



# Cisco NCS 6008 System Features

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## Cisco NCS 6008 Product Overview

### **Cisco Network Convergence System 6000 Series**

The Cisco Network Convergence System (NCS) 6000 Series System delivers outstanding network agility, packet optical convergence, and a system scale measured in petabits per second. It also facilitates the build-out of next-generation core to:

- support elastic capacity at the lowest total ownership cost
- deliver high-bandwidth mobile, video, and cloud services

Running the Cisco IOS XR operating system, Cisco's innovative virtualized operating environment, the Cisco NCS 6000 Series advances the concept of distributed routing and virtualization. With Cisco Virtualized IOS XR, the Cisco NCS 6000 Series brings new levels of programmability and virtualization to:

- enhance application service offerings
- increase provisioning speed
- optimize network economics

The Cisco NCS 6000 Series System is engineered for environmental efficiency, with the use of adaptable power consumption. The Cisco NCS 6000 Series System is powered by the Cisco nPower Network Processor Units (NPU). These technologies aid the Cisco NCS 6000 Series the lowest carbon footprint in service provider routing.

### **Cisco Network Convergence System 6008 Router**

The Cisco NCS 6008 router, part of the Cisco NCS 6000 Series System, is the next-generation core router that provides industry-leading 8 Tbps of full-duplex network bandwidth through eight line cards.

The Cisco NCS 6008 router runs on Cisco IOS XR software, with Linux as the underlying host operating system. A Kernel-based Virtual Machine (KVM) hypervisor provides a virtualized environment to independently run system administration and routing functions on separate virtual machines. This provision makes the new system versatile and robust, providing immense flexibility for future expansion without the need for a complete system overhaul.

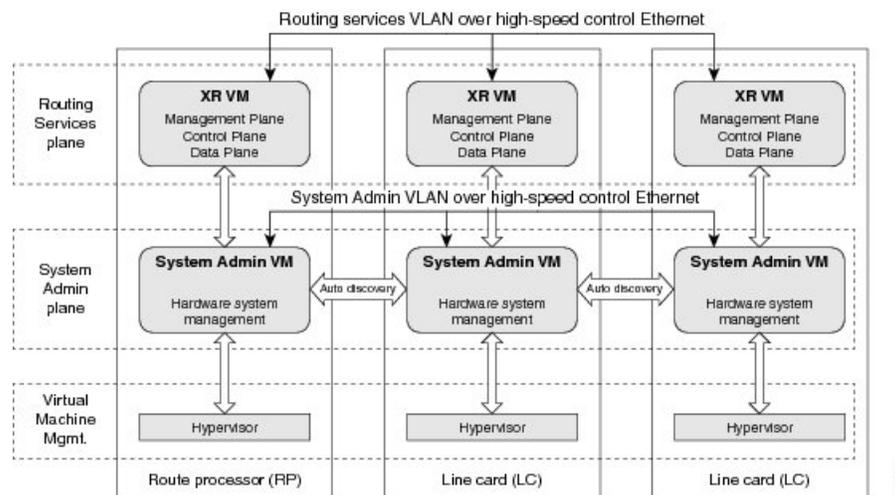
A multi-slice architecture of line cards enables the system to be configured to operate in a mixed operating mode, simultaneously supporting traffic at 10 Gbps and 100 Gbps on slice-level granularity.

## Virtual Machine based Routing and System Administration

On the Cisco NCS Series router, the routing functions and the System Administration functions are run on separate virtual machines (VMs) over a Linux host operating system. The VMs simulate individual physical computing environments over a common hardware.. Available hardware resources, like processor, memory, hard disk, and so on, are virtualized and allocated to individual virtual machines by the hypervisor.

The VM topology on the Cisco NCS Series router is shown in this figure.

**Figure 1: Virtualized IOS XR on Cisco NCS Series Router**



### Implementation of Virtualized IOS XR on Cisco NCS Series Router

- The hypervisor creates and manages individual VM environments.
- On every route processor (RP) and line card (LC) there are two VMs; one for system administration (System Admin VM) and one for managing the routing functions (XR VM).
- The two VMs on each node operate on their respective planes. On each plane, the VMs are connected to each other using a dedicated VLAN over a high-speed Control Ethernet connection.
- The System Admin VMs can detect each other's presence by auto discovery and thus maintain complete system awareness.

To access the XR VM, connect to the XR VM console port on the RP. To access the System Admin VM, in the XR VM CLI, execute the **admin** command.

### Advantages of Virtualized IOS XR on the Cisco NCS Series Router

- Faster boot time—Because the System Admin functions are on a dedicated VM, the boot time is considerably reduced.
- Independent upgrades—Software packages can be independently installed on the System Admin VM and the XR VM, resulting in minimal system downtime.
- Self-starting VMs—Both the System Admin VM and the XR VM are automatically launched during router boot-up without any user intervention. They have a default set-up that is ready for use.
- System redundancy—In spite of their interconnectivity, there is also a level of isolation between the VMs. Therefore, if a particular VM experiences any issues, it does not affect the functioning of other VMs.

## Command Modes

The Cisco NCS 6000 Series router runs on virtualized Cisco IOS XR software. Therefore, the CLI commands must be executed on virtual machines, namely the XR VM and the System Admin VM. This table lists the command modes for the VMs.

Command Mode	Description
XR EXEC mode (XR VM execution mode)	Run commands on the XR VM to display the operational state of the entire secure domain router (SDR).  Example: RP/0/RP0/CPU0:router#
XR Config mode (XR VM configuration mode)	Perform security, routing, and other XR feature configurations on the XR VM.  Example: RP/0/RP0/CPU0:router# <b>configure</b> RP/0/RP0/CPU0:router (config)#
System Admin EXEC mode (System Admin VM execution mode)	Run commands on the System Admin VM to display and monitor the operational state of the router hardware. The chassis or individual hardware modules can be reloaded from this mode.  Example: RP/0/RP0/CPU0:router# <b>admin</b> sysadmin-vm:0_RP0#
System Admin Config mode (System Admin VM configuration mode)	Run configuration commands on the System Admin VM to manage and operate the hardware modules of the entire chassis.  Example: RP/0/RP0/CPU0:router# <b>admin</b> sysadmin-vm:0_RP0# <b>config</b> sysadmin-vm:0_RP0 (config)#

# System Setup Workflow

The system setup of the Cisco NCS 6008 Series router involves these stages:

1. [Bring-up the Cisco NCS 6008 Router](#)—Connect to the router's console and boot-up the router. After booting is complete, specify the root username and password.
2. [Perform Preliminary Checks](#)—Perform basic verification of the router's default setup. This ensures that, if any setup issue is detected, corrective action is taken at an early stage.
3. [Create User Profiles and Assign Privileges](#)—Create users and assign privileges, as needed. Privileges are defined by data rules and command rules that are applied to users. Users are either permitted, or denied, the use of certain commands based on assigned privileges.
4. [Perform System Upgrade and Install Feature Packages](#)—Upgrade the operating system, if the default is not the latest version. Also, install relevant packages to deploy additional features and software patches on the router.
5. [Perform Disaster Recovery](#)—In the event of a router boot failure due to image corruption, boot the router using an external bootable USB drive.