

SaltStack

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About SaltStack

The Cisco Nexus switches support SaltStack through NX-OS. For information about Cisco NX-OS releases that support SaltStack, see https://github.com/saltstack/salt/blob/develop/doc/topics/installation/nxos.rst#step-1-verify-platform-and-software-version-support.

SaltStack is a free and open source automation framework for configuration, management, and remote execution of servers and other network devices. The SaltStack framework consists of a server that is called the Salt primary, and Salt nodes that run client programs, called minions. The Cisco Nexus switch (switch) is a Salt node, not the Salt primary.

SaltStack minions can run either on-box or off-box, respective to the switch, to execute the configuration or management operations:

- On-box, the minions run in the switch's Bash shell. These native minions receive and execute remote commands from the primary, and relay the command's results to the primary. In an on-box deployment, the minions are enabled in the switch's Guest shell.
- Off-box, a different type of minion, a proxy minion, runs over an SSH connection to the switch or through the NX-API. The proxy minion, either the SSH proxy minion or the NX-API proxy minion, receives and executes the commands. The proxy then relays the command's results to the primary.

Keys are used to ensure security between the Salt primary and the minions running on the Cisco Nexus switch. When the Salt primary initiates its connection with a minion running on the Cisco Nexus switch, it first passes a key. The minion receives the key, then computes the correct response, and transmits the key back to the primary. The primary also has computed the correct response value for the key. When the primary receives the key from the minion, if the keys match, the session is open. The Salt primary can then send commands. Sessions are not persistent across power cycles or reboots.

SaltStack manages and configures the switch through execution modules and salt states, which affect the switch's CLI, properties, and features. For example, through the modules, SaltStack can be used to upgrade

the Cisco Nexus switches. The Salt primary sends commands programmatically to leverage automation and scalability.

For more information, consult the following documentation:

SaltStack	https://www.saltstack.com/
SaltStack Documentation	https://docs.saltstack.com/en/latest/
Cisco Nexus Salt Minion Installation and Configuration Guide	https://github.com/saltstack/salt/blob/develop/doc/topics/installation/nxos.rst

About NX-OS and SaltStack

Salt Open is the open source, community edition of the Salt configuration management and distributed remote execution system. Cisco NX-OS provides an intermediate layer between the physical switch and the Salt Open software. Cisco NX-OS and Salt Open interoperate to provide the API and command-execution layer between Salt minions and Cisco Nexus switches. Cisco NX-OS hosts the minions and enables them to run as follows:

- On the switch, the Cisco NX-OS guest shell hosts SaltStack minions and provides automated orchestration of one or more switches through a unified interface. The minion running in the guest shell is a native minion and it connects over the NX-API the UNIX Domain Socket (UDS).
- Off the switch, the Salt primary runs the Salt Open software on a network device and communicates with NX-OS through SSH (the SSH proxy minion) or NX-API over HTTPS (the NX-API proxy minion). Cisco NX-OS interprets the commands, performs required configuration tasks, and reports success or failure back to the appropriate proxy minion. The proxy minion, in turn, transmits this data back to the Salt primary.

Guidelines and Limitations

The following are the guidelines and limitations for implementing SaltStack on the Cisco Nexus switches:

- If you are running SaltStack over SSH or NX-API HTTPS, enable the NX-API feature (**feature nxapi**) before you run Salt.
- The Salt primary listens for minions on port 4506. Make sure that this port is open (unblocked) and not used by another service.

Cisco NX-OS Environment for SaltStack

The Cisco NX-OS environment is different depending on whether you are running Salt on box or off box.

- For on-box management of the switch, you must install the SaltStack minion RPM in the Guest Shell, which is the hosting environment for the minion.
- For off-box management of the switch, SSH or NX-API must be enabled in NX-OS.

For more information, such as which Cisco Nexus switches support SaltStack, go to https://github.com/saltstack/salt/blob/develop/doc/topics/installation/nxos.rst#step-1-verify-platform-and-software-version-support.

Enabling NX-API for SaltStack

Before you begin

For proxy minions running over SSH or NX-API HTTPS, the NX-API feature must be enabled for SaltStack to function. By default, NX-API is enabled. The following instructions are provided in case you need to reenable it.

SUMMARY STEPS

1. **config terminal**
2. **feature nxapi**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**config terminal**
	Example:
	`switch-1# config terminal`
	`Enter configuration commands, one per line. End with CNTL/Z.`
	`switch-1(config)#`
		Enters configuration mode.

Step 2	**feature nxapi**
	Example:
	`switch-1# feature nxapi`
	`switch-1#(config)#`
		Enables NX-API for proxy minions.

What to do next

Install SaltStack.

Installing SaltStack for NX-OS

Use the following installation guide to install and bring up SaltStack on the Cisco Nexus switches:

https://github.com/saltstack/salt/blob/develop/doc/topics/installation/nxos.rst#cisco-nexus-salt-minion-installation-and-configuration-guide