



Cisco IOS Configuration

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Prerequisite Configuration

The following general tasks are prerequisites to configuring the Cisco IOS features described in this document:

- Establish a working IP network. For more information about configuring IP, refer to the *Cisco IOS IP Configuration Guide*.
- Configure Voice over IP. For more information about configuring Voice over IP, refer to the *Cisco IOS Voice Configuration Library*.
- Program and configure the interface between the RADIUS server and the Cisco voice gateway to operate with vendor specific attributes (VSAs). Refer to the *RADIUS Vendor-Specific Attributes Voice Implementation Guide*.
- Download the TCL scripts that are not embedded in Cisco IOS from the Cisco CCO software support URL:
<http://www.cisco.com/public/sw-center/>
- Define and apply IVR applications on the dial peer to direct AAA requests to a RADIUS server. For more information, see the *Cisco IOS TCL and VoiceXML Application Guide*

Configuring AAA Basics

You must follow these steps to set up AAA before you start directing AAA requests to a RADIUS server:

Step 1 Enable authentication, authorization, and accounting (AAA) security services:

```
Router(config)# aaa new-model
```



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Example:

```
aaa new-model
```

Step 2 Define a RADIUS server host by entering the following command:

```
Router(config)# radius server host ipaddress auth-port port-number acct-port port-number
```

Example:

```
radius server host 1.5.35.10 auth-port 2001 acct-port 2002
```

Step 3 Use the RADIUS server defined in Step 2 to define a AAA group.

a. To define a group name, enter the following command in global configuration mode:

```
Router(config)# aaa group server radius group-name
```



Note For the argument **group-name** in the command, enter the name of the specific RADIUS server (for example server1) you want to authenticate, or enter the argument **radius** if you want to authenticate all RADIUS servers.

Example:

```
aaa group server radius server1
```

b. To configure the IP address of the RADIUS server for the group server, enter the following command in group server configuration mode:

```
Router(config-sg-radius)# server ip-address auth-port port-number acct-port port-number
```

Example:

```
server 1.5.35.10 auth-port 2001 acct-port 2002
```

Step 4 Exit group server configuration mode.

```
Router(config-sg-radius)# exit
```

Step 5 To specify the password for use between the gateway and the RADIUS server, enter the following command in global configuration mode:

```
Router(config)# radius-server key key
```

Example:

```
radius-server key luser23
```

Step 6 Use the AAA group defined in Step 2 above to define an AAA method list.

a. For voice authentication, enter the **aaa authentication login** command

a. .

```
Router(config)# aaa authentication login list-name method1 [method2...]
```

Examples:

```
aaa authentication login h323 group server2
aaa authentication login MIS-access group radius
```

b. For voice authorization, enter the **aaa authorization** command.

```
Router(config)# aaa authorization exec list-name method1 [method2...]
```

Examples:

```
aaa authorization exec h323 group server2
aaa authorization exec MIS-access group radius
```

- c. For voice accounting, enter the **aaa accounting** command in global configuration mode.

```
Router(config)# aaa accounting connection list-name start-stop method1 [method2..]
```

Example:

```
aaa accounting connection h323 start-stop group server1
```

Directing AAA Requests to a RADIUS Server

You can use TCL scripts or the CLI to direct AAA requests to a specific RADIUS server based on:

- Customer account number
- Called party number
- Trunk group

Directing AAA Requests by Using Account Numbers

It is easier to use TCL scripts instead of the CLI to direct AAA requests using account numbers.

To use TCL scripts for directing AAA requests using account numbers, follow the steps below:

-
- Step 1** Before you start using TCL scripts to direct AAA requests using account numbers, you must define and apply the interactive voice response (IVR) application on the dial peer.
- Step 2** Use the authentication, authorization, and accounting TCL verbs to customize your TCL scripts. Refer to the [Accounting Template, page 21](#) in [Chapter 1, “Overview of AAA on Voice Gateways”](#) for an example of a TCL script.

The authentication, accounting, and authorization TCL verbs are:

- a. Authentication: Use the following TCL verb:

```
aaa authenticate account password [-a avlistSend] [-s servertag]
```

- b. Authorization: Use the following TCL verb:

```
aaa authorize account password ani destination {legID|info-tag} [-s servertag]
```

- c. Accounting: Use the following TCL verbs to start or update accounting messages:

```
aaa accounting start {legID|info-tag} [-s servertag]
```

- Step 3** (Optional). If you use the accounting TCL verb, then use the **accounting suppress** command to suppress accounting on the same dial peer on which you have specified your application.

Follow the steps below to suppress accounting on the dial peer:

- a. Enter the **voice class aaa** command in global configuration mode.

```
Router(config)# voice-class aaa tag
```

Example:

```
voice-class aaa 1001
```

- b. Enter the **accounting suppress** command in voice class configuration mode.

```
Router(config-class)# accounting suppress
```

- c. Enter the **voice class aaa** command in dial peer configuration mode.

```
Router(config)# dial-peer voice tag {pots|voip}  
Router(config-dial-peer)# voice class aaa tag
```

Example:

```
dial-peer voice 101 voip  
voice class aaa 1001
```

Directing AAA Requests using Called Party Number

You can use the called party number to direct AAA requests in dial peer configuration mode as follows:

Step 1 Define a dial peer.

- a. Enter dial peer configuration mode using the **dial peer voice** command. The argument **number** defines a particular dial peer.

```
Router(config)# dial-peer voice tag {pots|voip}
```

Example:

```
dial-peer voice 202 pots
```

- b. Specify the incoming called number using the **incoming called number** command in dial peer configuration mode. The argument *string* is a series of digits that specifies the incoming called number.

```
Router(config-dial-peer)# incoming called number string
```

Example:

```
incoming called number 5550900
```

Step 2 Define the voice class.

- a. Enter the **voice class aaa** command in global configuration mode. The argument *tag* identifies the dial peer.

```
Router(config)# voice class aaa tag
```

Example:

```
voice-class aaa 202
```

- b. Define authentication, authorization, and accounting methods. Enter the authentication, authorization and accounting commands in voice class mode. The argument *methodListName* is used to name the list of authentication, authorization or accounting methods applicable to each command.

```
Router(config-class)# authentication method methodListName  
Router(config-class)# accounting method methodListName  
Router(config-class)# authorization method methodListName
```

Example:

```
authentication method pw
accounting method rd
authorization method pc
```

- c. Define voice class in dial peer configuration mode. Enter dial peer configuration mode and then define the voice class in that mode. The argument **tag** identifies the same dial peer as in step a) above.

```
Router(config)# dial-peer voice tag {pots|voip}
Router(config-dial-peer)# voice-class aaa tag
```

Example:

```
dial-peer voice 202 pots
voice-class aaa 202
```

Directing AAA Requests Using Trunk Groups

To direct AAA requests using trunk groups, a trunk group must first associate with a dial peer. To use this method, group all the interfaces using one trunk group and define only one dial peer instead of individual ports for the interfaces using that trunk group.

You can direct AAA requests using trunk groups in dial-peer configuration mode as follows:

-
- Step 1** Define the trunk group by entering the **trunk group** command in global configuration mode. The argument *tag* is a number.

```
Router(config)# trunk group tag
```

Example:

```
trunk group 303
```

- Step 2** Use the trunk group tag in Step 1 to group the interfaces.

- a. Enter the **interface serial** command in global configuration mode to specify a serial interface on the channelized T1 or E1 controller. The argument *slot/port* denotes the slot and port number where the channelized T1 or E1 controller is located. The argument *timeslot* denotes the ISDN D channel timeslot which is 15 for channelized E1 and 23 for channelized T1.

```
Router(config)# interface serial slot/port: timeslot
```

Example:

```
interface serial 1/1:23
```

- b. Enter the **trunk group** command.

```
Router(config-inter-serial)# trunk group tag
```

Example:

```
trunk group 303
```

- Step 3** Use the *tag* defined in Step 2b) above.

- a. Enter the **voice class aaa** command in global configuration mode.

```
Router(config)# voice-class aaa tag
```

Example:

```
voice-class aaa 303
```

- b. Define authentication, accounting, and authorization methods. Enter the **authentication method**, **accounting method**, and **authorization method** commands in voice class mode. The argument *methodListName* is used to name the list of authentication, accounting, or authorization methods applicable to each command.

```
Router(config-class)# authentication method methodListName
Router(config-class)# accounting method methodListName
Router(config-class)# authorization method methodListName
```

Example:

```
authentication method ab
accounting method cd
authorization method ef
```

- c. Enter dial peer configuration mode using the **dial peer voice** command.

```
Router(config)# dial-peer voice tag {pots|voip}
```

Example:

```
dial-peer voice 303 pots
```

- d. Define the voice class in dial peer configuration mode. The argument *tag* identifies the same dial peer as in Step a above.

```
Router(config-dial-peer)# voice-class aaa tag
```

Example:

```
voice-class aaa 303
```

- e. Define the trunk group in dial peer configuration mode. The argument *tag* is the the same number as in Step b) above.

```
Router(config-dial-peer)# trunk group tag
```

Example:

```
trunk group 303
```

Enabling and Disabling Accounting for any Call Leg

Enabling voice accounting by using the **gw-accounting aaa** command will send only the default list of VSAs to the accounting server.

Global Configuration Mode

To enable and disable accounting for any call leg in global configuration mode, follow these steps:

- Step 1** To enable accounting for any call leg, enter the **gw-accounting aaa** command in global configuration mode. Use the no form of the command to disable accounting.

```
Router (config)# gw-accounting aaa
Router (config)# no gw-accounting aaa
```

To disable accounting based on the type of dial peer, use the following command:

Step 2 To disable accounting based on the type of dial peer, use the following commands:

- a. Enter the **gw-accounting aaa** command.

```
Router(config)# gw-accounting aaa
```

- b. Enter the **suppress** command.

```
Router(config-gw-accounting-aaa)# suppress
```

You have a choice of entering **pots** or **voip**, based on the type of dial peer.

- c. Enter the **suppress pots** or **suppress voip** command.

```
Router(config-gw-accounting-aaa)# suppress pots
```

or

```
Router(config-gw-accounting-aaa)# suppress voip
```

dial-peer configuration mode

To disable accounting in dial-peer configuration mode, follow these steps:

Step 1 Enter the **voice class aaa** command in global configuration mode.

```
Router(config)# voice class aaa tag
```

Example:

```
voice-class aaa 303
```

Step 2 Enter the **accounting suppress** command in voice class aaa mode.

```
Router(config-class)# accounting suppress [in-bound|out-bound]
```

Example:

```
accounting suppress
```

Step 3 Enter the **voice class aaa** command in dial peer configuration mode.

```
Router(config)# dial-peer voice tag {pots|voip}
```

```
Router(config-dial-peer)# voice-class aaa tag
```

Example:

```
dial-peer voice 303 pots
```

```
voice-class aaa 303
```

Customizing Accounting Packets

This section contains the following sub-sections:

- [Configuration Overview, page 8](#)

- [Configuration Tasks for Customizing Accounting Packets, page 9](#)

Configuration Overview

Accounting packets for voice calls consist of voice-specific attributes as well as those that are not specific to voice. This document focuses only on voice-specific attributes. You can add some application-level attributes through the TCL script and fine tune the attribute list created by the system; the result is an accounting template that is customized to your accounting needs.

To customize your accounting packets, first create accounting templates.



Note

If you do not want to customize your accounting packets, enable voice accounting by using the **gw-accounting aaa** command to generate accounting packets. A specific set of attributes, which include both non voice-specific and voice-specific attributes, is automatically sent by the gateway to the RADIUS server.

To view the current list of VSAs, refer to the *RADIUS Vendor Specific Attributes Voice Implementation Guide*. For example, in the “[Accounting Template](#)” section on page 21 of [Chapter 1, “Overview of AAA on Voice Gateways”](#), the default attributes are:

```
h323-gw-id
h323-call-origin
h323-call-type
h323-setup-time
h323-connect-time
h323-disconnect-time
h323-disconnect-cause
h323-remote-address
h323-voice-quality    ICPIF
subscriber
```

To send all the VSAs to the accounting server use the **template callhistory-detail** command in global configuration mode. The [Accounting Template, page 21](#) in [Chapter 1, “Overview of AAA on Voice Gateways”](#) includes the default and new VSAs. Refer to the “[Using Callhistory-detail to Send All VSAs](#)” section on [page 9](#) for configuration details.

For the latest list of VSAs, refer to *RADIUS Vendor-Specific Attributes Voice Implementation Guide*.

To fine tune your accounting packets based on your billing needs, create accounting templates using specific VSAs that are applicable to your accounting needs. For example, to target different accounting servers for incoming calls from different trunks, you must define multiple accounting templates and associate them with different sets of incoming dial peers. To create a template, remove the attributes that are not applicable by adding the # sign in front of each of those attributes.

To tunr your accounting packets, remove attributes that do not apply to your billing needs. Deleting these attributes creates a custom accounting template that acts as a filter, allowing only the defined attributes to be sent to the accounting server. To apply acustomized template, first define the template using the **call accounting template voice** command in global configuration mode, and then apply it using either TCL scripts or the CLI. If you are using the CLI, you can apply the template either in global configuration or dial-peer configuration mode. Refer to the [“Defining and Applying Customized Accounting Templates” section on page 10](#) for configuraion details.

Specific VSAs that cannot be controlled by the accounting template are sent as attribute-value (AV) pairs through the *avlistSend* argument of the TCL verbs used in the script, and they are:

- h323-ivr-out
- h323-ivr-in
- h323-credit-amount
- h323-return-code
- h323-prompt-id
- h323-time-and-delay
- h323-redirect-number
- h323-preferred-lang
- h323-redirect-ip-addr
- h323-billing-model
- h323-currency

Configuration Tasks for Customizing Accounting Packets

Use the [“Configuration Overview” section on page 8](#) to plan your customizing needs before you begin the applicable configuration tasks below.

Generate Accounting Packets by Enabling Voice Accounting

To automatically generate accounting packets by enabling voice accounting, enter the **gw-accounting aaa** command in global configuration mode.

```
Router(config)# gw-accounting aaa
Router(gw-accounting aaa)# exit
```

Using Callhistory-detail to Send All VSAs

To send all VSAs (default and new) to the accounting server:

Step 1 Enter the **gw-accounting aaa** command to enter C mode.

```
Router(config)# gw-accounting aaa
```

- Step 2** Enter the **acct-template callhistory-detail** command in V mode.

```
Router(config-gw-accounting-aaa)# acct-template callhistory-detail
Router(config-gw-accounting-aaa)#
```

Defining and Applying Customized Accounting Templates

To define an accounting template:

- Step 1** Enter the **call accounting-template voice** command in global configuration mode. Enter the template name for *acctTemplateName*. The *url* is the address where you store the template. Always assign a .cdr extension to the filename in the URL.

```
Router(config)# call accounting-template voice acctTemplateName url
```

Example:

```
call accounting-template voice cdr1 tftp://highway/mjs/templates/cdr1.cdr
```



Note

After bootup, if the template file fails to load from the TFTP server, the system tries to automatically reload the file at five minute intervals.

You can use an accounting template through the CLI (in global configuration or dial-peer configuration mode), or by using TCL verbs.

To use an accounting template through the CLI in global configuration mode, use the following commands:

- Step 1** Enter the **gw-accounting aaa** command to enter gateway accounting AAA mode.

```
Router(config)# gw-accounting aaa
```

- Step 2** Enter the **acct-template** command. Assign your template name to *acctTemplateName*.

```
Router (config-gw-accounting-aaa)# acct-template acctTemplateName
```

Example:

```
acct-template aprill
```

Applying a Customized Accounting Template through the CLI in Dial-Peer Configuration Mode

To apply a customized accounting template through the CLI in dial peer configuration mode, follow these steps:

- Step 1** Enter the **call accounting-template voice** command in global configuration mode. Assign your template name to *acctTemplateName* and your template address (usually your tftp address) to *url*.

```
Router(config)# call accounting-template voice acctTemplateName url
```

Example:

```
call accounting-template voice cdr1 tftp://highway/mjs/templates/cdr1.cdr
```

- Step 2** Enter the **voice class aaa** command in global configuration mode. Assign a numerical value to *tag*.

```
Router(config)# voice class aaa tag
```

Example:

```
voice-class aaa 404
```

- Step 3** Enter the **accounting-template** command in voice class AAA mode. Assign your template name to *acctTempName*.

```
Router(config-class)# accounting-template acctTempName
```

Example:

```
accounting-template april1
```

- Step 4** Change configuration mode from global to dial peer and using the **dial peer voice** command, enter the **voice class aaa** command in dial-peer configuration mode. The numerical value of *tag* is the same value of *tag* in Step 2 above.

```
Router(config)# dial peer voice number [pots|voip]
```

```
Router(config-dial-peer)# voice class aaa tag
```

Example:

```
dial-peer voice 404 pots
```

```
voice-class aaa 404
```

Applying a Customized Accounting Template through a TCL Script

Use the **aaa accounting start** TCL verb. Assign an incoming or outgoing call leg, or assign an information tag. Assign your template name to *acctTempName*.

```
aaa accounting start {legID|info-tag} -t acctTempName
```

Adding Attributes to Accounting Packets through TCL scripts

To add attributes to accounting packets through TCL scripts, follow these steps:

- Step 1** Use the *avlistSend* argument in the TCL verbs to send the following attributes:

- h323-ivr-out
- h323-ivr-in
- h323-credit-amount
- h323-return-code
- h323-prompt-id
- h323-time-and-delay
- h323-redirect-number
- h323-preferred-lang
- h323-redirect-ip-addr
- h323-billing-model
- h323-currency

Step 2 Use TCL verbs for authentication, authorization, and accounting.

- a. For authentication, use the **aaa authenticate** TCL verb.

```
aaa authenticate account password [-a avlistSend]
```

- b. For authorization, use the **aaa authorize** TCL verb.

```
aaa authorize account password ani destination {legID | info-tag} [-a avlistSend]
```

- c. For accounting, use the **aaa accounting start** TCL verb.

```
aaa accounting start {legID | info-tag} [-a avlistSend]
```

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