



Configuring Multiple Registrars on SIP Trunks

The Support for Multiple Registrars on SIP Trunks on a Cisco Unified Border Element, on Cisco IOS SIP TDM Gateways, and on Cisco Unified Communications Manager Express feature allows configuration of multiple registrars on Session Initiation Protocol (SIP) trunks, each simultaneously registered using their respective authentication instance. This feature allows a redundant registrar for each of the SIP trunks, which provides SIP trunk redundancy across multiple service providers.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

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. An account on Cisco.com is not required.

Prerequisites for Configuring Multiple Registrars on SIP Trunks

Before configuring support for multiple registrars on the SIP trunks of Cisco IOS SIP time-division multiplexing (TDM) gateways, Cisco Unified Border Elements (Cisco UBEs), or Cisco Unified Communications Manager Express (Cisco Unified CME), verify the SIP configuration within the VoIP network for the appropriate originating and terminating gateways as described in documentation listed in the "Related Documents" section.

Restrictions for Configuring Multiple Registrars on SIP Trunks

Configuring multiple registrars on SIP trunks has the following restrictions:

- Old and new forms of registrar command are mutually exclusive: the registrar can be configured in either primary/secondary mode or multiple registrar mode--not both.
- Dynamic Host Configuration Protocol (DHCP) support is not available with multiple registrars (available for primary/secondary mode only).
- Only one authentication configuration per username can be configured at any one time.
- A maximum of six registrars can be configured at any given time.
- A maximum of 12 different realms can be configured for each endpoint.
- You cannot restrict the registration of specific endpoints with specific registrars--once a new registrar is configured, all endpoints will begin registering to the new registrar.
- You cannot remove multiple configurations of credentials simultaneously--only one credential can be removed at a time.

Information About Configuring Multiple Primary SIP Trunks

To configure multiple registrars on SIP trunks, you should understand the following concepts:

Purpose of Multiple Registrars on SIP Trunks

You can configure endpoints on Cisco IOS SIP TDM gateways, Cisco UBEs, and Cisco Unified CME to register to a primary and a secondary registrar. You can use this setup to register all endpoints to their assigned registrar using authentication details that can be associated with only one domain (or service provider). The drawback is that if the registrar or service provider domain becomes unavailable, users supported on Cisco IOS SIP TDM gateways, Cisco UBEs, and Cisco Unified CME cannot make or receive calls.

The Support for Multiple Registrars on SIP Trunks on a Cisco Unified Border Element, on Cisco IOS SIP TDM Gateways, and on Cisco Unified Communications Manager Express feature provides support for simultaneous registration with multiple registrars for endpoints on Cisco IOS SIP TDM gateways, Cisco UBEs, and Cisco Unified CME. This feature allows outbound and inbound traffic to be distributed across different service providers while simultaneously providing redundancy for users supported on these devices.



Note

In a Cisco UBE multihome environment, all sets of credentials configured under the SIP user agent are sent to all configured registrars, regardless of realm configuration. This means that if a Cisco UBE registers multiple service providers, the credentials for both service providers are sent out to both. While the correct credentials will register, the incorrect sets will fail, possibly resulting in security measures taken by the service provider for failed registration attempts.

Authentication Attributes and Enhancements

The Support for Multiple Registrars on SIP Trunks on a Cisco Unified Border Element, on Cisco IOS SIP TDM Gateways, and on Cisco Unified Communications Manager Express feature is available in Cisco IOS Release 15.0(1)XA and later releases and utilizes the **authentication** command to allow configuration for specific endpoints and includes the following attributes and enhancements:

- You can configure up to 12 instances of the **authentication** command for a given endpoint, supporting 12 different realms for a single service provider domain.
- The authentication behavior can handle challenges from different service providers for SIP REGISTER and SIP INVITE/Other messages.
- You can specify a realm, which acts as a unique key for picking up username and password authentication details for each endpoint.
- The system uses authentication details to rebuild SIP Request messages in response to challenges.
- Enhancements introduced by this feature apply at both the dial peer and SIP user agent (UA) level.

Credentials Attributes and Enhancements

The **credentials** command is used to trigger SIP Register requests wherever registration is required for users who are not part of any POTS dial peers. The Support for Multiple Registrars on SIP Trunks on a Cisco Unified Border Element, on Cisco IOS SIP TDM Gateways, and on Cisco Unified Communications Manager Express feature is available in Cisco IOS Release 15.0(1)XA and later releases and modifies the **credentials** command to allow configuration for specific endpoints and includes the following attributes and enhancements:

- Credentials behavior supports SIP REGISTER and SIP INVITE/Other message challenges.
- You can use the **number** keyword to specify an endpoint, the value of which is used to populate the user portion of the To field in outgoing SIP REGISTER messages.
- The **number** keyword is optional and is used to allow the endpoint number to be different from the username.
- When both number and realm are configured, this pair of values acts as a unique key to pick up the username and password credentials configured for the endpoint.
- A maximum of 12 different realms can be configured for a given endpoint.

Determination of Authentication Details

When a SIP INVITE or SIP REGISTER request is challenged, the username and password details for authentication are determined in the following order:



Note Configuring more than one username is not supported--you must remove any currently configured username before configuring a new username.

1. If the realm specified in the challenge matches the realm in the authentication configuration for a POTS dial peer, the system uses the corresponding username and password.

2. If the realm specified in the challenge doesn't match the configured authentication for the POTS dial peer, then it will check for credentials configured for SIP UA.
3. If the realm specified in the challenge does not match the realm configured for credentials, then it will check for authentication configurations for SIP UA.
4. If the system does not find a matching authentication or credential for the received realm, then the request is terminated.
5. If there is no realm specified for the authentication configuration, then the system uses the username received from the challenge to build the response message.

Use of Preferred Option

When the primary and secondary registrar scenario is configured, the registrar address is used to populate the host portion of the From header in outbound SIP INVITE messages. However, when multiple registrars are configured, the only way to determine which registrar address is used to populate the host portion of the From header is to designate a single service provider domain as the preferred localhost name. The following behaviors are the result of using the **preferred** keyword with the **localhost** command (or **voice-class sip localhost** command for individual dial peers) when configuring multiple registrars:

- If the **localhost** command is enabled with the optional **preferred** keyword included, then the From header of outgoing SIP INVITE messages is populated with the domain name specified by the **localhost** command configuration.
- If the **localhost** command is not enabled or if it is enabled without the optional **preferred** keyword, then the best local interface address is used to populate the From header of outgoing SIP INVITE messages.

How to Configure Multiple Registrars on SIP Trunks

The tasks for configuring multiple registrars on the SIP trunks of Cisco IOS SIP TDM gateways, Cisco UBEs, or Cisco Unified CME are included in the following sections:

Configuring Multiple Registrars on SIP Trunks

To configure multiple registrars on SIP trunks, use the **registrar** and **authentication** commands as described in the following tasks:

Registration of POTS Endpoints to Multiple Registrars on SIP Trunks

Use the **registrar** command in SIP UA configuration mode to register POTS endpoints on a Cisco IOS SIP TDM gateway, Cisco UBE, or Cisco Unified CME to multiple registrars. To do so, you need to configure the command once for each registrar.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **sip-ua**
4. **registrar** *registrar-index* *registrar-server-address* **expires** *seconds*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: <pre>Router> enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: <pre>Router# configure terminal</pre>	Enters global configuration mode.
Step 3	sip-ua Example: <pre>Router(config)# sip-ua</pre>	Enters SIP UA configuration mode.
Step 4	registrar registrar-index registrar-server-address expires seconds Example: <pre>Router(config-sip-ua)# registrar 1 dns:example1.com expires 180</pre> Example: <pre>Router(config-sip-ua)# registrar 2 dns:example2.com expires 60</pre>	Enables a Cisco IOS voice gateway to register E.164 numbers with external SIP proxies or SIP registrars. The <i>register-index</i> range is 1 to 6. (The expires timer specification is optional).

Global Configuration of Authentication for POTS Endpoints with Multiple Registrars on a SIP Trunk

Use the **authentication** command in SIP UA configuration mode to configure authentication of endpoints on a Cisco IOS SIP TDM gateway, Cisco UBE, or Cisco Unified CME to multiple registrars. To do so, you need to configure the command once for each registrar.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **sip-ua**
4. **authentication username username password [0 | 7] password [realm realm]**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example:	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
	Router> enable	
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	sip-ua Example: Router(config)# sip-ua	Enters SIP UA configuration mode.
Step 4	authentication username <i>username</i> password [0 7] <i>password</i> [realm <i>realm</i>] Example: Router(config-sip-ua)# authentication username MyUsername password MyPassword realm Realm1.example.com Example: Router(config-sip-ua)# authentication username MyUsername password MyPassword realm Realm2.example.com	Enables SIP digest authentication globally (encryption type and realm specification are optional).

Dial Peer Configuration of Authentication for POTS

Use the **authentication** command in dial peer voice configuration mode to authenticate endpoints on a Cisco IOS SIP TDM gateway to multiple registrars on SIP trunks. To do so, you need to configure the command once for each registrar.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **dial-peer voice 1 pots**
4. **authentication username *username* password [0 | 7] *password* [realm *realm*]**

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.

	Command or Action	Purpose
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	dial-peer voice 1 pots Example: Router(config)# dial-peer voice 1 pots	Enters dial peer voice configuration mode.
Step 4	authentication username <i>username</i> password [0 7] <i>password</i> [realm <i>realm</i>] Example: Router(config-dial-peer)# authentication username MyUser password 7 MyPassword realm Realm1.example.com Example: Router(config-dial-peer)# authentication username MyUser password 7 MyPassword realm Realm2.example.com	Enables SIP digest authentication on an individual dial peer (encryption type and realm specification are optional).

Configuration of Credentials for Registering POTS Endpoints with Multiple Registrars on SIP Trunks

Use the **credentials** command in SIP UA configuration mode to configure registration requests sent from a Cisco IOS SIP TDM gateway, Cisco Unified CME, or a Cisco UBE to multiple registrars on a SIP trunk.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **sip-ua**
4. **credentials {dhcp | number *number* username *username*} password [0 | 7] *password* realm *realm***

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	sip-ua Example: <pre>Router(config)# sip-ua</pre>	Enters SIP UA configuration mode.
Step 4	credentials {dhcp number number username username} password [0 7] password realm realm Example: <pre>Router(config-sip-ua)# credentials number 1111 username MyUsername password MyPassword realm Realm1.example.com</pre> Example: <pre>Router(config-sip-ua)# credentials number 1111 username MyUsername password MyPassword realm Realm2.example.com</pre> Example: <pre>Router(config-sip-ua)# credentials number 1111 username AnotherUsername password TheirPassword realm Realm1.example.com</pre> Example: <pre>Router(config-sip-ua)# credentials number 1111 username AnotherUsername password TheirPassword realm Realm2.example.com</pre>	Configures credentials for endpoints on a Cisco IOS SIP TDM gateway, Cisco Unified CME, or Cisco UBE for responding to authentication challenges. Note The encryption type specification is optional but the dhcp keyword is not allowed when configuring credentials for multiple registrars on a SIP trunk.

Configuration Examples for Configuring Multiple Registrars on SIP Trunks

Registering POTS Endpoints to Multiple Registrars on SIP Trunks Example

The following example shows how to configure POTS endpoints to register with multiple registrars (“example1.com” and “example2.com”) on a SIP trunk simultaneously:

```
Router> enable
Router# configure terminal
Router(config)# sip-ua
Router(config-sip-ua)# registrar 1 dns:example1.com expires 180
Router(config-sip-ua)# registrar 2 dns:example2.com expires 360
Router(config-sip-ua)# authentication username MyUsername password MyPassword1 realm
Realm.example1.com
Router(config-sip-ua)# authentication username MyUsername password MyPassword2 realm
AnotherRealm.example1.com
Router(config-sip-ua)# authentication username MyUsername password MyPassword3 realm
```



```

Realm.example2.com
Router(config-sip-ua)# authentication username MyUsername password MyPassword4 realm
AnotherRealm.example2.com

```

Registering Individual POTS Endpoints on a Cisco IOS SIP

The following example shows how to configure individual POTS endpoints on a Cisco IOS SIP TDM gateway to register with multiple registrars (“Realm1” and “Realm2”) on a SIP trunk simultaneously:

```

Router> enable
Router# configure terminal
Router(config)# dial-peer voice 3 pots
Router(config-dial-peer)# authentication username MyUser password MyPassword realm
realm1.example.com
Router(config-dial-peer)# authentication username MyUser password MyPassword2 realm
Realm2.example.com
Router(config-dial-peer)# exit
Router(config)# sip-ua
Router(config-sip-ua)# registrar 1 dns:example1.com expires 180
Router(config-sip-ua)# registrar 2 ipv4:1.1.1.1 expires 360

```

Configuring Credentials for Endpoints to Register with Multiple Registrars on a SIP Trunk Example

The following example shows how to configure credentials for endpoints on a Cisco IOS SIP TDM gateway, Cisco Unified CME, or Cisco UBE to register with multiple registrars (“Example1.com” and “Example2.com”) on a SIP trunk simultaneously:

```

Router> enable
Router# configure terminal
Router(config)# sip-ua
Router(config-sip-ua)# credentials number 1111 username MyUsername password MyPassword realm
Realm.example1.com
Router(config-sip-ua)# credentials number 1111 username MyUsername2 password MyOtherPassword
realm AnotherRealm.example1.com
Router(config-sip-ua)# credentials number 2222 username TheirUsername password TheirPassword
realm Realm.example1.com
Router(config-sip-ua)# credentials number 2222 username TheirUsername2 password
TheirOtherPassword realm AnotherRealm.example1.com
Router(config-sip-ua)# registrar 1 dns:example1.com expires 180
Router(config-sip-ua)# registrar 2 dns:example2.com expires 360

```

Additional References

The following sections provide references related to the SIP Connection-Oriented Media, Forking, and MLPP features.

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases

Related Topic	Document Title
SIP commands	<i>Cisco IOS Voice Command Reference</i>
Tcl IVR and VoiceXML	<i>Cisco IOS Tcl IVR and VoiceXML Application Guide</i>
Cisco VoiceXML	<i>Cisco VoiceXML Programmer's Guide</i>

Standards

Standard	Title
No new or modified standards are supported, and support for existing standards has not been modified.	--

MIBs

MIB	MIBs Link
No new or modified MIBs are supported, and support for existing MIBs has not been modified.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported, and support for existing RFCs has not been modified.	--

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>	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Configuring Multiple Registrars on SIP Trunks

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. An account on Cisco.com is not required.

Table 1: Feature Information for Configuring Multiple Registrars on SIP Trunks

Feature Name	Releases	Feature Information
Support for Multiple Registrars on SIP Trunks on a Cisco Unified Border Element, on Cisco IOS SIP TDM Gateways, and on Cisco Unified Communications Manager Express feature	15.0(1)XA 15.1(1)T	This feature provides support for multiple registrars on SIP trunks on Cisco IOS SIP TDM gateways, Cisco Unified CME, and Cisco UBEs. This feature allows for a redundant registrar for each SIP trunk and enables registrar redundancy across multiple service providers. This feature includes the following new or modified commands: credentials , localhost , registrar , voice-class sip localhost .

Glossary

ISDN --Integrated Services Digital Network.

EFXS --IP phone virtual voice ports.

FXS --analog telephone voice ports.

SCCP --Skinny Client Control Protocol.

SDP --Session Description Protocol.

SIP --Session Initiation Protocol.

TDM --time-division multiplexing.

