Auto Smartports Configuration Guide

Cisco IOS Release 12.2(58)SE
April 2011

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Text Part Number: OL-23006-03

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Preface

If your switch is stacking-capable (for example, a Catalyst 3750-X, 3750-E, or 2960-S switch), unless otherwise noted, the term *switch* refers to a standalone switch and to a switch stack.

This document describes how to configure Auto and static Smartports macros in your network. It does not describe how to install your switch. For information, see the hardware installation guide for your switch.

- Catalyst 3750-X and 3560-X switches
- Catalyst 3750-E and 3560-E switches
- Catalyst 3750, 3560, 2960-S, and 2960 switches
- Catalyst 2918 switches

For information about the Cisco IOS commands, see the Cisco IOS documentation set on Cisco.com.

This guide does not describe how to use the embedded device manager GUIs or Cisco Network Assistant (hereafter referred to as *Network Assistant)*. For information about the device manager, see the switch online help. For information about Network Assistant, see *Getting Started with Cisco Network Assistant* on Cisco.com.

You can use CiscoWorks LAN Management Solution (LMS) to configure and manage Auto Smartports. For information about using CiscoWorks LMS and Auto Smartports: http://www.cisco.com/en/US/prod/collateral/netmgtsw/ps6504/ps6528/ps2425/white_paper_c11-542881_ps11200_Products_White_Paper.html#wp9000042

Conventions

This publication uses these conventions to convey instructions and information:

For command descriptions

- Commands and keywords are in **boldface** text.
- Arguments for which you supply values are in *italic*.
- Square brackets ([ ]) mean optional elements.
- Braces ({ }) group required choices, and vertical bars (|) separate the alternative elements.
- Braces and vertical bars within square brackets ([{ | }]) mean a required choice within an optional element.

For interactive examples

- Terminal sessions and system displays are in `screen` font.
- Information that you enter is in **`boldface screen`** font.
- Nonprinting characters, such as passwords or tabs, are in angle brackets (< >).

Notes, cautions, and warnings use these conventions and symbols:

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Filtering show Command Output

The **show** commands have optional output modifiers to filter the command output.

- **| begin**—Display begins with the line that matches the *expression*.
- **| exclude**—Display excludes with the line that matches the *expression*.
- **| include**—Display includes with the line that matches the *expression*.
- *expression*—Expression in the output to use as a reference point.

Expressions are case sensitive. If you enter **| exclude output**, the lines that contain *output* are not displayed, but the lines that contain *Output* are displayed.

Related Publications

For information about Cisco network devices running Auto Smartports, see the switch-specific documentation on Cisco.com:
http://www.cisco.com/cisco/web/support/index.html.

Note Before installing, configuring, or upgrading the switch, router, or other Cisco device, see these documents:

- For initial configuration information, see the “Using Express Setup” section in the getting started guide or the “Configuring the Switch with the CLI-Based Setup Program” appendix in the hardware installation guide.
- For device manager requirements, see the “System Requirements” section in the release notes.
- For Network Assistant requirements, see the *Getting Started with Cisco Network Assistant*.
- For cluster requirements, see the *Release Notes for Cisco Network Assistant*.
- For upgrading information, see the “Downloading Software” section in the release notes.

Obtaining Documentation, Support, and Security Guidelines

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation:
http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed, and set content to be delivered directly to your desktop by a reader application. The RSS feeds are a free service, and Cisco supports RSS version 2.0.

CHAPTER 1

Auto Smartports and Static Smartports Macros

Auto Smartports Macros

Auto Smartports macros dynamically configure ports based on the device type detected on the port. When the switch detects a new device on a port, it applies the appropriate macro on the port. When there is a link-down event on the port, the switch removes the macro. For example, when you connect a Cisco IP phone to a port, Auto Smartports automatically applies the IP phone macro. The IP phone macro enables quality of service (QoS), security features, and a dedicated voice VLAN to ensure proper treatment of delay-sensitive voice traffic. Auto Smartports uses event triggers to map devices to port macros.

You can also manually configure and apply global macros.

The macros embedded in the switch software are groups of command-line interface (CLI) commands.

You can also create user-defined macros by using the Cisco IOS Shell scripting capability, which is a BASH-like language syntax for command automation and variable replacement.

For information, see Chapter 2, “Configuring Auto Smartports and Static Smartports Macros.”

Static Smartports Macros

Static Smartports macros provide port configurations that you manually apply based on the device connected to the port. When you apply a static macro, the macro CLI commands are added to the existing port configuration. When there is a link-down event on the port, the switch does not remove the static macro configuration.

Event Triggers

Auto Smartports uses event triggers to map macros to the source port of the event. The most common triggers are based on Cisco Discovery Protocol (CDP) messages received from another device. A CDP event trigger occurs when these devices are detected:

- Cisco switch
- Cisco router
- Cisco IP Phone
- Cisco Wireless Access Points, including autonomous and lightweight access points
- Cisco IP video surveillance camera
- Cisco digital media player

Additional event triggers for Cisco and third-party devices are user-defined MAC address groups, MAC authentication bypass (MAB) messages, 802.1x authentication messages, and Link Layer Discovery Protocol (LLDP) messages.

LLDP supports a set of attributes used to discover neighbor devices. These type, length, and value attributes and descriptions are referred to as TLVs. LLDP-supported devices use TLVs to receive and send information. This protocol advertises details such as device configuration information, capabilities, and identity. Auto Smartports uses the LLDP *system capabilities* TLV as the event trigger. Use the event trigger control feature to specify if the switch applies a macro based on the detection method, device type, or configured trigger.

For more information about configuring the LLDP system capabilities TLV attributes for Auto Smartports, see the “Configuring LLDP, LLDP-MED, and Wired Location Service” chapter in the switch-specific software configuration guides.

For devices that do not support CDP, MAB, or 802.1x authentication, such as network printers, LLDP, or legacy Cisco Digital Media Players, you can configure a MAC address group with a MAC operationally unique identifier (OUI)-based trigger. You map the MAC address to a built-in or user-defined macro that has the desired configuration.

User-Defined Files

You can designate a remote server location for user-defined macro files. You can then update and maintain one set of macro files for use by multiple switches across the network.

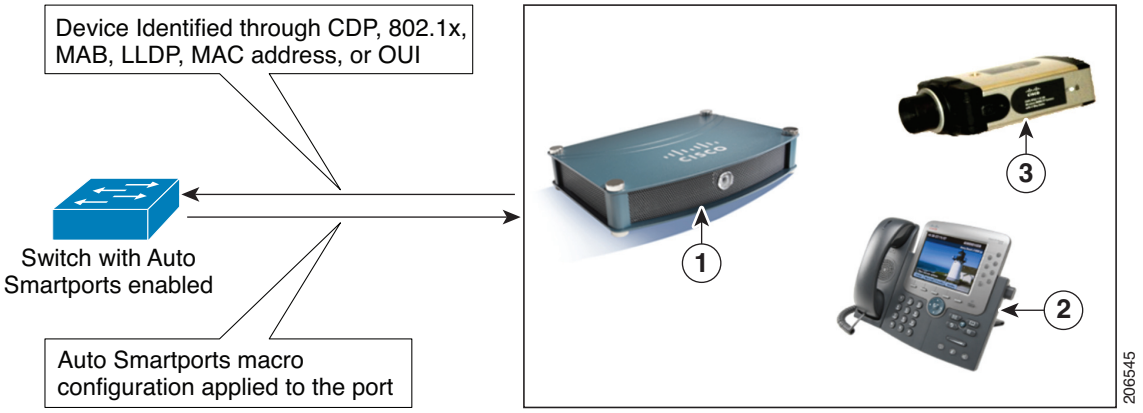
Macro Persistence

The macro persistence feature causes macro configurations to remain enabled on the switch ports regardless of a link-down event. This eliminates multiple system log and configuration change notifications when the switch has link-up and link-down events or is a domain member or an end point in an EnergyWise network.

Auto Smartports and Cisco Medianet

Cisco Medianet enables intelligent services in the network infrastructure for a variety of video applications. A service of Medianet is autoprovisioning for Cisco Digital Media Players and Cisco IP video surveillance cameras through Auto Smartports. The switch identifies Cisco and third-party video devices by using CDP, 802.1x, MAB, LLDP, and MAC addresses (Figure 1-1). The switch applies the applicable macro to enable the appropriate VLAN, standard quality of service (QoS), and auto-QoS settings for the device. The switch also uses a built-in MAC address group to detect the legacy Cisco digital media player (DMP), based on an OUI of of4400 or 23ac00. You can also create custom user-defined macros for any video device.

Figure 1-1 Cisco Medianet Deployment Example



1	Wireless access point	**3**	Cisco IP video surveillance camera
2	Cisco IP phone		

CHAPTER 2

Configuring Auto Smartports and Static Smartports Macros

Configuring Macros

Auto Smartports Configuration Guidelines

- You cannot delete or change the built-in macros. However, you can override a built-in macro by creating a user-defined macro with the same name. To restore the original built-in macro, delete the user-defined macro.
- If you enable both the **macro auto device** and the **macro auto execute** global configuration commands, the parameters specified in the command last executed are applied to the switch. Only one command is active on the switch.

- To avoid system conflicts when macros are applied, remove all port configurations except for 802.1x authentication.
- Do not configure port security when you enable device-specific Auto Smartports on the switch. The switch applies the appropriate port-based commands.
- If the macro conflicts with the original configuration, either the macro does not apply some of the original configuration commands, or the antimacro does not remove them. (The antimacro is the portion of the applied macro that removes the macro at a link-down event.)

  For example, if 802.1x authentication is enabled, you cannot remove the **switchport-mode access** configuration. Remove the 802.1x authentication before removing the **switchport mode** configuration.
- The built-in-macro default data VLAN is VLAN 1. The built-in macro default voice VLAN is VLAN 2. (VLAN 1 is the default data VLAN for all macros. VLAN 2 is the default voice VLAN for all macros.) If your switch uses different access, native, or voice VLANs, use the **macro auto device** or the **macro auto execute** global configuration commands to configure the values.
- If you use the VLAN name in a macro, it must be the same name that is in the VLAN database for all switches in the VLAN Trunking Protocol (VTP) domain.
- Use the **show macro auto device** privileged EXEC command to display the default macros with the default parameter values, current values, and the configurable parameter list for each macro. You can also use the **show shell functions** privileged EXEC command to see the built-in-macro default values.
- To use 802.1x authentication or MAC authentication bypass (MAB) to detect non-Cisco devices, configure the RADIUS server to support the Cisco attribute-value pair **auto-smart-port=***event trigger*.
- For stationary devices that do not support CDP, MAB, or 802.1x authentication, such as network printers, you can configure a MAC address group with a MAC OUI-based trigger and map it to a user-defined macro with the desired configuration.
- An 802.1x-authentication-based trigger takes precedence over all other event triggers, such as Cisco Discovery Protocol (CDP) messages, Link Layer Discovery Protocol (LLDP) messages, or user-defined MAC address groups.
- The switch supports Auto Smartport macros only on directly connected devices. Multiple device connections, such as hubs, are not supported. If multiple devices are connected, the applied macro is associated with the first detected device.
- If authentication is enabled on a port, the switch ignores a MAC address trigger if authentication fails, and there is no fallback for MAC address trigger support.
- The order of CLI commands within the macro and the corresponding antimacro can be different.
- When the device identity is configured and the device is authenticated on a switch port, these RADIUS attributes could be downloaded:
  - VLAN ID and switch ACL name or number from the Cisco access control server (ACS)
  - ASP trigger name in an attribute-value (AV) pair.

    After the AV pair is downloaded, the switch applies the macro on the port.

  The downloaded VLAN ID or ACL name could conflict with the settings in the user-defined or builtin macro applied by the switch.
- Auto Smartports does not support lightweight access points in the Remote Edge Access Point (REAP) or Hybrid Remote Edge Access Point (HREAP) mode.

- In Cisco IOS Release 12.2(58)SE, Auto Smartports does not support access points that have model numbers starting with
  - AIR-CAP3501e
  - AIR-CAP3501i
  - AIR-CAP3502e
  - AIR-CAP3502i

Enabling Auto Smartports Macros

Follow this required procedure to enable macros globally on the switch.

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**macro auto global processing**	Globally enables macros on the switch.
Step 3	**end**	Returns to privileged EXEC mode.
Step 4	**show running-config**	Verifies that Auto Smartports is enabled.
Step 5	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

To return to the default setting, use the **no macro auto global processing** global configuration command.

To disable macros on a specific port, use the **no macro auto processing** interface configuration command.

You can use the **show macro auto device**, the **show shell** *functions*, and the **show shell** *triggers* privileged EXEC commands to display the event triggers and the built-in macros.

This example shows how to enable macros on the switch and then how to disable macros on a specific interface:

```
Switch(config)# macro auto global processing
Switch(config)# interface interface_id
Switch(config-if)# no macro auto processing
```

Default Auto Smartports Configuration

- Auto Smartports is globally disabled and is enabled per interface.
- The **macro auto global processing** [**fallback cdp**] global configuration command is no longer supported and will be removed (deprecated).
- CDP fallback is globally disabled and is enabled per interface.
- Macro persistence is globally disabled and per interface.
- Cisco IOS shell is enabled.
- The switch uses these built-in macros (the defaults) when Auto Smartports is enabled for the specific devices.

Table 2-1 Device-Specific Built-In Macros

Macro Name	Description
CISCO_AP_AUTO_ SMARTPORT	This macro applies the wireless access point macro for Cisco access points. It enables standard QoS, auto-QoS, and 802.1q encapsulated trunking. It configures the native VLAN on the interface. It also enables macro persistence so that the macro remains active after a link-down event.
CISCO_DMP_AUTO_ SMARTPORT	This macro applies the digital media player macro for Cisco digital media players. It enables QoS trust, auto-QoS, port security, and spanning-tree protection. It configures the access VLAN for the interface and provides network protection from unknown unicast packets. **Note** If you enter the **auto qos video media-player** interface configuration command, the switch automatically uses the CDP to detect the presence or absence of a Cisco digital media player.
CISCO_IPVSC_AUTO_ SMARTPORT	This macro applies the IP camera macro for Cisco IP video surveillance cameras. It enables QoS trust, auto-QoS, port security, and spanning-tree protection. It configures the access VLAN for the interface and provides network protection from unknown unicast packets.
CISCO_LWAP_AUTO_ SMARTPORT	This macro applies the lightweight wireless access point macro for Cisco lightweight wireless access points. It enables QoS, port security, storm control, DHCP snooping, and spanning-tree protection. It configures the access VLAN for the interface and provides network protection from unknown unicast packets.
CISCO_PHONE_AUTO_ SMARTPORT	This macro applies the IP phone macro for Cisco IP phones. It enables QoS, port security, storm control, DHCP snooping, and spanning-tree protection. It also configures the access and voice VLANs for that interface.
CISCO_ROUTER_AUTO_ SMARTPORT	This macro applies the router macro for Cisco routers. It enables QoS and trunking with 802.1Q encapsulation and spanning-tree bridge protocol data unit (BPDU) protection.
CISCO_SWITCH_AUTO_ SMARTPORT	This macro applies the switch macro for Cisco switches. It enables QoS and trunking with 802.1q encapsulation. It also configures the native VLAN on the interface.

Use these macros when the switch does not use device-specific macros.

Table 2-2 Global and Custom Macros

Macro Name	Description
CISCO_CUSTOM_AUTO_ SMARTPORT	This macro applies the per-port user-defined settings after the antimacro[1] is applied on a switch port. You specify the settings in the macro.
CISCO_LAST_RESORT_AUTO_ SMARTPORT	This macro applies a per-port device-specific macro when the switch does not have built-in macro for the device. It has a basic configuration with a data VLAN.
CISCO_SWITCH_AAA_ ACCOUNTING	This macro applies the authentication, authorization, and accounting (AAA) accounting settings.
CISCO_SWITCH_AAA_ AUTHENTICATION	This macro applies the authentication, authorization, and accounting (AAA) authentication settings.
CISCO_SWITCH_AAA_ AUTHORIZATION	This macro applies the authentication, authorization, and accounting (AAA) authorization settings.
CISCO_SWITCH_AUTO_IP_ CONFIG	This macro applies the IP settings

Table 2-2 Global and Custom Macros (continued)

Macro Name	Description
CISCO_SWITCH_AUTO_PCI_ CONFIG	This macro applies Payment Card Industry (PCI)-compliant settings.
CISCO_SWITCH_DOMAIN_NAME_ CONFIG	This macro applies the domain name.
CISCO_SWITCH_ETHERCHANNEL _CONFIG	This macro applies the EtherChannel settings.
CISCO_SWITCH_HOSTNAME_ CONFIG	This macro applies the hostname.
CISCO_SWITCH_HTTP_SERVER_ CONFIG	This macro applies the HTTP server settings.
CISCO_SWITCH_LOGGING_ SERVER_CONFIG	This macro applies the logging server settings.
CISCO_SWITCH_MGMT_VLAN_ CONFIG	This macro applies the management VLAN settings.
CISCO_SWITCH_NAME_SERVER_ CONFIG	This macro applies the name server settings.
CISCO_SWITCH_NTP_SERVER_ CONFIG	This macro applies the Network Time Protocol (NTP) server settings. **Note** If the Virtual Private Network (VPN) routing/forwarding instance (VRF) name is not configured, the **ntp server** global configuration command is not applied.
CISCO_SWITCH_RADIUS_ SERVER_CONFIG	This macro applies the RADIUS server settings.
CISCO_SWITCH_SETUP_SNMP_ TRAPS	This macro applies the Simple Network Management Protocol (SNMP) trap settings.
CISCO_SWITCH_SETUP_USR_ CONFIG	This macro applies user settings.
CISCO_SWITCH_SNMP_SOURCE_ CONFIG	This macro applies the SNMP source interface settings.
CISCO_SWITCH_TACACS_ SERVER_CONFIG	This macro applies the TACACS server settings.
CISCO_SWITCH_USER_PASS_ CONFIG	This macro applies the username and password settings.

1. The antimacro is the portion of the applied macro that removes the macro at a link-down event.

In Cisco IOS Release 12.2(55)SE and later

- The switch applies the CISCO_PHONE_AUTO_SMARTPORT macro to Cisco IP phones.
- The access point macros have these enhancements:
  - The switch uses the platform string in the CDP message to determine the access point type (autonomous or lightweight) and then applies the appropriate macro.
  - To reduce overrun errors at the ingress interface on an access point Ethernet receiver, the switch adds the QoS bandwidth setting to the access point macros when it receives a CDP message with the auto-QoS type, length, and value attributes (TLVs). QoS derives the bandwidth value from the auto-QoS TLVs.

    If the CDP messages does not have the auto-QoS TLVs, the switch does not add the bandwidth setting to the macros.

Note If you do not upgrade the access point image to one that has the auto-QoS TLVs, the switch does not add the bandwidth setting to the access point macros. When you configure the bandwidth before the link to the receiver goes down, the setting is removed when the link comes up.

If you add a macro command that sets the QoS bandwidth and the switch applies the macro to an access point that does not support the auto-QoS TLVs, the command is not applied to the access point, We recommend that you create a user-defined macro without that command.

  - When a Catalyst 3750-E and 3560-E switch is connected to a Cisco Aironet 1250 access point, the switch applies a power setting to allocate up to 20 W.

When a switch running Cisco IOS Release 12.2(58)SE applies the CISCO_DMP_AUTO_ SMARTPORT macro to a CDP-capable digital media player, it generates an auto-QoS configuration for the digital media player.

Configuring Auto Smartports Parameter Values

The switch automatically maps from event triggers to built-in device-specific macros. You can follow this optional procedure to replace macro default parameter values with values that are specific to your switch.

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**show macro auto device**	Displays the macro default parameter values.
Step 2	**configure terminal**	Enters global configuration mode.

	Command	Purpose
Step 3	**macro auto device** {**access-point** | **ip-camera** | **lightweight-ap** | **media-player** | **phone** | **router** | **switch**} [*parameter=value*]	Replaces the specified macro default parameter values. Enter new values in the form of a name-value pair separated by spaces: [<name1>=<value1> <name2>=<value2>...]. You can enter the VLAN ID or the VLAN name when specifying VLAN parameter values. Default values are shown for each macro default parameter value. • **access-point NATIVE_VLAN=**1 • **ip-camera ACCESS_VLAN=**1 • **lightweight-ap ACCESS_VLAN=**1 • **media-player ACCESS_VLAN=**1 • **phone ACCESS_VLAN=**1 **VOICE_VLAN=**2 • **router NATIVE_VLAN=**1 • **switch NATIVE_VLAN=**1 **Note** You must enter the correct parameter name (for example, VOICE_VLAN) because this text string must match the text string in the built-in macro definition.
Step 4	**end**	Returns to privileged EXEC mode.
Step 5	**show macro auto device**	Verifies your entries.
Step 6	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

To return to the default setting, use the **no macro auto device** {*macro name*} *parameter=value* global configuration command.

This example shows how to see the IP phone macro parameter values and how to change the default voice VLAN to 20. When you change the default values, they are not immediately applied on the interfaces with existing applied macros. The configured values are applied at the next link-up event. Note that the exact text string was used for VOICE_VLAN. The entry is case sensitive.

```
Switch# show macro auto device phone
Device:phone
Default Macro:CISCO_PHONE_AUTO_SMARTPORT
Current Macro:CISCO_PHONE_AUTO_SMARTPORT
Configurable Parameters:ACCESS_VLAN VOICE_VLAN
Defaults Parameters:ACCESS_VLAN=1 VOICE_VLAN=2
Current Parameters:ACCESS_VLAN=1 VOICE_VLAN=2

Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# macro auto device phone VOICE_VLAN=20
Switch(config)# end
Switch# show macro auto device phone
Device:phone
Default Macro:CISCO_PHONE_AUTO_SMARTPORT
Current Macro:CISCO_PHONE_AUTO_SMARTPORT
Configurable Parameters:ACCESS_VLAN VOICE_VLAN
Defaults Parameters:ACCESS_VLAN=1 VOICE_VLAN=2
Current Parameters:voice_vlan=20
```

Configuring MAC Address Groups

For devices such as printers that do not support neighbor discovery protocols such as CDP or LLDP, use the MAC-address-based trigger configurations. This optional procedure requires these steps:

1. Configure a MAC-address-based trigger by using the **macro auto mac-address** global configuration command.
2. Associate the MAC address trigger to a built-in or a user-defined macro by using the **macro auto execute** global configuration command.

Note A switch running Cisco IOS Release 12.2(58)SE or later applies the macro as soon as soon as it learns a MAC address in the MAC address group.

A switch running a release earlier than Cisco IOS Release 12.2(58)SE applies the macro after it learns a MAC address in the MAC address group and waits 60 seconds.

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**macro auto mac-address-group** *name*	Specifies the group name, and enter MAC address configuration mode.
Step 3	[**mac-address list** *list*] | [**oui** [**list** *list* | **range** *start-value* **size** *number*]]	Configures a list of MAC addresses separated by spaces. Specify an operationally unique identifier (OUI) **list** or **range**. The OUI is the first three bytes of the MAC address and identifies the manufacturer of the product. Specifying the OUI allows devices that do not support neighbor discovery protocols to be recognized. • **list**—Enter an OUI list in hexadecimal format separated by spaces. • **range**—Enter the starting OUI hexadecimal value (*start-value*). • **size**—Enter the length of the range (*number*) from 1 to 5 to create a list of sequential addresses.
Step 4	**exit**	Returns to configuration mode.
Step 5	**macro auto execute** *address_trigger* **built-in** *macro name*	Maps the MAC address-group trigger to a built-in or user-defined macro. The MAC address trigger is applied to an interface after 65 seconds. The switch uses this hold time to apply a CDP- or LLDP-based event trigger instead of the MAC address trigger.
Step 6	**end**	Returns to privileged EXEC mode.
Step 7	**show macro auto address-group**	Verifies your entries.
Step 8	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

To delete an address group, use the **no macro auto mac-address-group** *name* global configuration command. Enter **no macro auto mac-address-group** *name* to remove the macro trigger and any associated trigger that maps to a macro defined by the **macro auto execute** global configuration command. Entering **no macro auto execute mac-address-group** only removes the mapping of the trigger to the macro.

This example shows how to create a MAC-address-group event trigger called *address_trigger* and how to verify your entries:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# macro auto mac-address-group address_trigger
Switch(config-addr-grp-mac)# mac-address list 2222.3333.3334 22.33.44 a.b.c
Switch(config-addr-grp-mac)# oui list 455555 233244
Switch(config-addr-grp-mac)# oui range 333333 size 2
Switch(config-addr-grp-mac)# exit
Switch(config)# macro auto execute address_trigger builtin CISCO_PHONE_AUTO_SMARTPORT
Switch(config)# end
Switch# show running configuration | include macro
macro auto mac-address-group address_trigger
mac auto mac-address-group hel
mac auto execute address_trigger builtin CISCO_PHONE_AUTO_SMARTPORT
 macro description CISCO_DMP_EVENT
 mac description CISCO_SWITCH_EVENT
!
<output truncated>
```

The example shows how to create an OUI list with five sequential addresses starting with 00000A and how to verify your entries:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# macro auto mac-address-group size5ouilist
Switch(config-addr-grp-mac)# oui range 00000A size 5
Switch(config-addr-grp-mac)# exit
Switch(config)# mac auto execute size5-ouilist builtin macro
Switch(config)# macro auto execute address_trigger builtin CISCO_PHONE_AUTO_SMARTPORT
Switch(config)# end
Switch# show running configuration | include oui
oui list 00000E
oui list 00000D
oui list 00000C
oui list 00000B
oui list 00000A
```

Configuring Macro Persistence

When you enable Auto Smartports on the switch, by default the macro configuration is applied at a link-up event and removed at a link-down event. When you enable macro persistence, the configuration is applied at link-up and is not removed at link-down. The applied configuration remains. Macro persistence remains configured after a reboot if you have saved the running configuration file.

Follow this optional procedure so that enable macros remain active on the switch after a link-down event.

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**interface** *interface-id*	Specifies an interface and enters interface configuration mode.
Step 3	**macro auto sticky**	Enables macros to remain active on the interface after a link-down event.
Step 4	**end**	Returns to privileged EXEC mode.

	Command	Purpose
Step 5	**show running-config interface** *interface-id*	Verifies your entries.
Step 6	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

To disable macro persistence, use the **no macro auto sticky** interface configuration command.

This example shows how to enable macro persistence on an interface:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet 2/0/1
Switch(config-if)# macro auto port sticky
Switch(config-if)# exit
Switch(config)# end
Switch# show running-config interface gigabitethernet 2/0/1
Building configuration...

Current configuration : 243 bytes
!
<output truncated>
!
interface GigabitEthernet2/0/1
 srr-queue bandwidth share 1 30 35 5
 queue-set 2
 priority-queue out
 mls qos trust device cisco-phone
 mls qos trust cos
macro auto port sticky
 service-policy input AUTOQOS-ENHANCED-CISCOPHONE-POLICY
end

<output truncated>

Switch#
```

Configuring Built-In Macro Options

Use this procedure to map event triggers to built-in macros and to replace the built-in macro default parameters with values that are specific to your switch. If you need to *replace* default parameters values in a macro, use the **macro auto device** global configuration command. All commands in this procedure are optional.

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**macro auto execute** *event trigger* **builtin** *built-in macro name* [*parameter*=*value*] [*parameter*=*value*]	Defines mapping from an event trigger to a built-in macro. Specify an *event trigger*: • CISCO_CUSTOM_EVENT • CISCO_DMP_EVENT • CISCO_IPVSC_EVENT • CISCO_LAST_RESORT_EVENT • CISCO_PHONE_EVENT • CISCO_ROUTER_EVENT • CISCO_SWITCH_EVENT • CISCO_WIRELESS_AP_EVENT • CISCO_WIRELESS_LIGHTWEIGHT_AP_EVENT • WORD—Apply a user-defined event trigger. Specify a **builtin** *built-in macro name*: Enter new values in the form of *name value pair* separated by spaces: [<name1>=<value1> <name2>=<value2>...]. Default values are shown exactly as they should be entered. • CISCO_AP_AUTO_SMARTPORT Specify the parameter value: NATIVE_VLAN=1. • CISCO_DMP_AUTO_SMARTPORT Specify the parameter value: ACCESS_VLAN=1. • CISCO_IPVSC_AUTO_SMARTPORT Specify the parameter value: ACCESS_VLAN=1. • CISCO_LWAP_AUTO_SMARTPORT Specify the parameter value: ACCESS_VLAN=1. • CISCO_PHONE_AUTO_SMARTPORT Specify the parameter values: ACCESS_VLAN=1 and VOICE_VLAN=2. • CISCO_ROUTER_AUTO_SMARTPORT Specify the parameter value: NATIVE_VLAN=1. • CISCO_SWITCH_AUTO_SMARTPORT Specify the parameter value: NATIVE_VLAN=1.

	Command	Purpose
Step 3	**remote** *url*	Specifies a remote server location for the remote macro file: • The syntax for the local flash file system on the standalone switch or the stack master: **flash:** • The syntax for the local flash file system on a stack member: **flash** *member number***:** • The syntax for the FTP: **ftp:**[[**//***username*[**:***password*]@*location*]*/directory*]*/filename* • The syntax for an HTTP server: **http://**[[*username***:***password*]@]{*hostname* | *host-ip*}[*/directory*]*/filename* • The syntax for a secure HTTP server: **https://**[[*username***:***password*]@]{*hostname* | *host-ip*}[*/directory*]*/filename* • The syntax for NVRAM: **nvram://**[[*username***:***password*]@][*/directory*]*/filename* • The syntax for the Remote Copy Protocol (RCP): **rcp:**[[**//***username*@*location*]*/directory*]*/filename* • The syntax for the Secure Copy Protocol (SCP): **scp:**[[*//username*@*location*]*/directory*]*/filename* • The syntax for the TFTP: **tftp:**[[**//***location*]*/directory*]*/filename*
Step 4	**end**	Returns to privileged EXEC mode.
Step 5	**show running-config**	Verifies your entries.
Step 6	**copy running-config startup-config**	Saves your entries in the configuration file.

This example shows how to use two built-in macros to connect Cisco switches and Cisco IP phones to the switch. This example modifies the default voice VLAN, access VLAN, and native VLAN for the trunk interface:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#!!! the next command modifies the access and voice vlans
Switch(config)#!!! for the built in Cisco IP phone auto smartport macro
Switch(config)# macro auto execute CISCO_PHONE_EVENT builtin CISCO_PHONE_AUTO_SMARTPORT
ACCESS_VLAN=10 VOICE_VLAN=20
Switch(config)#
Switch(config)#!!! the next command modifies the Native vlan used for inter switch trunks
Switch(config)# macro auto execute CISCO_SWITCH_EVENT builtin CISCO_SWITCH_AUTO_SMARTPORT
NATIVE_VLAN=10
Switch(config)#
Switch(config)#!!! the next command enables auto smart ports globally
Switch(config)# macro auto global processing
Switch(config)#
Switch(config)# exit

Switch# !!! here is the running configuration of the interface connected
Switch# !!! to another Cisco Switch after the Macro is applied
Switch#
Switch# show running-config interface gigabitethernet1/0/1
Building configuration...
```

```
Current configuration : 284 bytes
!
 interface GigabitEthernet1/0/1
 interface GigabitEthernet0/1
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 10
 switchport mode trunk
 srr-queue bandwidth share 10 10 60 20
 queue-set 2
 priority-queue out
 mls qos trust cos
 auto qos voip trust
 macro description CISCO_SWITCH_EVENT
end
```

This example shows how to configure the remote macro for native VLAN 5.

a. Configure the remote macro in the macro.txt file.

b. Use the **macro auto execute** configuration command to specify the remote location for the macro file.

Macro.txt file

```
if [[ $LINKUP -eq YES ]]; then
    conf t
           interface $INTERFACE
                  macro description $TRIGGER
                  auto qos voip trust
                  switchport trunk encapsulation dot1q
                  switchport trunk native vlan $NATIVE_VLAN
                  switchport trunk allowed vlan ALL
                  switchport mode trunk
            exit
    end
else
    conf t
           interface $INTERFACE
                 no macro description
                 no auto qos voip trust
                 no switchport mode trunk
                 no switchport trunk encapsulation dot1q
                 no switchport trunk native vlan $NATIVE_VLAN
                 no switchport trunk allowed vlan ALL
           exit
    end
```

```
Switch(config)# macro auto execute CISCO_SWITCH_EVENT remote tftp://<ip_address>/macro.txt
NATIVE_VLAN=5

Switch# show running configuration | include macro
macro auto execute CISCO_SWITCH_EVENT remote tftp://<ip_address>/macro.txt
NATIVE_VLAN=5
Switch#
```

Creating User-Defined Event Triggers

When using MAB or 802.1x authentication as an event trigger, create a trigger that corresponds to the Cisco attribute-value pair (**auto-smart-port=***event trigger*) sent by the RADIUS server. This procedure is optional.

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**shell trigger** *identifier description*	Specifies the event trigger identifier and description. The identifier should have no spaces or hyphens between words.
Step 3	**end**	Returns to privileged EXEC mode.
Step 4	**show shell triggers**	Displays the event triggers on the switch.
Step 5	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Use the **no shell trigger** *identifier* global configuration command to remove the event trigger.

This example shows how to map a user-defined event trigger called RADIUS_MAB_EVENT to the built-in macro CISCO_AP AUTO_SMARTPORT, to replace the default VLAN with VLAN 10, and how to verify the entries.

a. Connect the device to a MAB-enabled switch port.

b. On the RADIUS server, set the attribute-value pair to **auto-smart-port**=RADIUS_MAB_EVENT.

c. On the switch, create the event trigger RADIUS_MAB_EVENT.

d. The switch recognizes the attribute-value pair=RADIUS_MAB_EVENT response from the RADIUS server and applies the macro CISCO_AP_AUTO_SMARTPORT.

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# !!! create a user defined trigger and map
Switch(config)# !!! a system defined macro to it
Switch(config)# !!! first create the trigger event
Switch(config)# shell trigger RADIUS_MAB_EVENT MAC_AuthBypass Event
Switch(config)#
Switch(config)#!!! map a system defined macro to the trigger event
Switch(config)# macro auto execute RADIUS_MAB_EVENT builtin ?
  CISCO_AP_AUTO_SMARTPORT         Configure native vlan and trust cos
  CISCO_CUSTOM_AUTOSMARTPORT      Configure user defined parameters
  CISCO_DMP_AUTO_SMARTPORT        Configure access vlan, qos and port-security
  CISCO_IP_CAMERA_AUTO_SMARTPORT  Configure access vlan, qos and port-security
  CISCO_LAST_RESORT_SMARTPORT     Configure access vlan
  CISCO_LWAP_AUTO_SMARTPORT       Configure native vlan, qos, port-security and
                                  storm-control
  CISCO_PHONE_AUTO_SMARTPORT      Configure access vlan, voice vlan, trust
                                  device, interface bandwidth, port-security
  CISCO_ROUTER_AUTO_SMARTPORT     Configure native vlan, spanning tree
                                  port-fast,trunk mode and trust dscp
  CISCO_SWITCH_AUTO_SMARTPORT     Configure native vlan, trunk mode
Switch(config)# macro auto execute RADIUS_MAB_EVENT builtin CISCO_AP_AUTO_SMARTPORT
ACCESS_VLAN=10
Switch(config)# exit
Switch# show shell triggers
User defined triggers
---------------------
Trigger Id: RADIUS_MAB_EVENT
Trigger description: MAC_AuthBypass Event
Trigger environment:
Trigger mapping function: CISCO_AP_SMARTPORT
<output truncated>
```

This example shows how to use the **show shell** *triggers* privileged EXEC command to view the event triggers in the switch software:

```
Switch# show shell triggers
User defined triggers
---------------------
Built-in triggers
-----------------
Trigger Id: CISCO_AUTO_CONSOLE_EVENT
Trigger namespace: ASP_TRIG_GLOBAL_FUTURE
Trigger description: Console password
Trigger mapping function:
Parameters:
Current version: 1
Negotiated version: 1
Mapped Function: CISCO_AUTO_CONSOLE_PASSWD

Trigger Id: CISCO_AUTO_TIMEZONE_CONFIG
Trigger namespace: ASP_TRIG_GLOBAL_USR
Trigger description: timezone parameters
Trigger mapping function:
Parameters:
Current version: 1
Negotiated version: 1
Mapped Function: CISCO_AUTO_TIMEZONE

Trigger Id: CISCO_CUSTOM_EVENT
Trigger namespace: ASP_TRIG
Trigger description: Custom macro event to apply user defined configuration
Trigger mapping function:
Parameters:
Current version: 1
Negotiated version: 1
Mapped Function: CISCO_CUSTOM_AUTOSMARTPORT

Trigger Id: CISCO_DMP_EVENT
Trigger namespace: ASP_TRIG
Trigger description: Digital media-player device event to apply port configurati
on
Trigger mapping function:
Parameters: ACCESS_VLAN=1
Current version: 1
Negotiated version: 1
Mapped Function: CISCO_DMP_AUTO_SMARTPORT

Trigger Id: CISCO_IPVSC_EVENT
Trigger namespace: ASP_TRIG
Trigger description: IP-camera device event to apply port configuration
Trigger mapping function:
Parameters: ACCESS_VLAN=1
Current version: 1
Negotiated version: 1
Mapped Function: CISCO_IP_CAMERA_AUTO_SMARTPORT

Trigger Id: CISCO_LAST_RESORT_EVENT
Trigger namespace: ASP_TRIG
Trigger description: Last resort event to apply port confgiuration
Trigger mapping function:
Parameters: ACCESS_VLAN=1
Current version: 1
Negotiated version: 1
Mapped Function: CISCO_LAST_RESORT_SMARTPORT
```

```
Trigger Id: CISCO_PHONE_EVENT
Trigger namespace: ASP_TRIG
Trigger description: IP-phone device event to apply port configuration
Trigger mapping function:
Parameters: ACCESS_VLAN=1 VOICE_VLAN=2
Current version: 1
Negotiated version: 1
Mapped Function: CISCO_PHONE_AUTO_SMARTPORT

<output truncated>
```

This example shows how to use the **show shell functions** privileged EXEC command to view the built-in macros in the switch software:

```
Switch# show shell functions
#User defined functions:

#Built-in functions:
function CISCO_AP_AUTO_SMARTPORT () {
    if [[ $LINKUP -eq YES ]]; then
        conf t
            interface  $INTERFACE
                macro description $TRIGGER
                switchport trunk encapsulation dot1q
                switchport trunk native vlan $NATIVE_VLAN
                switchport trunk allowed vlan ALL
                switchport mode trunk
                switchport nonegotiate
                auto qos voip trust
                mls qos trust cos
                if [[ $LIMIT -eq 0 ]]; then
                  default srr-queue bandwidth limit
                else
                  srr-queue bandwidth limit $LIMIT
                fi
                if [[ $SW_POE -eq YES ]]; then
                   if [[ $AP125X -eq AP125X ]]; then
                      macro description AP125X
                      macro auto port sticky
                      power inline port maximum 20000
                   fi
                fi
             exit
        end
    fi
    if [[ $LINKUP -eq NO ]]; then
        conf t
            interface  $INTERFACE
                no macro description
                no switchport nonegotiate
                no switchport trunk native vlan $NATIVE_VLAN
                no switchport trunk allowed vlan ALL
                no auto qos voip trust
                no mls qos trust cos
                default srr-queue bandwidth limit
                if [[ $AUTH_ENABLED -eq NO ]]; then
                  no switchport mode
                  no switchport trunk encapsulation
                fi
                if [[ $STICKY -eq YES ]]; then
                   if [[ $SW_POE -eq YES ]]; then
                      if [[ $AP125X -eq AP125X ]]; then
                         no macro auto port sticky
                         no power inline port maximum
```

```
                        fi
                    fi
                fi
            exit
        end
    fi
}
<output truncated>
```

Configuring Event Trigger Control

Use event trigger control to specify when the switch applies macros. By default, the switch maps built-in and user-defined macros to these triggers:

- Detection method (for example, MAC address groups, MAB messages, 802.1x authentication messages, and LLDP messages)
- Device type (for example, Cisco switches, routers, and IP phones)
- Configured triggers

When you select triggers, the switch applies macros only when those triggers map to macros.

On a Switch

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**macro auto global control** {**detection** [**cdp**] [**lldp**] [**mac-address**] | **device** [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**] | **trigger** [**last-resort**]}	Specifies when the switch applies a macro based on the detection method, device type, or trigger. • **detection**—Use one or more of these as an event trigger: – **cdp**—CDP messages – **lldp**—LLDP messages – **mac-address**—User-defined MAC address groups • **device**—Use one or more of these devices as an event trigger: – **access-point**—Autonomous access point – **ip-camera**—Cisco IP video surveillance camera – **lightweight-ap**—Lightweight access point – **media-player**—Digital media player – **phone**—Cisco IP phone – **router**—Cisco router – **switch**—Cisco switch • **trigger**—Use a specific event trigger. – (Optional) **last-resort**—Last-resort trigger. By default, the switch uses all detection method, device types, and configured triggers.
Step 3	**end**	Returns to privileged EXEC mode.
Step 4	**show running-config**	Verifies your entries.
Step 5	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Use the **no macro auto global control** global configuration command to disable a specific trigger-to-macro mapping. The switch does not apply the macros mapped to the specific triggers.

To configure the switch to apply the CISCO_AP_AUTO_SMARTPORT macro only when it detects an autonomous access point:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# macro auto global control device access-point
Switch(config)# end
```

To configure the switch to apply the CISCO_AP_AUTO_SMARTPORT or the CISCO_SWITCH_AUTO_IP_CONFIG macro only when it detects an autonomous access point or a Cisco IP phone:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# macro auto global control device access-point phone
Switch(config)# end
```

On an Interface

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**interface** *interface_id*	Specifies an interface and enters interface configuration mode.
Step 3	**macro auto control** {**detection** [**cdp**] [**lldp**] [**mac-address**] | **device** [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**] | **trigger** [**last-resort**]}	Specifies when the switch applies a macro based on the detection method, device type, or trigger. • **detection**—Use one or more of these as an event trigger: – **cdp**—CDP messages – **lldp**—LLDP messages – **mac-address**—User-defined MAC address groups • **device**—Use one or more of these devices as an event trigger: – **access-point**—Autonomous access point – **ip-camera**—Cisco IP video surveillance camera – **lightweight-ap**—Lightweight access point – **media-player**—Digital media player – **phone**—Cisco IP phone – **router**—Cisco router – **switch**—Cisco switch • **trigger**—Use a specific event trigger. – (Optional) **last-resort**—Last-resort trigger. By default, the switch uses all detection method, device types, and configured triggers.
Step 4	**exit**	Returns to global configuration mode.
Step 5	**end**	Returns to privileged EXEC mode.
Step 6	**show macro auto**	Verifies your entries.
Step 7	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Use the **no macro auto global control** global configuration command to disable a specific trigger-to-macro mapping. The switch does not apply the macros mapped to the specific triggers.

To configure the switch to apply the CISCO_AP_AUTO_SMARTPORT or CISCO_PHONE_AUTO_SMARTPORT macro only when it detects a lightweight access point or a Cisco IP phone:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# interface gigabitethernet 5/0/1
Switch(config-if)# macro auto control device lightweight-ap phone
Switch(config-if)# exit
Switch(config)# end
```

Configuring User-Defined Macros

The Cisco IOS shell has basic scripting capabilities for configuring user-defined macros. These macros can contain multiple lines and can include any CLI command. You can also define variable-substitution, conditionals, functions, and triggers within the macro. This procedure is optional.

Note When configuring macros, you must enter a description. If the link is down (command **$LINKUP -eq NO**), you must enter the **no macro description** command. These commands are mandatory for Auto Smartports to work.

Beginning in privileged EXEC mode, follow these steps to map a user-defined event trigger to a user-defined macro.

	Command	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**macro auto execute** *event trigger* [*parameter=value*] **{***function contents***}**	Specifies a user-defined macro that maps to an event trigger. **{***function contents***}** Specify a user-defined macro to associate with the trigger. Enter the macro contents within braces. Begin the Cisco IOS shell commands with the left brace and end the command grouping with the right brace. (Optional) *parameter=value*—Replace default values that begin with **$**, and enter new values in the form of name value pair separated by spaces: [<name1>=<value1> <name2>=<value2>...].
Step 3	**end**	Returns to privileged EXEC mode.
Step 4	**show running-config**	Verifies your entries.
Step 5	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Example: User-Defined Event Trigger and Macro

This example shows how to map a user-defined event trigger called media player to a user-defined macro.

1. Connect the media player to an 802.1x- or MAB-enabled switch port.
2. On the RADIUS server, set the attribute-value pair to **auto-smart-port** =MP_EVENT.
3. On the switch, create the event trigger MP_EVENT, and enter the user-defined macro commands in the CLI example.
4. The switch recognizes the attribute-value pair=MP_EVENT response from the RADIUS server and applies the macro associated with this event trigger.

```
Switch(config)# shell trigger MP_EVENT mediaplayer
Switch(config)# macro auto execute MP_EVENT {
if [[ $LINKUP -eq YES ]]; then
conf t
 interface $INTERFACE
   macro description $TRIGGER
   switchport access vlan 1
   switchport mode access
   switchport port-security
   switchport port-security maximum 1
```

```
   switchport port-security violation restrict
   switchport port-security aging time 2
   switchport port-security aging type inactivity
   spanning-tree portfast
   spanning-tree bpduguard enable
   exit
fi
if [[ $LINKUP -eq NO ]]; then
conf t
interface $INTERFACE
     no macro description
     no switchport access vlan 1
     if [[ $AUTH_ENABLED -eq NO ]]; then
        no switchport mode access
     fi
     no switchport port-security
     no switchport port-security maximum 1
     no switchport port-security violation restrict
     no switchport port-security aging time 2
     no switchport port-security aging type inactivity
     no spanning-tree portfast
     no spanning-tree bpduguard enable
     exit
fi
}
Switch(config)# end
```

Example: Last-Resort Event Trigger and Macro

To map the CISCO_LAST_RESORT_AUTO_SMARTPORT macro to the last-resort trigger:

```
Switch(config)# macro auto global control trigger last-resort
```

CISCO_LAST_RESORT_AUTO_SMARTPORT macro:

```
if [[ $LINKUP -eq YES ]]; then
        conf t
            interface  $INTERFACE
                macro description $TRIGGER
                switchport access vlan $ACCESS_VLAN
                switchport mode access
                spanning-tree portfast
                spanning-tree bpdufilter enable
                load-interval 60
                no shutdown
            exit
        end
    fi
    if [[ $LINKUP -eq NO ]]; then
        conf t
            interface  $INTERFACE
                no macro description
                no switchport access vlan $ACCESS_VLAN
                no switchport mode access
                no spanning-tree portfast
                no spanning-tree bpdufilter enable
                no load-interval 60
            exit
        end
    fi
```

Example of user-defined mapping of a MAC address trigger to map a last-resort macro:

```
Switch(config)#macro auto mac
Switch(config)#macro auto mac-address-group Laptop
Switch(config-addr-grp-mac)#mac-address list 0000.0011.2233
Switch(config-addr-grp-mac)#exit
Switch(config)#macro auto execute laptop builtin CISCO_LAST_RESORT_SMARTPORT
ACCESS_VLAN=10
Switch(config)#end
Switch#
```

Example: Custom Event Trigger and CISCO_CUSTOM_AUTO_SMARTPORT Macro

Default CISCO_CUSTOM_AUTO_SMARTPORT macro:

```
if [[ $LINKUP -eq YES ]]; then
        conf t
            interface $INTERFACE
            exit
        end
    fi
    if [[ $LINKUP -eq NO ]]; then
        conf t
            interface $INTERFACE
            exit
        end
    fi
```

To create a user-defined macro with the same name as the custom macro, override the CISCO_CUSTOM_AUTO_SMARTPORT macro, and set the parameters for your switch, including the mapping from an event trigger to the macro.

```
Config# macro auto execute CISCO_CUSTOM_EVENT {
    if [[ $LINKUP -eq YES ]]; then
        conf t
            interface $INTERFACE
            description asp3-link-UP i.e. Custom Macro OFF
            no macro description
            switchport
            switchport mode access
            switchport access vlan $ACCESS_VLAN
            spanning-tree portfast
            exit
        end
    fi
    if [[ $LINKUP -eq NO ]]; then
        conf t
            interface $INTERFACE
            macro description $TRIGGER
            switchport access vlan $ACCESS_VLAN
            description asp3-link-DOWN i.e. Custom Macro ON
            exit
        end
    fi

}
```

Table 2-3 Supported Cisco IOS Shell Keywords

Command	Description
{	Begin the command grouping.
}	End the command grouping.
[[	Use as a conditional construct.
]]	Use as a conditional construct.
else	Use as a conditional construct.
-eq	Use as a conditional construct.
fi	Use as a conditional construct.
if	Use as a conditional construct.
then	Use as a conditional construct.
-z	Use as a conditional construct.
$	Variables that begin with the $ character are replaced with a parameter value.
#	Use the # character to enter comment text.

Table 2-4 Unsupported Cisco IOS Shell Reserved Keywords

Command	Description
|	Pipeline.
case	Conditional construct.
esac	Conditional construct.
for	Looping construct.
function	Shell function.
in	Conditional construct.
select	Conditional construct.
time	Pipeline.
until	Looping construct.
while	Looping construct.

Applying Macros on a Switch

You can use the CLI or the Cisco IOS shell scripting capability to set the macro parameters and to apply the macro.

To remove the macro, enter the **no** forms of the macro commands.

Using the CLI

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**macro auto config ?**	(Optional) Displays the global macros.
Step 2	**macro auto config** *global macro*	Sets the macro parameters. Follow the prompts in the CLI.
Step 3	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Example: One Macro

To display the global macros:

```
Switch# macro auto apply ?
  CISCO_SWITCH_AAA_ACCOUNTING         Configure aaa accounting parameters
  CISCO_SWITCH_AAA_AUTHENTICATION     Configure aaa authentication parameters
  CISCO_SWITCH_AAA_AUTHORIZATION      Configure aaa authorization parameters
  CISCO_SWITCH_AUTO_IP_CONFIG         Configure the ip parameters
  CISCO_SWITCH_AUTO_PCI_CONFIG        Configure PCI compliant parameters
  CISCO_SWITCH_DOMAIN_NAME_CONFIG     Configure domain name
  CISCO_SWITCH_ETHERCHANNEL_CONFIG    Configure the etherchannel parameters
  CISCO_SWITCH_HOSTNAME_CONFIG        Configure hostname
  CISCO_SWITCH_HTTP_SERVER_CONFIG     Configure http server
  CISCO_SWITCH_LOGGING_SERVER_CONFIG  Configure logging server
  CISCO_SWITCH_MGMT_VLAN_CONFIG       Configure management vlan parameters
  CISCO_SWITCH_NAME_SERVER_CONFIG     Configure name server parameters
  CISCO_SWITCH_NTP_SERVER_CONFIG      Configure NTP server
  CISCO_SWITCH_RADIUS_SERVER_CONFIG   Configure radius server
  CISCO_SWITCH_SETUP_SNMP_TRAPS       Configure SNMP trap parameters
  CISCO_SWITCH_SETUP_USR_CONFIG       Configure the user parameters
  CISCO_SWITCH_SNMP_SOURCE_CONFIG     Configure snmp source interface
  CISCO_SWITCH_TACACS_SERVER_CONFIG   Configure tacacs server
  CISCO_SWITCH_USER_PASS_CONFIG       Configure username and password

Switch# macro auto config ?
  CISCO_SWITCH_AAA_ACCOUNTING         Configure aaa accounting parameters
  CISCO_SWITCH_AAA_AUTHENTICATION     Configure aaa authentication parameters
  CISCO_SWITCH_AAA_AUTHORIZATION      Configure aaa authorization parameters
  CISCO_SWITCH_AUTO_IP_CONFIG         Configure the ip parameters
  CISCO_SWITCH_AUTO_PCI_CONFIG        Configure PCI compliant parameters
  CISCO_SWITCH_DOMAIN_NAME_CONFIG     Configure domain name
  CISCO_SWITCH_ETHERCHANNEL_CONFIG    Configure the etherchannel parameters
  CISCO_SWITCH_HOSTNAME_CONFIG        Configure hostname
  CISCO_SWITCH_HTTP_SERVER_CONFIG     Configure http server
  CISCO_SWITCH_LOGGING_SERVER_CONFIG  Configure logging server
  CISCO_SWITCH_MGMT_VLAN_CONFIG       Configure management vlan parameters
  CISCO_SWITCH_NAME_SERVER_CONFIG     Configure name server parameters
  CISCO_SWITCH_NTP_SERVER_CONFIG      Configure NTP server
  CISCO_SWITCH_RADIUS_SERVER_CONFIG   Configure radius server
  CISCO_SWITCH_SETUP_SNMP_TRAPS       Configure SNMP trap parameters
  CISCO_SWITCH_SETUP_USR_CONFIG       Configure the user parameters
  CISCO_SWITCH_SNMP_SOURCE_CONFIG     Configure snmp source interface
  CISCO_SWITCH_TACACS_SERVER_CONFIG   Configure tacacs server
  CISCO_SWITCH_USER_PASS_CONFIG       Configure username and password

Switch# macro auto config CISCO_SWITCH_HOSTNAME_CONFIG
Enter system's network name: CISCO
Do you want to apply the parameters? [yes/no]: yes
```

```
Enter configuration commands, one per line.  End with CNTL/Z.
Switch# macro auto apply CISCO_SWITCH_HOSTNAME_CONFIG
Enter configuration commands, one per line.  End with CNTL/Z.
CISCO#
```

Example: Combined Macros

```
Switch# macro auto config CISCO_SWITCH_AUTO_IP_CONFIG
Do you want to configure default domain name? [yes/no]: yes
Enter the domain name: cisco.com
Do you want to configure Name server ipv4 address? [yes/no]: yes
Enter the IPv4 address[a.b.c.d]: 10.77.11.34
Enter IP address of the logging host: 10.77.11.36
Do you want to configure VPN Routing/Forwarding Instance name? [yes/no]: no
Enter the ip address of NTP server[a.b.c.d]: 10.77.11.37
Do you want to apply the parameters? [yes/no]: yes
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Switch# macro auto apply CISCO_SWITCH_AUTO_IP_CONFIG
Enter configuration commands, one per line.  End with CNTL/Z.
Switch#
```

Using the Cisco IOS Shell

Beginning in privileged EXEC mode:

	Command	Purpose
Step 1	**macro auto config ?** or **macro auto apply ?**	(Optional) Displays the global macros.
Step 2	**macro auto config** *macro-name parameter=value* [*parameter=value*] ...	Sets the macro parameters. Follow the prompts in the CLI.
Step 3	**macro auto apply** *macro-name*	Applies the macro to the switch.
Step 4	**show macro auto**	Verifies your entries. The user-defined values appear only in the **show** command output.
Step 5	**copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Example: One Single Shell Parameter for One Macro

```
Switch# macro auto config CISCO_SWITCH_HOSTNAME_CONFIG HOSTNAME=CISCO
Switch# macro auto apply CISCO_SWITCH_HOSTNAME_CONFIG
Enter configuration commands, one per line.  End with CNTL/Z.
CISCO#
```

Example: Multiple Shell Parameters and Values for One Macro

```
Switch# macro auto config CISCO_SWITCH_ETHERCHANNEL_CONFIG PORT_CH_ID=1 PORT_CH_TYPE=2
EC_PROTO=Y EC_PROTO_TYPE=PAGP NO_OF_INT=3 MODE=AUTO INTERFACE=Gig2/0/1,Gig2/0/2,Gig2/0/3
NON_SILENT=Y EC_APPLY=YES
Switch# macro auto apply CISCO_SWITCH_ETHERCHANNEL_CONFIG
Enter configuration commands, one per line.  End with CNTL/Z.
Switch#
```

Example: Combined Macros

```
Switch# macro auto config CISCO_SWITCH_AUTO_IP_CONFIG CISCO_SWITCH_DOMAIN_NAME_CONFIG
DOMAIN_NAME=cisco.com
Switch# macro auto config CISCO_SWITCH_AUTO_IP_CONFIG CISCO_SWITCH_LOGGING_SERVER_CONFIG
HOST_IP=10.77.11.36
Switch# macro auto config CISCO_SWITCH_AUTO_IP_CONFIG CISCO_SWITCH_NAME_SERVER_CONFIG
IP_V4_ADDR=10.77.11.37
Switch# macro auto config CISCO_SWITCH_AUTO_IP_CONFIG CISCO_SWITCH_NTP_SERVER_CONFIG
IP_ADDRESS=10.77.11.38 VRF=NO
Switch# macro auto apply CISCO_SWITCH_AUTO_IP_CONFIG
Enter configuration commands, one per line.  End with CNTL/Z.
Switch#
```

Default Static Smartports Configuration

There are no static Smartports macros enabled on the switch.

Table 2-5 Default Static Smartports Macros

Macro Name[1]	Description
cisco-global	Use this global configuration macro to enable rapid per-VLAN spanning-tree plus (PVST+), loop guard, and dynamic port-error recovery for link state failures.
cisco-desktop	Use this interface configuration macro for increased network security and reliability when connecting a desktop device, such as a PC, to a switch port.
cisco-phone	Use this interface configuration macro when connecting a desktop device such as a PC with a Cisco IP Phone to a switch port. This macro is an extension of the **cisco-desktop** macro and provides the same security and resiliency feature and also dedicated voice VLANs to ensure proper treatment of delay-sensitive voice traffic.
cisco-switch	Use this interface configuration macro when connecting an access switch and a distribution switch or between access switches connected through small form-factor pluggable (SFP) modules.
cisco-router	Use this interface configuration macro when connecting the switch and a WAN router.
cisco-wireless	Use this interface configuration macro when connecting the switch and a wireless access point.

1. Cisco-default Smartports macros vary, depending on the software version running on your switch.

Static Smartports Configuration Guidelines

- When a macro is applied globally to a switch or to a switch interface, the existing configuration on the interface is retained. This is helpful when applying an incremental configuration.
- If a command fails because of a syntax or a configuration error, the macro continues to apply the remaining commands. You can use the **macro global trace** *macro-name* global configuration command or the **macro trace** *macro-name* interface configuration command to apply and then debug the macro to find any syntax or configuration errors.
- Some CLI commands are specific to certain interface types. If you apply a macro to an interface that does not accept the configuration, the macro fails the syntax or the configuration check, and the switch returns an error message.
- Applying a macro to an interface range is the same as applying a macro to a single interface. When you use an interface range, the macro is applied sequentially to each interface within the range. If a macro command fails on one interface, it is still applied to the remaining interfaces.
- When you apply a macro to a switch or a switch interface, the macro name is automatically added to the switch or interface. You can display the macro names and applied commands using the **show running-config** user EXEC command.

Applying Static Smartports Macros

Beginning in privileged EXEC mode, follow these steps to apply a static Smartports macro:

	Command	Purpose
Step 1	**show parser macro**	Displays the Cisco-default static Smartports macros embedded in the switch software.
Step 2	**show parser macro name** *macro-name*	Displays the specific macro that you want to apply.
Step 3	**configure terminal**	Enters global configuration mode.
Step 4	**macro global** {**apply** | **trace**} *macro-name* [**parameter** {*value*}] [**parameter** {*value*}] [**parameter** {*value*}]	Applies a macro on the switch: • To only apply each individual macro command, use the **macro global apply** *macro-name* command. • To apply and then debug a macro to find any syntax or configuration errors, use the **macro global trace** *macro-name*. Append the macro with the required values by using the **parameter** *value* keywords. Keywords that begin with **$** require a unique parameter value. You can use the **macro global apply** *macro-name* **?** command to display a list of any required values for the macro. If you apply a macro without entering the keyword values, the commands are invalid and are not applied. (Optional) Specify unique parameter values that are specific to the switch. You can enter up to three keyword-value pairs. Parameter keyword matching is case sensitive. The corresponding value replaces all matching occurrences of the keyword.
Step 5	**interface** *interface-id*	(Optional) Specifies an interface and enters interface configuration mode.

	Command	Purpose
Step 6	**default interface** *interface-id*	(Optional) Clears all configuration from the specified interface.
Step 7	**macro** {**apply** | **trace**} *macro-name* [**parameter** {*value*}] [**parameter** {*value*}] [**parameter** {*value*}]	Applies a macro on the interface: • To only apply each individual macro command, use the **macro apply** *macro-name* command. • To apply and then debug a macro to find any syntax or configuration errors, use the **macro trace** *macro-name*. Append the macro with the required values by using the **parameter** *value* keywords. Keywords that begin with **$** require a unique parameter value. You can use the **macro global apply** *macro-name* **?** command to display a list of any required values for the macro. If you apply a macro without entering the keyword values, the commands are invalid and are not applied. (Optional) Specify unique parameter values that are specific to the switch. You can enter up to three keyword-value pairs. Parameter keyword matching is case sensitive. The corresponding value replaces all matching occurrences of the keyword.
Step 8	**end**	Return to privileged EXEC mode.
Step 9	**show running-config interface** *interface-id*	Verify that the macro is applied to the interface.
Step 10	**copy running-config startup-config**	(Optional) Save your entries in the configuration file.

You can only delete a global macro-applied configuration on a switch by entering the **no** version of each command in the macro. You can delete a macro-applied configuration on a port by entering the **default interface** *interface-id* interface configuration command.

This example shows how to display the **cisco-desktop** macro, to apply the macro, and to set the access VLAN ID to 25 on an interface:

```
Switch# show parser macro name cisco-desktop
-------------------------------------------------------------
Macro name : cisco-desktop
Macro type : default interface
# macro keywords $access_vlan
# Basic interface - Enable data VLAN only
# Recommended value for access vlan should not be 1
switchport access vlan $access_vlan
switchport mode access
# Enable port security limiting port to a single
# MAC address -- that of desktop
switchport port-security
switchport port-security maximum 1
# Ensure port-security age is greater than one minute
# and use inactivity timer
switchport port-security violation restrict
switchport port-security aging time 2
switchport port-security aging type inactivity
# Configure port as an edge network port
spanning-tree portfast
spanning-tree bpduguard enable
-------------------------------------------------------------
Switch#
```

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet1/0/4
Switch(config-if)# macro apply cisco-desktop $access_vlan 25
```

Displaying Macros

Table 2-6 Commands for Displaying Auto Smartports and Static Smartports Macros

Command	Purpose
show macro auto ?	Displays information about Auto Smartports macros. • device: Displays device macro information • event: Displays macro event-related commands • global: Displays global macro information • interface: Displays interface Auto Smartports status
show parser macro	Displays all static smartports macros.
show parser macro name *macro-name*	Displays a specific static Smartports macro.
show parser macro brief	Displays the static Smartports macro names.
show parser macro description [**interface** *interface-id*]	Displays the static Smartports macro description for all interfaces or for a specified interface.
show shell	Displays information about Auto Smartports event triggers and macros. • data-path: Displays data paths for *fetch* • environment: Displays shell environment information • functions: Displays shell functions information • triggers: Displays shell triggers information

CHAPTER 3

Auto Smartports and Static Smartports Macros CLI Commands

debug macro

To enable debugging of the Auto Smartports macro activity, use the **debug macro** privileged EXEC command. Use the **no** form of this command to disable debugging.

debug macro {**action** | **all** | **api** | **common** | **detector** | **policydir** | **server** | **xml**}

no debug macro {**action** | **all** | **api** | **common** | **detector** | **policydir** | **server** | **xml**}

Syntax Description

action	Displays all action debug messages.
all	Displays all debug messages.
api	Displays all API debug messages.
common	Displays common debug messages.
detector	Displays detector error debug messages.
policydir	Displays policy director debug messages.
server	Displays server debug messages.
xml	Display XML debug messages.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(52)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E, 3560, 2975, 2960, and 2918 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

The **undebug macro** command is the same as the **no debug macro** command.

When you enable debugging on a switch stack, it is enabled only on the stack master. To enable debugging on a stack member, you can start a session from the stack master by using the **session** *switch-number* privileged EXEC command. Then enter the **debug** command at the command-line prompt of the stack member. You also can use the **remote command** *stack-member-number LINE* privileged EXEC command on the stack master switch to enable debugging on a member switch without first starting a session.

Related Commands

Command	Description
show debugging	Displays information about the enabled types of debugging.

macro

To apply a macro to an interface or to apply and debug a macro on an interface, use the **macro** interface configuration command.

macro {**apply** | **trace**} *macro-name* [**parameter** {*value*}] [**parameter** {*value*}] [**parameter** {*value*}]

Syntax Description

apply	Applies a macro to an interface.
trace	Applies a macro to an interface and then debugs it.
macro-name	Specifies the name of the macro.
parameter *value*	(Optional) Specifies unique parameter values that are specific to the interface. You can enter up to three keyword-value pairs. Parameter keyword matching is case sensitive. All matching occurrences of the keyword are replaced with the corresponding value.

Command Default

This command has no default setting.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(19)EA1	This command was introduced on Catalyst 3750 and 3560 switches.
12.2(18)SE	The **parameter value** keywords were added on Catalyst 3750 and 3560 switches.
12.2(25)FX	This command was introduced on Catalyst 2960 switches.
12.2(44)SE	This command was introduced on Catalyst 2918 switches.
12.2(46)EX	This command was introduced on Catalyst 2975 switches.
12.2(35)SE2	This command was introduced on the Catalyst 3750-E and 3560-E switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

You can use the **macro apply** *macro-name* interface configuration command to apply and show the macros running on an interface.

You can use the **macro trace** *macro-name* interface configuration command to apply and then debug the macro to find any syntax or configuration errors.

If a command fails because of a syntax error or a configuration error when you apply a macro, the macro continues to apply the remaining commands to the interface.

When creating a macro that requires the assignment of unique values, use the **parameter** *value* keywords to designate values specific to the interface.

Keyword matching is case sensitive. All matching occurrences of the keyword are replaced with the corresponding value. Any full match of a keyword, even if it is part of a larger string, is considered a match and is replaced by the corresponding value.

Some macros might contain keywords that require a parameter value. You can use the **macro apply** *macro-name* **?** command to display a list of any required values in the macro. If you apply a macro without entering the keyword values, the commands are invalid and are not applied.

There are Cisco-default Smartports macros embedded in the switch software. You can display these macros and the commands that they contain by using the **show parser macro** user EXEC command.

Follow these guidelines when you apply a Cisco-default Smartports macro on an interface:

- Display all macros on the switch by using the **show parser macro** user EXEC command. Display the contents of a specific macro by using the **show parser macro name** *macro-name* user EXEC command.
- Keywords that begin with **$** mean that a unique parameter value is required. Append the Cisco-default macro with the required values by using the **parameter** *value* keywords.

  The Cisco-default macros use the **$** character to identify required keywords. You can use the **$** character to define keywords when you create a macro.

When you apply a macro to an interface, the macro name is automatically added to the interface. You can display the applied commands and macro names by using the **show running-config interface** *interface-id* user EXEC command.

A macro applied to an interface range behaves the same way as a macro applied to a single interface. When you use an interface range, the macro is applied sequentially to each interface within the range. If a macro command fails on one interface, it is still applied to the remaining interfaces.

You can delete a macro-applied configuration on an interface by entering the **default interface** *interface-id* interface configuration command.

Examples

After you use the **macro name** global configuration command, you can apply it to an interface. This example shows how to apply a user-created macro called *duplex* to an interface:

```
Switch(config-if)# macro apply duplex
```

To debug a macro, use the **macro trace** interface configuration command to find any syntax or configuration errors in the macro as it is applied to an interface.

```
Switch(config-if)# macro trace duplex
Applying command...'duplex auto'
%Error Unknown error.
Applying command...'speed nonegotiate'
```

This example shows how to display the Cisco-default *cisco-desktop* macro and how to apply the macro and set the access VLAN ID to 25 on an interface:

```
Switch# show parser macro cisco-desktop
-------------------------------------------------------------
Macro name : cisco-desktop
Macro type : default

# Basic interface - Enable data VLAN only
# Recommended value for access vlan (AVID) should not be 1
switchport access vlan $AVID
switchport mode access

# Enable port security limiting port to a single
# MAC address -- that of desktop
```

```
switchport port-security
switchport port-security maximum 1

# Ensure port-security age is greater than one minute
# and use inactivity timer
switchport port-security violation restrict
switchport port-security aging time 2
switchport port-security aging type inactivity

# Configure port as an edge network port
spanning-tree portfast
spanning-tree bpduguard enable
------------------------------------------------------------------
Switch#
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet1/0/4
Switch(config-if)# macro apply cisco-desktop $AVID 25
```

Related Commands

Command	Description
macro description	Adds a description about the macros that are applied to an interface. This is a mandatory command for Auto Smartports to work.
macro global	Applies a macro on a switch or applies and traces a macro on a switch.
macro global description	Adds a description about the macros that are applied to the switch.
show parser macro	Displays the macro definition for all macros or for the specified macro.

macro auto

To configure and apply a global macro, use the **macro auto** privileged EXEC command. Use the **no** form of this command to return to the default setting.

Using the CLI:

macro auto {**apply** | **config**} *macro-name*

Using the Cisco IOS shell scripting capability:

macro auto apply *macro-name*

macro auto config *macro-name* [*parameter*=*value* [*parameter*=*value*] ...]

Syntax Description

apply	Applies the macro.
config	Enters the macro parameters.
macro-name	Specifies the macro name.
parameter=*value* [*parameter*=*value*] ...	*parameter*=*value*—Replaces values for global macro parameter values. Enter values in the form of name value pair separated by a space: <name1>=<value1> [<name2>=<value2>...].

Command Default

No macros are applied to the switch.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(55)SE	This command was introduced on the Catalyst 3750-X, 3750-E, 3750, 3560-X, 3560-E, 3560, 2975, 2960, and 2918 switches.

Usage Guidelines

To remove the macro from the switch, enter the **no** forms of the macro commands.

If you enter the **macro auto config** *macro-name* command, you are prompted to enter values for all the macro parameters.

Use the exact text string when entering the *macro-name* and *parameters*. The entries are case sensitive.

The user-defined values appear only in the **show macro auto** or **show running-config** command output.

Examples

To display global macros:

```
Switch# macro auto apply ?
  CISCO_SWITCH_AAA_ACCOUNTING         Configure aaa accounting parameters
  CISCO_SWITCH_AAA_AUTHENTICATION     Configure aaa authentication parameters
  CISCO_SWITCH_AAA_AUTHORIZATION      Configure aaa authorization parameters
  CISCO_SWITCH_AUTO_IP_CONFIG         Configure the ip parameters
```

```
  CISCO_SWITCH_AUTO_PCI_CONFIG        Configure PCI compliant parameters
  CISCO_SWITCH_DOMAIN_NAME_CONFIG     Configure domain name
  CISCO_SWITCH_ETHERCHANNEL_CONFIG    Configure the etherchannel parameters
  CISCO_SWITCH_HOSTNAME_CONFIG        Configure hostname
  CISCO_SWITCH_HTTP_SERVER_CONFIG     Configure http server
  CISCO_SWITCH_LOGGING_SERVER_CONFIG  Configure logging server
  CISCO_SWITCH_MGMT_VLAN_CONFIG       Configure management vlan parameters
  CISCO_SWITCH_NAME_SERVER_CONFIG     Configure name server parameters
  CISCO_SWITCH_NTP_SERVER_CONFIG      Configure NTP server
  CISCO_SWITCH_RADIUS_SERVER_CONFIG   Configure radius server
  CISCO_SWITCH_SETUP_SNMP_TRAPS       Configure SNMP trap parameters
  CISCO_SWITCH_SETUP_USR_CONFIG       Configure the user parameters
  CISCO_SWITCH_SNMP_SOURCE_CONFIG     Configure snmp source interface
  CISCO_SWITCH_TACACS_SERVER_CONFIG   Configure tacacs server
  CISCO_SWITCH_USER_PASS_CONFIG       Configure username and password

Switch# macro auto config ?
  CISCO_SWITCH_AAA_ACCOUNTING         Configure aaa accounting parameters
  CISCO_SWITCH_AAA_AUTHENTICATION     Configure aaa authentication parameters
  CISCO_SWITCH_AAA_AUTHORIZATION      Configure aaa authorization parameters
  CISCO_SWITCH_AUTO_IP_CONFIG         Configure the ip parameters
  CISCO_SWITCH_AUTO_PCI_CONFIG        Configure PCI compliant parameters
  CISCO_SWITCH_DOMAIN_NAME_CONFIG     Configure domain name
  CISCO_SWITCH_ETHERCHANNEL_CONFIG    Configure the etherchannel parameters
  CISCO_SWITCH_HOSTNAME_CONFIG        Configure hostname
  CISCO_SWITCH_HTTP_SERVER_CONFIG     Configure http server
  CISCO_SWITCH_LOGGING_SERVER_CONFIG  Configure logging server
  CISCO_SWITCH_MGMT_VLAN_CONFIG       Configure management vlan parameters
  CISCO_SWITCH_NAME_SERVER_CONFIG     Configure name server parameters
  CISCO_SWITCH_NTP_SERVER_CONFIG      Configure NTP server
  CISCO_SWITCH_RADIUS_SERVER_CONFIG   Configure radius server
  CISCO_SWITCH_SETUP_SNMP_TRAPS       Configure SNMP trap parameters
  CISCO_SWITCH_SETUP_USR_CONFIG       Configure the user parameters
  CISCO_SWITCH_SNMP_SOURCE_CONFIG     Configure snmp source interface
  CISCO_SWITCH_TACACS_SERVER_CONFIG   Configure tacacs server
  CISCO_SWITCH_USER_PASS_CONFIG       Configure username and password
```

To display the parameters for a specific macro:

```
Switch# macro auto config CISCO_SWITCH_AUTO_IP_CONFIG ?
  CISCO_SWITCH_DOMAIN_NAME_CONFIG     domain name parameters
  CISCO_SWITCH_LOGGING_SERVER_CONFIG  logging host parameters
  CISCO_SWITCH_NAME_SERVER_CONFIG     name server parameters
  CISCO_SWITCH_NTP_SERVER_CONFIG      ntp server parameters
  LINE                                Provide parameters of form [Parameters
                                      name=value]
  <cr>

Switch# macro auto config CISCO_SWITCH_AUTO_PCI_CONFIG ?
  CISCO_SWITCH_AAA_ACCOUNTING         aaa accounting parameters
  CISCO_SWITCH_AAA_AUTHENTICATION     aaa authentication parameters
  CISCO_SWITCH_AAA_AUTHORIZATION      aaa authorization parameters
  CISCO_SWITCH_HTTP_SERVER_CONFIG     http server parameters
  CISCO_SWITCH_RADIUS_SERVER_CONFIG   radius server parameters
  CISCO_SWITCH_TACACS_SERVER_CONFIG   tacacs server parameters
  LINE                                Provide parameters of form [Parameters
                                      name=value]
  <cr>

Switch# macro auto config CISCO_SWITCH_SETUP_SNMP_TRAPS ?
  CISCO_SWITCH_SNMP_SOURCE_CONFIG   snmp source parameters
  LINE                              Provide parameters of form [Parameters
                                    name=value]
  <cr>
```

```
Switch# macro auto config CISCO_SWITCH_SETUP_USR_CONFIG ?
  CISCO_AUTO_TIMEZONE_CONFIG    timezone parameters
  CISCO_SWITCH_HOSTNAME_CONFIG  hostname parameter
  LINE                          Provide parameters of form [Parameters
                                name=value]
  <cr>
```

To set macro parameters and apply the macro using the CLI:

```
Switch# macro auto config CISCO_SWITCH_ETHERCHANNEL_CONFIG
Enter the port channel id[1-48] for 3K & 2350,[1-6] for 2K: 2
Enter the port channel type, Layer:[2-3(L3 not supported on 2K)]: 2
Enter etherchannel mode for the interface[auto/desirable/on/active/passive]: active
Enter the channel protocol[lacp/none]: lacp
Enter the number of interfaces to join the etherchannel[8-PAGP/MODE:ON,16-LACP]: 7
Enter interface name[GigabitEthernet3/0/3]: gigabitethernet1/0/1
Enter interface name[GigabitEthernet3/0/3]: gigabitethernet1/0/2
Enter interface name[GigabitEthernet3/0/3]: gigabitethernet1/0/3
Enter interface name[GigabitEthernet3/0/3]: gigabitethernet1/0/4
Enter interface name[GigabitEthernet3/0/3]: gigabitethernet1/0/5
Enter interface name[GigabitEthernet3/0/3]: gigabitethernet1/0/6
Enter interface name[GigabitEthernet3/0/3]: gigabitethernet1/0/7
Do you want to apply the parameters? [yes/no]: yes
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Enter configuration commands, one per line.  End with CNTL/Z.
Switch# macro auto apply CISCO_SWITCH_ETHERCHANNEL_CONFIG
Enter configuration commands, one per line.  End with CNTL/Z.
Switch#
```

You can also use the Cisco IOS shell scripting capability to set the parameters. For examples, see the "Configuring and Applying Global Macros" section in the "Configuring Auto Smartports and Static Smartports Macros" chapter.

Related Commands

Command	Description
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro auto control

To specify when the switch applies an Auto Smartports macro based on the detection method, device type, or trigger (referred to as event trigger control), use the **macro auto control** interface configuration command. Use the **no** form of this command to disable trigger-to-macro mapping. The switch then does not ai pply macros based on event triggers.

macro auto control {**detection** [**cdp**] [**lldp**] [**mac-address**] | **device** [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**] | **trigger** [**last-resort**]}

no macro auto control {**detection** [**cdp**] [**lldp**] [**mac-address**] | **device** [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**] | **trigger** [**last-resort**]}

Syntax Description

detection [**cdp**] [**lldp**] [**mac-address**]	**detection**—Sets one or more of these as an event trigger: • (Optional) **cdp**—CDP messages • (Optional) **lldp**—LLDP messages • (Optional) **mac-address**—User-defined MAC address groups
device [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**]	**device**—Sets one or more of these devices as an event trigger: • (Optional) **access-point**—Autonomous access point • (Optional) **ip-camera**—Cisco IP video surveillance camera • (Optional) **lightweight-ap**—Lightweight access point • (Optional) **media-player**—Digital media player • (Optional) **phone**—Cisco IP phone • (Optional) **router**—Cisco router • (Optional) **switch**—Cisco switch
trigger [**last-resort**]	**trigger**—Sets a specific event trigger. • (Optional) **last-resort**—Last-resort trigger.

Command Default

The switch uses the device type as the event trigger. If the switch cannot determine the device type, it uses MAC address groups, MAB messages, 802.1x authentication messages, and LLDP messages in random order.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(55)SE	This command was introduced on the Catalyst 3750-X, 3750-E, 3750, 3560-X, 3560-E, 3560, 2975, 2960, and 2918 switches.

Usage Guidelines

If you do not set event triggers, the switch uses the device type as the event trigger. If the switch cannot determine the device type, it uses MAC address groups, MAB messages, 802.1x authentication messages, and LLDP messages in random order.

To verify that a macro is applied to an interface, use the **show macro auto interface** user EXEC command.

Examples

To set LLDP messages and MAC address groups as event triggers:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# interface gigabitethernet 5/0/2
Switch(config-if)# macro auto control detection lldp mac-address
Switch(config-if)# exit
Switch(config)# end
```

To set access points, video surveillance cameras, and digital media players as event triggers:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# interface gigabitethernet 5/0/1
Switch(config-if)# macro auto control device access-point ip-camera media-player
Switch(config-if)# exit
Switch(config)# end
```

The switch applies a built-in macro only when it detects an access point, video surveillance camera, or digital media player.

Related Commands

Command	Description
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto mac-address-group	Configures MAC address groups.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro auto device

To replace macro default parameter values with values that are specific to your switch, use the **macro auto device** global configuration command. Use the **no** form of this command to remove the parameter values.

macro auto device {**access-point** | **ip-camera** | **lightweight-ap** | **media-player** | **phone** | **router** | **switch**} [*parameter=value*]

no macro auto device {**access-point** | **ip-camera** | **lightweight-ap** | **media-player** | **phone** | **router** | **switch**} [*parameter=value*]

Syntax Description

access-point	Replaces the access-point default parameter value: NATIVE_VLAN=1
ip-camera	Replaces the IP video surveillance camera default parameter value: ACCESS_VLAN=1
lightweight-ap	Replaces the lightweight access point default parameter value: ACCESS_VLAN=1
media-player	Replaces the digital media player default parameter value: ACCESS_VLAN=1
phone	Replaces the IP phone default parameter values: ACCESS_VLAN=1 VOICE_VLAN=2
router	Replaces the router default parameter value: NATIVE_VLAN=1
switch	Replaces the switch default parameter value: NATIVE_VLAN=1
parameter=value	(Optional) Replaces the macro default parameter values. Enter new values in the form of name value pair separated by spaces: [<name1>=<value1> <name2>=<value2>...]

Command Default

Macro default parameter values are defined previously.

Command Modes

Global configuration

Command History

Release	Modification
12.2(52)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E, 3560, 2975, 2960, and 2918 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use the **macro auto device** global configuration command to replace macro default parameter values with values that are specific to your switch. Use the **no** form of this command to remove the parameter values.

Use the **show macro device** privileged EXEC command to display the contents of the macros. Use the *parameter=value* keywords to replace default parameter values within a specific macro.

You can also use the **macro auto execute** global configuration command to specify default parameter values. This command also requires that you specify an event trigger and a built-in or user-defined macro. If you enable both the **macro auto device** and the **macro auto execute** commands, the parameters specified in the command last executed is applied to the switch. Only one command is active on the switch.

To verify that a macro is applied to an interface, use the **show macro auto interface** user EXEC command.

Examples

This example shows how to display the IP phone macro parameter values, enable the IP phone macro, and change the default voice VLAN to 20:

```
Switch# show macro auto device phone
Device:phone
Default Macro:CISCO_PHONE_AUTO_SMARTPORT
Current Macro:CISCO_PHONE_AUTO_SMARTPORT
Configurable Parameters:ACCESS_VLAN VOICE_VLAN
Defaults Parameters:ACCESS_VLAN=1 VOICE_VLAN=2
Current Parameters:ACCESS_VLAN=1 VOICE_VLAN=2

Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# macro auto device phone VOICE_VLAN=20
Switch(config)# end
Switch# show macro auto device phone
Device:phone
Default Macro:CISCO_PHONE_AUTO_SMARTPORT
Current Macro:CISCO_PHONE_AUTO_SMARTPORT
Configurable Parameters:ACCESS_VLAN VOICE_VLAN
Defaults Parameters:ACCESS_VLAN=1 VOICE_VLAN=2
Current Parameters:VOICE_VLAN=20
```

Related Commands

Command	Description
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto mac-address-group	Configures MAC address groups.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro auto execute

To replace built-in macro default values and to configure mapping from an event trigger to a built-in or user-defined macro, use the **macro auto execute** global configuration command.

macro auto execute *event trigger* {[**builtin** *built-in macro name*] | [**remote** *url*]} [*parameter*=*value*]

macro auto execute *event trigger* [*parameter*=*value*] [{ *function contents* }]

no macro auto execute *event trigger* {[**builtin** *built-in macro name*] | [**remote** *url*]} [*parameter*=*value*]

no macro auto execute *event trigger* [*parameter*=*value*] [{ *function contents* }]

Syntax Description

event trigger	Defines mapping from an event trigger to a built-in macro. Specifies an *event trigger*: • CISCO_CUSTOM_EVENT • CISCO_DMP_EVENT • CISCO_IPVSC_EVENT • CISCO_LAST_RESORT_EVENT • CISCO_PHONE_EVENT • CISCO_ROUTER_EVENT • CISCO_SWITCH_EVENT • CISCO_WIRELESS_AP_EVENT • CISCO_WIRELESS_LIGHTWEIGHT_AP_EVENT • WORD—Apply a user-defined event trigger such as a MAC address group.
builtin *built-in macro name*	(Optional) Specifies a **builtin** *built-in macro name*: • CISCO_AP_AUTO_SMARTPORT Specify the parameter value: NATIVE_VLAN=1. • CISCO_DMP_AUTO_SMARTPORT Specify the parameter value: ACCESS_VLAN=1. • CISCO_IPVSC_AUTO_SMARTPORT Specify the parameter value: ACCESS_VLAN=1. • CISCO_LWAP_AUTO_SMARTPORT Specify the parameter value: ACCESS_VLAN=1. • CISCO_PHONE_AUTO_SMARTPORT Specify the parameter values: ACCESS_VLAN=1 and VOICE_VLAN=2. • CISCO_ROUTER_AUTO_SMARTPORT Specify the parameter value: NATIVE_VLAN=1. • CISCO_SWITCH_AUTO_SMARTPORT Specify the parameter value: NATIVE_VLAN=1.

parameter=value	(Optional) *parameter=value*—Replaces default values for parameter values shown for the *bultin-macro name,* for example, ACCESS_VLAN=1. Enter new values in the form of name value pair separated by a space: [<name1>=<value1> <name2>=<value2>...].
{*function contents*}	(Optional) {*function contents*} Specifies a user-defined macro to associate with the trigger. Enter the macro contents within braces. Begin the Cisco IOS shell commands with the left brace and end the command grouping with the right brace.
remote *url*	(Optional) Specifies a remote server location: • The syntax for the local flash file system on the standalone switch or the stack master: **flash:** • The syntax for the local flash file system on a stack member: **flash** *member number***:** • The syntax for the FTP: **ftp:**[[*//username*[**:***password*]*@location*]*/directory*]*/filename* • The syntax for an HTTP server: **http://**[[*username***:***password*]@]{*hostname* | *host-ip*}[*/directory*]*/filename* • The syntax for a secure HTTP server: **https://**[[*username***:***password*]@]{*hostname* | *host-ip*}[*/directory*]*/filename* • The syntax for the NVRAM: **nvram://**[[*username***:***password*]@][*/directory*]*/filename* • The syntax for the Remote Copy Protocol (RCP): **rcp:**[[*//username@location*]*/directory*]*/filename* • The syntax for the Secure Copy Protocol (SCP): **scp:**[[*//username@location*]*/directory*]*/filename* • The syntax for the TFTP: **tftp:**[[*//location*]*/directory*]*/filename*

Command Default

This command has no default setting.

Command Modes

Global configuration

Command History

Release	Modification
12.2(50)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E, 3560, 2960, and 2918 switches. It replaced the **macro name** global configuration command.
12.2(52)SE	The **remote** keyword and *url* argument were added on the Catalyst 3750-E, 3750, 3560-E, 3560, 2960, and 2918 switches. The command was introduced on Catalyst 2975 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use the **macro auto execute** global configuration command to replace the built-in macro default values with values that are specific to your switch.

The switch automatically maps from event triggers to built-in macros. The built-in macros are system-defined macros in the software image. You can also create user-defined macros by using the Cisco IOS shell scripting capability.

You can create new event triggers by using the **shell trigger** global configuration commands. Use the **show shell triggers** privileged EXEC command to display the contents of the user-defined triggers and macros.

You can use the **macro auto mac-address-group** global configuration command to create event triggers for devices that do not support Cisco Discovery Protocol (CDP) or Link Layer Discovery Protocol (LLDP).

You can use the remote macro feature to store macros in a central location for designated network switches to use. You can then maintain and update the macro files for use by multiple switches. Use **remote** *url* to configure the remote server location and macro path information. There are no specific file extension requirements for saved macro files.

Auto Smartports macros and antimacros (the antimacro is the portion of the applied macro that removes it at link down) have these guidelines and limitations:

- You can delete or change the built-in macros. However, you can override a built-in macro by creating a user-defined macro with the same name. To restore the original built-in macro, delete the user-defined macro.
- If you enable both the **macro auto device** and the **macro auto execute** global configuration commands, the parameters specified in the command last executed are applied to the switch. Only one command is active on the switch.
- To avoid system conflicts when macros are applied, remove all port configurations except for 802.1x authentication.
- Do not configure port security when enabling Auto Smartports on the switch.
- If the macro conflicts with the original configuration, either the macro does not apply some of the original configuration commands, or the antimacro does not remove them. (The antimacro is the portion of the applied macro that removes the macro at a link-down event.)

  For example, if 802.1x authentication is enabled, you cannot remove the switchport-mode access configuration. Remove the 802.1x authentication before removing the switchport mode configuration.
- A port cannot be a member of an EtherChannel when you apply Auto Smartports macros.
- The built-in-macro default data VLAN is VLAN 1. The default voice VLAN is VLAN 2. If your switch uses different access, native, or voice VLANs, use the **macro auto device** or the **macro auto execute** global configuration commands to configure the values.
- For 802.1x authentication or MAC authentication bypass (MAB), to detect non-Cisco devices, configure the RADIUS server to support the Cisco attribute-value pair **auto-smart-port=***event trigger.*
- The switch supports Auto Smartport macros only on directly connected devices. Multiple device connections, such as hubs, are not supported.
- If authentication is enabled on a port, the switch ignores a MAC address trigger if authentication fails.
- The order of CLI commands within the macro and the corresponding antimacro can be different.

Examples

This example shows how to use two built-in macros for connecting Cisco switches and Cisco IP phones to the switch. This example modifies the default voice VLAN, access VLAN, and native VLAN for the trunk interface:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#!!! the next command modifies the access and voice vlans
Switch(config)#!!! for the built in Cisco IP phone auto smartport macro
Switch(config)# macro auto execute CISCO_PHONE_EVENT builtin CISCO_PHONE_AUTO_SMARTPORT
ACCESS_VLAN=10 VOICE_VLAN=20
Switch(config)#
Switch(config)#!!! the next command modifies the Native vlan used for inter switch trunks
Switch(config)# macro auto execute CISCO_SWITCH_EVENT builtin CISCO_SWITCH_AUTO_SMARTPORT
NATIVE_VLAN=10
Switch(config)#
Switch(config)#!!! the next command enables auto smart ports globally
Switch(config)# macro auto global processing
Switch(config)#
Switch(config)# exit

Switch# !!! here is the running configuration of the interface connected
Switch# !!! to another Cisco Switch after the Macro is applied
Switch#
Switch# show running-config interface gigabitethernet1/0/1
Building configuration...

Current configuration : 284 bytes
!
interface GigabitEthernet1/0/1
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 10
 switchport mode trunk
 srr-queue bandwidth share 10 10 60 20
 queue-set 2
 priority-queue out
 mls qos trust cos
 auto qos voip trust
 macro description CISCO_SWITCH_EVENT
end
```

This example shows how to map a user-defined event trigger called media player to a user-defined macro.

1. Connect the media player to an 802.1x- or MAB-enabled switch port.
2. On the RADIUS server, set the attribute-value pair to **auto-smart-port**=MP_EVENT.
3. On the switch, create the event trigger MP_EVENT, and enter the user-defined macro commands.
4. The switch recognizes the attribute-value pair=MP_EVENT response from the RADIUS server and applies the macro associated with this event trigger.

```
Switch(config)# shell trigger MP_EVENT mediaplayer
Switch(config)# macro auto execute MP_EVENT {
if [[ $LINKUP -eq YES ]]; then
conf t
 interface $INTERFACE
   macro description $TRIGGER
   switchport access vlan 1
   switchport mode access
   switchport port-security
   switchport port-security maximum 1
   switchport port-security violation restrict
   switchport port-security aging time 2
```

```
   switchport port-security aging type inactivity
   spanning-tree portfast
   spanning-tree bpduguard enable
   exit
fi
if [[ $LINKUP -eq NO ]]; then
conf t
interface $INTERFACE
     no macro description $TRIGGER
     no switchport access vlan 1
     if [[ $AUTH_ENABLED -eq NO ]]; then
        no switchport mode access
     fi
     no switchport port-security
     no switchport port-security maximum 1
     no switchport port-security violation restrict
     no switchport port-security aging time 2
     no switchport port-security aging type inactivity
     no spanning-tree portfast
     no spanning-tree bpduguard enable
     exit
fi
```

Table 3-1 Supported Cisco IOS Shell Keywords

Command	Description
{	Begin the command grouping.
}	End the command grouping.
[[	Use as a conditional construct.
]]	Use as a conditional construct.
else	Use as a conditional construct.
-eq	Use as a conditional construct.
fi	Use as a conditional construct.
if	Use as a conditional construct.
then	Use as a conditional construct.
-z	Use as a conditional construct.
$	Variables that begin with the $ character are replaced with a parameter value.
#	Use the # character to enter comment text.

Table 3-2 Unsupported Cisco IOS Shell Reserved Keywords

Command	Description
|	Pipeline.
case	Conditional construct.
esac	Conditional construct.
for	Looping construct.
function	Shell function.
in	Conditional construct.
select	Conditional construct.
time	Pipeline.
until	Looping construct.
while	Looping construct.

Related Commands

Command	Description
macro auto device	Configures macro default parameter values.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto mac-address-group	Configures MAC address groups.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro auto file

To deregister the Cisco IOS shell scripts and to register user-defined scripts, use the **macro auto file** global configuration command. Use the **no** form of this command to remove the registration of system-defined scripts from the policy engine.

macro auto file {**directory** *word*} | {**register** *word* **type** [**system** | **user**]}

no macro auto file {**directory** *word*} | {**register** *word* **type** [**system** | **user**]}

Syntax Description

directory *word*	Specifies the auto execution user file directory path.
register *word* **type**	Specifies the name and type of the file to register.
system	(Optional) Searches for a system policy file.
user	(Optional) Searches for a user policy file.

Command Default

There is no default.

Command Modes

Global configuration

Command History

Release	Modification
12.2(52)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E. 3560, 2975, 2960, and 2918 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use the **macro auto file** global configuration command to deregister the Cisco IOS shell scripts and to register user-defined scripts.

Examples

This example shows how to deregister the system-defined file *Mandatory.cdp.sh*, copy the user-defined script to flash, register the location of the user-defined file, register the file *Mandatory.cdp.sh*, and how to verify your entries:

```
Switch# directory flash:
Directory of flash:/

    3  -rwx        3533   Mar 1 1993 00:02:26 +00:00  Mandatory.cdp.sh

Switch(config)# no macro auto file register Mandatory.cdp.sh
Switch(config)# macro auto file directory "flash:"
Switch(config)# macro auto file register Mandatory.cdp.sh type user
Switch(config)# end
Switch# show running config | inc macro

macro auto file directory "flash:/"
macro auto file register Mandatory.cdp.sh type user
```

```
For ASP EEM registers the following policy scripts:

Mandatory.cdp.sh        Mandatory.link.sh       Mandatory.lldp.sh
Mandatory.identity.sh   Mandatory.link2.sh      Mandatory.mat.sh
```

Related Commands

Command	Description
macro auto global processing	Enables Auto Smartports on a switch.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro auto global control

To specify when the switch applies an Auto Smartports macro based on the detection method, device type, or trigger (referred to as event trigger control), use the **macro auto global control** global configuration command. Use the **no** form of this command to disable trigger-to-macro mapping. The switch then does not apply macros based on event triggers.

macro auto global control {**detection** [**cdp**] [**lldp**] [**mac-address**] | **device** [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**] | **trigger** [**last-resort**]}

no macro auto global control {**detection** [**cdp**] [**lldp**] [**mac-address**] | **device** [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**] | **trigger** [**last-resort**]}

Syntax Description

detection [**cdp**] [**lldp**] [**mac-address**]	**detection**—Sets one or more of these as an event trigger: • (Optional) **cdp**—CDP messages • (Optional) **lldp**—LLDP messages • (Optional) **mac-address**—User-defined MAC address groups
device [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**]	**device**—Sets one or more of these devices as an event trigger: • (Optional) **access-point**—Autonomous access point • (Optional) **ip-camera**—Cisco IP video surveillance camera • (Optional) **lightweight-ap**—Lightweight access point • (Optional) **media-player**—Digital media player • (Optional) **phone**—Cisco IP phone • (Optional) **router**—Cisco router • (Optional) **switch**—Cisco switch
trigger [**last-resort**]	**trigger**—Sets a specific event trigger. • (Optional) **last-resort**—Last-resort trigger.

Command Default

The switch uses the device type as the event trigger. If the switch cannot determine the device type, it uses MAC address groups, MAB messages, 802.1x authentication messages, and LLDP messages in random order.

Command Modes

Global configuration

Command History

Release	Modification
12.2(55)SE	This command was introduced on the Catalyst 3750-X, 3750-E, 3750, 3560-X, 3560-E, 3560, 2975, 2960, and 2918 switches.

Usage Guidelines

If you do not set event triggers, the switch uses the device type as the event trigger. If the switch cannot determine the device type, it uses MAC address groups, MAB messages, 802.1x authentication messages, and LLDP messages in random order.

To verify that a macro is applied to a switch, use the **show macro auto global** user EXEC command.

Examples

To set CDP messages, LLDP messages and MAC address groups as event triggers:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# macro auto global control detection cdp lldp mac-address
Switch(config)# end
```

To set autonomous access points, lightweight access points, and IP phones:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# macro auto global control device access-point lightweight-ap phone
Switch(config)# end
```

Related Commands

Command	Description
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto mac-address-group	Configures MAC address groups.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro auto global processing

To enable Auto Smartports macros on the switch, use the **macro auto global processing** global configuration command. Use the **no** form of this command to disable the macros.

macro auto global processing [**fallback cdp**]

no macro auto global processing [**fallback cdp**]

Syntax Description

fallback cdp	(Optional) Use the Cisco Discovery Protocol (CDP) as the fallback mechanism if authentication fails. Starting in Cisco IOS Release 12.2(58)SE, these keywords are no longer supported.

Command Default

Auto Smartports is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.2(50)SE	This command was introduced on the Catalyst 3750-E. 3750, 3560-E, 3560, 2960, and 2918 switches.
12.2(52)SE	The command changed from **macro auto global processing** [**cdp-fallback**] to **macro auto global processing** [**fallback cdp**] on Catalyst 3750-E. 3750, 3560-E, 3560, 2960, and 2918 switches. The command was introduced on Catalyst 2975 switches.
12.2(53)SE2	This command was introduced on Catalyst 3750-X and 3560-X switches.
12.2(58)SE	The **fallback cdp** keywords are no longer supported.

Usage Guidelines

Use the **macro auto global processing** global configuration command to globally enable macros on the *switch*. To disable macros on a specific *port*, use the **no macro auto processing** command in interface mode.

When using 802.1x or MAB authentication, you need to configure the RADIUS server to support the Cisco attribute-value pair **auto-smart-port=***event trigger*. If authentication fails, the macro is not applied. If the 802.1x or MAB authentication fails on the interface, the switch does not use the fallback CDP event trigger.

When CDP-identified devices advertise multiple capabilities, the switch chooses a capability first by switch and then by router.

To verify that a macro is applied to an interface, use the **show macro auto interface** privileged EXEC command.

Examples

This example shows how enable Auto Smartports on the switch and to disable the feature on a specific interface:

```
Switch(config)# macro auto global processing
Switch(config)# interface interface_id
Switch(config-if)# no macro auto processing
```

Related Commands

Command	Description
macro auto device	Configures macro default parameter values.
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto mac-address-group	Configures MAC address groups.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro auto mac-address-group

To create an event trigger for devices that do not support Cisco Discovery Protocol (CDP) or Link Layer Discover Protocol (LLDP), use the **macro auto mac-address-group** global configuration command. Use the **no** form of this command to delete the group.

macro auto mac-address-group *name* [**mac-address list** *list*] | [**oui** [**list** *list* | **range** *start-value* **size** *number*]]

no macro auto mac-address-group *name* [**mac-address list** *list*] | [**oui** [**list** *list* | **range** *start-value* **size** *number*]]

Syntax Description

name	Specifies the group name.
oui	(Optional) Specifies an operationally unique identifier (OUI) **list** or **range**. • **list**—Enter an OUI list in hexadecimal format separated by spaces. • **range**—Enter the starting OUI hexadecimal value (*start-value*). • **size**—Enter the length of the range (*number*) from 1 to 5 to create a list of sequential addresses.
mac-address list *list*	(Optional) Configures a list of MAC addresses separated by a space.

Command Default

No groups are defined.

Command Modes

Group configuration

Command History

Release	Modification
12.2(52)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E, 3560, 2975, 2960, and 2918 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use the **macro auto mac-address-group** global configuration command to create an event trigger for devices that do not support CDP or LLDP. Use the MAC address group as a trigger to map to a built-in or user-defined macro by using the **macro auto execute** global configuration command. At link-up the switch detects the device type and applies the specified macro.

The switch supports up to ten MAC address groups. Each group can have up to 32 OUI and 32 MAC configured addresses.

Examples

This example shows how to create a MAC-address-group event trigger called *address_trigger* and how to verify your entries:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# macro auto address-group mac address_trigger
```

```
Switch(config-addr-grp-mac)# mac-address list 2222.3333.3334 22.33.44 a.b.c
Switch(config-addr-grp-mac)# oui list 455555 233244
Switch(config-addr-grp-mac)# oui range 333333 size 2
Switch(config-addr-grp-mac)# exit
Switch(config)# end
Switch# show running configuration
!
!macro auto mac-address-group address_trigger
 oui list 333334
 oui list 333333
 oui list 233244
 oui list 455555
 mac-address list 000A.000B.000C
 mac-address list 0022.0033.0044
 mac-address list 2222.3333.3334
!

<output truncated>
```

Related Commands

Command	Description
macro auto device	Configures macro default parameter values.
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro auto sticky

To configure macros remain active after a link-down event, referred to as *macro persistence*, use the **macro auto sticky** global configuration command. Use the **no** form of this command to disable the macro persistence.

macro auto sticky

no macro auto sticky

Syntax Description

This command has no arguments or keywords.

Command Default

Macro persistence is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.2(52)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E, 3560, 2975, 2960, and 2918 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use the **macro auto sticky** global configuration command so that macros remain active after a link-down event.

Examples

This example shows how to enable macro persistence on an interface:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet 2/0/1
Switch(config-if)# macro auto port sticky
Switch(config-if)# exit
Switch(config)# end
```

Related Commands

Command	Description
macro auto device	Configures macro default parameter values.
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto mac-address-group	Configures MAC address groups.
shell trigger	Creates event triggers.

Command	Description
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

macro description

To enter a description about which macros are applied to an interface, use the **macro description** interface configuration command. Use the **no** form of this command to remove the description. This command is mandatory for Auto Smartports to work.

macro description *text*

no macro description *text*

Syntax Description

description *text*	Enters a description about the macros that are applied to the specified interface.

Command Default

This command has no default setting.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(19)EA1	This command was introduced on the Catalyst 3750 and 3560 switches.
12.2(25)FX	This command was introduced on the Catalyst 2960 switches.
12.2(44)SE	This command was introduced on the Catalyst 2918 switches.
12.2(46)EX	This command was introduced on the Catalyst 2975 switches.
12.2(35)SE2	This command was introduced on the Catalyst 3750-E and 3560-E switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use the **description** keyword to associate comment text or the macro name with an interface. When multiple macros are applied on a single interface, the description text is from the last applied macro.

You can verify your settings by entering the **show parser macro description** privileged EXEC command.

Examples

This example shows how to add a description to an interface:

```
Switch(config-if)# macro description duplex settings
```

Related Commands

Command	Description
macro apply	Applies a macro on an interface.
macro global	Applies a macro on a switch or applies and traces a macro on a switch
macro global description	Adds a description about the macros that are applied to the switch.
macro trace	Applies and traces a macro on an interface.
show parser macro	Displays the macro definition for all macros or for the specified macro.

macro global

To apply a macro to a switch or to apply and debug a macro on a switch, use the **macro global** global configurationcommand.

macro global {**apply** | **trace**} *macro-name* [**parameter** {*value*}] [**parameter** {*value*}] [**parameter** {*value*}]

Syntax Description

apply	Applies a macro to the switch.
trace	Applies a macro to a switch and debugs the macro.
macro-name	Specifies the name of the macro.
parameter *value*	(Optional) Specifies unique parameter values that are specific to the switch. You can enter up to three keyword-value pairs. Parameter keyword matching is case sensitive. All matching occurrences of the keyword are replaced with the corresponding value.

Command Default

This command has no default setting.

Command Modes

Global configuration

Command History

Release	Modification
12.2(20)SE	This command was introduced on the Catalyst 3750 and 3560 switches.
12.2(25)FX	This command was introduced on the Catalyst 2960 switches.
12.2(44)SE	This command was introduced on the Catalyst 2918 switches.
12.2(46)EX	This command was introduced on the Catalyst 2975 switches.
12.2(35)SE2	This command was introduced on the Catalyst 3750-E and 3560-E switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use the **macro global apply** *macro-name* global configuration command to apply the macro to an interface.

Use the **macro global trace** *macro-name* global configuration command to apply and then debug the macro to find any syntax or configuration errors.

If a command fails when you apply a macro because of a syntax error or a configuration error, the macro continues to apply the remaining commands to the switch.

When creating a macro that requires the assignment of unique values, use the **parameter** *value* keywords to designate values specific to the switch.

Keyword matching is case sensitive. All matching occurrences of the keyword are replaced with the corresponding value. Any full match of a keyword, even if it is part of a larger string, is considered a match and is replaced by the corresponding value.

Some macros might contain keywords that require a parameter value. You can use the **macro global apply** *macro-name* **?** command to display a list of any required values in the macro. If you apply a macro without entering the keyword values, the commands are invalid and are not applied.

There are Cisco-default Smartports macros embedded in the switch software. You can display these macros and the commands they contain by using the **show parser macro** user EXEC command.

Follow these guidelines when you apply a Cisco-default Smartports macro on a switch:

- Display all macros on the switch by using the **show parser macro** user EXEC command. Display the contents of a specific macro by using the **show parser macro name** *macro-name* user EXEC command.
- Keywords that begin with **$** mean that a unique parameter value is required. Append the Cisco-default macro with the required values by using the **parameter** *value* keywords.

  The Cisco-default macros use the **$** character to help identify required keywords. There is no restriction on using the **$** character to define keywords when you create a macro.

When you apply a macro to a switch, the macro name is automatically added to the switch. You can display the applied commands and macro names by using the **show running-config** user EXEC command.

You can delete a global macro-applied configuration on a switch only by entering the **no** version of each command in the macro.

Examples

After you have created a new macro by using the **macro auto execute** global configuration command, you can apply it to a switch. This example shows how see the **snmp** macro, how to apply the macro, set the hostname to test-server, and set the IP precedence value to 7:

```
Switch# show parser macro name snmp
Macro name : snmp
Macro type : customizable

#enable port security, linkup, and linkdown traps
snmp-server enable traps port-security
snmp-server enable traps linkup
snmp-server enable traps linkdown
#set snmp-server host
snmp-server host ADDRESS
#set SNMP trap notifications precedence
snmp-server ip precedence VALUE

------------------------------------------------
Switch(config)# macro global apply snmp ADDRESS test-server VALUE 7
```

To debug a macro, use the **macro global trace** global configuration command to find any syntax or configuration errors in the macro when you apply it to a switch. In this example, the **ADDRESS** parameter value was not entered, the `snmp-server host` command failed, and the remainder of the macro is applied to the switch:

```
Switch(config)# macro global trace snmp VALUE 7
Applying command...'snmp-server enable traps port-security'
Applying command...'snmp-server enable traps linkup'
Applying command...'snmp-server enable traps linkdown'
Applying command...'snmp-server host'
%Error Unknown error.
Applying command...'snmp-server ip precedence 7'
```

Related Commands

Command	Description
macro apply	Applies a macro on an interface.
macro description	Adds a description about the macros that are applied to an interface.
macro global description	Adds a description about the macros that are applied to the switch.
macro trace	Applies and traces a macro on an interface.
show parser macro	Displays the macro definition for all macros or for the specified macro.

macro global description

To enter a description about the macros that are applied to a switch, use the **macro global description** global configuration command. Use the **no** form of this command to remove the description.

macro global description *text*

no macro global description *text*

Syntax Description

description *text*	Enters a description about the macros that are applied to the switch.

Command Default

This command has no default setting.

Command Modes

Global configuration

Command History

Release	Modification
12.2(20)SE	This command was introduced on the Catalyst 3750 and 3560 switches.
12.2(25)FX	This command was introduced on the Catalyst 2960 switches.
12.2(44)SE	This command was introduced on the Catalyst 2918 switches.
12.2(46)EX	This command was introduced on the Catalyst 2975 switches.
12.2(35)SE2	This command was introduced on the Catalyst 3750-E and 3560-E switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use the **description** keyword to associate comment text or the macro name with a switch. When multiple macros are applied on a switch, the description text is from the last applied macro.

You can verify your settings by entering the **show parser macro description** privileged EXEC command.

Examples

This example shows how to add a description to a switch:

```
Switch(config)# macro global description udld aggressive mode enabled
```

Related Commands

Command	Description
macro apply	Applies a macro on an interface.
macro description	Adds a description about the macros that are applied to an interface.
macro global	Applies a macro on a switch or applies and traces a macro on a switch.
macro trace	Applies and debugs a macro on an interface.
show parser macro	Displays the macro definition for all macros or for the specified macro.

shell trigger

To create an event trigger, use the **shell trigger** global configuration command. Use the **no** form of this command to delete the trigger.

shell trigger *identifier description*

no shell trigger *identifier description*

Syntax Description

identifier	Specifies the event trigger identifier. The identifier should have no spaces or hyphens between words.
description	Specifies the event trigger description text.

Command Default

System-defined event triggers:

- CISCO_DMP_EVENT
- CISCO_IPVSC_AUTO_EVENT
- CISCO_PHONE_EVENT
- CISCO_SWITCH_EVENT
- CISCO_ROUTER_EVENT
- CISCO_WIRELESS_AP_EVENT
- CISCO_WIRELESS_LIGHTWEIGHT_AP_EVENT

Command Modes

Global configuration

Command History

Release	Modification
12.2(50)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E, 3560, and 2960 switches.
12.2(52)SE	This command was introduced on the Catalyst 2975 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use this command to create user-defined event triggers for use with the **macro auto device** and the **macro auto execute** global configuration commands.

To support dynamic device discovery when using IEEE 802.1x authentication, you need to configure the RADIUS authentication server to support the Cisco attribute-value pair: **auto-smart-port=***event trigger.*

Examples

This example shows how to create a user-defined event trigger called RADIUS_MAB_EVENT:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# shell trigger RADIUS_MAB_EVENT MAC_AuthBypass Event
Switch(config)# end
```

Related Commands

Command	Description
macro auto device	Configures macro default parameter values.
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto mac-address-group	Configures MAC address groups.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.
show shell	Displays information about event triggers and macros.

show macro auto

To display Auto Smartports macro information, use the **show macro auto** user EXEC command.

show macro auto {**address-group** [*address-group-name*] | **device** [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**] | **event manager** | **global** [*event_trigger*] | **interface** [*interface_id*]}

Syntax Description

address-group [*address-group-name*]	Displays address-group information. (Optional) *address-group-name*—Displays information for the specified address group.
device [**access-point**] [**ip-camera**] [**lightweight-ap**] [**media-player**] [**phone**] [**router**] [**switch**]	Displays device information about one or more devices. • (Optional) **access-point**—Autonomous access point • (Optional) **ip-camera**—Cisco IP video surveillance camera • (Optional) **lightweight-ap**—Lightweight access point • (Optional) **media-player**—Digital media player • (Optional) **phone**—Cisco IP phone • (Optional) **router**—Cisco router • (Optional) **switch**—Cisco switch
event manager	Displays embedded event manager information.
global [*event_trigger*]	Displays Auto Smartports information about the switch. (Optional) *event_trigger*—Displays information about the specified event trigger.
interface [*interface_id*]	Displays interface status. (Optional) *interface_id*—Displays information about the specified interface.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(52)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E, 3560, 2975, 2960, and 2918 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.
12.2(55)SE	The **global** keyword was added on the Catalyst 3750-X, 3750-E, 3750, 3560-X, 3560-E, 3560, 2975, 2960, and 2918 switches. The **address-group**, **device**, **event manager**, and **interface** keywords are not optional.

Usage Guidelines

Use this command to display the Auto Smartports information for the switch. Use the **show macro auto device** privileged EXEC command to display the configurable parameters for a device.

Examples

This example shows how to use the **show macro auto device** privileged EXEC command to view the configuration on the switch:

```
Switch> show macro auto device
Device:lightweight-ap
Default Macro:CISCO_LWAP_AUTO_SMARTPORT
Current Macro:CISCO_LWAP_AUTO_SMARTPORT
Configurable Parameters:ACCESS_VLAN
Defaults Parameters:ACCESS_VLAN=1
Current Parameters:ACCESS_VLAN=1

Device:access-point
Default Macro:CISCO_AP_AUTO_SMARTPORT
Current Macro:CISCO_AP_AUTO_SMARTPORT
Configurable Parameters:NATIVE_VLAN
Defaults Parameters:NATIVE_VLAN=1
Current Parameters:NATIVE_VLAN=1

Device:phone
Default Macro:CISCO_PHONE_AUTO_SMARTPORT
Current Macro:CISCO_PHONE_AUTO_SMARTPORT
Configurable Parameters:ACCESS_VLAN VOICE_VLAN
Defaults Parameters:ACCESS_VLAN=1 VOICE_VLAN=2
Current Parameters:ACCESS_VLAN=1 VOICE_VLAN=2

Device:router
Default Macro:CISCO_ROUTER_AUTO_SMARTPORT
Current Macro:CISCO_ROUTER_AUTO_SMARTPORT
Configurable Parameters:NATIVE_VLAN
Defaults Parameters:NATIVE_VLAN=1
Current Parameters:NATIVE_VLAN=1

Device:switch
Default Macro:CISCO_SWITCH_AUTO_SMARTPORT
Current Macro:CISCO_SWITCH_AUTO_SMARTPORT
Configurable Parameters:NATIVE_VLAN
Defaults Parameters:NATIVE_VLAN=1
Current Parameters:NATIVE_VLAN=1

Device:ip-camera
Default Macro:CISCO_IP_CAMERA_AUTO_SMARTPORT
Current Macro:CISCO_IP_CAMERA_AUTO_SMARTPORT
Configurable Parameters:ACCESS_VLAN
Defaults Parameters:ACCESS_VLAN=1
Current Parameters:ACCESS_VLAN=1

Device:media-player
Default Macro:CISCO_DMP_AUTO_SMARTPORT
Current Macro:CISCO_DMP_AUTO_SMARTPORT
Configurable Parameters:ACCESS_VLAN
Defaults Parameters:ACCESS_VLAN=1
Current Parameters:ACCESS_VLAN=1
```

This example shows how to use the **show macro auto address-group** *name* privileged EXEC command to view the TEST3 address group configuration on the switch:

```
Switch> show macro auto address-group TEST3
MAC Address Group Configuration:

Group Name                       OUI         MAC ADDRESS
-------------------------------------------------------------
TEST3                          2233.33     0022.0022.0022
                               2233.34
```

Related Commands

Command	Description
macro auto device	Configures macro default parameter values.
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto mac-address-group	Configures MAC address groups.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show shell	Displays information about event triggers and macros.

show parser macro

To display the parameters for all configured macros or for one macro on the switch, use the **show parser macro** user EXEC command.

show parser macro [{**brief** | **description** [**interface** *interface-id*] | **name** *macro-name*}]

Syntax Description

brief	(Optional) Displays the name of each macro.
description [**interface** *interface-id*]	(Optional) Displays all macro descriptions or the description of a specific interface.
name *macro-name*	(Optional) Displays information about a single macro identified by the macro name.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.1(19)EA1	This command was introduced on the Catalyst 3750 and 3560 switches.
12.2(25)FX	This command was introduced on the Catalyst 2960 switches.
12.2(44)SE	This command was introduced on the Catalyst 2918 switches.
12.2(46)EX	This command was introduced on the Catalyst 2975 switches.
12.2(35)SE2	This command was introduced on the Catalyst 3750-E and 3560-E switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Examples

This is a partial output example from the **show parser macro** command. The output for the Cisco-default macros varies depending on the switch platform and the software image running on the switch:

```
Switch# show parser macro
Total number of macros = 6
------------------------------------------------------------------
Macro name : cisco-global
Macro type : default global
# Enable dynamic port error recovery for link state
# failures
errdisable recovery cause link-flap
errdisable recovery interval 60

<output truncated>

------------------------------------------------------------------
Macro name : cisco-desktop
Macro type : default interface
# macro keywords $AVID
# Basic interface - Enable data VLAN only
# Recommended value for access vlan (AVID) should not be 1
switchport access vlan $AVID
switchport mode access
```

```
<output truncated>

------------------------------------------------------------------
Macro name : cisco-phone
Macro type : default interface
# Cisco IP phone + desktop template
# macro keywords $AVID $VVID
# VoIP enabled interface - Enable data VLAN
# and voice VLAN (VVID)
# Recommended value for access vlan (AVID) should not be 1
switchport access vlan $AVID
switchport mode access

<output truncated>

------------------------------------------------------------------
Macro name : cisco-switch
Macro type : default interface
# macro keywords $NVID
# Access Uplink to Distribution
# Do not apply to EtherChannel/Port Group
# Define unique Native VLAN on trunk ports
# Recommended value for native vlan (NVID) should not be 1
switchport trunk native vlan $NVID

<output truncated>

------------------------------------------------------------------
Macro name : cisco-router
Macro type : default interface
# macro keywords $NVID
# Access Uplink to Distribution
# Define unique Native VLAN on trunk ports
# Recommended value for native vlan (NVID) should not be 1
switchport trunk native vlan $NVID

<output truncated>

------------------------------------------------------------------
Macro name : snmp
Macro type : customizable

#enable port security, linkup, and linkdown traps
snmp-server enable traps port-security
snmp-server enable traps linkup
snmp-server enable traps linkdown
#set snmp-server host
snmp-server host ADDRESS
#set SNMP trap notifications precedence
snmp-server ip precedence VALUE

------------------------------------------------------------------
```

This is an example of output from the **show parser macro name** command:

```
Switch# show parser macro name standard-switch10
Macro name : standard-switch10
Macro type : customizable
macro description standard-switch10
# Trust QoS settings on VOIP packets
auto qos voip trust
```

```
# Allow port channels to be automatically formed
channel-protocol pagp
```

This is an example of output from the **show parser macro brief** command:

```
Switch# show parser macro brief
    default global   : cisco-global
    default interface: cisco-desktop
    default interface: cisco-phone
    default interface: cisco-switch
    default interface: cisco-router
    customizable     : snmp
```

This is an example of output from the **show parser macro description** command:

```
Switch# show parser macro description
Global Macro(s): cisco-global
Interface    Macro Description(s)
-----------------------------------------------------------------
Gi1/0/1        standard-switch10
Gi1/0/2       this is test macro
-----------------------------------------------------------------
```

This is an example of output from the **show parser macro description interface** command:

```
Switch# show parser macro description interface gigabitethernet1/0/2
Interface    Macro Description
-----------------------------------------------------------------
Gi1/0/2      this is test macro
-----------------------------------------------------------------
```

Related Commands

Command	Description
macro apply	Applies a macro on an interface or applies and traces a macro on an interface.
macro description	Adds a description about the macros that are applied to an interface.
macro global	Applies a macro on a switch or applies and traces a macro on a switch.
macro global description	Adds a description about the macros that are applied to the switch.
show running-config	Displays the operating configuration.

show shell

To display shell information, use the **show shell** user EXEC command.

show shell [**environment** | **functions** [**brief** | *shell_function*] | **triggers**]

Syntax Description

environment	(Optional) Displays shell environment information.
functions [**brief** | *shell_function*]	(Optional) Displays macro information. • **brief**—Names of the shell functions. • *shell_function*—Name of a shell function.
triggers	(Optional) Displays event trigger information.

Command Modes

User EXEC
Privilieged EXEC

Command History

Release	Modification
12.2(50)SE	This command was introduced on the Catalyst 3750-E, 3750, 3560-E, 3560, 2960, and 2918 switches.
12.2(52)SE	This command was introduced on the Catalyst 2975 switches.
12.2(53)SE2	This command was introduced on the Catalyst 3750-X and 3560-X switches.

Usage Guidelines

Use this command to display the shell information for the switch.

Examples

This example shows how to use the **show shell** *triggers* privileged EXEC command to view the event triggers in the switch software:

```
Switch# show shell triggers
User defined triggers
---------------------
Built-in triggers
-----------------
Trigger Id: CISCO_CUSTOM_EVENT
Trigger description: Custom macroevent to apply user defined configuration
Trigger environment: User can define the macro
Trigger mapping function: CISCO_CUSTOM_AUTOSMARTPORT

Trigger Id: CISCO_DMP_EVENT
Trigger description: Digital media-player device event to apply port configuration
Trigger environment: Parameters that can be set in the shell - $ACCESS_VLAN=(1)
 The value in the parenthesis is a default value
Trigger mapping function: CISCO_DMP_AUTO_SMARTPORT

Trigger Id: CISCO_IPVSC_EVENT
Trigger description: IP-camera device event to apply port configuration
Trigger environment: Parameters that can be set in the shell - $ACCESS_VLAN=(1)
 The value in parenthesis is a default value
Trigger mapping function: CISCO_IP_CAMERA_AUTO_SMARTPORT
```

```
Trigger Id: CISCO_LAST_RESORT_EVENT
Trigger description: Last resortevent to apply port configuration
Trigger environment: Parameters that can be set in the shell - $ACCESS_VLAN=(1)
 The value in the parenthesis is a default value
Trigger mapping function: CISCO_LAST_RESORT_SMARTPORT

Trigger Id: CISCO_PHONE_EVENT
Trigger description: IP-phone device event to apply port configuration
Trigger environment: Parameters that can be set in the shell - $ACCESS_VLAN=(1)
and $VOICE_VLAN=(2), The value in the parenthesis is a default value
Trigger mapping function: CISCO_PHONE_AUTO_SMARTPORT

Trigger Id: CISCO_ROUTER_EVENT
Trigger description: Router device event to apply port configuration
Trigger environment: Parameters that can be set in the shell - $NATIVE_VLAN=(1)
 The value in the parenthesis is a default value
Trigger mapping function: CISCO_ROUTER_AUTO_SMARTPORT

Trigger Id: CISCO_SWITCH_ETHERCHANNEL_CONFIG
Trigger description: etherchannel parameter
Trigger environment: $INTERFACE_LIST=(),$PORT-CHANNEL_ID=(),
                              $EC_MODE=(),$EC_PROTOCOLTYPE=(),
                              PORT-CHANNEL_TYPE=()
Trigger mapping function: CISCO_ETHERCHANNEL_AUTOSMARTPORT

Trigger Id: CISCO_SWITCH_EVENT
Trigger description: Switch device event to apply port configuration
Trigger environment: Parameters that can be set in the shell - $NATIVE_VLAN=(1)
 The value in the parenthesis is a default value
Trigger mapping function: CISCO_SWITCH_AUTO_SMARTPORT

Trigger Id: CISCO_WIRELESS_AP_EVENT
Trigger description: Autonomous ap device event to apply port configuration
Trigger environment: Parameters that can be set in the shell - $NATIVE_VLAN=(1)
 The value in the parenthesis is a default value
Trigger mapping function: CISCO_AP_AUTO_SMARTPORT

Trigger Id: CISCO_WIRELESS_LIGHTWEIGHT_AP_EVENT
Trigger description: Lightweight-ap device event to apply port configuration
Trigger environment: Parameters that can be set in the shell - $ACCESS_VLAN=(1)
  The value in the parenthesis is a default value
Trigger mapping function: CISCO_LWAP_AUTO_SMARTPORT

Trigger Id: word
Trigger description: word
Trigger environment:
Trigger mapping function:
```

This example shows how to use the **show shell functions** privileged EXEC command to view the built-in macros in the switch software:

```
Switch# show shell functions
#User defined functions:

#Built-in functions:
function CISCO_AP_AUTO_SMARTPORT () {
    if [[ $LINKUP -eq YES ]]; then
        conf t
            interface  $INTERFACE
                macro description $TRIGGER
                switchport trunk encapsulation dot1q
                switchport trunk native vlan $NATIVE_VLAN
                switchport trunk allowed vlan ALL
                switchport mode trunk
                switchport nonegotiate
                auto qos voip trust
                mls qos trust cos
                if [[ $LIMIT -eq 0 ]]; then
                  default srr-queue bandwidth limit
                else
                  srr-queue bandwidth limit $LIMIT
                fi
                if [[ $SW_POE -eq YES ]]; then
                   if [[ $AP125X -eq AP125X ]]; then
                      macro description AP125X
                      macro auto port sticky
                      power inline port maximum 20000
                   fi
                fi
             exit
        end
    fi
    if [[ $LINKUP -eq NO ]]; then
        conf t
            interface  $INTERFACE
                no macro description
                no switchport nonegotiate
                no switchport trunk native vlan $NATIVE_VLAN
                no switchport trunk allowed vlan ALL
                no auto qos voip trust
                no mls qos trust cos
                default srr-queue bandwidth limit
                if [[ $AUTH_ENABLED -eq NO ]]; then
                  no switchport mode
                  no switchport trunk encapsulation
                fi
                if [[ $STICKY -eq YES ]]; then
                   if [[ $SW_POE -eq YES ]]; then
                      if [[ $AP125X -eq AP125X ]]; then
                         no macro auto port sticky
                         no power inline port maximum
                      fi
                   fi
                fi
            exit
        end
    fi
}
<output truncated>
```

Related Commands

Command	Description
macro auto device	Configures macro default parameter values.
macro auto execute	Configures mapping from an event trigger to a built-in macro.
macro auto global processing	Enables Auto Smartports on a switch.
macro auto mac-address-group	Configures MAC address groups.
macro auto sticky	Configures macro persistence.
shell trigger	Creates event triggers.
show macro auto	Displays information about macros.