

Preparing for Installation

This chapter provides information about the prerequisites for installing Cisco IOS XRv 9000 Router.

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Introduction

The Cisco IOS XRv 9000 Router is a cloud-based router that is deployed on a virtual machine (VM) instance on x86 server hardware running 64-bit IOS XR software. Cisco IOS XRv 9000 Router provides traditional Provider Edge services in a virtualized form factor, as well as virtual Route Reflector capabilities. Cisco IOS XRv 9000 Router is based on Cisco IOS XR software, so it inherits and shares the wide breadth of routing functionality available on other IOS XR platforms.

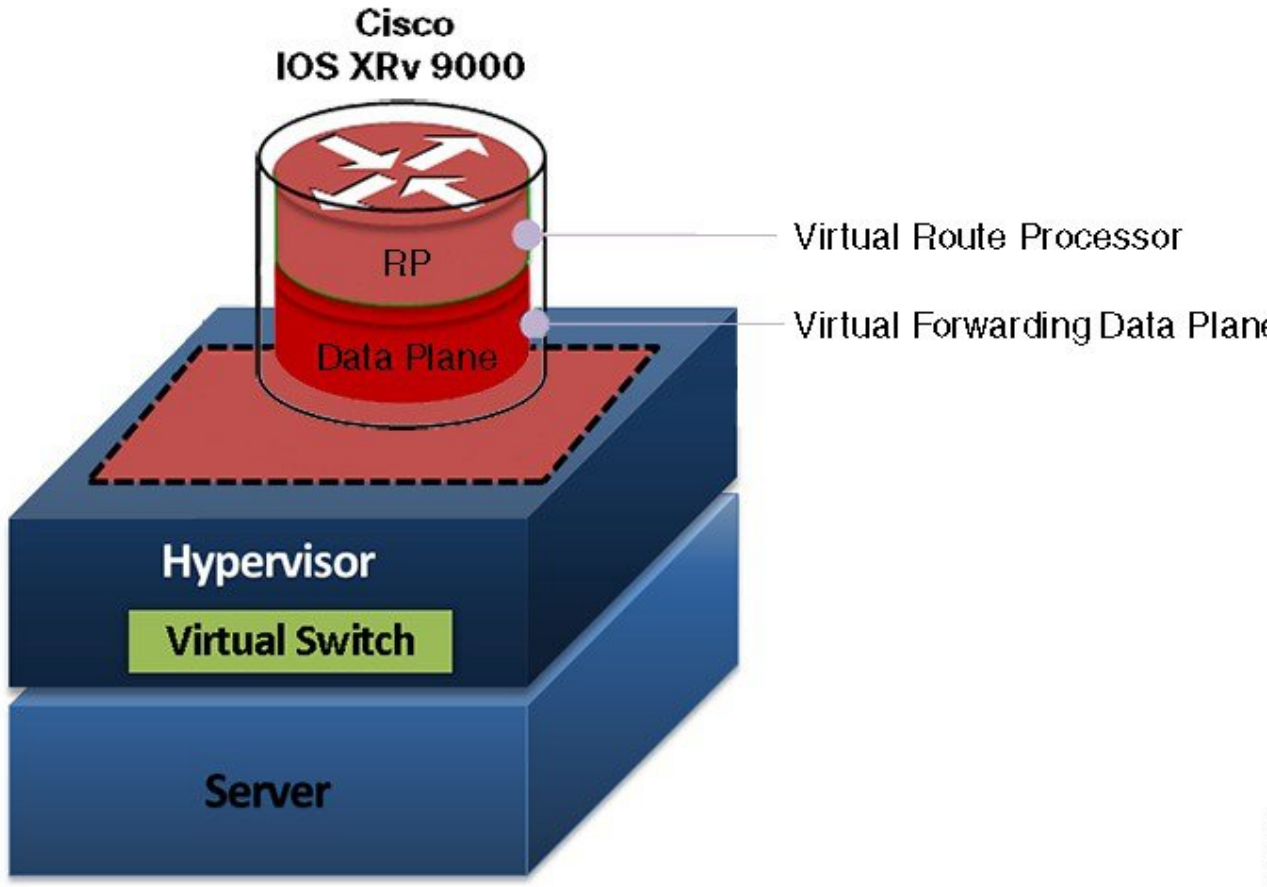
Note **RHEL KVM, ESXi, and AWS VMs are not supported for the Releases 24.4.1 and 24.4.2.**

The XRV-M7-APLN-25G and XRV-M7-APLN-100G M7 appliances are supported starting from Release 24.4.2.

For information on IOS XR features available on Cisco IOS XRv 9000 Router, refer section *Supported Cisco IOS XR Technologies* in the latest *Release Notes for Cisco IOS XRv 9000 Router* .

When the Cisco IOS XRv 9000 Router virtual IOS XR software is deployed on a VM, the Cisco IOS XR software functions just as if it were deployed on a traditional Cisco IOS XR hardware platform. The Cisco IOS XRv 9000 Router combines Route Processor, Line Card, and virtualized forwarding capabilities into a single, centralized forwarding instance. The Cisco IOS XRv 9000 Router has a fully featured, high speed virtual x86 data plane.

Figure 1: Cisco IOS XRv 9000 Router Virtual Form Factor



The Cisco IOS XRv 9000 router can be deployed as virtual form factor or in appliance mode.

This figure shows the basic virtual form factor for the Cisco IOS XRv 9000 Router. The Cisco IOS XRv 9000 Router is deployed as a VM on a hypervisor. Cisco IOS XRv 9000 Router offers various connectivity models, including virtualized interfaces connected to a virtual switch (vSwitch), or physical pass-through of 10G interfaces directly into the VM for maximum performance.

For information on VM requirement, and limitation of the Cisco IOS XRv 9000 Router, see section Virtual Machine Requirements.

Cisco IOS XRv 9000 Router is deployed on VMware, KVM hypervisors, or on AWS servers. For details on supported hypervisors, see section Hypervisor Support.

Software Configuration and Management

You can perform software configuration and manage the Cisco IOS XRv 9000 Router using VM or in appliance mode.

Using VM

- Provision a serial port in the VM and connect to the serial port to access Cisco IOS XR CLI commands.

- Use the VM console or the console on the virtual serial port to access Cisco IOS XR CLI commands.

Note A serial port can be used to manage a Cisco IOS XRv 9000 Router VM only if the underlying hypervisor supports the associating of a serial port with a VM. See your hypervisor documentation for details.

- Use remote SSH/Telnet to access Cisco IOS XR CLI commands.

  For more information on how to access the router console, see the Access the Cisco IOS XRv 9000 Router Through the Virtual Serial Port

Using Appliance

- Connect to the XR console (or a controller) through the serial port which connects directly to CIMC.
- Login to the XR console using admin password.
- Configure the router manually using CLIs.

Provisioning the VM

Cisco hardware routers are normally shipped with the Cisco IOS XR software pre-installed. Because the Cisco IOS XRv 9000 Router is not hardware-based, you must download the Cisco IOS XR software from Cisco.com and install it directly onto the virtual machine (VM). However, as part of the initial installation process, you must first provision the attributes (memory, hard disk, etc) of the VM so that the Cisco IOS XRv 9000 Router image can install and boot.

Also, Cisco IOS XRv 9000 Appliance is the pre-installed Cisco IOS XRv 9000 Router software that is sent from the factory on a bare metal UCS server hardware. Cisco IOS XRv 9000 Appliance is inclusive of all applicable licenses. The Appliance package enables you to virtualize your network routing function without having operational concerns about ownership of hardware and software.

Router Interfaces

Cisco IOS XRv 9000 Router interfaces perform the same function as those on hardware-based Cisco routers. Cisco IOS XRv 9000 interface naming convention is:

- Interfaces are logically named as GigabitEthernet interfaces. These interfaces can either be virtualized interfaces such as VMXNET3 or E1000, or physical 1 Gigabit interfaces which are passed into the VM through PCI passthrough.
- Interfaces are logically named based on their speed and are passed into the VM via PCI passthrough:
  - HundredGigE for 100G interface
  - FortyGigE for 40G interface
  - TenGigE for 10G interface
  - GigabitEthernet for 1G interface

- The interface numbering starts at 0 and increases monotonically; for example:

```
interface GigabitEthernet 0/0/0/0
interface GigabitEthernet 0/0/0/1
interface GigabitEthernet 0/0/0/2
```

or in the case of Ten Gigabit interfaces:

```
interface TenGigE 0/0/0/0
interface TenGigabitE 0/0/0/1
```

or in the case of forty Gigabit interfaces:

```
interface FortyGigE 0/0/0/0
interface FortyGigE 0/0/0/1
```

or in the case of hundred Gigabit interfaces:

```
interface HundredGigE 0/0/0/0
interface HundredGigE 0/0/0/1
```

Mapping the Router Network Interfaces to VM Network Interface Cards

Cisco IOS XRv 9000 Router maps the logical virtual network interface cards (vNICs) or physical NICs assigned to the VM to management Ethernet interface, GigabitEthernet, TenGigE, TwentyFiveGigE, or HundredGigE interface.

Each time Cisco IOS XRv 9000 Router is booted, the first NIC is used as the management Ethernet interface of the virtual router, the second and third NICs are used by the virtual router internally. These three NICS can be E100 or any other. The rest of the NICs are mapped to the data plane as line interfaces.

The naming convention of line interfaces is <GigabitEthernet | TenGigE | TwentyFiveGigE | HundredGigE | FortyGigE> 0/0/0/<port number>.

The port numbers are allocated across the NIC types. Here are the rules for allocating port number :

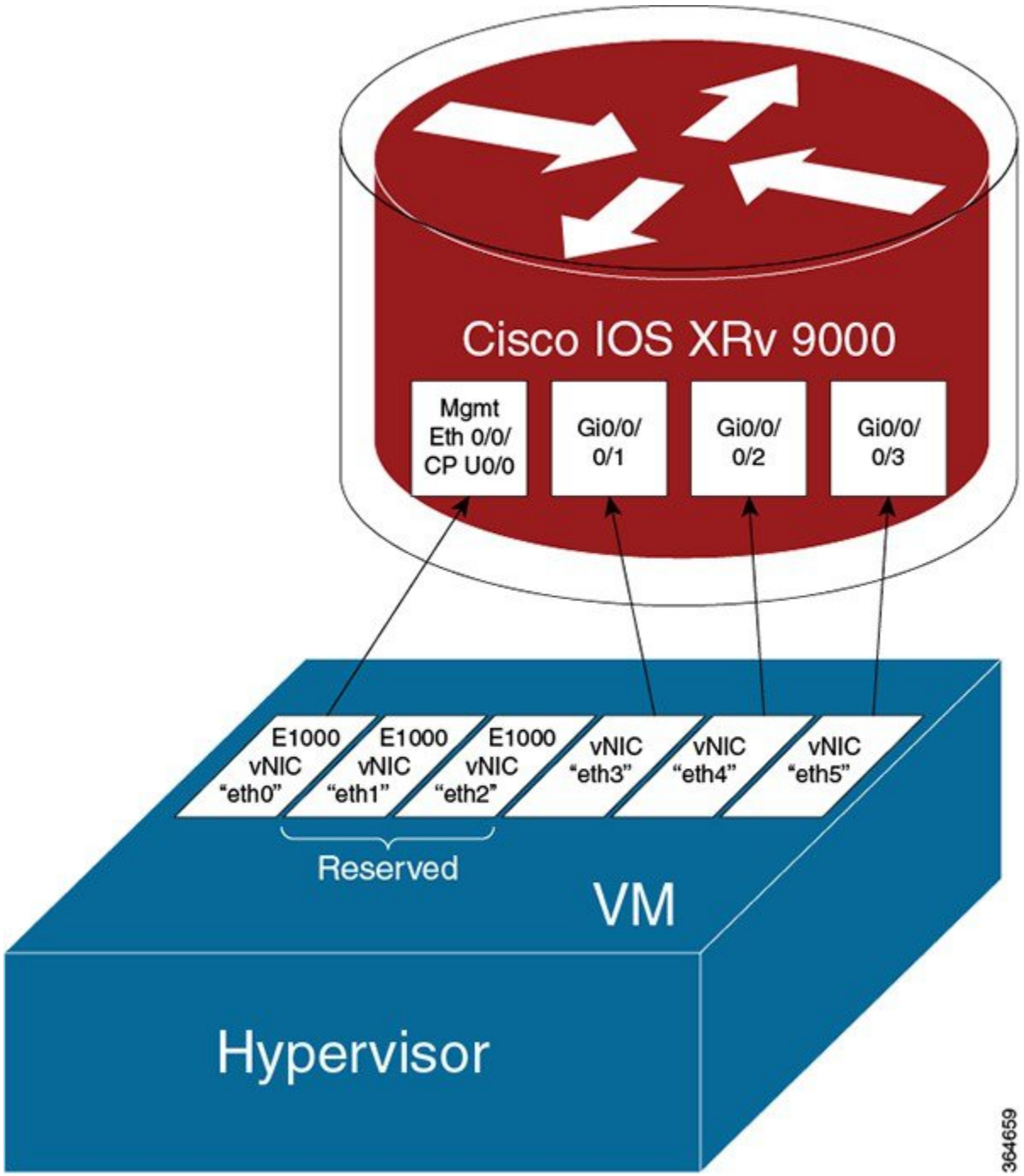
- Allocate faster interfaces before slower interfaces. For example, 10GE interface comes before 1GE then,
- within the same speed allocate lower PCI addresses before higher addresses. For example, 04:00.0 comes before 04.00.1.

Assume that there is one TegGigE NIC, one physical GigabitEthernet NIC and one virtual NIC mapped to the data plane. in such a case then naming of line interface is:

- TenGigE NIC is names as TegGigE 0/0/0/0.
- Physical GigabitEthernet NIC is name as GigabitEthernet 0/0/0/1.
- The virtual NIC is named as GigabitEthernet 0/0/0/2.

This figure shows an example of 6 NICs (virtual and physical) mapped to Cisco IOS XRv 9000 Router. The figure is applicable for VMware and KVM hypervisors:

Figure 2: Mapping NICs with Cisco IOS XRv 9000 Router



For interface mapping on XRv 9000 Appliance, see Appliance Physical Connections Overview

Cisco IOS XRv 9000 Installation Files

The following file types are included in the Cisco IOS XRv 9000 Router's software image package and are used to install the Cisco IOS XRv 9000 Router on the supported hypervisors.

- .iso—Used for installing the software image on the VM. This can be used to create a VM in any supported hypervisor environment.
- .ova—Used for deploying the Open Virtualization Appliance (OVA) template on the VM (in TAR format). The OVA image is recommended for deploying Cisco IOS XRv 9000 Router on the VMware ESXi hypervisor. The OVA file contains a Virtual machine disk image (VMDK) with the Cisco IOS XRv 9000 Router software installed.



Note The VMDK disk inside the OVA file is in a stream optimized format and cannot be booted directly. In order to use the the stream optimized VMDK disk it must be converted to a standard Read/Write disk format. During OVA deployment, ESXi will transparently convert the disk to a standard Read/Write VMDK format. A stream optimized VMDK can also be converted to a standard Read/Write VMDK or QCOW2 disk using a standard disk tool like **qemu-img**.

- .qcow2 —Used for booting the software image in KVM OpenStack environments. The qcow2 disk image contains the Cisco IOS XRv 9000 Router software installed.
- virsh.xml—Sample XML that can be used for launching the Cisco IOS XRv 9000 Router in KVM environments using Virsh.
- CML2—You can create a lab with CML2.1(Cisco Modelling Lab) and start XRv 9000 Router on CML.

Installation Image Variants

The above image types come in a default or vrr (virtual Route Reflector) variant. Any image without vrr in the filename is a default variant.

- default—tuned for working as a virtual Provider Edge (vPE) router. vPE has more CPU for data plane versus vRR for control plane. VPE is the default profile for other hypervisors like ESXI. Use VPE mode for high speed L2 functions at PE
- vrr—tuned for working as a virtual Route Reflector (vRR). vRR is the default profile for baremetal appliances.

These are the default type installation images:

- xrv9k-fullk9-x.iso
- xrv9k-fullk9-x.ova
- xrv9k-fullk9-x.qcow2
- xrv9k-fullk9-x.virsh.xml

These are the vrr type installation images:

- xrv9k-fullk9-x.vrr.iso
- xrv9k-fullk9-x.vrr.ova
- xrv9k-fullk9-x.vrr.qcow2
- xrv9k-fullk9-x.vrr.virsh.xml

xrv9k-li-x.pkg—Optional package for Lawful Intercept.

From Cisco IOS XR Software Release 7.2.1, xrv9k-full(k9).iso build has been discontinued. From Cisco IOS XR Software Release 7.2.1, we are building GISO images as a part of post build and these images are renamed to xrv9k-fullk9-iso images as well. With Cisco IOS XR Software Release 7.8.1 XRv 9000 platform has moved to LJAM build and with LJAM migration, automatic GISO post build scripts have been discontinued. So, now we must build the GISO with GISO tool with xrv9k-mini.iso and the required RPMs. You shouldn't use the xrv9k-full and xrv9k-fullk9.iso from Cisco.com.

Build the GISO image with the GISO tool with xrv9k-mini.iso and the required RPMs and try the install upgrade/downgrade.

GISO Tool Link: Download `gisobuild.py` from GitHub

See limitations Golden ISO Workflow.

Console Image Variants

If you don't want to login through serial port, then you can go for VGA image which provides VGA console. The installation images with vga in the filename are console image variants. If VGA image is used for installation of the router then the XR console is mapped to the VGA console, else the XR console will be mapped to the first serial port. The installation procedure is same with or without VGA images.

These are the console image variants:

- xrv9k-fullk9_vga-x.iso
- xrv9k-fullk9_vga-x.ova
- xrv9k-fullk9_vga-x.qcow2
- xrv9k-fullk9_vga-x.vrr.iso
- xrv9k-fullk9_vga-x.vrr.ova
- xrv9k-fullk9_vga-x.vrr.qcow2
- xrv9k-fullk9-x_vga.virsh.xml
- xrv9k-fullk9-x.vrr_vga.virish.xml

Installing the Cisco IOS XRv 9000 Router

The Cisco IOS XRv 9000 Router is installed either on VMware or KVM hypervisors. See these sections for detailed information on installing the Cisco IOS XRv 9000 Router:

- *Installing the Cisco IOS XRv 9000 Router in VMware ESXi Environments*
- *Installing the Cisco IOS XRv 9000 Router in KVM Environments*

For XRv 9000 Appliance software installation, see Configuring the Appliance