



Configuring System-Level Parameters

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This chapter describes the system-level settings to configure before you add devices and configure Cisco Unified Communications Manager Express (Cisco Unified CME) features.

Finding Feature Information in This Module

Your Cisco Unified CME version may not support all of the features documented in this module. For a list of the versions in which each feature is supported, see the [“Feature Information for System-Level Parameters”](#) section on page 138.

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Prerequisites for System-Level Parameters

- To directly connect Cisco Unified IP phones that are running Session Initiation Protocol (SIP) in Cisco Unified CME, Cisco CME 3.4 or a later version must be installed on the router. For installation information, see [“Installing and Upgrading Cisco Unified CME Software”](#) on page 53.
- Cisco Unified CME must be configured to work with your IP network. For configuration information, see [“Defining Network Parameters”](#) on page 75.

Information About Configuring System-Level Parameters

To configure system-level parameters, you should understand the following concepts:

- [DSCP, page 102](#)
- [Maximum Ephones in Cisco Unified CME 4.3 and Later Versions, page 102](#)
- [Network Time Protocol for SIP Phones, page 103](#)
- [Per-Phone Configuration Files, page 103](#)
- [Redundant Cisco Unified CME Router, page 104](#)
- [Timeouts, page 105](#)

DSCP

Differentiated Services Code Point (DSCP) packet marking is used to specify the class of service for each packet. Cisco Unified IP Phones get their DSCP information from the configuration file that is downloaded to the device.

In earlier versions of Cisco Unified CME, the DSCP value is predefined. In Cisco Unified CME 7.1 and later versions, you can configure the DSCP value for different types of network traffic. Cisco Unified CME downloads the configured DSCP value to SCCP and SIP phones in their configuration files and all control messages and flow-through RTP streams are marked with the configured DSCP value. This allows you to set different DSCP values, for example, for video streams and audio streams.

For configuration information, see the “[SCCP: Setting Up Cisco Unified CME](#)” section on page 114 or the “[SIP: Setting Up Cisco Unified CME](#)” section on page 125.

Maximum Ephones in Cisco Unified CME 4.3 and Later Versions

In Cisco Unified CME 4.3 and later versions, the **max-ephones** command is enhanced to set the maximum number of SCCP phones that can register to Cisco Unified CME, without limiting the number that can be configured. In previous versions of Cisco Unified CME, the **max-ephones** command defined the maximum number of phones that could be both configured and registered.

This enhancement expands the maximum number of phones that can be configured to 1000. The maximum number of phones that can register to Cisco Unified CME has not changed; it is dependent on the number of phones supported by the hardware platform and is limited by the **max-ephones** command.

This enhancement supports features such as Extension Assigner that require you to configure more phones than can register. For example, if you set the **max-ephones** command to 50 and configure 100 ephones, only 50 phones can register to Cisco Unified CME, one at a time in random order. The remaining 50 phones cannot register and an error message displays for each rejected phone. This enhancement also allows you to assign ephone tags that match the extension number of the phone, for extensions up to 1000.

If you reduce the value of the **max-ephones** command, currently registered phones are not forced to unregister until a reboot. If the number of registered phones, however, is already equal to or more than the **max-ephones** value, no additional phones can register to Cisco Unified CME. If you increase the value of the **max-ephones** command, the previously rejected ephones are able to register immediately until the new limit is reached.

Network Time Protocol for SIP Phones

SIP phones registered to a Cisco Unified CME router can synchronize to an NTP server. SIP phones can synchronize to the Cisco Unified CME router; however, a router can lose its clock after a reboot causing phones to display the wrong time. Synchronizing to an NTP server ensures that SIP phones maintain the correct time. For configuration information, see the [“SIP: Setting Network Time Protocol” section on page 129](#).

Per-Phone Configuration Files

In Cisco Unified CME 4.0 and later versions, you can use an external TFTP server to off load the TFTP server function on the Cisco Unified CME router. Using flash memory or slot 0 memory on the Cisco Unified CME router allows you to use different configuration files for each phone type or for each phone, which allows you to specify different user locales and network locales for different phones. Before this version, you could specify only a single default user and network locale for a Cisco Unified CME system.

You can specify one of the following four locations to store configuration files:

- **System**—This is the default. When `system:/its` is the storage location, there is only one default configuration file for all phones in the system. All phones, therefore, use the same user locale and network locale. User-defined locales are not supported.
- **Flash or slot 0**—When flash memory or slot 0 memory on the router is the storage location, you can create additional configuration files to apply per phone type or per individual phone. Up to five user and network locales can be used in these configuration files.

**Note**

When the storage location chosen is flash memory and the file system type on this device is Class B (LEFS), check free space on the device periodically and use the **squeeze** command to free the space used up by deleted files. Unless you use the **squeeze** command, the space used by the moved or deleted configuration files cannot be used by other files. Rewriting flash memory space during the squeeze operation may take several minutes. We recommend using this command during scheduled maintenance periods or off-peak hours.

- **TFTP**—When an external TFTP server is the storage location, you can create additional configuration files that can be applied per phone type or per individual phone. Up to five user and network locales can be used in these configuration files.

You can then specify one of the following ways to create configuration files:

- **Per system**—This is the default. All phones use a single configuration file. The default user and network locale in a single configuration file are applied to all phones in the Cisco Unified CME system. Multiple locales and user-defined locales are not supported.
- **Per phone type**—This setting creates separate configuration files for each phone type. For example, all Cisco Unified IP Phone 7960s use `XMLDefault7960.cnf.xml`, and all Cisco Unified IP Phone 7905s use `XMLDefault7905.cnf.xml`. All phones of the same type use the same configuration file, which is generated using the default user and network locale. This option is not supported if you store the configuration files in the `system:/its` location.
- **Per phone**—This setting creates a separate configuration file for each phone, by MAC address. For example, a Cisco Unified IP Phone 7960 with the MAC address 123.456.789 creates the per-phone configuration file `SEP123456789.cnf.xml`. The configuration file for a phone generates with the

default user and network locale unless a different user and network locale is applied to the phone using an ephone template. This option is not supported if you store the configuration files in the system:/its location.

For configuration information, see the [“SCCP: Defining Per-Phone Configuration Files and Alternate Location” section on page 119](#).

Redundant Cisco Unified CME Router

A second Cisco Unified CME router can be configured to provide call-control services if the primary Cisco Unified CME router fails. The secondary Cisco Unified CME router provides uninterrupted services until the primary router becomes operational again.

When a phone registers to the primary router, it receives a configuration file from the primary router. Along with other information, the configuration file contains the IP addresses of the primary and secondary Cisco Unified CME routers. The phone uses these addresses to initiate a keepalive (KA) message to each router. The phone sends a KA message after every KA interval (30 seconds by default) to the router with which it is registered and after every two KA intervals (60 seconds by default) to the other router. The KA interval can be adjusted.

If the primary router fails, a phone will not receive an acknowledgment (ACK) to its KA message to the primary router. If the phone does not get an ACK from the primary router for three consecutive KAs, it registers with the secondary Cisco Unified CME router.

During the time that the phone is registered to the secondary router, it keeps sending a KA probe to the primary router to see if it has come back up, now every 60 seconds by default or two times the normal KA interval. After the primary Cisco Unified CME router is operating normally, the phone starts receiving ACKs for its probes. After the phone receives ACKs from the primary router for three consecutive probes, it switches back to the primary router and reregisters with it. The reregistration of phones with the primary router is also called rehomeing.

The physical setup for redundant Cisco Unified CME routers is as follows. The FXO line from the PSTN is split using a splitter. From the splitter, one line goes to the primary Cisco Unified CME router, and the other line goes to the secondary Cisco Unified CME router. When a call comes in on the FXO line, it is presented to both the primary and secondary Cisco Unified CME routers. The primary router is configured by default to answer the call immediately. The secondary Cisco Unified CME router is configured to answer the call after three rings. If the primary router is operational, it answers the call immediately and changes the call state so that the secondary router does not try to answer it. If the primary router is unavailable and does not answer the call, the secondary router sees the new call coming in and answers after three rings.

The secondary Cisco Unified CME router should be connected in some way on the LAN, either through the same switch or through another switch that may or may not be connected to the primary Cisco Unified CME router directly. As long as both routers and the phones are connected on the LAN with the appropriate configurations in place, the phones can register to whichever router is active.

Configure primary and secondary Cisco Unified CME routers identically, with the exception that the FXO voice port from the PSTN on the secondary router should be configured to answer after more rings than the primary router, as previously explained. The same command is used on both routers to specify the IP addresses of the primary and secondary routers.

For configuration information, see the [“SCCP: Configuring a Redundant Router” section on page 123](#).

Timeouts

The following system-level timeout parameters have default values that are generally adequate:

- **Busy Timeout**—Length of time that can elapse after a transferred call reaches a busy signal before the call is disconnected.
- **Interdigit Timeout**—Length of time that can elapse between the receipt of individual dialed digits before the dialing process times out and is terminated. If the timeout ends before the destination is identified, a tone sounds and the call ends. This value is important when using variable-length dial-peer destination patterns (dial plans). For more information, see [Dial Peer Configuration on Voice Gateway Routers](#).
- **Ringing Timeout**—Length of time a phone can ring with no answer before returning a disconnect code to the caller. This timeout is used only for extensions that do not have no-answer call forwarding enabled. The ringing timeout prevents hung calls received over interfaces such as FXO that do not have forward-disconnect supervision.
- **Keepalive**—Interval determines how often a message is sent between the router and Cisco Unified IP phones, over the session, to ensure that the keepalive timeout is not exceeded. If no other traffic is sent over the session during the interval, a keepalive message is sent.

For configuration information, see the [“SCCP: Changing Defaults for Timeouts”](#) section on page 121.

IPv6 Support in Cisco Unified CME SCCP Endpoints.

Internet Protocol version 6 (IPv6), which is the latest version of the Internet Protocol (IP) that uses packets to exchange data, voice, and video traffic over digital networks, increases the number of network address bits from 32 bits in IPv4 to 128 bits. IPv6 support in Cisco Unified CME allows the network to behave transparently in a dual-stack (IPv4 and IPv6) environment and provides additional IP address space to SCCP phones and devices that are connected to the network. For information on configuring DHCP for IPv6, see the [Defining Network Parameters](#) chapter.

Before Cisco Unified CME 8.0, SCCP protocol supported IPv4 addresses (4 bytes) only. With Cisco Unified CME 8.0, SCCP protocol version is upgraded to store IPv6 address (16 bytes) also.

Following SCCP phones and devices are supported on IPv6: 7911, 7931, 7941G, 7941GE, 7961G, 7961GE, 7970G, 7971G, 7971G-GE, 7942, 7962, 7945, 7965, 7975, SCCP analogue gateway, Xcoder, and Hardware Conference devices. For more information on configuring SCCP IP phones for IPv6 source address, see the [“Configuring IPv6 Source Address for SCCP IP Phones.”](#) section on page 109.

**Note**

You must disable Alternative Network Address Transport (ANAT) globally for SIP lines if you have CME with dual-stack SIP trunk and enable ANAT at dial-peer level for SIP trunk.

Support for IPv4-IPv6 (Dual-Stack)

Cisco Unified CME 8.0 can interact with and support any SCCP devices that support IPv4 only or both IPv4 and IPv6 (dual-stack). In dual-stack mode two IP addresses are assigned to an interface, one is an IPv4 address and the other is an IPv6 address. Both IPv4 and IPv6 stacks are enabled on the voice gateways so that applications can interact with both versions of IP addresses. To support devices that use both IPv4 and IPv6 (dual-stack) addresses, you must ensure that the Cisco Unified CME has both IPv4

address and IPv6 address enabled, so it can interact and support devices that use IPv4 only, IPv6 only, or dual-stack. For more information, see the “[Configuring IP Phones in IPv4, IPv6, or Dual Stack Mode](#)” section on page 107

Media Flow Through and Flow Around

Media transport modes such as flow around and flow through are used to transport media packets across the endpoints. Media flow around enables media packets to pass directly between the endpoints, without the intervention of the IP-IP Gateway (IPIPGW). Media flow-through enables media packets to pass through the endpoints, without the intervention of the IPIPGW.

Table 9 lists media flow-through and flow-around scenarios between endpoints that support IPv4, IPv6, and dual-stack. When both endpoints are IPv4 only or IPv6 only, the call flows around. When one endpoint is IPv4 and the other is IPv6, calls flow through. When one endpoint is dual-stack and the other IPv4 or IPv6 the call s flow around. When both endpoints are dual-stack calls flow around or follows the preference (preferred IP address version) selected by protocol mode in dual-stack.

Table 9 Call flow scenarios between IPv4 only, IPv6 only, and Dual-stack

IP Versions	IPv4 Only	IPv6 Only	Dual-Stack
IPv4 Only	Flow Around ¹	Flow Through	Flow Around
IPv6 Only	Flow Through	Flow Around	Flow Around/IPv6
Dual-Stack	Flow Around/IPv4	Flow Around/IPv6	Flow Around/Preference

1. When MTP is configured under ephones all the call flow around scenarios change to flow through. This ia also applicable to cross-VRF endpoints.

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[Configuring Bulk Registration](#), page 112 (optional)

IPv6 Support on Cisco Unified CME

- [Configuring IP Phones in IPv4, IPv6, or Dual Stack Mode](#), page 107 (required)
- [Configuring IPv6 Source Address for SCCP IP Phones.](#), page 109 (required)
- [Verifying IPv6 and Dual-Stack Configuration on Cisco Unified CME](#), page 111 (Optional)

SCCP

- [SCCP: Setting Up Cisco Unified CME](#), page 114 (required)
- [SCCP: Setting Date and Time Parameters](#), page 117 (required)
- [SCCP: Blocking Automatic Registration](#), page 118 (optional)
- [SCCP: Defining Per-Phone Configuration Files and Alternate Location](#), page 119 (optional)
- [SCCP: Changing Defaults for Timeouts](#), page 121 (optional)
- [SCCP: Configuring a Redundant Router](#), page 123 (optional)

SIP

- [SIP: Setting Up Cisco Unified CME, page 125](#) (required)
- [SIP: Setting Date and Time Parameters, page 127](#) (required)
- [SIP: Setting Network Time Protocol, page 129](#) (required)
- [SIP: Changing Session-Level Application for SIP Phones, page 130](#) (optional)

Configuring IP Phones in IPv4, IPv6, or Dual Stack Mode

To configure Cisco Unified CME for dual-stack, perform the following steps:

Prerequisites

- Cisco Unified CME 8.0 or later version
- IPv6 cef must be enabled for dual-stack configuration

Restrictions

- Legacy IP phones are not supported.
- Multicast MOH and multicast paging features are not supported on IPv6 only phones. If you want to receive paging calls on IPv6 enabled phones, use the default multicast paging.
- Primary and secondary CME need to be provisioned with the same network type.
- MWI relay server must be in IPv4 network.
- Presence server must be IPv4 only.
- Video endpoints such as CUVA and 7985 are not supported in IPv6
- TAPI client is not supported in IPv6.
- All HTTP based IPv6 services are not supported.
- IOS TFTP server is not supported in IPv6.
- If protocol mode is IPv4, you can only configure IPv4 as the source IP-address, if protocol mode is IPv6 you can only configure IPv6 as the source IP address and if the protocol mode is dual-stack, you can configure both IPv4 and IPv6 sources addresses.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **telephony-service**
4. **protocol mode {ipv4 | ipv6 | dual-stack [preference {ipv4 | ipv6}]}**
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	telephony-service Example: Router(config)# telephony-service	Enters the telephony-service configuration mode.
Step 4	protocol mode {ipv4 ipv6 dual-stack [preference {ipv4 ipv6}]} Example: Router(config-telephony)# protocol mode dual-stack preference ipv6	Allows SCCP phones to interact with phones on IPv4 voice gateways. You can configure phones for IPv4 address, IPv6 address or in dual-stack mode <ul style="list-style-type: none">• ipv4 allows you to set protocol mode as an IPv4 address• ipv6 allows you to set the protocol mode as an IPv6 address• dual-stack allows you to set the protocol mode for both IPv4 and IPv6 addresses.• preference allows you to choose a preferred IP address family if protocol mode is dual-stack. (dual-stack)
Step 5	end Example: Router(config-telephony)# end	Returns to privileged EXEC mode.

Examples

```
telephony-service
 protocol mode dual-stack preference ipv6
 ....
 ip source-address 10.10.2.1 port 2000
 ip source-address 2000:A0A:201:0:F:35FF:FF2C:697D
```

Configuring IPv6 Source Address for SCCP IP Phones.

To configure IPv6 source address on SCCP IP Phones, perform the following steps:

Prerequisites

- Cisco Unified CME 8.0 or a later version.

Restrictions

- IPv6 option only appears if protocol mode is in dual-stack or IPv6.
- Do not change the default port number (2000) in the “ip source-address” configuration command. If you change the port number, IPv6 CEF packet switching engine may not be able to handle the IPv6 SCCP phones and various packet handling problems may occur.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **telephony service**
4. **ip source-address** { *ipv4 address* | <*ipv6 address* } port] [**secondary** { *ipv4 address* | *ipv6 address* } [*rehome seconds*]] [**strict-match**]
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	telephony-service Example: Router(config)# telephony-service	Enters the telephony-service configuration mode.

Command or Action	Purpose
<p>Step 4</p> <pre>ip source-address ipv4 address ipv6 address port port secondary ipv4 address ipv6 address rehome seconds strict-match</pre> <p>Example: Rrouter(config-telephony)# ip source-address 10.10.10.33 port 2000 ip source-address 2001:10:10:10::3</p>	<p>Allows to configure a IPv4 or IPv6 address as a IP source-address for the phones to communicate with a Cisco Unified CME router.</p> <ul style="list-style-type: none"> IPv4 address allows the phones to communicate with phones or voice gateways in network. IPv4 address can only be configured with IPv4 address or dual-stack mode. IPv6 address allows the phones to communicate with phones or voice gateways in IPv6 network. IPv6 can only be configured with IPv6 or dual-stack mode. <p>(Optional) port <i>port</i>—TCP/IP port number to use for Skinny Client Control Protocol (SCCP). Range is from 2000 to 9999. Default is 2000. For dual-stack, port is only configured with IPv4 address.</p> <p>(Optional) <i>Second</i>—Cisco Unified CME router with which phones can register if the primary Cisco Unified CME router fails.</p> <p>(Optional) Rehome <i>seconds</i>— Used only by Cisco Unified IP phones that have registered with a Cisco Unified Survivable Remote Site Telephony (SRST) router. This keyword defines a delay that is used by phones to verify the stability of their primary SCCP controller (Cisco Unified Communication Manager or Cisco Unified CME) before the phones reregister with it. This parameter is ignored by phones unless they are registered to a secondary Cisco Unified SRST router. The range is from 0 to 65535 seconds. The default is 120 seconds.</p> <p>The use of this parameter is a phone behavior and is subject to change, based on the phone type and phone firmware version.</p> <p>(Optional) strict-match— Requires strict IP address checking for registration.</p>
<p>Step 5</p> <pre>end</pre> <p>Example: outer(config-telephony)# end</p>	<ul style="list-style-type: none"> Returns to privileged EXEC mode.

Verifying IPv6 and Dual-Stack Configuration on Cisco Unified CME

- Step 1** The following example show a list of success messages that are printed during IOS boot up. These messages confirm whether IPv6 has been enabled on interfaces (for example, EDSP0.1 to EDSP0.5) specific to exchanging RTP packets with SCCP endpoints.

```
Router#
00:00:33: %EDSP-6-IPV6_ENABLED: IPv6 on interface EDSP0 added.
00:00:34: %EDSP-6-IPV6_ENABLED: IPv6 on interface EDSP0.1 added.
00:00:34: %EDSP-6-IPV6_ENABLED: IPv6 on interface EDSP0.2 added.
00:00:34: %EDSP-6-IPV6_ENABLED: IPv6 on interface EDSP0.3 added.
00:00:34: %EDSP-6-IPV6_ENABLED: IPv6 on interface EDSP0.4 added.
00:00:34: %EDSP-6-IPV6_ENABLED: IPv6 on interface EDSP0.5 added.
00:00:34: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
00:00:34: %LINK-3-UPDOWN: Interface ephone_dsp DN 1.1, changed state to up
00:00:34: %LINK-3-UPDOWN: Interface ephone_dsp DN 1.2, changed state to up
```

- Step 2** Use the **show ephone socket** command to verify if IPv4 only, IPv6 only, or dual-stack (IPv4/IPv6) is configured in Cisco Unified CME. In the following example, SCCP TCP listening socket (skinny_tcp_listen_socket fd) values 0 and 1 verify dual-stack configuration. When **IPv6** only is configured **show ephone socket** command displays SCCP TCP listening socket values as (-1) and (0). The listening socket is closed if the value is (-1). When **IPv4 only** is configured the **show ephone socket** command displays SCCP TCP listening socket values as (0) and (-1).

```
Router# show ephone socket
skinny_tcp_listen_socket fd = 0
skinny_tcp_listen_socket (ipv6) fd = 1

skinny_secure_tcp_listen_socket fd = -1
skinny_secure_tcp_listen_socket (ipv6) fd = -1

Phone 7,
skinny_sockets[15] fd = 16 [ipv6]
    read_buffer 0x483C0BC4, read_offset 0, read_header N, read_length 0
    resend_queue 0x47EC69EC, resend_offset 0, resend_flag N, resend_Q_depth 0
MTP 1,
skinny_sockets[16] fd = 17
    read_buffer 0x483C1400, read_offset 0, read_header N, read_length 0
    resend_queue 0x47EC6978, resend_offset 0, resend_flag N, resend_Q_depth 0
Phone 8,
skinny_sockets[17] fd = 18 [ipv6]
    read_buffer 0x483C1C3C, read_offset 0, read_header N, read_length 0
    resend_queue 0x47EC6904, resend_offset 0, resend_flag N, resend_Q_depth 0
```

- Step 3** Use the **show ephone summary** command to verify IPv6 address or IPv4 addresses configured for ephones. Following example displays IPv6 and IPv4 addresses for different ephones.

```
Router# show ephone summary
ephone-2[1] Mac:0016.46E0.796A TCP socket:[7] activeLine:0 whisperLine:0 REGISTERED
mediaActive:0 whisper_mediaActive:0 startMedia:0 offhook:0 ringing:0 reset:0 reset_sent:0
debug:0 privacy:1 primary_dn: 1*
IPv6:2000:A0A:201:0:216:46FF:FEE0:796A* IP:10.10.10.12 7970 keepalive 599 music 0 1:1
spl:2004

ephone-7[6] Mac:0013.19D1.F8A2 TCP socket:[6] activeLine:0 whisperLine:0 REGISTERED
mediaActive:0 whisper_mediaActive:0 startMedia:0 offhook:0 ringing:0 reset:0 reset_sent:0
debug:0 privacy:0 primary_dn: 13*
IP:10.10.10.14 * Telecaster 7940 keepalive 2817 music 0 1:13 2:28
```

Configuring Bulk Registration

To configure bulk registration for registering a block of phone numbers with an external registrar so that calls can be routed to Cisco Unified CME from a SIP network, follow the steps in this section.

Numbers that match the defined number pattern can register with the external registrar. The block of numbers that is registered can include any phone that is attached to Cisco Unified CME or any analog phone that is directly attached to an FXS port on a Cisco Unified CME router.



Note

Use this command to specify that an individual directory number not register with the external registrar. For configuration information, see the [“SIP: Disabling SIP Proxy Registration for a Directory Number” section on page 180](#).

Prerequisites

- Cisco Unified CME 3.4 or a later version.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice register global**
4. **mode cme**
5. **bulk number**
6. **exit**
7. **sip-ua**
8. **registrar {dns:address | ipv4:destination-address} expires seconds [tcp] [secondary] no registrar [secondary]**
9. **end**

DETAILED STEPS

	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 register global Example: Router(config)# voice register global	Enters voice register global configuration mode to set parameters for all supported SIP phones in Cisco Unified CME.

	Command or Action	Purpose
Step 4	<code>mode cme</code> Example: Router(config-register-global)# mode cme	Enables mode for provisioning SIP phones in Cisco Unified CME.
Step 5	<code>bulk number</code> Example: Router(config-register-global)# bulk 408526....	Sets bulk registration for E.164 numbers that will register with SIP proxy server. <ul style="list-style-type: none"> <i>number</i>—Unique sequence of up to 32 characters including wild cards and patterns that represents E.164 numbers that will register with Sip proxy server.
Step 6	<code>exit</code> Example: Router(config-register-pool)# exit	Exits configuration mode to the next highest mode in the configuration mode hierarchy.
Step 7	<code>sip-ua</code> Example: Router(config)# sip-ua	Enters Session Initiation Protocol (SIP) user agent (ua) configuration mode for configuring the user agent.
Step 8	<code>registrar {dns:address ipv4:destination-address} expires seconds [tcp] [secondary] no registrar [secondary]</code> Example: Router(config-sip-ua)# registrar server ipv4:1.5.49.240	Enables SIP gateways to register E.164 numbers with SIP proxy server.
Step 9	<code>end</code> Example: Router(config-sip-ua)# end	Exits configuration mode and enters privileged EXEC mode.

Examples

The following example shows that all phone numbers that match the pattern “408555...” can register with a SIP proxy server (IP address 1.5.49.240):

```
voice register global
 mode cme
  bulk 408555...
 sip-ua
  registrar ipv4:1.5.49.240
```

SCCP: Setting Up Cisco Unified CME

To identify filenames and the location of phone firmware for phone types to be connected, specify the port for phone registration, and specify number of phones and directory numbers to be supported, perform the following steps.

Restrictions

- DSCP requires Cisco Unified CME 7.1 or a later version. If DSCP is configured for the gateway interface using the **service-policy** command or for the dial peer using the **ip qos dscp** command, the value set with those commands takes precedence over the DSCP value configured in this procedure.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **tftp-server** *device:filename*
4. **telephony-service**
5. **load** *phone-type firmware-file*
6. **max-ephones** *max-phones*
7. **max-dn** *max-directory-numbers* [**preference** *preference-order*] [**no-reg** **primary** | **both**]
8. **ip source-address** *ip-address* **port** *port* [**any-match** | **strict-match**]
9. **ip qos dscp** { *number* | *af* | *cs* | **default** | **ef** } { **media** | **service** | **signaling** | **video** }
10. **end**

DETAILED STEPS

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

	Command or Action	Purpose
Step 3	<p>tftp-server <i>device:filename</i></p> <p>Example: Router(config)# tftp-server flash:P00307020300.bin</p>	<p>(Optional) Creates TFTP bindings to permit IP phones served by the Cisco Unified CME router to access the specified file.</p> <ul style="list-style-type: none"> • A separate tftp-server command is required for each phone type. • Required for Cisco Unified CME 7.0/4.3 and earlier versions. • Cisco Unified CME 7.0(1) and later versions: Required only if the location for cnf files is <i>not</i> flash or slot 0, such as system memory or a TFTP server url. Use the complete filename, including the file suffix, for phone firmware versions later than version 8-2-2 for all phone types.
Step 4	<p>telephony-service</p> <p>Example: Router(config)# telephony-service</p>	<p>Enters telephony-service configuration mode.</p>
Step 5	<p>load <i>phone-type firmware-file</i></p> <p>Example: Router(config-telephony)# load 7960-7940 P00307020300</p>	<p>Identifies a Cisco Unified IP phone firmware file to be used by phones of the specified type when they register.</p> <ul style="list-style-type: none"> • A separate load command is required for each IP phone type. • <i>firmware-file</i>—Filename is case-sensitive. <ul style="list-style-type: none"> – Cisco Unified CME 7.0/4.3 and earlier versions: Do not use the .sbin or .loads file extension except for the Cisco ATA and Cisco Unified IP Phone 7905 and 7912. – Cisco Unified CME 7.0(1) and later versions: Use the complete filename, including the file suffix, for phone firmware versions later than version 8-2-2 for all phone types. <p>Note If you are loading a firmware file larger than 384 KB, you must first load a file for that phone type that is smaller than 384 KB, and then load the larger file.</p>

	Command or Action	Purpose
Step 6	<p>max-ephones <i>max-phones</i></p> <p>Example: Router(config-telephony)# max-ephones 24</p>	<p>Sets the maximum number of phones that can register to Cisco Unified CME.</p> <ul style="list-style-type: none"> Maximum number is platform and version-specific. Type ? for range. In Cisco Unified CME 7.0/4.3 and later versions, the maximum number of phones that can register is different than the maximum number of phones that can be configured. The maximum number of phones that can be configured is 1000. In versions earlier than Cisco Unified CME 7.0/4.3, this command restricted the number of phones that could be configured on the router.
Step 7	<p>max-dn <i>max-directory-numbers</i> [preference <i>preference-order</i>] [no-reg primary both]</p> <p>Example: Router(config-telephony)# max-dn 200 no-reg primary</p>	<p>Limits number of directory numbers to be supported by this router.</p> <ul style="list-style-type: none"> Maximum number is platform and version-specific. Type ? for value.
Step 8	<p>ip source-address <i>ip-address</i> [port <i>port</i>] [any-match strict-match]</p> <p>Example: Router(config-telephony)# ip source-address 10.16.32.144</p>	<p>Identifies the IP address and port number that the Cisco Unified CME router uses for IP phone registration.</p> <ul style="list-style-type: none"> port <i>port</i>—(Optional) TCP/IP port number to use for SCCP. Range is 2000 to 9999. Default is 2000. any-match—(Optional) Disables strict IP address checking for registration. This is the default. strict-match—(Optional) Instructs the router to reject IP phone registration attempts if the IP server address used by the phone does not exactly match the source address.
Step 9	<p>ip qos dscp {{<i>number</i> <i>af</i> <i>cs</i> default <i>ef</i>} {media service signaling video}}</p> <p>Example: Router(config-telephony)# ip qos dscp af43 video</p>	<p>Sets the DSCP priority levels for different types of traffic.</p>
Step 10	<p>end</p> <p>Example: Router(config-telephony)# end</p>	<p>Returns to privileged EXEC mode.</p>

Examples

The following example shows different DSCP settings for media, signaling, video, and services enabled with the **ip qos dscp** command.

```
telephony-service
load 7960-7940 P00308000500
max-ephones 100
max-dn 240
ip source-address 10.10.10.1 port 2000
```

```
ip qos dscp af11 media
ip qos dscp cs2 signal
ip qos dscp af43 video
ip qos dscp 25 service
cnf-file location flash:
.
```

SCCP: Setting Date and Time Parameters

To specify the format of the date and time that appears on all SCCP phones in Cisco Unified CME, follow the steps in this section.



Note

For certain phones, such as the Cisco Unified IP Phone 7906, 7911, 7931, 7941, 7942, 7945, 7961, 7962, 7965, 7970, 7971, and 7975, you must configure the **time-zone** command to ensure that the correct time stamp appears on the phone display. This command is not required for Cisco Unified IP Phone 7902G, 7905G, 7912G, 7920, 7921, 7935, 7936, 7940, 7960, or 7985G.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **telephony-service**
4. **date-format** { *dd-mm-yy* | *mm-dd-yy* | *yy-dd-mm* | *yy-mm-dd* }
5. **time-format** { *12* | *24* }
6. **time-zone** *number*
7. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	telephony-service Example: Router(config)# telephony-service	Enters telephony-service configuration mode.

	Command or Action	Purpose
Step 4	<p>date-format {<i>dd-mm-yy</i> <i>mm-dd-yy</i> <i>yy-dd-mm</i> <i>yy-mm-dd</i>}</p> <p>Example: Router(config-telephony)# date-format yy-mm-dd</p>	<p>(Optional) Sets the date format for phone display.</p> <ul style="list-style-type: none"> Default: mm-dd-yy.
Step 5	<p>time-format {<i>12</i> <i>24</i>}</p> <p>Example: Router(config-telephony)# time-format 24</p>	<p>(Optional) Selects a 12-hour or 24-hour clock for the time display format on phone display.</p> <ul style="list-style-type: none"> Default: 12.
Step 6	<p>time-zone <i>number</i></p> <p>Example: Router(config-telephony)# time-zone 2</p>	<p>Sets time zone for SCCP phones.</p> <ul style="list-style-type: none"> Not required for Cisco Unified IP Phone 7902G, 7905G, 7912G, 7920, 7921, 7935, 7936, 7940, 7960, or 7985G. Default: 5, Pacific Standard/Daylight Time (-480).
Step 7	<p>end</p> <p>Example: Router(config-telephony)# end</p>	<p>Returns to privileged EXEC mode.</p>

SCCP: Blocking Automatic Registration

To prevent Cisco Unified IP phones that are not explicitly configured in Cisco Unified CME from registering with the Cisco Unified CME router, perform the following steps.

Prerequisite

- Cisco Unified CME 4.0 or a later version.

SUMMARY STEPS

- enable**
- configure terminal**
- telephony-service**
- auto-reg-ephone**
- end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	telephony-service Example: Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 4	auto-reg-ephone Example: Router(config-telephony)# no auto-reg-ephone	Enables all Cisco Unified IP phones that are running SCCP to register regardless of whether the phone is explicitly configured in Cisco Unified CME. <ul style="list-style-type: none"> Default: Enabled.
Step 5	end Example: Router(config-telephony)# end	Returns to privileged EXEC mode.

SCCP: Defining Per-Phone Configuration Files and Alternate Location

To define a location other than `system:/its` for storing configuration files for per-phone and per-phone type configuration files, perform the following steps.

Prerequisites

- Cisco Unified CME 4.0 or a later version.

Restrictions

- TFTP does not support file deletion. When configuration files are updated, they overwrite any existing configuration files with the same name. If you change the configuration file location, files are not deleted from the TFTP server.
- Generating configuration files on flash memory or slot 0 memory can take up to a minute, depending on the number of files being generated.
- For smaller routers such as the Cisco 2600 series routers, you must manually enter the **squeeze** command to erase files after changing the configuration file location or entering any commands that trigger the deletion of configuration files. Unless you use the **squeeze** command, the space used by the moved or deleted configuration files is not usable by other files.

- If VRF Support on Cisco Unified CME is configured and the **cnf-file location** command is configured for **system:**, the per phone or per phone type file for an ephone in a VRF group is created in *system:/its/vrf<group-tag>/*. The vrf directory is automatically created and appended to the TFTP path. No action is required on your part. Locale files are still created in *system:/its/*.
- If VRF Support on Cisco Unified CME is configured and the **cnf-file location** command is configured as **flash:** or **slot0:**, the per phone or per phone type file for an ephone in a VRF group is named *flash:/its/vrf<group-tag>_<filename>* or *slot0:/its/vrf<group-tag>_<filename>*. The vrf directory is automatically created and appended to the TFTP path. No action is required on your part. The location of the locale files is not changed.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **telephony-service**
4. **cnf-file location {flash: | slot0: | tftp tftp-url}**
5. **cnf-file {perphonetype | perphone }**
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	telephony-service Example: Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 4	cnf-file location {flash: slot0: tftp tftp-url} Example: Router(config-telephony)# cnf-file location flash:	Specifies a location other than <i>system:/its</i> for storing phone configuration files. <ul style="list-style-type: none"> • Required for per-phone or per-phone type configuration files.

	Command or Action	Purpose
Step 5	cnf-file { perphonetype perphone } Example: Router(config-telephony)# cnf-file perphone	Specifies whether to use a separate file for each type of phone or for each individual phone. <ul style="list-style-type: none"> Required if you configured the cnf-file location command.
Step 6	end Example: Router(config-telephony)# end	Returns to privileged EXEC mode.

Examples

The following example selects flash memory as the configuration file storage location and per-phone as the type of configuration files that the system generates.

```
telephony-service
 cnf-file location flash:
 cnf-file perphone
```

What to Do Next

If you changed the configuration file storage location, use the **option 150 ip** command to update the address. See [“Changing the TFTP Address on a DHCP Server” on page 93](#).

SCCP: Changing Defaults for Timeouts

To configure values for system-level intervals for which default values are typically adequate, perform the following steps.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **telephony-service**
4. **timeouts busy** *seconds*
5. **timeouts interdigit** *seconds*
6. **timeouts ringing** *seconds*
7. **keepalive** *seconds*
8. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	telephony-service Example: Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 4	timeouts busy seconds Example: Router(config-telephony)# timeouts busy 20	(Optional) Sets the length of time after which calls that are transferred to busy destinations are disconnected. <ul style="list-style-type: none"> <i>seconds</i>—Number of seconds. Range is 0 to 30. Default is 10.
Step 5	timeouts interdigit seconds Example: Router(config-telephony)# timeouts interdigit 30	(Optional) Configures the interdigit timeout value for all Cisco Unified IP phones attached to the router. <ul style="list-style-type: none"> <i>seconds</i>—Number of seconds before the interdigit timer expires. Range is 2 to 120. Default is 10.
Step 6	timeouts ringing seconds Example: Router(config-telephony)# timeouts ringing 30	(Optional) Sets the duration, in seconds, for which the Cisco Unified CME system allows ringing to continue if a call is not answered. Range is 5 to 60000. Default is 180.
Step 7	keepalive seconds Example: Router(config-telephony)# keepalive 45	(Optional) Sets the time interval, in seconds, between keepalive messages that are sent to the router by Cisco Unified IP phones. <ul style="list-style-type: none"> The default is usually adequate. If the interval is set too large, it is possible for notification to be delayed when a system goes down. Range: 10 to 65535. Default: 0.
Step 8	end Example: Router(config-telephony)# end	Returns to privileged EXEC mode.

SCCP: Configuring a Redundant Router

To configure a secondary Cisco Unified CME router to act as a backup if the primary router fails, perform the following steps on both the primary and secondary Cisco Unified CME routers.

Prerequisites

- Cisco Unified CME 4.0 or a later version.
- The secondary router's running configuration must be identical to that of the primary router.
- The physical configuration of the secondary router must be as described in the [“Redundant Cisco Unified CME Router”](#) section on page 104.
- Phones that use this feature must be configured with the **type** command, which guarantees that the appropriate phone configuration file will be present.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **telephony-service**
4. **ip source-address** *ip-address* **port** *port* [**secondary** *ip-address* [**rehome** *seconds*]] [**any-match** | **strict-match**]
5. **exit**
6. **voice-port** *slot-number/port*
7. **signal ground-start**
8. **incoming alerting ring-only**
9. **ring number** *number*
10. **end**

DETAILED STEPS

	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	telephony-service Example: Router(config)# telephony-service	Enters telephony-service configuration mode.

	Command or Action	Purpose
Step 4	<p>ip source-address <i>ip-address</i> [port <i>port</i>] [secondary <i>ip-address</i> [rehome <i>seconds</i>]] [any-match strict-match]</p> <p>Example: Router(config-telephony)# ip source-address 10.0.0.1 secondary 10.2.2.25</p>	<p>Identifies the IP address and port number that the Cisco Unified CME router uses for IP phone registration.</p> <ul style="list-style-type: none"> • <i>ip-address</i>—Address of the primary Cisco Unified CME router. • port <i>port</i>—(Optional) TCP/IP port number to use for SCCP. Range is 2000 to 9999. Default is 2000. • secondary <i>ip-address</i>—Indicates a backup Cisco Unified CME router. • rehome <i>seconds</i>—Not used by Cisco Unified CME. Used only by phones registered to Cisco Unified SRST. • any-match—(Optional) Disables strict IP address checking for registration. This is the default. • strict-match—(Optional) Router rejects IP phone registration attempts if the IP server address used by the phone does not exactly match the source address.
Step 5	<p>exit</p> <p>Example: Router(config-telephony)# exit</p>	<p>Exits telephony-service configuration mode.</p>
Step 6	<p>voice-port <i>slot-number/port</i></p> <p>Example: Router(config)# voice-port 2/0</p>	<p>Enters voice-port configuration mode for the FXO voice port for DID calls from the PSTN.</p>
Step 7	<p>signal ground-start</p> <p>Example: Router(config-voiceport)# signal ground-start</p>	<p>Specifies ground-start signaling for a voice port.</p>
Step 8	<p>incoming alerting ring-only</p> <p>Example: Router(config-voiceport)# incoming alerting ring-only</p>	<p>Instructs the FXO ground-start voice port to detect incoming calls by detecting incoming ring signals.</p>

	Command or Action	Purpose
Step 9	<pre>ring number number</pre> <p>Example: Router(config-voiceport)# ring number 3</p>	<p>(Required only for the secondary router) Sets the maximum number of rings to be detected before answering an incoming call over an FXO voice port.</p> <ul style="list-style-type: none"> <i>number</i>—Number of rings detected before answering the call. Range is 1 to 10. Default is 1. <p>Note For an incoming FXO voice port on a secondary Cisco Unified CME router, set this value higher than is set on the primary router. We recommend setting this value to 3 on the secondary router.</p>
Step 10	<pre>end</pre> <p>Example: Router(config-voiceport)# end</p>	Returns to privileged EXEC mode.

SIP: Setting Up Cisco Unified CME

To identify filenames and location of phone firmware for phone types to be connected, to specify the port for phone registration, and to specify the number of phones and directory numbers to be supported, perform the following steps.



Note

If your Cisco Unified CME system supports SCCP and SIP phones, do *not* connect your SIP phones to your network until after you have verified the configuration profile for the SIP phone.

Prerequisites

- Cisco CME 3.4 or a later version.

Restrictions

- SIP endpoints are not supported on H.323 trunks. SIP endpoints are supported on SIP trunks only.
- Certain Cisco Unified IP phones, such as the Cisco Unified IP Phone 7911G, 7941G, 7941GE, 7961G, 7961GE, 7970G, and 7971GE, are supported only in Cisco Unified CME 4.1 and later.
- DSCP requires Cisco Unified CME 7.1 or a later version. If DSCP is configured for the gateway interface using the **service-policy** command or for the dial peer using the **ip qos dscp** command, the value set with those commands takes precedence over the DSCP value configured in this procedure.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice register global**
4. **mode cme**
5. **source-address** *ip-address* [**port** *port*]

6. **load** *phone-type firmware-file*
7. **tftp path** {**flash:** | **slot0:** | **tftp://url**}
8. **max-pool** *max-phones*
9. **max-dn** *max-directory-numbers*
10. **authenticate** [**all**] [**realm** *string*]
11. **ip qos dscp** {*number* | *af* | *cs* | **default** | *ef*} {**media** | **service** | **signaling** | **video**}
12. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	voice register global Example: Router(config)# voice register global	Enters voice register global configuration mode to set parameters for all supported SIP phones in Cisco Unified CME.
Step 4	mode cme Example: Router(config-register-global)# mode cme	Enables mode for provisioning SIP phones in Cisco Unified CME.
Step 5	source-address <i>ip-address</i> [port <i>port</i>] Example: Router(config-register-global)# source-address 10.6.21.4	Enables the Cisco Unified CME router to receive messages from SIP phones through the specified IP address and port. <ul style="list-style-type: none">port—(Optional) TCP/IP <i>port</i> number. Range: 2000 to 9999. Default: 2000.
Step 6	load <i>phone-type firmware-file</i> Example: Router(config-register-global)# load 7960-7940 POS3-07-3-00	Associates a phone type with a phone firmware file. <ul style="list-style-type: none">A separate load command is required for each phone type.
Step 7	tftp-path { flash: slot0: tftp://url }	(Optional) Defines a location, other than system memory, from which the SIP phones will download configuration profile files. <ul style="list-style-type: none">Default: system memory (system:/cme/sipphone/).

	Command or Action	Purpose
Step 8	<p>max-pool <i>max-phones</i></p> <p>Example: Router(config-register-global)# max-pool 10</p>	<p>Sets maximum number of SIP phones to be supported by the Cisco Unified CME router.</p> <ul style="list-style-type: none"> Version- and platform-dependent; type ? for range. In Cisco CME 3.4 to Cisco Unified CME 7.0: Default is maximum number supported by platform. In Cisco Unified CME 7.0(1) and later versions: Default is 0.
Step 9	<p>max-dn <i>max-directory-numbers</i></p> <p>Example: Router(config-register-global)# max-dn 20</p>	<p>(Optional) Sets maximum number of directory numbers for SIP phones to be supported by the Cisco Unified CME router.</p> <ul style="list-style-type: none"> Required for Cisco Unified CME 7.0(1) and later versions. In Cisco Unified CME 7.0(1) and later versions: Default is 0. Range: 1 to maximum number supported by platform. Type ? for range. In Cisco CME 3.4 to Cisco Unified CME 7.0: Default: 150 or maximum allowed on platform. Type ? for value.
Step 10	<p>authenticate [all] [realm <i>string</i>]</p> <p>Example: Router(config-register-global)# authenticate all realm company.com</p>	<p>(Optional) Enables authentication for registration requests in which the MAC address of the SIP phone cannot be identified by using other methods.</p>
Step 11	<p>ip qos dscp {{<i>number</i> <i>af</i> <i>cs</i> default ef} {media service signaling video}}</p> <p>Example: Router(config-register-global)# ip qos dscp af43 video</p>	<p>Sets the DSCP priority levels for different types of traffic.</p>
Step 12	<p>end</p> <p>Example: Router(config-register-global)# end</p>	<p>Exits configuration mode and enters privileged EXEC mode.</p>

SIP: Setting Date and Time Parameters

To specify the format of the date and time stamps that appear on all SIP phones in Cisco Unified CME, follow the steps in this section.

Prerequisites

- Cisco CME 3.4 or a later version.
- The **mode cme** command is enabled.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice register global**
4. **timezone** *number*
5. **date-format** [*d/m/y* | *m/d/y* | *y-d-m* | *y/d/m* | *y/m/d* | *yy-m-d*]
6. **time-format** {*12* | *24*}
7. **dst auto-adjust**
8. **dst** {*start* | *stop*} *month* [*day* *day-of-month* | *week* *week-number* | *day* *day-of-week*] **time** *hour:minutes*
9. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	voice register global Example: Router(config)# voice register global	Enters voice register global configuration mode to set parameters for all supported SIP phones in Cisco Unified CME.
Step 4	timezone <i>number</i> Example: Router(config-register-global)# timezone 8	Selects the time zone used for SIP phones in Cisco Unified CME. <ul style="list-style-type: none"> • Default: 5, Pacific Standard/Daylight Time. Type ? to display a list of time zones.
Step 5	date-format [<i>d/m/y</i> <i>m/d/y</i> <i>y-d-m</i> <i>y/d/m</i> <i>y/m/d</i> <i>yy-m-d</i>] Example: Router(config-register-global)# date-format yy-m-d	(Optional) Selects the date display format on SIP phones in Cisco Unified CME. <ul style="list-style-type: none"> • Default: m/d/y.
Step 6	time-format { <i>12</i> <i>24</i> }	(Optional) Selects the time display format on SIP phones in Cisco Unified CME. <ul style="list-style-type: none"> • Default: 12.

	Command or Action	Purpose
Step 7	dst auto-adjust Example: Router(config-register-global)# dst auto-adjust	(Optional) Enables automatic adjustment of Daylight Saving Time on SIP phones in Cisco Unified CME. <ul style="list-style-type: none"> To modify start and stop times for daylight savings time, use the dst command.
Step 8	dst {start stop} month [day day-of-month week week-number day day-of-week] time hour:minutes Example: Router(config-register-global)# dst start jan day 1 time 00:00 Router(config-register-global)# dst stop mar day 31 time 23:59	(Optional) Sets the time period for Daylight Saving Time on SIP phones in Cisco Unified CME. <ul style="list-style-type: none"> Required if automatic adjustment of Daylight Saving Time is enabled by using the dst auto-adjust command. Default is Start: First week of April, Sunday, 2:00 a.m. Stop: Last week of October, Sunday 2:00 a.m.
Step 9	end Example: Router(config-register-global)# end	Returns to privileged EXEC mode.

SIP: Setting Network Time Protocol

To enable Network Time Protocol (NTP) for certain phones, such as the Cisco Unified IP Phone 7911G, 7941G, 7941GE, 7961G, 7961GE, 7970G, and 7971GE, connected to Cisco Unified CME running SIP, perform this task.

Prerequisites

- Cisco Unified CME 4.1 or a later version.
- The firmware load 8.2(1) or a later version is installed for SIP phones to download. For upgrade information, see the [“SIP: Upgrading or Downgrading Phone Firmware Between Versions” section on page 61](#).

SUMMARY STEPS

- enable
- configure terminal
- voice register global
- ntp-server *ip-address* [mode {anycast | directedbroadcast | multicast | unicast}]
- end

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	voice register global Example: Router(config)# voice register global	Enters voice register global configuration mode to set global parameters for all supported SIP phones in a Cisco Unified CME environment.
Step 4	ntp-server ip-address [mode {anycast directedbroadcast multicast unicast}] Example: Router(config-register-global)# ntp-server 10.1.2.3	Synchronizes clock on this router with the specified NTP server.
Step 5	end Example: Router(config-register-global)# end	Returns to privileged EXEC mode.

SIP: Changing Session-Level Application for SIP Phones

To change a the default session-level application for all SIP phones, perform the following steps.

Prerequisites

- Cisco CME 3.4 or a later version.

SUMMARY STEPS

- enable**
- configure terminal**
- voice register global**
- application application-name**
- end**

DETAILED STEPS

	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 register global Example: Router(config)# voice register global	Enters voice register global configuration mode to set parameters for all supported SIP phones in Cisco Unified CME.
Step 4	application application-name Example: Router(config-register-global)# application sipapp2	(Optional) Changes the default application for all dial peers associated with the SIP phones in Cisco Unified CME to the specified application. Note This command can also be configured in voice register pool configuration mode. The value set in voice register pool configuration mode has priority over the value set in voice register global mode.
Step 5	end Example: Router(config-register-global)# end	Exits configuration mode and enters privileged EXEC mode.

Configuration Examples for System-Level Parameters

This section contains the following examples:

- [IPv6 Support on Cisco Unified CME: Example, page 132](#)
- [System-Level Parameters: Example, page 134](#)
- [Blocking Automatic Registration: Example, page 135](#)
- [Redundant Router: Example, page 136](#)

IPv6 Support on Cisco Unified CME: Example

```

!
ip source-route
!
!ip cef
no ip dhcp use vrf connected
ip dhcp excluded-address 10.10.10.1 10.10.10.9
ip dhcp excluded-address 192.168.2.1
ipv6 unicast-routing
ipv6 cef
ntp server 223.255.254.254
multilink bundle-name authenticated
isdn switch-type primary-5ess
!
voice service voip
allow-connections h323 to h323
allow-connections h323 to sip
allow-connections sip to h323
allow-connections sip to sip
fax protocol cisco
sip
registrar server expires max 1200 min 300
!
!
!
voice register dn 1
number 2016
allow watch
name SIP-7961GE
label SIP2016
!
voice register dn 2
number 2017
!
!
voice logout-profile 1
!
voice logout-profile 2
number 2001 type normal
speed-dial 1 2004 label "7960-1"
!
interface GigabitEthernet0/0
ip address 10.10.10.2 255.255.255.0
duplex auto
speed auto
ipv6 address 2000:A0A:201:0:F:35FF:FF2C:697D/64
ipv6 enable
interface GigabitEthernet0/1
ip address 40.10.30.1 255.255.255.0
shutdown
duplex auto
speed auto
ipv6 address 2000::1/64
ipv6 address 2000::2/64
ipv6 address 2000::A/64
ipv6 address 3000::1/64
ipv6 address 4000::1/64
ipv6 address 9000::1/64
ipv6 address F000::1/64
ipv6 enable
!
i!

```

```

!
!
ip http server
!
ipv6 route 2001:20:20:20::/64 2000:A0A:201:0:F:35FF:FF2C:5
ipv6 route 2001:50:50:50::/64 2000:A0A:201:0:F:35FF:FF2C:5
!
tftp-server flash:P00308000500.bin
tftp-server flash:P00308000500.loads
p-server flash:cvm70sccp.8-5-2FT1-18.sbn
!
!
voice-port 0/0/0:23
!
!
mgcp fax t38 ecm
!
sccp local GigabitEthernet0/0
sccp ccm 10.10.10.2 identifier 1 version 7.0
sccp ccm 2000:A0A:201:0:F:35FF:FF2C:697D identifier 2 version 7.0
sccp

!
!
gateway
timer receive-rtp 1200
!
sip-ua
protocol mode dual-stack preference ipv6
!
!
telephony-service
protocol mode dual-stack preference ipv6
sdspfarm conference mute-on 111 mute-off 222
sdspfarm units 2
sdspfarm transcode sessions 20
sdspfarm tag 1 xcoder
sdspfarm tag 2 conference
conference hardware
no auto-reg-ephone
em logout 0:0 0:0 0:0
max-ephones 52
max-dn 192
ip source-address 10.10.10.2 port 2000
ip source-address 2000:A0A:201:0:F:35FF:FF2C:697D
service phone settingsAccess 1
service phone spanTOPCPort 0
timeouts transfer-recall 15
system message MOTO-CME1
url directories http://10.10.10.2:80/localdirectory
url authentication http://10.10.10.2/CCMCIP/authenticate.asp cme cme
cnf-file location flash:
cnf-file perphone
load 7914 S00103020003
load 7911 SCCP11.8-5-2FT1-18S
load 7970 SCCP70.8-5-2FT1-18S
time-zone 5
max-conferences 4 gain -6
call-forward pattern .T
web admin system name cisco password cisco
web admin customer name admin password admin
transfer-system full-consult

```

System-Level Parameters: Example

The following example shows the system-level configuration for a Cisco Unified CME that can support up to 500 directory numbers on 100 phones. It sets up TFTP file sharing for phone firmware files for Cisco Unified IP Phone 7905, 7912, 7914, 7920, 7940, and 7960 and it loads those files.

```
tftp-server flash:ATA030100SCCP040211A.zup
! ATA 186/188 firmware
tftp-server flash:CP7902080001SCCP051117A.sbin
! 7902 firmware
tftp-server flash:CP7905080001SCCP051117A.sbin
! 7905 firmware
tftp-server flash:CP7912080001SCCP051117A.sbin
! 7912 firmware
tftp-server flash:cmterm_7920.4.0-02-00.bin
! 7914 firmware
tftp-server flash:P00503010100.bin
! 7920 firmware
tftp-server flash:S00104000100.sbn
! 7935 firmware
tftp-server flash:cmterm_7936.3-3-5-0.bin
! 7936 firmware
tftp-server flash:P0030702T023.bin
tftp-server flash:P0030702T023.loads
tftp-server flash:P0030702T023.sb2
! 7960/40 firmware
!
telephony-service
max-ephones 100
max-dn 500
load ata ATA030100SCCP040211A
load 7902 CP7902080001SCCP051117A
load 7905 CP7905080001SCCP051117A
load 7912 CP7912080001SCCP051117A
load 7914 S00104000100
load 7920 cmterm_7920.4.0-02-00
load 7935 P00503010100
load 7936 cmterm_7936.3-3-5-0
load 7960-7940 P0030702T023
ip source-address 10.16.32.144 port 2000
create cnf-files version-stamp Jan 01 2002 00:00:00
transfer-system full-consult
```

Cisco Unified IP Phone 7911, 7941, 7941-GE, 7961, 7961-GE, 7970, and 7971 require multiple files to be shared using TFTP. The following configuration example adds support for these phones.

```
tftp-server flash:SCCP11.7-2-1-0S.loads
tftp-server flash:term11.default.loads
tftp-server flash:apps11.1-0-0-72.sbn
tftp-server flash:cnu11.3-0-0-81.sbn
tftp-server flash:cvm11.7-2-0-66.sbn
tftp-server flash:dsp11.1-0-0-73.sbn
tftp-server flash:jar11.7-2-0-66.sbn
! 7911 firmware
!
tftp-server flash:TERM41.7-0-3-0S.loads
tftp-server flash:TERM41.DEFAULT.loads
tftp-server flash:TERM61.DEFAULT.loads
tftp-server flash:CVM41.2-0-2-26.sbn
tftp-server flash:cnu41.2-7-6-26.sbn
tftp-server flash:Jar41.2-9-2-26.sbn
! 7941/41-GE, 7961/61-GE firmware
!
```

```

tftp-server flash:TERM70.7-0-1-0s.LOADS
tftp-server flash:TERM70.DEFAULT.loads
tftp-server flash:TERM71.DEFAULT.loads
tftp-server flash:CVM70.2-0-2-26.sbn
tftp-server flash:cnu70.2-7-6-26.sbn
tftp-server flash:Jar70.2-9-2-26.sbn
! 7970/71 firmware
!
telephony-service
load 7911 SCCP11.7-2-1-0S
load 7941 TERM41.7-0-3-0S
load 7961 TERM41.7-0-3-0S
load 7941GE TERM41.7-0-3-0S
load 7961GE TERM41.7-0-3-0S
load 7970 TERM70.7-0-1-0s
load 7971 TERM70.7-0-1-0s
create cnf-files version-stamp Jan 01 2002 00:00:00
.
.
.

```

Blocking Automatic Registration: Example

The following example shows how to disable automatic ephone registration, display a log of attempted registrations, and then clear the log.

```

Router(config)# telephony-service
Router(config-telephony)# no auto-reg-ephone
Router(config-telephony)# exit
Router(config)# exit
Router# show ephone attempted-registrations

```

Attempting Mac address:

Num	Mac Address	DateTime	DeviceType
1	C863.8475.5417	22:52:05 UTC Thu Apr 28 2005	SCCP Gateway (AN)
2	C863.8475.5408	22:52:05 UTC Thu Apr 28 2005	SCCP Gateway (AN)
.....			
25	000D.28D7.7222	22:26:32 UTC Thu Apr 28 2005	Telecaster 7960
26	000D.BDB7.A9EA	22:25:59 UTC Thu Apr 28 2005	Telecaster 7960
...			
47	C863.94A8.D40F	22:52:17 UTC Thu Apr 28 2005	SCCP Gateway (AN)
48	C863.94A8.D411	22:52:18 UTC Thu Apr 28 2005	SCCP Gateway (AN)
49	C863.94A8.D400	22:52:15 UTC Thu Apr 28 2005	SCCP Gateway (AN)

```

Router# clear telephony-service ephone-attempted-registrations

```

Redundant Router: Example

The following example is configured on the primary Cisco Unified CME router. It establishes the router at 10.5.2.78 as a secondary router. The voice port 3/0/0 is the FXO port for incoming calls from the PSTN. It is set to use ground-start signaling and to detect incoming calls by counting incoming ring signals.

```
telephony-service
 ip source-address 10.0.0.1 port 2000 secondary 10.5.2.78

voice-port 3/0/0
 signal ground-start
 incoming alerting ring-only
```

The secondary Cisco Unified CME router is configured with the same commands, except that the ring number command is set to 3 instead of using the default of 1.

```
telephony-service
 ip source-address 10.0.0.1 port 2000 secondary 10.5.2.78

voice-port 3/0/0
 signal ground-start
 incoming alerting ring-only
 ring number 3
```

Where to Go Next

After configuring system-level parameters, you are ready to configure phones in Cisco Unified CME for making basic calls.

- To use Extension Assigner to assign extension numbers to the phones in your Cisco Unified CME, see [“Creating Phone Configurations Using Extension Assigner” on page 229](#).
- Otherwise, see [“Configuring Phones to Make Basic Calls” on page 139](#).

Additional References

The following sections provide references related to Cisco Unified CME features.

Related Documents

Related Topic	Document Title
Cisco Unified CME configuration	<ul style="list-style-type: none"> • Cisco Unified CME Command Reference • Cisco Unified CME Documentation Roadmap
Cisco IOS commands	<ul style="list-style-type: none"> • Cisco IOS Voice Command Reference • Cisco IOS Software Releases 12.4T Command References
Cisco IOS configuration	<ul style="list-style-type: none"> • Cisco IOS Voice Configuration Library • Cisco IOS Software Releases 12.4T Configuration Guides
Phone documentation for Cisco Unified CME	<ul style="list-style-type: none"> • User Documentation for Cisco Unified IP Phones

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/techsupport</p>

Feature Information for System-Level Parameters

Table 10 lists the features in this module and enhancements to the features by version.

To determine the correct Cisco IOS release to support a specific Cisco Unified CME version, see the *Cisco Unified CME and Cisco IOS Software Version Compatibility Matrix* at http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/requirements/guide/33matrix.htm.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



Note

Table 10 lists the Cisco Unified CME version that introduced support for a given feature. Unless noted otherwise, subsequent versions of Cisco Unified CME software also support that feature.

Table 10 Feature Information for System-Level Parameters

Feature Name	Cisco Unified CME Versions	Feature Information
IPv6 Support on Cisco Unified CME	8.0	SCCP Phones can interact with and support any SCCP devices that support IPv4 only or both IPv4 and IPv6 (dual-stack).
Blocking Automatic Registration	4.0	IP phones that are not explicitly configured in Cisco Unified CME are blocked from registering.
Bulk Registration	3.4	Bulk registration for registering a block of phone numbers with an external registrar was introduced.
DSCP	7.1	Supports DSCP packet marking for Cisco Unified IP Phones to specify the class of service for each packet.
Maximum Ephones	7.0/4.3	The max-ephones command sets the maximum number of SCCP phones that can register to Cisco Unified CME, without limiting the number that can be configured. Maximum number of phones that can be configured is 1000.
Network Time Protocol for SIP Phones	4.1	SIP phones can synchronize to an NTP server.
Per-Phone Configuration Files and Alternate Location	4.0	Defines a location other than system for storing configuration files and specifies the type of configuration files to generate.
Redundant Router	4.0	Redundant router capability was introduced.
SIP phones in Cisco Unified CME	3.4	Support for SIP endpoints directly connected to Cisco Unified CME was introduced.