



Software Configuration Guide, Cisco IOS XE Gibraltar 16.10.x (Catalyst 9500 Switches)

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883



CONTENTS

PREFACE

Preface v

Document Conventions v

Related Documentation vii

Obtaining Documentation and Submitting a Service Request vii

CHAPTER 1

Contents 1

CHAPTER 2

Configuring the Switch Using the Web User Interface 3

Setting up the Switch 3

Connecting to the Switch 4

Creating User Accounts 6

Choosing Setup Options 7

Configuring Basic Device Settings 7

Configuring Your Device Based on a Site Profile 9

Configuring VLAN Settings 12

Configure STP Settings 12

Configuring DHCP, NTP, DNS and SNMP Settings 13

Configuring Port Settings 14

Notices 17



Preface

- [Document Conventions](#) , on page v
- [Related Documentation](#), on page vii
- [Obtaining Documentation and Submitting a Service Request](#), on page vii

Document Conventions

This document uses the following conventions:

| Convention | Description |
|--------------------------|--|
| ^ or Ctrl | Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination ^D or Ctrl-D means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.) |
| bold font | Commands and keywords and user-entered text appear in bold font . |
| <i>Italic font</i> | Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> . |
| Courier font | Terminal sessions and information the system displays appear in <code>courier font</code> . |
| Bold Courier font | Bold Courier font indicates text that the user must enter. |
| [x] | Elements in square brackets are optional. |
| ... | An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated. |
| | A vertical line, called a pipe, indicates a choice within a set of keywords or arguments. |
| [x y] | Optional alternative keywords are grouped in brackets and separated by vertical bars. |
| {x y} | Required alternative keywords are grouped in braces and separated by vertical bars. |

| Convention | Description |
|-------------|---|
| [x {y z}] | Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element. |
| string | A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks. |
| < > | Nonprinting characters such as passwords are in angle brackets. |
| [] | Default responses to system prompts are in square brackets. |
| !, # | An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line. |

Reader Alert Conventions

This document may use the following conventions for reader alerts:



Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.



Tip Means *the following information will help you solve a problem*.



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



Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.



Warning IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Related Documentation



Note Before installing or upgrading the device, refer to the device release notes.

- Cisco Catalyst 9500 Series Switches documentation, located at:
<http://www.cisco.com/go/c9500>
- Cisco SFP and SFP+ modules documentation, including compatibility matrixes, located at:
http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html
- Cisco Validated Designs documents, located at:
<http://www.cisco.com/go/designzone>

Obtaining Documentation and Submitting a Service Request

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, at:

<http://www.cisco.com/c/en/us/td/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 using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.



CHAPTER 1

Contents

Audio Video Bridging
Cisco TrustSec
High Availability
Interface and Hardware Components
IP
IP Multicast Routing
IPv6
Layer 2
Multiprotocol Label Switching
Network Management
Programmability
Quality of Service
Routing
Security
System Management
VLAN



CHAPTER 2

Configuring the Switch Using the Web User Interface



Note Any figures included in the document are shown for illustrative purposes only.

- [Setting up the Switch, on page 3](#)
- [Connecting to the Switch, on page 4](#)
- [Creating User Accounts, on page 6](#)
- [Choosing Setup Options, on page 7](#)
- [Configuring Basic Device Settings, on page 7](#)
- [Configuring Your Device Based on a Site Profile, on page 9](#)
- [Configuring VLAN Settings, on page 12](#)
- [Configure STP Settings, on page 12](#)
- [Configuring DHCP, NTP, DNS and SNMP Settings, on page 13](#)
- [Configuring Port Settings, on page 14](#)

Setting up the Switch

After you complete the hardware installation, you need to setup the switch with configuration required to enable traffic to pass through the network. On your first day with your new device, you can perform a number of tasks to ensure that your device is online, reachable and easily configured.

The Web User Interface (Web UI) is an embedded GUI-based device-management tool that provides the ability to provision the device, to simplify device deployment and manageability, and to enhance the user experience. It comes with the default image, so there is no need to enable anything or install any license on the device. You can use WebUI to build configurations, and to monitor and troubleshoot the device without having CLI expertise.

Connecting to the Switch

Before you begin

Set up the DHCP Client Identifier on the client to get the IP address from the switch, and to be able to authenticate with Day 0 login credentials.

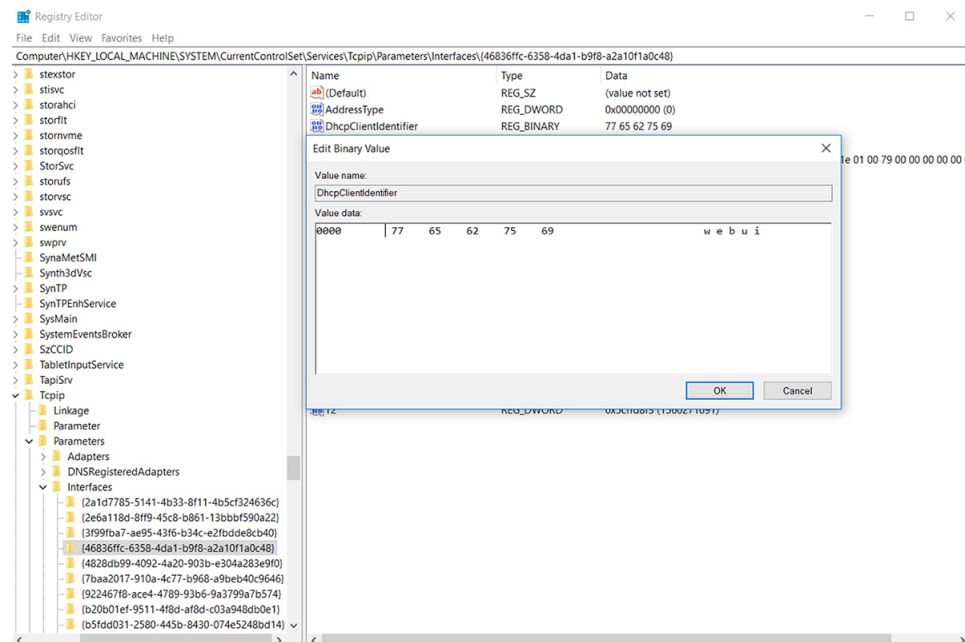
Setting up the DHCP Client Identifier on the client for Windows

1. Type **regedit** in the Windows search box on the taskbar and press **enter**.
2. If prompted by User Account Control, click **Yes** to open the Registry Editor.
3. Navigate to

Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters\Interfaces and locate the **Ethernet Interface** Global Unique Identifier (GUID).

4. Add a new REG_BINARY **DhcpClientIdentifier** with Data **77 65 62 75 69** for **webui**. You need to manually type in the value.

Figure 1: Setting up DHCP Client Identifier on Windows

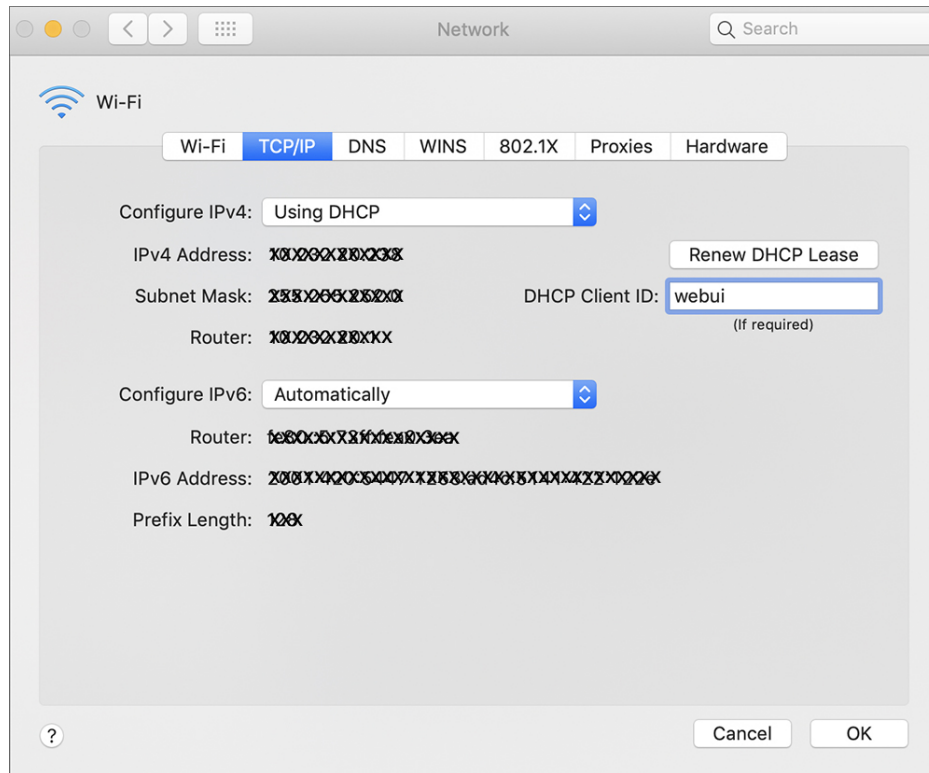


5. Restart the PC for the configuration to take effect.

Setting up the DHCP Client Identifier on the client for MAC

1. Go to **System Preferences > Network > Advanced > TCP > DHCP Client ID:** and enter **webui**.

Figure 2: Setting up DHCP Client Identifier on MAC

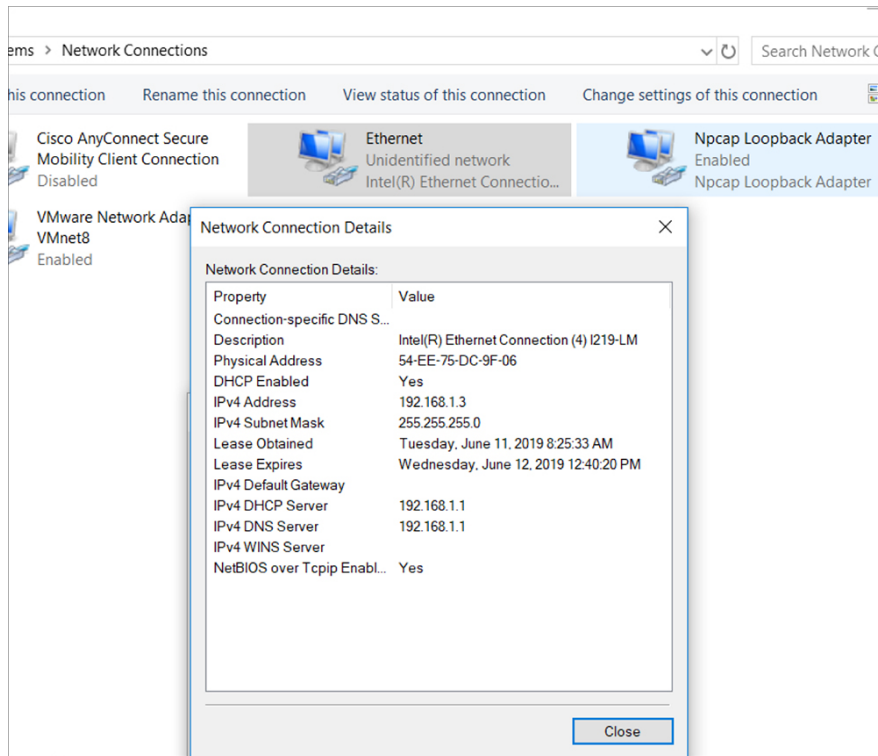


2. Click **OK** to save the changes.

The bootup script runs the configuration wizard, which prompts you for basic configuration input: (**Would you like to enter the initial configuration dialog? [yes/no]:**). To configure Day 0 settings using the web UI, do not enter a response. Perform the following tasks instead:

-
- Step 1** Make sure that no devices are connected to the switch.
 - Step 2** Connect one end of an ethernet cable to one of the downlink (non-management) ports on the active supervisor and the other end of the ethernet cable to the host (PC/MAC).
 - Step 3** Set up your PC/MAC as a DHCP client, to obtain the IP address of the switch automatically. You should get an IP address within the 192.168.1.x/24 range.

Figure 3: Obtaining the IP Address



It may take up to three mins. You must complete the Day 0 setup through the web UI before using the device terminal.

Step 4 Launch a web browser on the PC and enter the device IP address (<https://192.168.1.1>) in the address bar.

Step 5 Enter the Day 0 **username webui** and **password serial number** of the switch.

The serial number is case sensitive.

What to do next

Create a user account.

Creating User Accounts

Setting a username and password is the first task you will perform on your device. Typically, as a network administrator, you will want to control access to your device and prevent unauthorized users from seeing your network configuration or manipulating your settings.

Step 1 Log on using the default username and password provided with the device.

Step 2 Set a password of up to 25 alphanumeric characters. The username password combination you set gives you privilege 15 access. The string cannot start with a number, is case sensitive, and allows spaces but ignores leading spaces.

Figure 4: Create Account

The screenshot shows the 'Create Account' step of the Cisco Configuration Setup Wizard. The interface includes a progress bar at the top with six steps: CREATE ACCOUNT (active), BASIC SETTINGS, SITE PROFILE, SWITCH WIDE SETTINGS, PORT SETTINGS, and SUMMARY. The main content area is divided into two columns. The left column contains three input fields: 'Login Name', 'Password', and 'Confirm password'. Below these fields is a 'Create New Account' button. The right column is titled 'Hardware and Software details of the device.' and contains five sections, each with a plus icon and a label: 'Platform Type:', 'IOS Installed:', 'Serial Number:', 'Modules:', and 'License Installed:'. At the bottom right of the right column is a 'Basic Device Settings >' button.

Choosing Setup Options

Select **Wired Network** to configure your device based on a site profile, and continue to configure switch wide settings. Otherwise, continue to the next step and configure only basic settings for your device.

Configuring Basic Device Settings

On the **Basic Device Settings** page configure the following information:

- Step 1** In the **Device ID and Location Settings** section, type a unique name to identify your device in the network.
- Step 2** Choose the date and time settings for your device. To synchronize your device with a valid outside timing mechanism, such as an NTP clock source, choose Automatic, or choose Manual to set it yourself.

Figure 5: Basic Settings - Device ID and Location Settings

Step 3 In the **Device Management Settings** section, assign an **IP address** to the management interface. Ensure that the IP address you assign is part of the subnet mask you enter.

Step 4 Optionally, enter an **IP address** to specify the default gateway.

Step 5 To enable access to the device using telnet, check the **Telnet** check box.

Step 6 To enable secure remote access to the device using Secure Shell (SSH), check the **SSH** check box.

Step 7 Check the **VTP transparent mode** check box to disable the device from participating in VTP.

If you did not select **Wired Network**, in the earlier step, continue to the next screen to verify your configuration on the **Day 0 Config Summary** screen, and click **Finish**. To automatically configure your device based on a site profile, click **Setup Options**, and select **Wired Network**.

Figure 6: Basic Settings - Device Management Settings

Configuring Your Device Based on a Site Profile

To ease your configuration tasks and save time, choose a site profile based on where your device may be installed and managed in your network. Based on the site profile you choose, your device is automatically configured according to Cisco best practices. You can easily modify this default configuration, from the corresponding detailed configuration screens.

Choosing a site profile as part of Quick Setup allows you to configure your device based on the business needs of your enterprise. For example, you could use your device as an access switch, to connect client nodes and endpoints on your network, or as a distribution switch, to route packets between subnets and VLANs.

Table 1: Default Configuration Loaded with Each Site Profile (Distribution Switches)

| Setting | Single Distribution Switch (Single Downlink) | Single Distribution Switch (Single Port Channel Downlink) | Redundant Distribution Switch (Port Channel Peer and Downlink) |
|---------------------------|---|---|---|
| Hostname | The hostname or device name you provided as part of Quick Setup | The hostname or device name you provided as part of Quick Setup | The hostname or device name you provided as part of Quick Setup |
| Spanning Tree Mode | RPVST+ | RPVST+ | RPVST+ |
| VTP | Mode Transparent | Mode Transparent | Mode Transparent |
| UDLD | Enabled | Enabled | Enabled |
| Error Disable Recovery | Recovery mode set to Auto | Recovery mode set to Auto | Recovery mode set to Auto |
| Port Channel Load Balance | Source Destination IP | Source Destination IP | Source Destination IP |
| SSH | Version 2 | Version 2 | Version 2 |
| SCP | Enabled | Enabled | Enabled |
| VTY Access to Switch | Enabled | Enabled | Enabled |
| Service Timestamp | Enabled | Enabled | Enabled |
| VLAN | The following VLANs are created: <ul style="list-style-type: none"> • Default VLAN • Data VLAN • Voice VLAN • Management VLAN | The following VLANs are created: <ul style="list-style-type: none"> • Default VLAN • Data VLAN • Voice VLAN • Management VLAN | The following VLANs are created: <ul style="list-style-type: none"> • Default VLAN • Data VLAN • Voice VLAN • Management VLAN |

| Setting | Single Distribution Switch (Single Downlink) | Single Distribution Switch (Single Port Channel Downlink) | Redundant Distribution Switch (Port Channel Peer and Downlink) |
|----------------------|--|--|--|
| Management Interface | Layer 3 settings configured on the management port, based on Quick Setup | Layer 3 settings configured on the management port, based on Quick Setup | Layer 3 settings configured on the management port, based on Quick Setup |
| QoS Policy | QoS Policy for Distribution defined | QoS Policy for Distribution defined | QoS Policy for Distribution defined |
| Uplink Interfaces | Selected uplink ports connect to other distribution or core switches | Selected uplink ports connect to other distribution or core switches | Selected uplink ports connect to other distribution or core switches |
| Downlink Interfaces | Downlink connections to access switches configured in Trunk mode | Downlink connections to access switches configured in Trunk mode | Downlink connections to access switches configured in Trunk mode |
| Port-channel | Port-channel to core created | Port-channel to core or access created | Port-channel to core or distribution created |

Figure 7: Site Profile - Distribution Switches

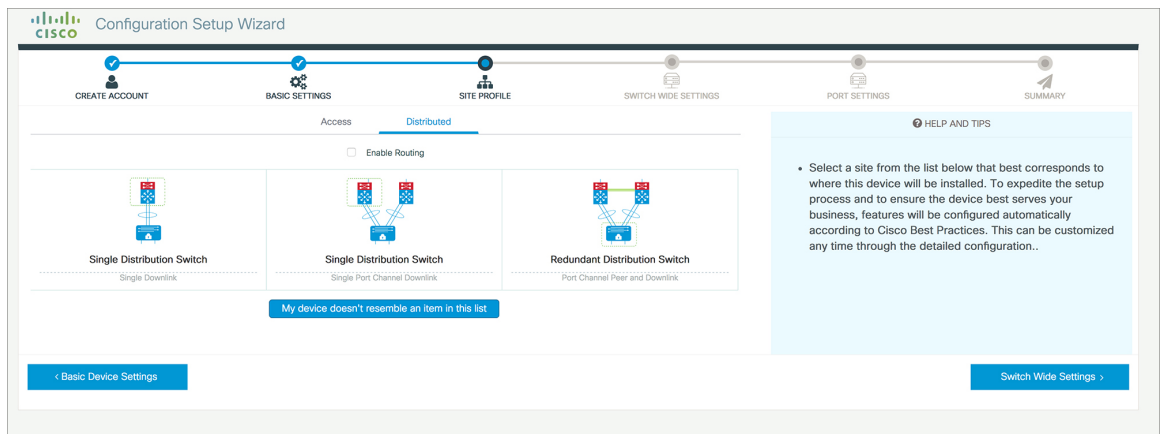


Figure 8: Site Profile - Distribution Switches (with Routed Access)

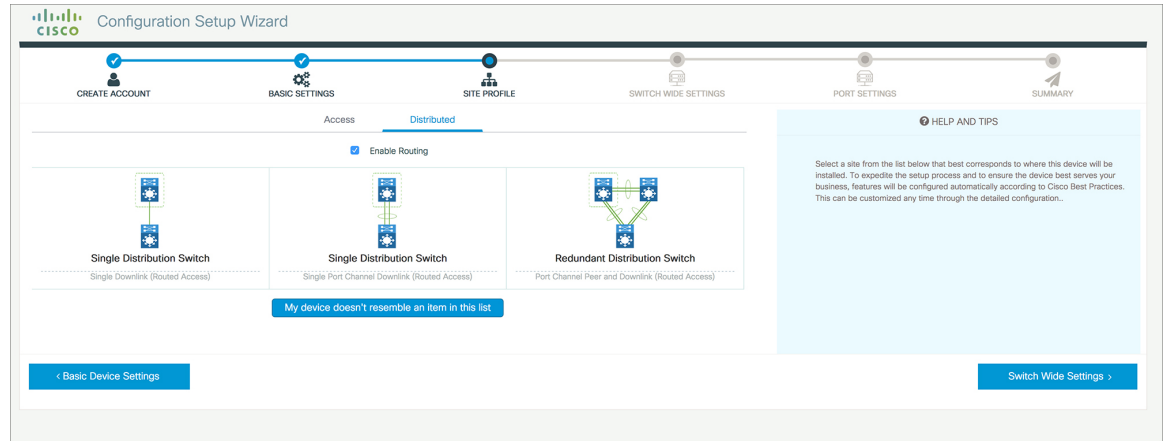
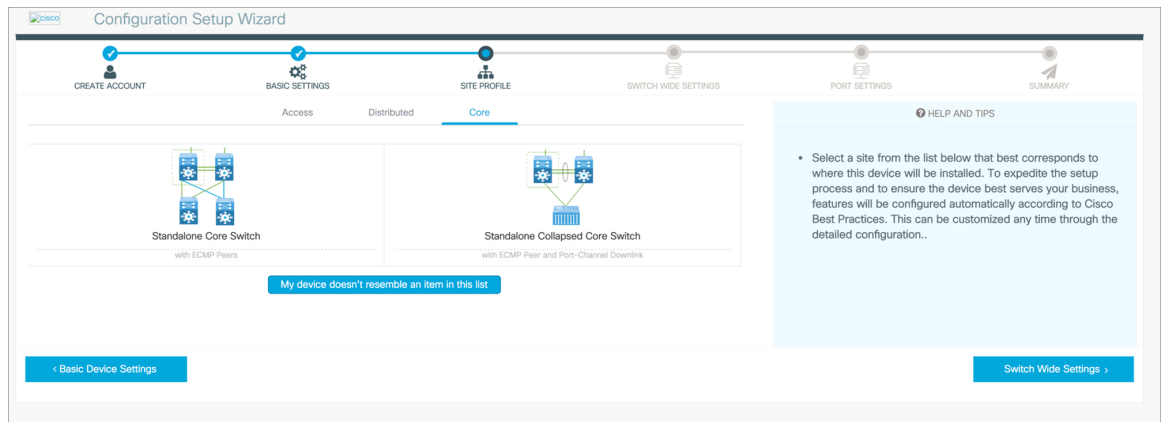


Table 2: Default Configuration Loaded with Each Site Profile (Core Switches)

| Setting | Standalone Core Switch (with ECMP Peers) | Standalone Collapsed Core Switch (with ECMP Peer and Port Channel Downlink) |
|---------------------------|--|---|
| Hostname | The hostname or device name you provided as part of Quick Setup | The hostname or device name you provided as part of Quick Setup |
| UDLD | Enabled | Enabled |
| Error Disable Recovery | Recovery mode set to Auto | Recovery mode set to Auto |
| Port Channel Load Balance | Source Destination IP | Source Destination IP |
| SSH | Version 2 | Version 2 |
| SCP | Enabled | Enabled |
| VTY Access to Switch | Enabled | Enabled |
| Mitigate Address Spoofing | Unicast RPF (uRPF) in strict mode | Unicast RPF (uRPF) in strict mode |
| Service Timestamp | Enabled | Enabled |
| Management Interface | Layer 3 settings configured on the management port, based on Quick Setup | Layer 3 settings configured on the management port, based on Quick Setup |
| QoS Policy | QoS Policy for Distribution/Core defined | QoS Policy for Distribution/Core defined |
| Uplink Interfaces | Selected uplink ports connect to MAN/WAN device | Selected uplink ports connect to MAN/WAN device |
| Downlink Interfaces | Downlink connections to access switches | Downlink connections to distribution switches |

| Setting | Standalone Core Switch (with ECMP Peers) | Standalone Collapsed Core Switch (with ECMP Peer and Port Channel Downlink) |
|--------------------------|---|---|
| Cross-connect Interfaces | Selected ports connect to other core switches | Selected ports connect to other core switches |

Figure 9: Site Profile - Core Switches



Configuring VLAN Settings

- Step 1** In the **VLAN Configuration** section, you can configure both data and voice VLANs. Type a name for your data VLAN.
- Step 2** To configure a data VLAN, ensure that the **Data VLAN** check box is checked, type a name for your VLAN, and assign a VLAN ID to it. If you are creating several VLANs, indicate only a VLAN range.
- Step 3** To configure a voice VLAN, ensure that the **Voice VLAN** check box is checked, type a name for your VLAN, and assign a VLAN ID to it. If you are creating several VLANs, indicate a VLAN range.

Configure STP Settings

- Step 1** RPVST is the default STP mode configured on your device. You can change it to PVST from the **STP Mode** drop-down list.
- Step 2** To change a bridge priority number from the default value 32748, change **Bridge Priority** to Yes and choose a priority number from the drop-down list.

Figure 10: VLAN and STP Settings

The screenshot shows the Cisco Configuration Setup Wizard interface. At the top, there is a progress bar with six steps: CREATE ACCOUNT, BASIC SETTINGS, SITE PROFILE, SWITCH WIDE SETTINGS, PORT SETTINGS, and SUMMARY. The current step is SWITCH WIDE SETTINGS.

The main content area is divided into three sections:

- VLAN Configuration:** Contains three checkboxes:
 - Data VLAN
 - Voice VLAN
 - Management Vlan (Switch Wide Settings)
- STP Configuration:** Contains two dropdown menus:
 - STP Mode: RPVST
 - Bridge Priority Number: 32768
- General Configuration:** Contains two buttons:
 - < Site Profile
 - Port Settings >

On the right side, there is a 'HELP AND TIPS' section with the following text:

- A data VLAN is a VLAN that is configured to carry user-generated traffic. Voice VLAN allows you to enhance VoIP service by configuring ports to carry IPvoice traffic from IP phones on a specific VLAN.
- STP is to prevent bridge loops and the broadcast radiation that results from them.
- The part of a network address which identifies it as belonging to a particular domain.
- Configure Syslog Client within the Cisco Device, use a severity level of warnings through emergencies to generate error message about software and hardware malfunctions.
- Protocol for network management and its collecting information from, and configuring, network devices, such as switches, and routers on an IP network.

Configuring DHCP, NTP, DNS and SNMP Settings

- Step 1** In the **Domain Details** section, enter a domain name that the software uses to complete unqualified hostnames.
- Step 2** Type an IP address to identify the DNS server. This server is used for name and address resolution on your device.
- Step 3** In the **Server Details** section, type the IP address of the DNS server that you want to make available to DHCP clients.
- Step 4** In the **Syslog Server** field, type the IP address of the server to which you want to send syslog messages.
- Step 5** To ensure that your device is configured with the right time, date and timezone, enter the IP address of the NTP server with which you want to synchronize the device time.
- Step 6** In the **Management Details** section, type an IP address to identify the SNMP server. SNMPv1, SNMPv2, and SNMPv3 are supported on your device.
- Step 7** Specify the **SNMP community** string to permit access to the SNMP protocol.

Figure 11: DHCP, NTP, DNS and SNMP Settings

The screenshot shows the 'PORT SETTINGS' step of the Cisco Configuration Setup Wizard. The wizard is titled 'Configuration Setup Wizard' and has a progress bar with six steps: CREATE ACCOUNT, BASIC SETTINGS, SITE PROFILE, SWITCH WIDE SETTINGS, PORT SETTINGS (current), and SUMMARY. The 'General Configuration' section is active, showing fields for Domain Name, DNS Server, DHCP Server, Syslog Server, and NTP Server. A 'HELP AND TIPS' panel on the right provides information about VLANs, STP, and Syslog. Navigation buttons for '< Site Profile' and 'Port Settings >' are visible at the bottom.

What to do next

Configure port settings.

Configuring Port Settings

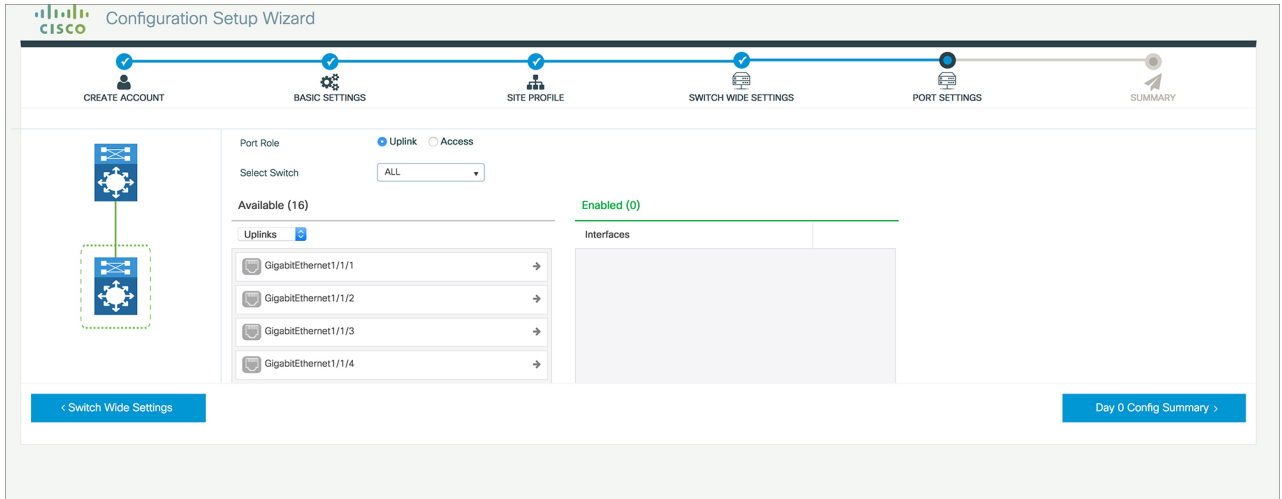
Step 1 Based on the site profile chosen in the earlier step which is displayed in the left-pane, select the **Port Role** from among the following options:

- Uplink – For connecting to devices towards the core of the network.
- Downlink – For connecting to devices further down in the network topology.
- Access – For connecting guest devices that are VLAN-unaware.

Step 2 Choose an option from the **Select Switch** drop-down list.

Step 3 Make selections from the **Available** list of interfaces based on how you want to enable them and move them to the **Enabled** list.

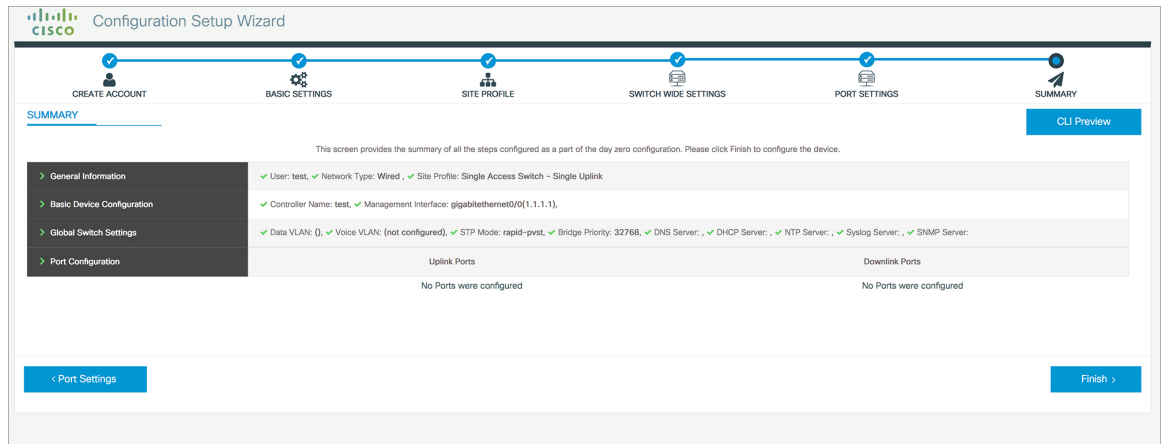
Figure 12: Port Settings



What to do next

- Click **Day 0 Config Summary** to verify your setup.
- Click **Finish**.

Figure 13: Day 0 Config Summary



Notices

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies of this document are considered uncontrolled. See the current online version for the latest version.

Cisco has more than 200 offices worldwide. Addresses and phone numbers are listed on the Cisco website at www.cisco.com/go/offices.

