transfer Failed
Conference	Cannot Complete Conference	
Meet-Me Conference	No Screen Display Update	
Pickup	Unknown Number	
Park	Unknown Number	

## LPCOR VSAs

New vendor-specific attributes (VSAs) for the LPCOR policy associated with a call are included in the call detail records (CDRs) generated by Cisco Unified CME for Remote Authentication Dial-in User Services (RADIUS) accounting. A null value is used for call legs without an associated LPCOR policy, which is the default LPCOR value. The incoming or outgoing LPCOR policy of a call is added to RADIUS stop records.

[Table 4: VSAs Supported by Cisco Voice Calls, on page 8](#) lists the new VSAs.

Table 4: VSAs Supported by Cisco Voice Calls

Attribute	VSA No. (Decimal)	Format for Value or Text	Sample Value or Text	Description
in-lpcor-group	1	String	pstn_group	Logical partitioning class of restriction (LPCOR) resource-group policy associated with an incoming call.
out-lpcor-group	1	String	voip_group	LPCOR resource-group policy associated with an outgoing call.

# Configure LPCOR

## Define a LPCOR Policy

To enable LPCOR functionality and define a policy for each resource group that requires call restrictions, perform the following task. You can define one LPCOR policy for each resource group. Do not create a LPCOR policy for resource groups that do not require call restrictions. A target resource group without a LPCOR policy can accept incoming calls from any other resource group.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice lpcor enable**
4. **voice lpcor call-block cause** *cause-code*
5. **voice lpcor custom**
6. **group** *number lpcor-group*
7. **exit**
8. **voice lpcor policy** *lpcor-group*
9. **accept** *lpcor-group*
10. **end**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.



	Command or Action	Purpose
Step 3	<b>voice lpcor enable</b> <b>Example:</b> Router(config)# voice lpcor enable	Enables LPCOR functionality on the Cisco Unified CME router.
Step 4	<b>voice lpcor call-block cause <i>cause-code</i></b> <b>Example:</b> Router(config)# voice lpcor call-block cause 79	(Optional) Defines the cause code to use when a call is blocked because LPCOR validation fails. <ul style="list-style-type: none"> <li>• Range: 1 to 180. Default: 63 (serv/opt-unavail-unspecified). Type ? to display a description of the cause codes.</li> </ul>
Step 5	<b>voice lpcor custom</b> <b>Example:</b> Router(config)# voice lpcor custom	Defines the name and number of LPCOR resource groups on the Cisco Unified CME router.
Step 6	<b>group <i>number lpcor-group</i></b> <b>Example:</b> Router(cfg-lpcor-custom)# group 1 pstn_trunk	Adds a LPCOR resource group to the custom resource list. <ul style="list-style-type: none"> <li>• <i>number</i>—Group number of the LPCOR entry. Range: 1 to 64.</li> <li>• <i>lpcor-group</i>—String that identifies the LPCOR resource group.</li> </ul>
Step 7	<b>exit</b> <b>Example:</b> Router(cfg-lpcor-custom)# exit	Exits LPCOR custom configuration mode.
Step 8	<b>voice lpcor policy <i>lpcor-group</i></b> <b>Example:</b> Router(config)# voice lpcor policy pstn_trunk	Creates a LPCOR policy for a resource group. <ul style="list-style-type: none"> <li>• <i>lpcor-group</i>—Name of the resource group that you defined in Step 6.</li> </ul>
Step 9	<b>accept <i>lpcor-group</i></b> <b>Example:</b> Router(cfg-lpcor-policy)# accept analog_phone	Allows a LPCOR policy to accept calls associated with the specified resource group. <ul style="list-style-type: none"> <li>• Default: Calls from other groups are rejected; calls from the same resource group are accepted.</li> <li>• Repeat this command for each resource group whose calls you want this policy to accept.</li> </ul>
Step 10	<b>end</b> <b>Example:</b> Router(cfg-lpcor-policy)# end	Returns to privileged EXEC mode.

## Examples

The following example shows a LPCOR configuration where resources are partitioned into five groups. Three of the resource groups have LPCOR policies that limit the calls they can accept. The other two groups, `ipphone_local` and `analog_phone`, can accept calls from any of the other resource groups because they do not have a LPCOR policy defined.

```
voice lpcor enable
voice lpcor call-block cause invalid-number
voice lpcor custom
  group 1 pstn_trunk
  group 2 analog_phone
  group 3 iptrunk
  group 4 ipphone_local
  group 5 ipphone_remote
!
voice lpcor policy pstn_trunk
  accept analog_phone
  accept ipphone_local
!
voice lpcor policy iptrunk
  accept analog_phone
  accept ipphone_local
  accept ipphone_remote
!
voice lpcor policy ipphone_remote
  accept iptrunk
  accept analog_phone
  accept ipphone_local
```

The following example shows a LPCOR configuration where resources are partitioned into the following four policy groups:

- `siptrunk`—Accepts all IP trunk calls.
- `h323trunk`—Accepts all IP trunk calls.
- `pstn`—Blocks all IP trunk and voice-mail calls.
- `voicemail`—Accepts both IP trunk and PSTN calls.

```
voice lpcor enable
voice lpcor custom
  group 1 siptrunk
  group 2 h323trunk
  group 3 pstn
  group 4 voicemail
!
voice lpcor policy siptrunk
  accept h323trunk
  accept voicemail
!
voice lpcor policy h323trunk
  accept siptrunk
  accept voicemail
!
voice lpcor policy pstn
!
voice lpcor policy voicemail
```

```
accept siptrunk
accept h323trunk
accept pstn
```

The following example shows a LPCOR policy that is configured to reject calls associated with itself. Devices that belong to the local\_phone resource group cannot accept calls from each other.

```
voice lpcor policy local_phone
no accept local_phone
accept analog_phone
```

## Associate a LPCOR Policy with Analog Phone or PSTN Trunk Calls

To associate a LPCOR policy with calls that originate or terminate at an analog phone or PSTN trunk, perform the following task. You can apply a specific LPCOR policy through the voice port or trunk group to remote analog phones or to local analog phones that you do not want to associate with the default LPCOR policy.



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**Note** For an analog FXS phone that is locally registered to Cisco Unified CME through the LAN, see [Associate a LPCOR Policy with IP Phone or SCCP FXS Phone Calls, on page 16](#).

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Incoming calls from an analog phone or PSTN trunk are associated with a LPCOR resource group based on the following configurations, in the order listed:

1. Voice port
2. Trunk group

Outgoing calls from an analog phone or PSTN trunk are associated with a LPCOR policy based on the voice port or trunk group configuration in the outbound POTS dial-peer:

- If the outbound dial-peer is configured with the **port** command, an outgoing call uses the LPCOR policy specified in the voice port.
- If the outbound dial-peer is configured with the **trunkgroup** command, the call uses the LPCOR policy specified in the trunk group.

### Before you begin

The LPCOR policy must be defined. See [Define a LPCOR Policy, on page 8](#).

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **trunk group** *name*
4. **lpcor incoming** *lpcor-group*
5. **lpcor outgoing** *lpcor-group*
6. **exit**
7. **voice-port** *port*
8. **lpcor incoming** *lpcor-group*

9. **lpcor outgoing** *lpcor-group*
10. **end**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
Step 2	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>trunk group name</b> <b>Example:</b> Router(config)# trunk group isdn1	Enters trunk-group configuration mode to define a trunk group.
Step 4	<b>lpcor incoming</b> <i>lpcor-group</i> <b>Example:</b> Router(config-trunk-group)# lpcor incoming isdn_group1	Associates a LPCOR resource-group policy with an incoming call.
Step 5	<b>lpcor outgoing</b> <i>lpcor-group</i> <b>Example:</b> Router(config-trunk-group)# lpcor outgoing isdn_group1	Associates a LPCOR resource-group policy with an outgoing call.
Step 6	<b>exit</b> <b>Example:</b> Router(config-trunk-group)# exit	
Step 7	<b>voice-port port</b> <b>Example:</b> Router(config)# voice-port 0/1/0	Enters voice-port configuration mode. <ul style="list-style-type: none"><li>• <i>Port</i> argument is platform-dependent; type ? to display syntax.</li></ul>
Step 8	<b>lpcor incoming</b> <i>lpcor-group</i> <b>Example:</b> Router(config-voiceport)# lpcor incoming vp_group3	Associates a LPCOR resource-group policy with an incoming call.
Step 9	<b>lpcor outgoing</b> <i>lpcor-group</i> <b>Example:</b> Router(config-voiceport)# lpcor outgoing vp_group3	Associates a LPCOR resource-group policy with an outgoing call.
Step 10	<b>end</b> <b>Example:</b>	Returns to privileged EXEC mode.

	Command or Action	Purpose
	Router(config-voiceport)# end	

## Examples for Configuring LPCOR for a PSTN Trunk and Analog Phones

### PSTN Trunks

#### Analog Phones

The following example shows a configuration for a PSTN trunk. Outbound calls from dial peer 201 use LPCOR policy isdn\_group1 because dial peer 201 is configured with trunk group isdn1. Outbound calls from dial peer 202 use LPCOR policy vp\_group3 because dial peer 202 is configured with voice port 3/1:15. A dial peer can be configured with either a voice port or trunk group; it cannot use both.

```
trunk group isdn1
  lpcor incoming isdn_group1
  lpcor outgoing isdn_group1
!
interface Serial2/0:15
  isdn incoming-voice voice
  trunk-group isdn1
...
voice-port 3/1:15
  lpcor incoming vp_group3
  lpcor outgoing vp_group3
!
!
dial-peer voice 201 pots
description TG outbound dial-peer
destination-pattern 201T
trunkgroup isdn1
!
dial-peer voice 202 pots
description VP outbound dial-peer
destination-pattern 202T
port 3/1:15
```

The following example shows a LPCOR configuration for analog phones:

```
trunk group analog1
  lpcor incoming analog_group1
  lpcor outgoing analog_group1
!
voice-port 1/0/0
!
voice-port 1/0/1
!
voice-port 1/1/0
  lpcor incoming vp_group1
  lpcor outgoing vp_group1
!
dial-peer voice 100 pots
description VP dial-peer
destination-pattern 100
port 1/0/0
!
```

```
dial-peer voice 101 pots
  description VP dial-peer
  destination-pattern 101
  port 1/0/1
!
dial-peer voice 110 pots
  description VP dial-peer
  destination-pattern 110
  port 1/1/0
!
dial-peer voice 300 pots
  description TG outbound dial-peer
  destination-pattern 300
  trunk-group analog1
```

## Associate a LPCOR Policy with VoIP Trunk Calls

To associate a LPCOR policy with calls that originate or terminate at a VoIP trunk (H.323 or SIP), perform the following task.

Incoming VoIP trunk calls are associated with a LPCOR policy based on the following configurations, in the order listed:

1. IP-trunk subnet table
2. Voice service voip configuration

Outgoing VoIP trunk calls are associated with a LPCOR policy based on the following configurations, in the order listed:

1. Outbound VoIP dial peer
2. Default LPCOR policy (no LPCOR policy is applied)



### Restriction

- The LPCOR IP-trunk subnet table is not supported for calls with an IPv6 address. The LPCOR policy specified with the **lpcor incoming** command in voice service configuration mode is supported for IPv6 trunk calls.
- Only a single LPCOR policy is applied to outgoing IP trunk calls if the outbound VoIP dial-peer is configured with the **session target** command using the **sip-server** or **ras** keyword.
- If a dial peer COR and LPCOR are both defined in a dial peer, the dial peer COR configuration has priority over LPCOR. For example, if the dial peer COR restricts the call and LPCOR allows the call, the call fails because of the dial peer COR before ever considering LPCOR.

### Before you begin

The LPCOR policy must be defined. See [Define a LPCOR Policy, on page 8](#).

### SUMMARY STEPS

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

3. **voice lpcor ip-trunk subnet incoming**
4. **index** *index-number lpcor-group { ipv4-address network-mask | hostname hostname }*
5. **exit**
6. **voice service voip**
7. **lpcor incoming** *lpcor-group*
8. **exit**
9. **dial-peer voice tag voip**
10. **lpcor outgoing** *lpcor-group*
11. **end**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>voice lpcor ip-trunk subnet incoming</b> <b>Example:</b> Router(config)# voice lpcor ip-trunk subnet incoming	Creates a LPCOR IP-trunk subnet table for incoming calls from a VoIP trunk.
Step 4	<b>index</b> <i>index-number lpcor-group { ipv4-address network-mask   hostname hostname }</i> <b>Example:</b> Router(cfg-lpcor-iptrunk-subnet)# index 1 h323_group1 172.19.33.0 255.255.255.0	Adds a LPCOR resource group to the IP trunk subnet table.
Step 5	<b>exit</b> <b>Example:</b> Router(cfg-lpcor-iptrunk-subnet)# exit	Exits LPCOR custom configuration mode.
Step 6	<b>voice service voip</b> <b>Example:</b> Router(config)# voice service voip	Enters voice-service configuration mode to specify the VoIP encapsulation type.
Step 7	<b>lpcor incoming</b> <i>lpcor-group</i> <b>Example:</b> Router(conf-voi-serv)# lpcor incoming voip_trunk_1	Associates a LPCOR resource-group policy with an incoming call.
Step 8	<b>exit</b> <b>Example:</b>	Exits voice-service configuration mode.

	Command or Action	Purpose
	<code>Router(conf-voi-serv)# exit</code>	
<b>Step 9</b>	<b>dial-peer voice tag voip</b> <b>Example:</b> <code>Router(config)# dial-peer voice 233 voip</code>	Enters dial-peer configuration mode to define a dial peer for VoIP calls.
<b>Step 10</b>	<b>lpcor outgoing lpcor-group</b> <b>Example:</b> <code>Router(config-dial-peer)# lpcor outgoing h323_group1</code>	Associates a LPCOR resource-group policy with an outgoing call.
<b>Step 11</b>	<b>end</b> <b>Example:</b> <code>Router(config-dial-peer)# end</code>	Returns to privileged EXEC mode.

### Examples

The following example shows a LPCOR configuration for VoIP trunks:

```
voice lpcor ip-trunk subnet incoming
  index 1 h323_group1 172.19.33.0 255.255.255.0
  index 2 sip_group1 172.19.22.0 255.255.255.0
  index 3 sip_group2 hostname sipexample
!
voice service voip
  lpcor incoming voip_trunk_1
!
dial-peer voice 233 voip
  description H323 trunk outbound dial-peer
  destination-pattern 233T
  session target ipv4:172.19.33.233
  lpcor outgoing h323_group1
!
dial-peer voice 2255 voip
  description SIP trunk outbound dial-peer
  destination-pattern 255T
  session protocol sipv2
  session target ipv4:172.19.33.255
  lpcor outgoing sip_group1
```

## Associate a LPCOR Policy with IP Phone or SCCP FXS Phone Calls

To associate a LPCOR policy with calls that originate or terminate at a local or remote IP phone or local SCCP analog (FXS) phone, perform the following task.

According to TRAI requirements, an IP phone or a SCCP FXS phone can accept both PSTN and VoIP calls if it is locally registered to Cisco Unified CME through the LAN. If a phone is registered to Cisco Unified CME through the WAN, then PSTN calls must be blocked from that remote phone.



**Restriction**

- Phones that share a directory number must be configured with the same LPCOR policy. A warning message displays if you try to configure a different LPCOR policy between IP phones that share the same directory number.
- Local and remote IP phones cannot use the same LPCOR policy.
- Software-based three-party ad hoc conferencing is not supported on SIP phones.
- Hardware-based ad hoc conferencing is not supported on SIP phones.
- LPCOR feature is not supported on voice gateways such as the Cisco VG224 or Cisco integrated service router if the voice gateway is registered to Cisco Unified Communications Manager. Cisco Unified Communications Manager does not support LPCOR.
- If a third-party call-control application makes two separate calls to Cisco Unified CME and performs a media bridging between the two calls, LPCOR validation is not supported because Cisco Unified CME is not aware of the bridging.

**Before you begin**

- The LPCOR policy must be defined. See [Define a LPCOR Policy, on page 8](#).
- SCCP FXS phones are configured with the **type anl** command.

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **ephone** *phone-tag* or **voice register pool** *phone-tag*
4. **lpcor type**{**local** | **remote**}
5. **lpcor incoming** *lpcor-group*
6. **lpcor outgoing** *lpcor-group*
7. **end**

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>ephone</b> <i>phone-tag</i> or <b>voice register pool</b> <i>phone-tag</i> <b>Example:</b>	Enters ephone configuration mode to set phone-specific parameters for an SCCP phone.

	Command or Action	Purpose
	<pre>Router(config)# ephone 2</pre> <p>or</p> <pre>Router(config)# voice register pool 4</pre>	<p>or</p> <p>Enters voice register pool configuration mode to set phone-specific parameters for a SIP phone.</p> <ul style="list-style-type: none"> <li>• <i>phone-tag</i>—Unique sequence number that identifies the phone. Range is version and platform-dependent; type ? to display range.</li> </ul>
<b>Step 4</b>	<p><b>lpcor type</b> { <b>local</b>   <b>remote</b> }</p> <p><b>Example:</b></p> <pre>Router(config-ephone)# lpcor type remote</pre> <p>or</p> <pre>Router(config-register-pool)# lpcor type local</pre>	<p>Sets the LPCOR type for an IP phone.</p> <ul style="list-style-type: none"> <li>• <b>local</b>—IP phone always registers to Cisco Unified CME through the LAN.</li> <li>• <b>remote</b>—IP phone always registers to Cisco Unified CME through the WAN.</li> <li>• This command can also be configured in ephone-template or voice register template configuration mode and applied to one or more phones. The phone configuration has precedence over the template configuration.</li> </ul>
<b>Step 5</b>	<p><b>lpcor incoming</b> <i>lpcor-group</i></p> <p><b>Example:</b></p> <pre>Router(config-ephone)# lpcor incoming ephone_group1</pre> <p>or</p> <pre>Router(config-register-pool)# lpcor incoming remote_group3</pre>	<p>Associates a LPCOR resource-group policy with an incoming call.</p> <ul style="list-style-type: none"> <li>• If this phone shares a directory number with another phone, you cannot configure a LPCOR policy that is different than the LPCOR policy on the other phone.</li> <li>• This command can also be configured in ephone-template or voice register template configuration mode and applied to one or more phones. The phone configuration has precedence over the template configuration.</li> </ul>
<b>Step 6</b>	<p><b>lpcor outgoing</b> <i>lpcor-group</i></p> <p><b>Example:</b></p> <pre>Router(config-ephone)# lpcor outgoing ephone_group2</pre> <p>or</p> <pre>Router(config-register-pool)# lpcor outgoing remote_group3</pre>	<p>Associates a LPCOR resource-group policy with an outgoing call.</p> <ul style="list-style-type: none"> <li>• If this phone shares a directory number with another phone, you cannot configure a LPCOR policy that is different than the LPCOR policy on the other phone.</li> <li>• This command can also be configured in ephone-template or voice register template configuration mode and applied to one or more phones. The phone configuration has precedence over the template configuration.</li> </ul>
<b>Step 7</b>	<p><b>end</b></p> <p><b>Example:</b></p> <pre>Router(config-ephone)# end</pre>	<p>Returns to privileged EXEC mode.</p>

	Command or Action	Purpose
	OR Router(config-register-pool)# end	

### Example for Configuring LPCOR on SCCP Phone, SIP Phones, and SCCP FXS Phones

#### SCCP

#### SIP

#### SCCP FXS Analog

The following example shows a LPCOR configuration for two SCCP phones. One configuration is applied directly to the phone and the other is applied through a phone template:

```

ephone-template 1
  lpcor type local
  lpcor incoming ephone_group1
  lpcor outgoing ephone_group1
!
ephone 1
  mac-address 00E1.CB13.0395
  ephone-template 1
  type 7960
  button 1:1
!
ephone 2
  lpcor type remote
  lpcor incoming ephone_group2
  lpcor outgoing ephone_group2
  mac-address 001C.821C.ED23
  type 7960
  button 1:2

```

The following example shows a LPCOR configuration for two SIP phones:

```

voice register template 1
  lpcor type local
  lpcor incoming test_group
  lpcor outgoing test_group
!
voice register pool 3
  id mac 001B.D584.E80A
  type 7960
  number 1 dn 2
  template 1
  codec g711ulaw
!
voice register pool 4
  lpcor type remote
  lpcor incoming remote_group3
  lpcor outgoing remote_group3
  id mac 0030.94C2.9A55
  type 7960
  number 1 dn 2
  dtmf-relay rtp-nt

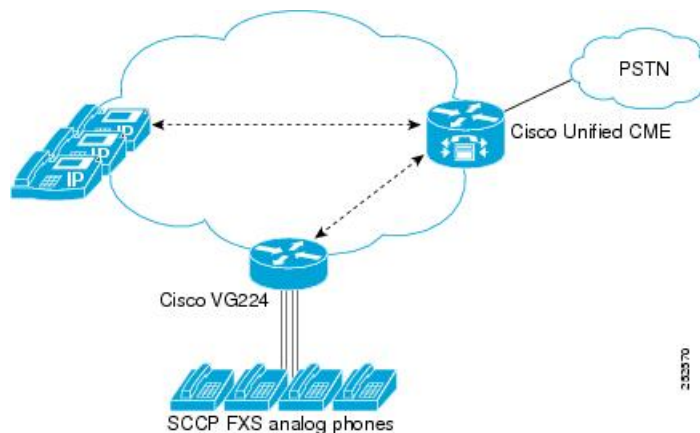
```

The following example shows a LPCOR configuration for two SCCP FXS phones connected to a Cisco VG224 and controlled by Cisco Unified CME:

```
dial-peer voice 102 pots
  service stcapp
  port 1/0/2
  !
ephone 5
  lpcor type local
  lpcor incoming analog_vg224
  lpcor outgoing analog_vg224
  mac-address F9E5.8B28.2402
  ephone-template 1
  max-calls-per-button 2
  type anl
  button 1:5
  !
ephone 6
  lpcor type local
  lpcor incoming analog_vg224
  lpcor outgoing analog_vg224
  mac-address F9E5.8B28.2403
  ephone-template 1
  max-calls-per-button 2
  type anl
  button 1:6
```

Figure 3: SCCP FXS Phones Managed by Cisco Unified CME, on page 20 shows an example of a network with SCCP FXS phones managed by Cisco Unified CME.

**Figure 3: SCCP FXS Phones Managed by Cisco Unified CME**



## Associate LPCOR with Mobile Phone Calls

To associate a LPCOR policy with calls that originate or terminate at a mobile-type phone, perform the following task.

A mobile-type phone can register to Cisco Unified CME through either the LAN or WAN. For example an Extension Mobility phone, Cisco IP Communicator softphone, or a remote teleworker phone.

Incoming and outgoing calls to and from a mobile-type phone are associated with a LPCOR policy based on the following configurations, in the order listed:

1. IP-phone subnet table
2. Default LPCOR policy for mobile-type phones




---

**Restriction** The LPCOR IP-phone subnet table is not supported for calls with an IPv6 address.

---

### Before you begin

The LPCOR policy must be defined. See [Define a LPCOR Policy, on page 8](#).

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ephone** *phone-tag* or **voice register pool** *phone-tag*
4. **lpcor type mobile**
5. **exit**
6. **voice lpcor ip-phone subnet** { **incoming** | **outgoing** }
7. **index** *index-number* *lpcor-group* { *ipv4-address network-mask* [*vrfvrf-name*] | **dhcp-pool** *pool-name* }
8. **exit**
9. **voice lpcor ip-phone mobility** { **incoming** | **outgoing** } *lpcor-group*
10. **exit**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
Step 2	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>ephone</b> <i>phone-tag</i> or <b>voice register pool</b> <i>phone-tag</i> <b>Example:</b> Router(config)# ephone 1  or Router(config)# voice register pool 1	Enters ephone configuration mode to set phone-specific parameters for an SCCP phone.  or Enters voice register pool configuration mode to set phone-specific parameters for a SIP phone. <ul style="list-style-type: none"><li>• <i>phone-tag</i>—Unique sequence number that identifies the phone. Range is version and platform-dependent; type ? to display range.</li></ul>
Step 4	<b>lpcor type mobile</b>	Sets the LPCOR type for a mobile-type phone.

	Command or Action	Purpose
	<b>Example:</b> <pre>Router(config-ephone)# lpcor type mobile</pre>	<ul style="list-style-type: none"> <li>This command can also be configured in ephone-template or voice register template configuration mode and applied to one or more phones. The phone configuration has precedence over the template configuration.</li> </ul>
<b>Step 5</b>	<b>exit</b> <b>Example:</b> <pre>Router(config-ephone)# exit</pre>	Exits the phone configuration.
<b>Step 6</b>	<b>voice lpcor ip-phone subnet { incoming   outgoing }</b> <b>Example:</b> <pre>Router(config)# voice lpcor ip-phone subnet incoming</pre>	Creates a LPCOR IP-phone subnet table for calls to or from a mobile-type phone.
<b>Step 7</b>	<b>index index-number lpcor-group { ipv4-address network-mask [ vrfvrf-name ]   dhcp-pool pool-name }</b> <b>Example:</b> <pre>Router(cfg-lpcor-ipphone-subnet)# index 1 local_group1 dhcp-pool pool1</pre>	Adds a LPCOR group to the IP-phone subnet table.
<b>Step 8</b>	<b>exit</b> <b>Example:</b> <pre>Router(cfg-lpcor-ipphone-subnet)# exit</pre>	Exits LPCOR IP-phone configuration mode.
<b>Step 9</b>	<b>voice lpcor ip-phone mobility { incoming   outgoing } lpcor-group</b> <b>Example:</b> <pre>Router(config)# voice lpcor ip-phone mobility incoming remote_group1</pre>	Sets the default LPCOR policy for mobile-type phones.
<b>Step 10</b>	<b>exit</b> <b>Example:</b> <pre>Router(config)# exit</pre>	Exits to privileged EXEC mode.

### Examples

The following example shows the configuration for three mobile-type phones:

```
ephone 270
 lpcor type mobile
 mac-address 1234.4321.6000
 type 7960
 button 1:6
 mtp
 codec g729r8 dspfarm-assist
 description teleworker remote phone
```

```

ephone 281
  lpcor type mobile
  mac-address 0003.4713.5554
  type CIPC
  button 1:5
...
voice register pool 6
  lpcor type mobile
  id mac 0030.94C2.9A66
  type 7960
  number 1 dn 3
  dtmf-relay rtp-nte

```

The following example shows a LPCOR IP-phone subnet configuration with a single shared IP address pool. Any mobile-type IP phones with a shared IP address from DHCP pool1 are considered local IP phones and are associated with the local\_group1 LPCOR policy. Other mobile-type IP phones without a shared IP address are considered remote IP phones and are associated with remote\_group1, the default LPCOR policy for mobile-type phones.

```

ip dhcp pool pool1
  network 10.0.0.0 255.255.0.0
  option 150 ip 10.0.0.1
  default-router 10.0.0.1
!
!
voice lpcor ip-phone subnet incoming
  index 1 local_group1 dhcp-pool pool1
!
voice lpcor ip-phone subnet outgoing
  index 1 local_group1 dhcp-pool pool1
!
voice lpcor ip-phone mobility incoming remote_group1
  voice lpcor ip-phone mobility outgoing remote_group1

```

The following example shows a LPCOR IP-phone subnet configuration with a separate IP address DHCP pools. Any mobile-type IP phones with separate DHCP pools are considered local IP phones and are assigned the local\_group1 LPCOR policy. Other mobile-type IP phones without a DHCP address are considered remote IP phones and are assigned the remote\_group1 LPCOR policy.

```

ip dhcp pool client1
  network 10.0.0.0 255.255.0.0
  mac-address 0003.4713.5554
  option 150 ip 10.0.0.1
  default-router 10.0.0.1
!
ip dhcp pool client2
  network 10.0.0.0 255.255.0.0
  mac-address 0030.94C2.9A66
  option 150 ip 10.0.0.1
  default-router 10.0.0.1
!
!
voice lpcor ip-phone subnet incoming
  index 1 local_group1 dhcp-pool client1
  index 2 local_group1 dhcp-pool client2
!
voice lpcor ip-phone subnet outgoing
  index 1 local_group1 dhcp-pool client1
  index 2 local_group1 dhcp-pool client2

```

```
!
voice lpcor ip-phone mobility incoming remote_group1
voice lpcor ip-phone mobility outgoing remote_group1
```

The following example shows a LPCOR IP phone subnet configuration with both an IP address network mask and a single shared-address DHCP pool. A specific LPCOR policy can be associated with an IP phone by matching the IP address network mask in the IP-phone subnet table. LPCOR policy `local_group2` is associated with the local IP phone with IP address 10.0.10.23. LPCOR `local_group2` is associated with the other local IP phones through the DHCP-pool match.

```
ip dhcp pool pool1
  network 10.0.0.0 255.255.0.0
  option 150 ip 10.0.0.1
  default-router 10.0.0.1
!
!
voice lpcor ip-phone subnet incoming
  index 1 local_g2 10.0.10.23 255.255.255.0 vrf vrf-group2
  index 2 remote_g2 172.19.0.0 255.255.0.0
  index 3 local_g1 dhcp-pool pool1
!
voice lpcor ip-phone subnet outgoing
  index 1 local_g4 10.1.10.23 255.255.255.0 vrf vrf-group2
  index 2 remote_g4 172.19.0.0 255.255.0.0
  index 3 local_g5 dhcp-pool pool1
!
voice lpcor ip-phone mobility incoming remote_g1
voice lpcor ip-phone mobility outgoing remote_g1
```

## Verify LPCOR Configuration

Use the following **show** commands to display LPCOR configuration information and to verify the LPCOR policy associated with calls.

- **show call active voice**—Displays the LPCOR information for incoming and outgoing call legs (VoIP, ephone, SIP, PSTN).
- **show call history voice**—Displays the LPCOR information for incoming and outgoing call legs (VoIP, ephone, SIP, PSTN). Also displays the LPCOR call-block cause code if the call is blocked due to LPCOR policy validation.
- **show dial-peer voice**—Displays configuration settings for voice dial peers including the LPCOR setting for incoming and outgoing calls.
- **show trunk group**—Displays configuration settings for trunk groups including the LPCOR setting for incoming and outgoing calls.
- **show voice lpcor**—Displays information about LPCOR calls including the LPCOR policy associated with each resource group and directory number, and statistics for failed calls.
- **show voice port**—Displays configuration settings for voice ports including the LPCOR setting for incoming and outgoing calls.



# Configuration Examples for LPCOR

## Example for Configuring LPCOR for Cisco Unified CME

Figure 4: LPCOR Resource Grouping in Cisco Unified CME Network, on page 25 shows an example of a Cisco Unified CME network using LPCOR. This network is organized into the following four LPCOR resource groups:

- `local_group`—Analog and IP phones, including a mobile-type phone, connected locally to Cisco Unified CME.
- `psstn_group`—Trunks between the PSTN and Cisco Unified CME.
- `remote_group`—IP phones, including a mobile-type phone, and a SIP proxy server connected remotely to Cisco Unified CME through the WAN.
- `voice_mail_group`—Cisco Unity Express voice-mail system connected remotely to Cisco Unified CME through the WAN.

Figure 4: LPCOR Resource Grouping in Cisco Unified CME Network

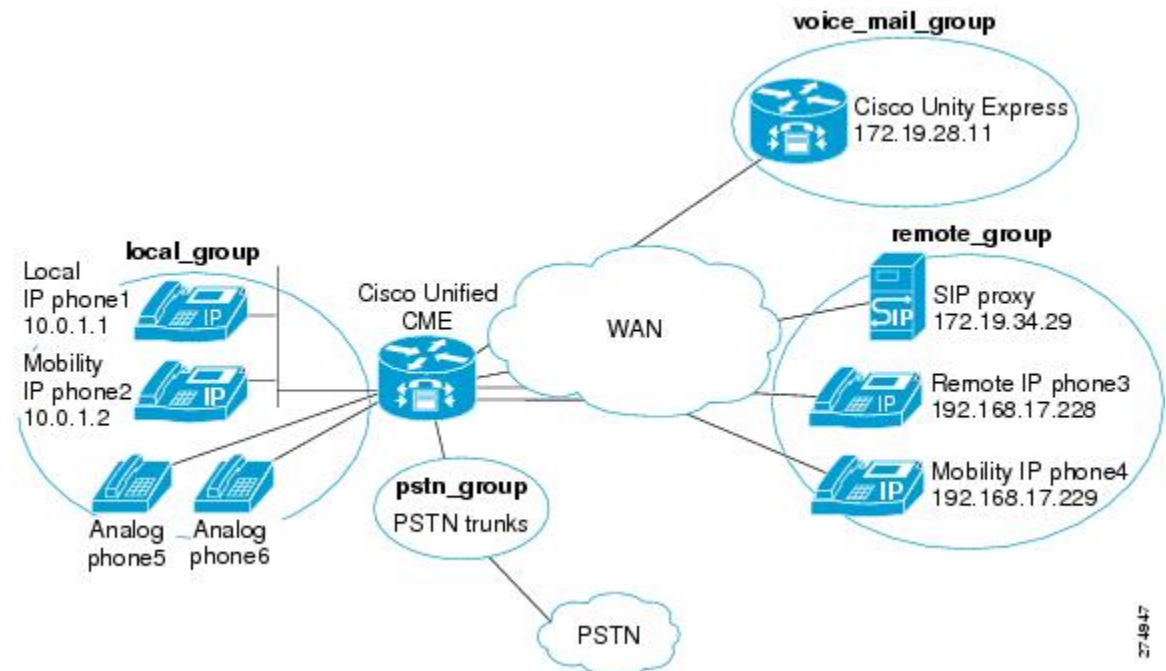
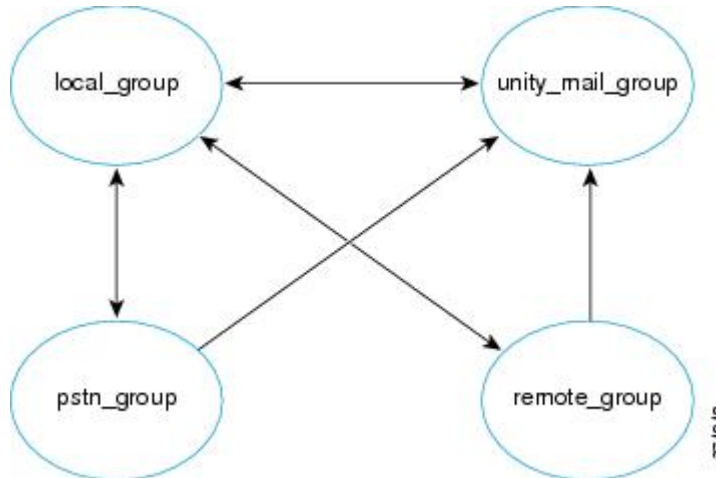


Figure 5: LPCOR Policy Logic, on page 26 illustrates the access policy between resource groups that provides the following call requirements:

- Blocks calls between `remote_group` and `psstn_group`
- Blocks calls from `voice_mail_group` to `psstn_group` and `remote_group`
- Allows calls between `local_group` and `remote_group`

- Allows calls between local\_group and pstn\_group
- Allows all calls to voice\_mail\_group

**Figure 5: LPCOR Policy Logic**



The following output shows the LPCOR configuration for this example and describes the steps. Comments describing the configuration are included in the output.

1. Enable LPCOR functionality in Cisco Unified CME and define custom LPCOR group.

```
voice lpcor enable
!
voice lpcor custom
group 1 pstn_group
group 2 local_group
group 3 remote_group
group 4 voice_mail_group
!
#Allow calls only from local group to PSTN group
voice lpcor policy pstn_group
  accept local_group
!
# Allow calls from PSTN, remote, and voice_mail groups to local group
voice lpcor policy local_group
  accept pstn_group
  accept remote_group
  accept voice_mail_group
!
# Allow calls only from local group to remote group
voice lpcor policy remote_group
  accept local_group
!
# Allow calls from PSTN, remote, and local groups to voice_mail group
voice lpcor voice_mail_group
  accept pstn_group
  accept local_group
  accept remote_group
!
```

2. Assign LPCOR to the phone, trunk, and IP resources.

```
# analog phone5
voice-port 1/0/0
  lpcor incoming local_group
  lpcor outgoing local_group
!
# analog phone6
voice-port 1/0/1
  lpcor incoming local_group
  lpcor outgoing local_group
!
# TDM trunks
voice-port 2/1:23
  lpcor incoming pstn_group
  lpcor outgoing pstn_group
!
!
# Specific LPCOR setting for incoming calls from voice_mail_group
voice lpcor ip-trunk subnet incoming
  voice_mail_group 172.19.28.11 255.255.255.255
!
!
# Default LPCOR setting for any incoming VoIP calls
voice service voip
  lpcor incoming remote_group
!
# Cisco Unified CME is DHCP server
ip dhcp pool client1
  network 10.0.0.0 255.255.0.0
  mac-address 0003.4713.5554
  option 150 ip 10.0.0.1
default-router 10.0.0.1
!
# IP phone1 (local)
ephone 1
  lpcor type local
  lpcor incoming local_group
  lpcor outgoing local_group
!
# IP phone2 (mobile)
ephone 2
  lpcor type mobile
!
# IP phone3 (remote)
ephone 3
  lpcor type remote
  lpcor incoming remote_group
  lpcor outgoing remote_group
!
# IP phone4 (mobile)
ephone 4
  lpcor type mobile
!
# IP-phone subnet tables for mobile IP phones
voice lpcor ip-phone subnet incoming
  local_group dhcp-pool pool1
!
voice lpcor ip-phone subnet outgoing
  local_group dhcp-pool client1
!
# Default LPCOR policy for mobile IP phones that
# are not provisioned through IP-phone subnet tables
voice lpcor ip-phone mobility incoming remote_group
voice lpcor ip-phone mobility outgoing remote_group
```

### 3. Define outgoing LPCOR setting for outgoing VoIP calls.

```
# VoIP outbound dial-peer to Cisco Unity Express mail
dial-peer voice 1234 voip
  destination-pattern 56800
  session target ipv4:172.19.281.1
  pcor outgoing voice_mail_group
!
# VoIP outbound dial-peer to SIP proxy
dial-peer voice 1255 voip
  destination-pattern 1255T
  session protocol sipv2
  session target sip-server
  lpcor outgoing remote
```

## Example for Configuring LPCOR on Cisco 3800 Series Integrated Services Router

```
Router# show running-config

Building configuration...

Current configuration : 10543 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
card type t1 2 1
logging message-counter syslog
logging buffered 2000000
no logging console
!
no aaa new-model
network-clock-participate slot 2
!
ip source-route
ip cef
!
!
ip dhcp excluded-address 192.168.20.1
ip dhcp excluded-address 192.168.20.1 192.168.20.5
!
ip dhcp pool voice
  network 192.168.20.0 255.255.255.0
  option 150 ip 192.168.20.1
  default-router 192.168.20.1
!
!
no ip domain lookup
no ipv6 cef
multilink bundle-name authenticated
!
```

```
!  
isdn switch-type primary-5ess  
!  
voice-card 0  
!  
voice-card 2  
!  
!  
voice service voip  
  notify redirect ip2pots  
  allow-connections sip to sip  
  sip  
    bind control source-interface GigabitEthernet0/1  
    bind media source-interface GigabitEthernet0/1  
    registrar server expires max 120 min 60  
!  
!  
!  
voice class custom-cptone leavetone  
  dualtone conference  
    frequency 400 800  
    cadence 400 50 200 50 200 50  
!  
voice class custom-cptone jointone  
  dualtone conference  
    frequency 600 900  
    cadence 300 150 300 100 300 50  
!  
!  
voice iec syslog  
voice register global  
  mode cme  
  source-address 192.168.20.1 port 5060  
  max-dn 20  
  max-pool 20  
  load 7970 SIP70.8-4-2S  
  load 7960-7940 POS3-08-11-00  
  authenticate realm cisco.com  
  tftp-path flash:  
  telnet level 2  
  create profile sync 0000312474383825  
!  
voice register dn 1  
  number 4000  
  name cme-sip1  
  label 4000  
!  
voice register dn 2  
  number 4001  
  name cme-sip-2  
  label 4001  
!  
voice register dn 3  
  number 4002  
  name cme-remote  
  label 4002  
!  
voice register template 1  
  softkeys remote-in-use cBarge Barge Newcall  
!  
voice register pool 1  
  lpcor type local  
  lpcor incoming local_sip  
  lpcor outgoing local_sip
```

```

id mac 001B.D4C6.AE44
type 7960
number 1 dn 1
dtmf-relay rtp-nte
codec g711ulaw
!
voice register pool 2
lpcor type local
lpcor incoming local_sip
lpcor outgoing local_sip
id mac 001E.BE8F.96C1
type 7940
number 1 dn 2
dtmf-relay rtp-nte
codec g711ulaw
!
voice register pool 3
lpcor type remote
lpcor incoming remote_sip
lpcor outgoing remote_sip
id mac 001E.BE8F.96C0
type 7940
number 1 dn 3
dtmf-relay rtp-nte
codec g711ulaw
!
!
voice lpcor enable
voice lpcor call-block cause invalid-number
voice lpcor custom
group 1 voip_siptrunk
group 2 voip_h323trunk
group 3 pstn_trunk
group 4 cue_vmail_local
group 5 cue_vmail_remote
group 6 vmail_unity
group 7 local_sccp
group 8 local_sip
group 9 remote_sccp
group 10 remote_sip
group 11 analog_vg224
group 12 analog_fxs
group 13 mobile_phone
!
voice lpcor policy voip_siptrunk
accept cue_vmail_local
accept local_sccp
accept local_sip
accept analog_vg224
!
voice lpcor policy cue_vmail_local
accept voip_siptrunk
accept voip_h323trunk
accept local_sccp
accept local_sip
!
voice lpcor policy local_sccp
accept local_sip
accept remote_sccp
accept remote_sip
accept analog_vg224
accept analog_fxs
!
voice lpcor policy remote_sccp

```

```
accept local_sccp
accept local_sip
accept remote_sip
!
voice lpcor policy analog_vg224
accept local_sccp
accept local_sip
accept remote_sccp
accept remote_sip
!
voice lpcor policy analog_fxs
accept local_sccp
accept local_sip
!
voice lpcor ip-phone subnet incoming
index 1 local_sccp dhcp-pool voice
!
voice lpcor ip-phone subnet outgoing
index 1 local_sccp dhcp-pool voice
!
!
!
archive
log config
hidekeys
!
!
controller T1 2/0
cablelength short 133
pri-group timeslots 1-24
!
controller T1 2/1
!
!
interface Loopback1
ip address 192.168.21.1 255.255.255.0
ip ospf network point-to-point
!
interface GigabitEthernet0/0
ip address 192.168.160.1 255.255.255.0
duplex auto
speed auto
media-type rj45
!
interface GigabitEthernet0/1
ip address 192.168.20.1 255.255.255.0
duplex auto
speed auto
media-type rj45
!
interface FastEthernet0/2/0
ip address 192.168.98.1 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/2/1
no ip address
duplex auto
speed auto
!
interface Service-Engine1/0
ip unnumbered Loopback1
service-module ip address 192.168.21.100 255.255.255.0
service-module ip default-gateway 192.168.21.1
```

```

!
interface Serial2/0:23
  no ip address
  encapsulation hdlc
  isdn switch-type primary-5ess
  isdn incoming-voice voice
  no cdp enable
!
router ospf 1
  log-adjacency-changes
  network 192.168.160.0 0.0.0.255 area 0
  network 192.168.20.0 0.0.0.255 area 0
  network 192.168.21.0 0.0.0.255 area 0
!
ip forward-protocol nd
ip route 192.168.21.100 255.255.255.255 Service-Engine1/0
!
!
no ip http server
!
!
tftp-server flash:term41.default.loads
tftp-server flash:term61.default.loads
tftp-server flash:SCCP41.8-3-1S.loads
tftp-server flash:apps41.8-3-0-50.sbn
tftp-server flash:cnu41.8-3-0-50.sbn
tftp-server flash:P003-08-11-00.bin
tftp-server flash:P003-08-11-00.sbn
tftp-server flash:P0S3-08-11-00.sb2
tftp-server flash:P0S3-08-11-00.loads
tftp-server flash:term71.default.loads
tftp-server flash:term70.default.loads
tftp-server flash:jar70sccp.8-2-2TR2.sbn
tftp-server flash:dsp70.8-2-2TR2.sbn
tftp-server flash:cvm70sccp.8-2-2TR2.sbn
tftp-server flash:apps70.8-2-2TR2.sbn
tftp-server flash:SCCP70.8-2-2SR2S.loads
!
control-plane
!
!
voice-port 0/1/0
  lpcor incoming analog_fxs
  lpcor outgoing analog_fxs
  station-id name FXS-Phone
  station-id number 3000
  caller-id enable
!
voice-port 0/1/1
!
voice-port 2/0:23
!
ccm-manager fax protocol cisco
!
mgcp fax t38 ecm
!
!
!
dial-peer voice 2 voip
  destination-pattern 2...
  lpcor outgoing voip_siptrunk
  session protocol sipv2
  session target ipv4:192.168.97.1
  codec g711ulaw

```



```
ip qos dscp cs5 media
ip qos dscp cs4 signaling
!
dial-peer voice 5050 voip
description *** VMAIL Dial-Peer ***
destination-pattern 5...
lpcor outgoing cue_vmail_local
session protocol sipv2
session target ipv4:192.168.21.100
dtmf-relay sip-notify
codec g711ulaw
no vad
!
dial-peer voice 30 pots
destination-pattern 3000
direct-inward-dial
port 0/1/0
!
!
sip-ua
mwi-server ipv4:192.168.21.100 expires 3600 port 5060 transport udp
registrar ipv4:192.168.21.1 expires 3600
!
!
telephony-service
em logout 0:0 0:0 0:0
max-ephones 15
max-dn 15
ip source-address 192.168.20.1 port 2000
service phone videoCapability 1
load 7941 SCCP41.8-3-1S
date-format dd-mm-yy
voicemail 5050
max-conferences 12 gain -6
transfer-system full-consult
transfer-pattern .T
transfer-pattern ....
fac standard
create cnf-files version-stamp Jan 01 2002 00:00:00
!
!
ephone-template 1
softkeys hold Join Newcall Resume Select
softkeys idle Cfdall ConfList Dnd Join Newcall Pickup Redial RmLstC
softkeys seized Endcall Redial Cfdall Pickup
!
!
ephone-template 2
lpcor type remote
lpcor incoming remote_sccp
lpcor outgoing remote_sccp
!
!
ephone-dn 1 dual-line
number 5000
call-forward busy 5050
call-forward noan 5050 timeout 10
mwi sip
!
!
ephone-dn 2 dual-line
number 5001
call-forward busy 5050
call-forward noan 5050 timeout 10
```

```

mwi sip
!
!
ephone-dn 3 dual-line
number 5010
description vg224-1/1
name analog-1
!
!
ephone-dn 4 dual-line
number 5011
description vg224-1/2
name analog-2
!
!
ephone-dn 5 dual-line
number 5012
description vg224-1/3
name analog-3
!
!
ephone-dn 6 dual-line
number 5013
description vg224-1/4
name analog-4
!
!
ephone-dn 7 dual-line
number 5020
name SCCP-Remote
mwi sip
!
!
ephone 1
lpcor type local
lpcor incoming local_sccp
lpcor outgoing local_sccp
mac-address 001E.7A26.EB60
ephone-template 1
type 7941
button 1:1
!
!
!
ephone 2
lpcor type local
lpcor incoming local_sccp
lpcor outgoing local_sccp
mac-address 001E.7AC2.CCF9
ephone-template 1
type 7941
button 1:2
!
!
!
ephone 3
lpcor type local
lpcor incoming analog_vg224
lpcor outgoing analog_vg224
mac-address F9E5.8B28.2400
ephone-template 1
max-calls-per-button 2
type anl
button 1:3

```

```
!  
!  
!  
ephone 4  
  lpcor type local  
  lpcor incoming analog_vg224  
  lpcor outgoing analog_vg224  
  mac-address F9E5.8B28.2401  
  ephone-template 1  
  max-calls-per-button 2  
  type anl  
  button 1:4  
!  
!  
!  
ephone 5  
  lpcor type local  
  lpcor incoming analog_vg224  
  lpcor outgoing analog_vg224  
  mac-address F9E5.8B28.2402  
  ephone-template 1  
  max-calls-per-button 2  
  type anl  
  button 1:5  
!  
!  
!  
ephone 6  
  lpcor type local  
  lpcor incoming analog_vg224  
  lpcor outgoing analog_vg224  
  mac-address F9E5.8B28.2403  
  ephone-template 1  
  max-calls-per-button 2  
  type anl  
  button 1:6  
!  
!  
!  
ephone 7  
  mac-address 001B.D52C.DF1F  
  ephone-template 2  
  type 7970  
  button 1:7  
!  
!  
alias exec cue ser ser 1/0 sess  
!  
line con 0  
line aux 0  
line 66  
  no activation-character  
  no exec  
  transport preferred none  
  transport input all  
  transport output pad telnet rlogin lapb-ta mop udptn v120  
line vty 0 4  
  login  
!  
exception data-corruption buffer truncate  
scheduler allocate 20000 1000  
endRouter# show running-config  
  
Building configuration...
```

```

Current configuration : 10543 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
card type t1 2 1
logging message-counter syslog
logging buffered 2000000
no logging console
!
no aaa new-model
network-clock-participate slot 2
!
ip source-route
ip cef
!
!
ip dhcp excluded-address 192.168.20.1
ip dhcp excluded-address 192.168.20.1 192.168.20.5
!
ip dhcp pool voice
    network 192.168.20.0 255.255.255.0
    option 150 ip 192.168.20.1
    default-router 192.168.20.1
!
!
no ip domain lookup
no ipv6 cef
multilink bundle-name authenticated
!
!
isdn switch-type primary-5ess
!
voice-card 0
!
voice-card 2
!
!
voice service voip
    notify redirect ip2pots
    allow-connections sip to sip
    sip
        bind control source-interface GigabitEthernet0/1
        bind media source-interface GigabitEthernet0/1
        registrar server expires max 120 min 60
!
!
!
voice class custom-cptone leavetone
    dualtone conference
    frequency 400 800
    cadence 400 50 200 50 200 50
!
voice class custom-cptone jointone
    dualtone conference

```

```
frequency 600 900
cadence 300 150 300 100 300 50
!
!
voice iec syslog
voice register global
mode cme
source-address 192.168.20.1 port 5060
max-dn 20
max-pool 20
load 7970 SIP70.8-4-2S
load 7960-7940 POS3-08-11-00
authenticate realm cisco.com
tftp-path flash:
telnet level 2
create profile sync 0000312474383825
!
voice register dn 1
number 4000
name cme-sip1
label 4000
!
voice register dn 2
number 4001
name cme-sip-2
label 4001
!
voice register dn 3
number 4002
name cme-remote
label 4002
!
voice register template 1
softkeys remote-in-use cBarge Barge Newcall
!
voice register pool 1
lpcor type local
lpcor incoming local_sip
lpcor outgoing local_sip
id mac 001B.D4C6.AE44
type 7960
number 1 dn 1
dtmf-relay rtp-nte
codec g711ulaw
!
voice register pool 2
lpcor type local
lpcor incoming local_sip
lpcor outgoing local_sip
id mac 001E.BE8F.96C1
type 7940
number 1 dn 2
dtmf-relay rtp-nte
codec g711ulaw
!
voice register pool 3
lpcor type remote
lpcor incoming remote_sip
lpcor outgoing remote_sip
id mac 001E.BE8F.96C0
type 7940
number 1 dn 3
dtmf-relay rtp-nte
codec g711ulaw
```

```

!
!
voice lpcor enable
voice lpcor call-block cause invalid-number
voice lpcor custom
  group 1 voip_siptrunk
  group 2 voip_h323trunk
  group 3 pstn_trunk
  group 4 cue_vmail_local
  group 5 cue_vmail_remote
  group 6 vmail_unity
  group 7 local_sccp
  group 8 local_sip
  group 9 remote_sccp
  group 10 remote_sip
  group 11 analog_vg224
  group 12 analog_fxs
  group 13 mobile_phone
!
voice lpcor policy voip_siptrunk
  accept cue_vmail_local
  accept local_sccp
  accept local_sip
  accept analog_vg224
!
voice lpcor policy cue_vmail_local
  accept voip_siptrunk
  accept voip_h323trunk
  accept local_sccp
  accept local_sip
!
voice lpcor policy local_sccp
  accept local_sip
  accept remote_sccp
  accept remote_sip
  accept analog_vg224
  accept analog_fxs
!
voice lpcor policy remote_sccp
  accept local_sccp
  accept local_sip
  accept remote_sip
!
voice lpcor policy analog_vg224
  accept local_sccp
  accept local_sip
  accept remote_sccp
  accept remote_sip
!
voice lpcor policy analog_fxs
  accept local_sccp
  accept local_sip
!
voice lpcor ip-phone subnet incoming
  index 1 local_sccp dhcp-pool voice
!
voice lpcor ip-phone subnet outgoing
  index 1 local_sccp dhcp-pool voice
!
!
!
archive
  log config
  hidekeys

```

```
!  
!  
controller T1 2/0  
  cablelength short 133  
  pri-group timeslots 1-24  
!  
controller T1 2/1  
!  
!  
interface Loopback1  
  ip address 192.168.21.1 255.255.255.0  
  ip ospf network point-to-point  
!  
interface GigabitEthernet0/0  
  ip address 192.168.160.1 255.255.255.0  
  duplex auto  
  speed auto  
  media-type rj45  
!  
interface GigabitEthernet0/1  
  ip address 192.168.20.1 255.255.255.0  
  duplex auto  
  speed auto  
  media-type rj45  
!  
interface FastEthernet0/2/0  
  ip address 192.168.98.1 255.255.255.0  
  duplex auto  
  speed auto  
!  
interface FastEthernet0/2/1  
  no ip address  
  duplex auto  
  speed auto  
!  
interface Service-Engine1/0  
  ip unnumbered Loopback1  
  service-module ip address 192.168.21.100 255.255.255.0  
  service-module ip default-gateway 192.168.21.1  
!  
interface Serial2/0:23  
  no ip address  
  encapsulation hdlc  
  isdn switch-type primary-5ess  
  isdn incoming-voice voice  
  no cdp enable  
!  
router ospf 1  
  log-adjacency-changes  
  network 192.168.160.0 0.0.0.255 area 0  
  network 192.168.20.0 0.0.0.255 area 0  
  network 192.168.21.0 0.0.0.255 area 0  
!  
ip forward-protocol nd  
ip route 192.168.21.100 255.255.255.255 Service-Engine1/0  
!  
!  
no ip http server  
!  
!  
tftp-server flash:term41.default.loads  
tftp-server flash:term61.default.loads  
tftp-server flash:SCCP41.8-3-1S.loads  
tftp-server flash:apps41.8-3-0-50.sbn
```

```

tftp-server flash:cnu41.8-3-0-50.sbn
tftp-server flash:P003-08-11-00.bin
tftp-server flash:P003-08-11-00.sbn
tftp-server flash:P0S3-08-11-00.sb2
tftp-server flash:P0S3-08-11-00.loads
tftp-server flash:term71.default.loads
tftp-server flash:term70.default.loads
tftp-server flash:jar70sccp.8-2-2TR2.sbn
tftp-server flash:dsp70.8-2-2TR2.sbn
tftp-server flash:cvm70sccp.8-2-2TR2.sbn
tftp-server flash:apps70.8-2-2TR2.sbn
tftp-server flash:SCCP70.8-2-2SR2S.loads
!
control-plane
!
!
voice-port 0/1/0
  lpcor incoming analog_fxs
  lpcor outgoing analog_fxs
  station-id name FXS-Phone
  station-id number 3000
  caller-id enable
!
voice-port 0/1/1
!
voice-port 2/0:23
!
ccm-manager fax protocol cisco
!
mgcp fax t38 ecm
!
!
!
dial-peer voice 2 voip
  destination-pattern 2...
  lpcor outgoing voip_siptrunk
  session protocol sipv2
  session target ipv4:192.168.97.1
  codec g711ulaw
  ip qos dscp cs5 media
  ip qos dscp cs4 signaling
!
dial-peer voice 5050 voip
  description *** VMAIL Dial-Peer ***
  destination-pattern 5...
  lpcor outgoing cue_vmail_local
  session protocol sipv2
  session target ipv4:192.168.21.100
  dtmf-relay sip-notify
  codec g711ulaw
  no vad
!
dial-peer voice 30 pots
  destination-pattern 3000
  direct-inward-dial
  port 0/1/0
!
!
sip-ua
  mwi-server ipv4:192.168.21.100 expires 3600 port 5060 transport udp
  registrar ipv4:192.168.21.1 expires 3600
!
!
telephony-service

```



```
em logout 0:0 0:0 0:0
max-ephones 15
max-dn 15
ip source-address 192.168.20.1 port 2000
service phone videoCapability 1
load 7941 SCCP41.8-3-1S
date-format dd-mm-yy
voicemail 5050
max-conferences 12 gain -6
transfer-system full-consult
transfer-pattern .T
transfer-pattern ....
fac standard
create cnf-files version-stamp Jan 01 2002 00:00:00
!
!
ephone-template 1
softkeys hold Join Newcall Resume Select
softkeys idle Cfwdall ConfList Dnd Join Newcall Pickup Redial RmLstC
softkeys seized Endcall Redial Cfwdall Pickup
!
!
ephone-template 2
lpcor type remote
lpcor incoming remote_sccp
lpcor outgoing remote_sccp
!
!
ephone-dn 1 dual-line
number 5000
call-forward busy 5050
call-forward noan 5050 timeout 10
mwi sip
!
!
ephone-dn 2 dual-line
number 5001
call-forward busy 5050
call-forward noan 5050 timeout 10
mwi sip
!
!
ephone-dn 3 dual-line
number 5010
description vg224-1/1
name analog-1
!
!
ephone-dn 4 dual-line
number 5011
description vg224-1/2
name analog-2
!
!
ephone-dn 5 dual-line
number 5012
description vg224-1/3
name analog-3
!
!
ephone-dn 6 dual-line
number 5013
description vg224-1/4
name analog-4
```

```
!  
!  
ephone-dn 7 dual-line  
  number 5020  
  name SCCP-Remote  
  mwi sip  
!  
!  
ephone 1  
  lpcor type local  
  lpcor incoming local_sccp  
  lpcor outgoing local_sccp  
  mac-address 001E.7A26.EB60  
  ephone-template 1  
  type 7941  
  button 1:1  
!  
!  
!  
ephone 2  
  lpcor type local  
  lpcor incoming local_sccp  
  lpcor outgoing local_sccp  
  mac-address 001E.7AC2.CCF9  
  ephone-template 1  
  type 7941  
  button 1:2  
!  
!  
!  
ephone 3  
  lpcor type local  
  lpcor incoming analog_vg224  
  lpcor outgoing analog_vg224  
  mac-address F9E5.8B28.2400  
  ephone-template 1  
  max-calls-per-button 2  
  type anl  
  button 1:3  
!  
!  
!  
ephone 4  
  lpcor type local  
  lpcor incoming analog_vg224  
  lpcor outgoing analog_vg224  
  mac-address F9E5.8B28.2401  
  ephone-template 1  
  max-calls-per-button 2  
  type anl  
  button 1:4  
!  
!  
!  
ephone 5  
  lpcor type local  
  lpcor incoming analog_vg224  
  lpcor outgoing analog_vg224  
  mac-address F9E5.8B28.2402  
  ephone-template 1  
  max-calls-per-button 2  
  type anl  
  button 1:5  
!
```

```

!
!
ephone 6
  lpcor type local
  lpcor incoming analog_vg224
  lpcor outgoing analog_vg224
  mac-address F9E5.8B28.2403
  ephone-template 1
  max-calls-per-button 2
  type an1
  button 1:6
!
!
!
ephone 7
  mac-address 001B.D52C.DF1F
  ephone-template 2
  type 7970
  button 1:7
!
!
alias exec cue ser ser 1/0 sess
!
line con 0
line aux 0
line 66
  no activation-character
  no exec
  transport preferred none
  transport input all
  transport output pad telnet rlogin lapb-ta mop udptn v120
line vty 0 4
  login
!
exception data-corruption buffer truncate
scheduler allocate 20000 1000
end

```

## Feature Information for LPCOR

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 [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 5: Feature Information for LPCOR**

Feature Name	Cisco Unified CME Version	Feature Information
Call Restriction Regulations for Cisco Unified CME	8.0	Introduced support for LPCOR feature.

