Overview

This chapter contains the following sections:

Information About Cisco Nexus 1000V InterCloud

Hybrid cloud is an interaction between private and public clouds where private clouds extends to public clouds and utilizes 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 a 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 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 in the enterprise data center and in the public cloud. In the Cisco Nexus 1000V InterCloud solution, one or more Virtual Ethernet Module (VEM) is deployed in the cloud as an extension of a Cisco Nexus 1000V. 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 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.

- It is responsible for providing the hybrid cloud operations, management of cloud resources, and instantiating of the InterCloud components though the enterprise virtualization platform and cloud provider APIs.
- It presents a consolidated view of virtual machines across the enterprise data center and the cloud.
- It enables virtual machines to be migrated from the enterprise data center to a cloud provider.
- It monitors the health of all the InterCloud link components and assists in component failure recovery.

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

InterCloud Extender

InterCloud Extender is a virtual machine running in the enterprise datacenter. 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 includes:

- Establishing secure tunnel to interconnect all 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 running 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 includes:

- Running the Cisco Nexus 1000V VEM to provide the Cisco Nexus 1000V functions.
- Establishing secure tunnel to connect the VEM with InterCloud Extender.
- Establishing secure tunnels to connect all the cloud VMs.
- Providing InterCloud switch related statistics.
- Monitor and report statistics of VMs in the Cloud.
- Monitor and report any component failures in the cloud to the Cisco Prime Network Services Controller.

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

- Communicating with the VSM function running at the enterprise for retrieving VM specific network policies such as port-profile.
- Switching network traffic between cloud VMs.

- Switching network traffic between cloud VMs and the enterprise.
- Applying network polices to any switching network traffic.
- Collecting and reporting VEM related statistics.

InterCloud Agent (ICA)

InterCloud Agent (ICA) provides the compute environment and network overlay to the enterprise virtual machines 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 running within cloud VM's operating system. It also redirects network traffic to the secure overlay network.

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

Cisco Nexus 1000V VSM

Cisco Nexus 1000V VSM is the 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 the InterCloud Extender in the enterprise and the InterCloud Switch in the public cloud. A secure Layer 2 tunnel connects the InterCloud Extender and the InterCloud Switch, thereby extending the enterprise network into the cloud.

The InterCloud Extender, Intercloud Switch with the embedded VEM, and each of the VMs in the cloud are all 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 allows the enterprise to manage the cloud extensions 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 5.0/5.1 as the hypervisor in the enterprise.

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 Layer2 Extension

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 is achieved by providing a highly secure Layer 2 connectivity between the enterprise data center and the cloud. In the enterprise, the InterCloud Extender interfaces with enterprise network and receives the bridged traffic. A secure tunnel is

formed between the InterCloud Extender in the enterprise and the InterCloud Switch in the cloud. All 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 the 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 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 the traffic from the VMs are sent to the VEM for processing thus enabling the network administrators to apply network policies in the VEM.

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

The compute administrator can use the 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.