

Cisco ASR 9000 System Features

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Cisco ASR 9000 Product Overview

The Cisco ASR 9000 series routers are next-generation edge access routers that are optimized for service provider applications. These routers are designed to fulfill various roles in:

- Layer 2 and Layer 3 Ethernet aggregation
- Subscriber-aware broadband aggregation

The Cisco ASR 9000 series routers meet carrier-class requirements for redundancy, availability, packaging, power, and other requirements traditional to the service provider.

The Cisco ASR 9000 series consists of the following routers:

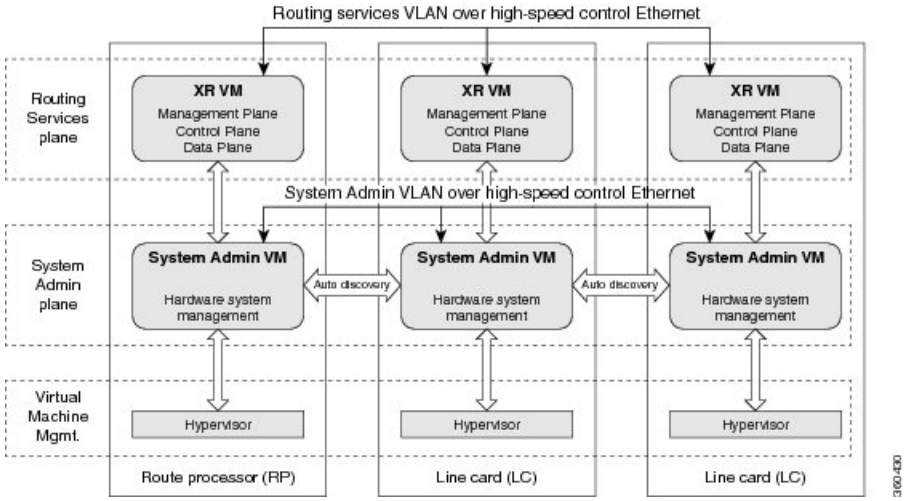
- Cisco ASR 9001 Router (32-bit)
- Cisco ASR 9001-S Router
- Cisco ASR 9006 Router
- Cisco ASR 9010 Router
- Cisco ASR 9901 Router
- Cisco ASR 9904 Router
- Cisco ASR 9906 Router
- Cisco ASR 9910 Router
- Cisco ASR 9912 Router
- Cisco ASR 9922 Router

Virtual Machine based Routing and System Administration

On the Cisco ASR 9000 series router running 64-bit IOS XR, 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 ASR 9000 series router running 64-bit IOS XR is shown in this figure.

Figure 1: Virtualized IOS XR on Cisco ASR 9000 Series Router



Implementation of Virtualized IOS XR on Cisco ASR 9000 Series Router

- The hypervisor creates and manages individual VM environments.
- On every route processor (RP) 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.

Note In 32-bit IOS XR OS, the management interfaces are available from XR VM. In 64-bit IOS XR OS, the Management ports on the RP/RSP are available as follows:

- MGT LAN 0 is available in XR VM.
- MGT LAN 1 is available in Admin VM.

Advantages of Virtualized IOS XR on the 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

This table lists the command modes:

Command Mode	Description
XR VM Execution Mode	Run commands on the XR VM to display the operational state of the router. Example: `RP/0/RP0/CPU0:router#`

XR VM Global Configuration	Perform security, routing, and other XR feature configurations on the XR VM.
	Example:
	`RP/0/RP0/CPU0:router#configure`
	`RP/0/RP0/CPU0:router(config)#`

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#admin`
	`sysadmin-vm:0_RP0#`

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#admin`
	`sysadmin-vm:0_RP0#config`
	`sysadmin-vm:0_RP0(config)#`