Day 0 Configuration For CSR 1000v Release 17.2 and Later

Information About Day0 Configuration

The Cisco CSR 1000v instance requires manual configuration before the device is fully functional. To automate the configuration steps or to connect to on-premise sites, you can upload the CSR 1000v custom data or user data in all the supported public and private clouds.

By uploading the custom data for your cloud service provider or your private cloud, you can automate the day 0 and/or the bootstrap configuration. Upload or attach a bootstrap configuration file, (iosxe_config.txt file, ciscosdwan_cloud_init.cfg file or a ciscosdwan.cfg file) or provide the user data to automate these processes to bring up the device into a functional state with minimal to no touch.

Starting Cisco IOS XE Release 17.2, the Day0 configuration is changed. The same universalk9 image is available to deploy Cisco IOS XE (autonomous mode) and Cisco IOS XE SD-WAN (controller mode) features on Cisco IOS XE devices. After you deploy the CSR 1000v Release 17.2 image, the Day0 and/or the bootstrap configuration is used to determine if the router has to boot up in the Controller mode or the autonomous mode.

Autonomous and Controller Mode

You can access the Cisco IOS XE and the Cisco IOS XE SD-WAN functionalities by choosing either the autonomous mode or the Controller mode, respectively. The autonomous mode is the default mode for Cisco CSR 1000v and includes the Cisco IOS XE functionalities. To access the Cisco IOS XE SD-WAN functionalities, switch to the controller mode.

The following are the main differences between autonomous mode and controller modes:

Table 1:

Feature	Autonomous Mode	Controller Mode
Configuration method	• CLI • NETCONF	• YANG-based configuration • Cisco vManage • NETCONF

Feature	Autonomous Mode	Controller Mode
Onboarding modes	• Config-Wizard • WebUI • USB • Auto-install (Python script, TCL script) • ZTP (using DCHP option 150 and option 67)	Plug and Play USB
Interconnectivity	Network interface	VPN
Licensing	• Cisco Smart Licensing • PayG	Cisco High Performance Security (HSEC) software licensing. No device licensing.
Dual-IOSd redundancy model	Supported	Not supported
High availability	Supported	Not supported
Global configuration mode	**configure terminal** command	**configure transition** command

Note When you upgrade the CSR 1000v image to the IOS XE 17.2 release or later, if the system is unable to detect any of the following four parameters – OTP, UUID, VBOND, ORG, the device boots in the autonomous mode.

To switch between controller and autonomous modes, see the *Switching Between Autonomous and Controller Modes* section in this feature document.

If you are a user who wants to proceed with the autonomous mode configuration, continue reading this feature document. If you wish to deploy the CSR 1000v instance in the controller mode, see Install and Upgrade for Cisco IOS 17.2 and Later.

Prerequisites for Deploying the Unified Image

- Download the install the CSR 1000v 17.2 image. For more information, see CSR1000v Installation Overview.

• If you want to deploy the CSR 1000v instance in the controller mode, generate the bootstrap config file from vManage.

Restrictions for Deploying the Unified Image

• Starting from Cisco IOS XE Release 17.2, ucmk9 image is not published.

• If you use the PayG licensing model, you cannot perform a mode switch as controller mode does not support the PayG licensing model.

• Only the autonomous mode supports Dual-IOSd.

• Images without payload encryption and NO-LI images are not supported in the controller mode.

• After onboarding and determining the mode of operation, if you switch from the controller mode to the autonomous mode or the reverse, results in loss of configuration.

• When you switch from the autonomous mode to the controller mode or vice versa, your Smart Licensing registration does not work. You must reregister for your Smart Licenses to work.

How to Perform Day0 Configuration

Bootstrap Configuration Files

On a device that already runs a Cisco IOS XE non-SDWAN image, after you install the Cisco IOS XE

17.2 image, when you launch the CSR 1000v instance for the first time, in the absence of bootstrap configuration the instance always comes up in the autonomous mode. If you provide any user-data or custom-data or bootstrap configuration to the instance depending on the cloud environment, the data is used for the bootstrap configuration. To know more about the Day0 or bootstrap configuration for each service provider, see Day0 and Custom Data Configuration in this feature document.

On a new, out of box device, if you want to boot up the device in the autonomous mode, you need not provide the bootstrap configuration. In this scenario, by default, the instance always boots up in the autonomous mode. If you want to provide bootstrap related configurations, upload the iosxe_config.txt file or the ovf-env.xml file.

Note   In the case of public clouds, the filename does not matter as the instance fetches the latest user data or the custom data from metadata. However, in the case of private clouds, if you upload the .iso file, the filename is important.

On a new, out of box device, if you want to boot up the device in the controller mode, make sure that all the four parameters (OTP, UUID, VBOND, ORG) is present in the `ciscosdwan.cfg/ciscosdwan_cloud_init.cfg` file for a fresh deployment on Cisco CSR1000v or Cisco ISRv devices. After the device boots up in the controller mode, the configuration present in the configuration file is applied.

Day 0 and Custom Data Configuration for the Cloud Service Providers

Based on the cloud in which you are deploying the CSR 1000v instance, see the following to perform the bootstrap and/or the day 0 configuration:

- Deploying the OVA to the VM

- Manually creating the Cisco CSR 1000v VM using the .iso file (Citrix XenServer)

- Creating a CSR 1000v VM using the self installing .run package

- Manually creating the VM using the .iso file (Microsoft Hyper-V)

- Booting the CSR 1000v Instance

- Deploying a CSR 1000v VM Using Custom Data

- Deploying a CSR 1000v VM on Microsoft Azure

Note For a CSR 1000v instance running on Cisco CSP-5000 hypervisor, when you enter the settings in the Day Zero Config screen, ensure that you maintain the format mentioned here:

- **Source File Name**: Enter the value for this field in the format: *day0_filename cisco_sdwan.cfg*.

- **Destination File Name**: Enter the value for this field in the format: *day0-dest-filename /openstack/content/cisco_sdwan.cfg*.

Verifying the Router Operation Mode and Day 0 Configuration

To verify whether you've deployed or upgraded to the IOS XE 17.2 release successfully, run the **show version** command. The **operating device-mode** parameter displays whether the CSR 1000v instance is running in the autonomous or the controller mode.

Sample configuration output for CSR1000v instance in autonomous mode

```
Device# show version | inc operating
Router operating mode: Autonomous
Device# show platform software device-mode
Operating device-mode: Autonomous
Device-mode bootup status:
------------------------------------
Device# show platform software chasfs r0 brief | inc device_managed_mode
/tmp/chassis/local/rp/chasfs/etc/device_managed_mode : [autonomous]
/tmp/fp/chasfs/etc/device_managed_mode : [autonomous]
Device# show version | inc Last reload
Last reload reason: Enabling autonomous-mode
```

Sample configuration output for CSR1000v instance in controller mode

```
Device# show version | inc operating
Router operating mode: Controller-Managed
Device# show platform software device-mode
Operating device-mode: Controller
Device-mode bootup status:
```

```
------------------------------------
Success
Device# show platform software chasfs r0 brief | inc device_managed_mode
/tmp/chassis/local/rp/chasfs/etc/device_managed_mode : [controller]
/tmp/fp/chasfs/etc/device_managed_mode : [controller]
Device# show version | inc Last reload
Last reload reason: Enabling controller-mode
```

Upgrading from existing IOS XE and SD-WAN Images

Non-SD-WAN Image to Autonomous Mode Upgrade

If you are an existing non-SD WAN user and you are upgrading to the 17.2 release (autonomous mode), you can directly perform the upgrade. That is, you can directly upgrade an existing instance from either UCMk9 or universalk9 to 17.2 universalk9 images.

For example, if you use the image csr1000v-universalk9.16.12.02s.SPA.bin, and upgrade to csr1000v-universalk9.17.xx.xx.SPA.bin, the instance boots up in the autonomous mode and the configuration from UniversalK9 16.xx.xx instance gets ported over to the 17.2 autonomous mode instance.

To know more about the day0/bootstrap configuration for each cloud, see *Day 0 and Custom Data Configuration for the Cloud Service Providers* in this feature document.

SD-WAN Image to Controller Mode Upgrade

If you are an existing SD-WAN user, and you upgrade to the IOS XE 17.2. release, for example, you upgrade from Csr1000v-ucmk9.16.xx.xx.SPA.bin to CSR1000v-universalk9.16.xx.xx.bin, the instance boots up in the controller mode automatically and the configuration from 16.xx.xx cedge instance gets ported over to the 17.2.1 controller mode instance.

Non-SD-WAN Image to Controller Mode Upgrade

If you are an existing non-SD-WAN user (universalk9 user) who wants to upgrade to the IOS XE 17.2 release (Controller mode), perform a mode switch. In this case, the existing configuration data is deleted. To proceed with the router configuration the controller mode, see Upgrading from Existing IOS XE and SD-WAN image to Cisco IOS XE 17.2 and Later.

Note After you install the Cisco IOS XE 17.2 image, if you want to switch to the autonomous mode, for CSR1000v instance running on public clouds, provide the appropriate bootstrap configuration. For CSR 1000v instances running on private clouds, the instance comes up with no bootstrap configuration unless you mount an ISO file with the iosxe_config.txt file or the ovf-env.xml file.

Downgrade from Cisco IOS XE 17.2 and Later

Downgrading to a fresh install of old image versions brings the device to Day 0 configuration. For example, if you have never installed Cisco IOS XE 16.12 on your device and attempt to downgrade from Cisco IOS XE Release or later releases to Cisco IOS XE 1612, the following warning displays:

⚠

Warning   You are trying to activate an old image which will remove all device configuration and bring the device back to day-0 state. To proceed, use the **clean** option at activation.

For all the downgrade scenarios, see Downgrade from Cisco IOS XE 17.2 and Later section in the Cisco SD-WAN Getting Started Guide.

Switching Between Autonomous and Controller Modes

To determine the current mode of your device, run the **show version | inc operating** command. The following table lists the commands and the configuration files needed for switching between the two modes:

Current Mode	Command to Switch Mode	Mode Changes To	Configuration File and Location	Configuration Example
Autonomous mode	controller mode enable	Controller mode	ciscosdwan.cfg on bootflash, CDROM, or CDROM1 ciscosdwan_cloud_init.cfg on bootflash, CDROM, or CDROM1	```cisco#controller-mode enable``` ```Enabling controller mode will erase the nvram filesystem, remove all configuration files, and reload the box! Ensure the BOOT variable points to a valid image Continue? [confirm]```
Controller mode	controller mode disable	Autonomous mode	ciscortr.cfg in any file system available to the device	```cisco#controller-mode disable``` ```Disabling controller mode will erase the nvram filesystem, remove all configuration files, and reload the box! Ensure the BOOT variable points to a valid image Continue? [confirm]```

Note	After you execute these commands, the device reloads before the mode change takes effect.

If you want to perform a mode switch and you have a bootstrap configuration file for your configuration, ensure that you copy the file to the bootflash.

If you're using a Cisco CSR1000V 17.3.x instance, upload the ciscosdwan_cloud_init.cfg bootstrap file with the *aaa authorization exec default local* command to the router. This command configures the AAA authorization, checks the local database, and allows you to run an EXEC shell.

To know more about uploading the bootstrap file in controller mode, see
https://www.cisco.com/c/en/us/td/docs/routers/sdwan/configuration/sdwan-xe-gs-book/hardware-and-software-installation.html#c_On_Site_Bootstrap_Process_for_SD_WAN_Devices_12488.xml2.

In the case of public clouds, to provide access to the Cisco CSR 1000V instance in either modes, the instance comes up with bare minimum bootstrap configuration. You can use an SSH to log in to the instance during the initial bootup stage or after performing the mode switch operation.

Frequently Asked Questions

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Q. I have been using Cisco IOS XE image until now. Which mode should I now choose?

A. If you have been using the Cisco IOS XE universalk9 image so far, deploy the IOS XE 17.2 image and enter the autonomous mode. For more information, see *Bootstrap Configuration* section in this chapter.

Q. If I am upgrading to the CSR 1000v 17.2 release, do I need to provide the bootstrap configuration?

A. Prior to Cisco IOS XE Release 17.2, the Cisco IOS XE SD-WAN images were in the ucmk9 format while the Cisco IOS XE was in the universalk9 format. If you are an existing non-SD WAN user and are upgrading to the IOS XE 17.2 release (autonomous mode), you can directly perform the upgrade. You need not perform the Day 0 or the custom data configuration again.

For CSR 1000v instance running on Azure, the device uses the custom data that you provided the first time you configured your CSR 1000v instance.

For CSR 1000v instances running on AWS and GCP, the device fetches the custom data from the cloud service provider.

Q. What happens to my custom data configuration after switching modes?

A. The existing configuration data is deleted. Perform the bootstrap or custom data configuration just as you do for a fresh installation.

Q. What happens to my custom data after a factory reset?

A. When you perform a factory reset, the configuration and the files present on the disk are erased. The router boots up like a fresh install and looks for configuration files at the appropriate location specified. This action determines the mode and the associated configuration.

Q. Can I deploy my CSR 1000v instance in the controller mode with PayG license?

A. If you use the PayG licensing model, you cannot deploy the CSR 1000v instance in the controller mode or switch to the Controller mode, as this mode does not support the PayG licensing model.