



# Overview

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## Programmability Overview

The Cisco NX-OS software running on the Cisco Nexus 3600 Series devices is as follows:

- **Resilient**  
Provides critical business-class availability.
- **Modular**  
Has extensions that accommodate business needs.
- **Highly Programmatic**  
Allows for rapid automation and orchestration through Application Programming Interfaces (APIs).
- **Secure**  
Protects and preserves data and operations.
- **Flexible**  
Integrates and enables new technologies.
- **Scalable**  
Accommodates and grows with the business and its requirements.
- **Easy to use**  
Reduces the amount of learning required, simplifies deployment, and provides ease of manageability.

With the Cisco NX-OS operating system, the device functions in the unified fabric mode to provide network connectivity with programmatic automation functions.

Cisco NX-OS contains Open Source Software (OSS) and commercial technologies that provide automation, orchestration, programmability, monitoring and compliance support.

For more information on Open NX-OS, see <https://developer.cisco.com/site/nx-os/>.

## Standard Network Manageability Features

- SNMP (V1, V2, V3)
- Syslog
- RMON
- NETCONF
- CLI and CLI scripting

## Advanced Automation Feature

The enhanced Cisco NX-OS on the device supports automation. The platform includes support for Power On Auto Provisioning (POAP).

The enhanced Cisco NX-OS on the device supports automation. The platform includes the following features that support automation:

- Power On Auto Provisioning (POAP) support
- Chef and Puppet integration
- OpenStack integration
- OpenDayLight integration and OpenFlow support

## Power On Auto Provisioning Support

Power On Auto Provisioning (POAP) automates the process of installing and upgrading software images and installing configuration files on Cisco Nexus devices that are being deployed in the network for the first time. It reduces the manual tasks that are required to scale the network capacity.

When a Cisco Nexus device with the POAP feature boots and does not find the startup configuration, the device enters POAP mode. It locates a DHCP server and bootstraps itself with its interface IP address, gateway, and DNS server IP addresses. The device obtains the IP address of a TFTP server or the URL of an HTTP server and downloads a configuration script that enables the device to download and install the appropriate software image and configuration file.

## Programmability Support

Cisco NX-OS on Cisco Nexus 9000 devices support several capabilities to aid programmability.

## NX-API Support

Cisco NX-API allows for HTTP-based programmatic access to the Cisco Nexus 9000 platform. This support is delivered by NX-API, an open source webservice. NX-API provides the configuration and management capabilities of the Cisco NX-OS CLI with web-based APIs. The device can be set to publish the output of the API calls in XML or JSON format. This API enables rapid development on the Cisco Nexus 9000 platform.

## Python Scripting

Cisco Nexus 9000 devices support Python v2.7.5 in both interactive and noninteractive (script) modes.

The Python scripting capability on the devices provides programmatic access to the switch CLI to perform various tasks, and to Power-On Auto Provisioning (POAP) and Embedded Event Manager (EEM) actions. Responses to Python calls that invoke the Cisco NX-OS CLI return text or JSON output.

The Python interpreter is included in the Cisco NX-OS software.

## Bash

Cisco Nexus 9000 devices support direct Bourne-Again Shell (Bash) access. With Bash, you can access the underlying Linux system on the device and manage the system.

## Perl Modules

In order to support additional applications, the following Perl modules have been added:

- bytes.pm
- feature.pm
- hostname.pl
- lib.pm
- overload.pm
- Carp.pm
- Class/Struct.pm
- Data/Dumper.pm
- DynaLoader.pm
- Exporter/Heavy.pm
- FileHandle.pm
- File/Basename.pm
- File/Glob.pm
- File/Spec.pm
- File/Spec/Unix.pm

- File/stat.pm
- Getopt/Std.pm
- IO.pm
- IO/File.pm
- IO/Handle.pm
- IO/Seekable.pm
- IO/Select.pm
- List/Util.pm
- MIME/Base64.pm
- SelectSaver.pm
- Socket.pm
- Symbol.pm
- Sys/Hostname.pm
- Time/HiRes.pm
- auto/Data/Dumper/Dumper.so
- auto/File/Glob/Glob.so
- auto/IO/IO.so
- auto/List/Util/Util.so
- auto/MIME/Base64/Base64.so
- auto/Socket/Socket.so
- auto/Sys/Hostname/Hostname.so
- auto/Time/HiRes/HiRes.so