



## Overview

---

This chapter contains the following sections:

- [Information About Cisco Nexus 1000V InterCloud, page 1](#)
- [Cisco Nexus 1000V InterCloud Architecture, page 1](#)
- [Cisco Nexus 1000V InterCloud Solution, page 3](#)

## Information About Cisco Nexus 1000V InterCloud

A hybrid cloud is an interaction between private and public clouds where private clouds extend to public clouds and utilize public cloud resources in a secure and scalable way. Cisco Nexus 1000V InterCloud provides the architectural foundation for secure hybrid clouds, allowing enterprises to easily and securely connect the enterprise data center to the public cloud. With a hybrid cloud, enterprises can combine the benefits of public and private clouds. Cisco Nexus 1000V InterCloud provides the following benefits:

- Provides highly secure Layer 2 connectivity between the enterprise data center and the public cloud.
- Provides a single pane of management across enterprise data centers and public clouds through Cisco Prime Network Services Controller.
- Enables use of the same network policies and services across private and public clouds.

## Cisco Nexus 1000V InterCloud Architecture

Cisco Nexus 1000V InterCloud is a hybrid cloud solution deployed as virtual machines (VMs) in the enterprise data center and in the public cloud. In the Cisco Nexus 1000V InterCloud solution, one or more Virtual Ethernet Modules (VEMs) are deployed in the cloud as an extension of the Cisco Nexus 1000V. The Cisco Nexus 1000V InterCloud solution consists of the following components:

- Cisco Prime Network Services Controller
- InterCloud Switch (ICS)
- InterCloud Extender (ICX)
- InterCloud Agent (ICA)

- Cisco Nexus 1000V Virtual Supervisor Module (VSM)
- InterCloud Link

### Cisco Prime Network Services Controller

Cisco Prime Network Services Controller provides a single pane of management across enterprise data centers and public clouds. Cisco Prime Network Services Controller does the following:

- Provides the hybrid cloud operations, management of cloud resources, and instantiation of the InterCloud components through the enterprise virtualization platform and cloud provider APIs.
- Presents a consolidated view of virtual machines across the enterprise data center and the cloud.
- Enables virtual machines to be migrated from the enterprise data center to a cloud provider.
- Monitors the health of all the InterCloud link components and assists in component failure recovery.

Cisco Nexus 1000V InterCloud enables you to construct various network topologies for the InterCloud based on the optimal network requirements of application workloads.

### InterCloud Extender

InterCloud Extender is a virtual machine that runs in the enterprise data center. It is responsible for establishing a secure tunnel for interconnecting the InterCloud components in the cloud with enterprise networks. The main functions of the InterCloud Extender are as follows:

- Establishing a secure tunnel to interconnect all of the cloud resources with enterprise networks.
- Interacting with Cisco Nexus 1000V at the enterprise.
- Providing InterCloud secure tunnel statistics.

### InterCloud Switch

InterCloud Switch is a virtual machine that runs in the cloud. It is responsible for establishing secure tunnels for connecting VMs in the cloud to the enterprise VMs and other VMs in the cloud. The main functions of the InterCloud Switch are as follows:

- Runs the Cisco Nexus 1000V VEM to provide the Cisco Nexus 1000V functions.
- Establishes a secure tunnel to connect the VEM with InterCloud Extender.
- Establishes a secure tunnels to connect all of the cloud VMs.
- Provides InterCloud Switch related statistics.
- Monitors and reports statistics of VMs in the cloud.
- Monitors and reports any component failures in the cloud to Cisco Prime Network Services Controller.

The Cisco Nexus 1000V VEM is embedded in the InterCloud Switch and is responsible for the following:

- Communicates with the VSM function that runs at the enterprise for retrieving VM specific network policies such as port profiles.
- Switches the network traffic between cloud VMs.
- Switches the network traffic between cloud VMs and the enterprise.

- Applies network polices to any switching network traffic.
- Collects and reports VEM related statistics.

### InterCloud Agent

InterCloud Agent (ICA) provides the compute environment and network overlay to the enterprise VMs in the cloud. It secures the guest VM in the cloud and abstracts the cloud infrastructure. It is deployed in the provider cloud as a secure tunnel driver that runs within the cloud VM's operating system. It also redirects network traffic to the secure overlay network as follows:

- Establishes a secure tunnel to connect to an InterCloud Switch for allowing VMs in the cloud to communicate with enterprise VMs and cloud VMs.
- Collects secure overlay related statistics.

### Cisco Nexus 1000V VSM

The Cisco Nexus 1000V VSM is a virtual switch that provides highly secure Layer 2 connectivity between the enterprise data center and the public cloud.

### InterCloud Link

InterCloud links are secure connections between an enterprise and a public cloud. It includes InterCloud Extender in the enterprise and InterCloud Switch in the public cloud. A secure Layer 2 tunnel connects InterCloud Extender and InterCloud Switch, which extends the enterprise network into the cloud.

InterCloud Extender, InterCloud Switch with the embedded VEM, and each of the VMs in the cloud are connected through secure tunnels. The VMs in the cloud communicate with each other and with the components located in the enterprise data center through secure tunnels.

## Cisco Nexus 1000V InterCloud Solution

Cisco Nexus 1000V InterCloud provides the infrastructure for enterprises to extend their enterprise data center and private clouds into public clouds by providing an overlay infrastructure in the cloud. This solution allows the enterprise to manage the cloud extension as if it is part of its own environment.



#### Note

---

In this release, Cisco Nexus 1000V InterCloud supports Amazon Web Services (AWS) as the public cloud and VMware ESX 5.0 and 5.1 as the hypervisor in the enterprise.

---

The Cisco Nexus 1000V InterCloud solution uses the secure Layer 2 extension, compute overlay, and Cisco Prime Network Services Controller to provide the required infrastructure.

### Secure Layer 2 Extension

The Cisco Nexus 1000V InterCloud solution enables the enterprises to extend their network securely into the cloud by retaining the network attributes of the VM when it is migrated to the cloud. This process is achieved by providing highly secure Layer 2 connectivity between the enterprise data center and the cloud. In the enterprise, InterCloud Extender interfaces with the enterprise network and receives the bridged traffic. A secure tunnel is formed between InterCloud Extender in the enterprise and InterCloud Switch in the cloud. All of the communication between the enterprise and cloud is transmitted through this secure tunnel.

### Compute Overlay

InterCloud Agent (ICA) is a virtualization environment that makes the VMs transparent to the cloud infrastructure. It secures the VM in the public cloud by ensuring that only the enterprise network components can communicate with the VM. It filters all other traffic by establishing a secure tunnel with InterCloud Switch. All the communication between the VMs is transmitted using this tunnel. It abstracts the cloud infrastructure and enterprise VLANs to VMs in the cloud.

### Management Infrastructure

The Cisco Nexus 1000V InterCloud solution maintains the separation of duties between network administrators and compute administrators when the infrastructure is extended to the cloud. The Cisco Nexus 1000V VSM manages the VEM in the cloud and acts as the point of control for network administrators and the VEM provides the data-plane functionality. Each VM interface is treated as a port by the VEM and all of the traffic from the VMs is sent to the VEM for processing, which enables the network administrators to apply network policies in the VEM.

Network administrators can define the network policies for the VMs in the cloud. The network administrator can define the policies and the server administrator can associate them to the VMs. When a VM is migrated, the policy moves along with the VM.

The compute administrator can use Cisco Prime Network Services Controller for compute management. Cisco Prime Network Services Controller interacts with the cloud provider for managing the resources in the cloud by using the management APIs of the cloud. It also acts as an interface to the hypervisor to get the information about locally running VMs and the defined templates.