



Cisco ACI vPod Overview

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Cisco ACI vPod: Extending the Cisco ACI Fabric

Organizations increasingly adopt hybrid data center models to meet infrastructure demands, flexibility, and reduce costs. They combine various technologies—including virtual private clouds and other internal IT resources—with remote locations. The remote locations can be hosted data centers, satellite data centers, or multicloud environments.

However, hybrid deployments require consistent management and policy for workloads regardless of their location. They also require support for disaster recovery and the ability to migrate workloads between data centers. Meanwhile, they can lack compatible hardware or space to add new equipment.

By deploying Cisco Application Centric Infrastructure (ACI) Virtual Pod (vPod), you can overcome these challenges and virtually extend the Cisco ACI fabric into various remote locations.

What Cisco ACI vPod Is

Cisco ACI vPod was introduced with general availability in Cisco APIC Release 4.0(2). It is a software-only solution that you can deploy wherever you have at least two servers on which you can run the VMware ESXi hypervisor. Cisco ACI vPod and its components—a virtual spine (vSpine), virtual leaf (vLeaf), and Cisco ACI Virtual Edge, run on the ESXi hypervisor.

Cisco ACI vPod allows you to use Cisco ACI Virtual Edge where you do not have a physical leaf. You can use up to eight instances of Cisco ACI Virtual Edge in each Cisco ACI vPod in the remote location as you would in your on-premises data center.

Cisco ACI vPod communicates with a physical, on-premises pod or multipod over an interpod network (IPN). You configure the physical pod or multipod, the IPN connection, and Cisco ACI vPod in Cisco Application Policy Infrastructure Controller (APIC). You then use the Cisco ACI vCenter plug-in, a Python script, or PowerCLI to deploy Cisco ACI vPod components.

Benefits of Cisco ACI vPod

Once Cisco ACI vPod is installed, you can use it with Cisco APIC to enforce Cisco ACI fabric policy in the remote location.

Cisco APIC provides central management of workloads in the on-premises data center and the remote location. It enables you to enforce policy easily and consistently in both on-premises and remote locations.

The flexibility, scalability, and central management of the Cisco ACI vPod solution enable you to take advantage of the following use case scenarios:

- Extension of the Cisco ACI fabric to the bare-metal cloud
- Extension of the Cisco ACI fabric to brownfield deployments
- Extension of the Cisco ACI fabric to colocation data centers
- Migration of workloads from non-Cisco hardware to the Cisco ACI fabric

Where to Find More Information

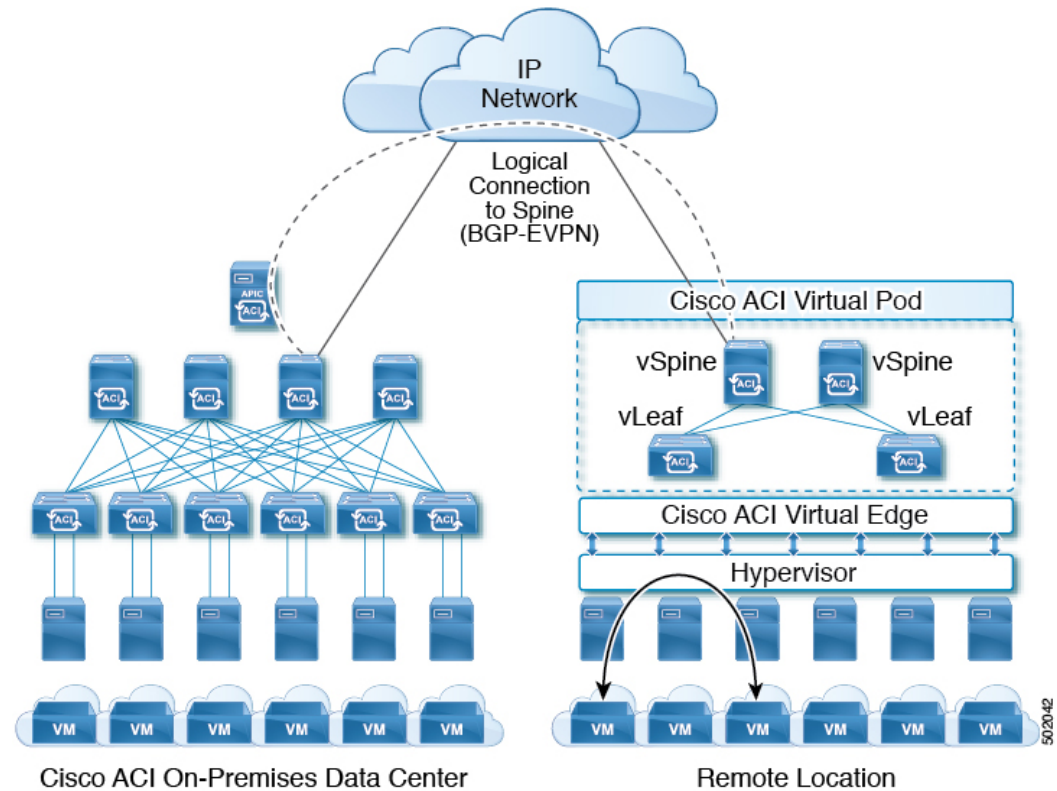
For general information, see the *Cisco ACI Virtual Pod Release Notes* on Cisco.com.

Cisco ACI vPod Architecture

Cisco Application Centric Infrastructure (ACI) Virtual Pod (vPod) extends the multipod architecture into the virtual infrastructure. It consists of virtual spines (vSpines), virtual leafs (vLeafs), and one to 32 instances of Cisco ACI Virtual Edge. These elements are deployed on a VMware ESXi hypervisor in the remote location.

The vSpines and Cisco ACI Virtual Edge logically connect to the on-premises data center over an interpod network (IPN). The Cisco Application Policy Infrastructure Controller (APIC) cluster in the on-premises data center discovers, configures, and extends the policy on the Cisco ACI vPod.

Figure 1: Cisco ACI vPod in a Remote Location



Cisco ACI vPod includes the following elements:

- **Virtual spine (vSpine) and Virtual leaf (vLeaf):** The vSpine and vLeaf are separate virtual machines (VMs) within Cisco ACI vPod. They emulate the functionality of a physical spine and physical leaf. The vSpines and Cisco ACI Virtual Edge logically connect to the on-premises data center over an IPN.

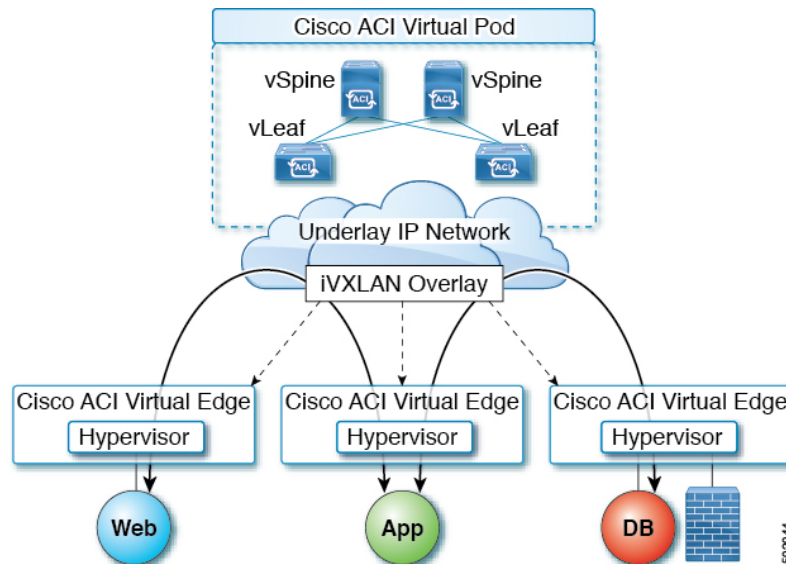
The vSpine and vLeaf function as services inside the VMs in the Cisco ACI vPod, handling control plane management. They are contained in the Cisco ACI vPod installation package.

- **vSpine:** Establishes a Border Gateway Protocol (BGP) Ethernet VPN (EVPN) connection to the on-premises spine and the vPod control plane.
- **vLeaf:** Distributes the policies that are created on Cisco Application Policy Infrastructure Controller (APIC) to the Cisco ACI Virtual Edge.
- **Cisco ACI Virtual Edge:** Connects to spines and border leaves in the physical Cisco ACI fabric through Insieme VXLAN (iVXLAN) tunnels. It also uses iVXLAN for communication within the remote site. Cisco ACI Virtual Edge handles packet forwarding, policy enforcement, and all data plane management. The iVXLAN overlay technology in the data plane provides Layer 2 and Layer 3 connectivity services between endpoints, regardless of their location.

You deploy one Cisco ACI Virtual Edge on each VMware ESXi hypervisor host that participates in the virtual pod, creating a distributed data plane across the virtual pod. You can have up to 32 Cisco ACI Virtual Edge virtual leaves in a Cisco ACI vPod, one on each host.

Cisco ACI Virtual Edge uses the fast packet-processing framework Data Plane Development Kit (DPDK) for high-performance forwarding in the user space.

Figure 2: Cisco ACI vPod Components



A single Cisco ACI can contain multiple physical pods and multiple virtual pods. A single Cisco APIC manages the entire fabric. Tenant configurations—including virtual routing and forwarding (VRF), bridge domains, and endpoint groups (EPGs)—are available across all the pods.

Cisco ACI vPod Licensing

You obtain the following two licenses for Cisco Application Centric Infrastructure (ACI) Virtual Pod (vPod) on Cisco.com:

- **Management Cluster:** You need a single license for each Cisco ACI vPod.

The management cluster is licensed as a pair of redundant virtual spine (vSpine) and virtual leaf (vLeaf) virtual machines (VMs). The cluster provides Cisco ACI management and control plane functions. It also programs the individual Cisco Application Centric Infrastructure (ACI) Virtual Edge within the Cisco ACI vPod.

The single Cisco ACI vPod management cluster license includes the redundant vSpines and vLeafs, a total of four VMs.



Note VMware ESXi 6.0 or later is required for the management cluster.

- **Cisco ACI Virtual Edge:** You need one license for each instance of Cisco ACI Virtual Edge; you can have up to 32 instances on each Cisco ACI vPod.

Cisco ACI Virtual Edge is licensed in vPod mode, when it is part of Cisco ACI vPod. It is licensed as a VM that operates on each workload server. It provides data plane and policy enforcement functions. (Cisco ACI Virtual Edge is not licensed when installed on a physical leaf—when it functions outside of Cisco ACI vPod deployments.)



Note VMware ESXi 6.0 or later is required for the workload.

Cisco ACI vPod in a Multipod Environment

Cisco Application Centric Infrastructure (ACI) Virtual Pod (vPod) can be used with multipod Cisco ACI fabrics. You must configure an interpod network (IPN) connection to a physical pod in the on-premises data center before you can add the Cisco ACI vPod.

Multipod environments enable a more fault-tolerant fabric comprising multiple pods with isolated control plane protocols. They also provide greater flexibility in full mesh cabling between leaf and spine switches.

For detailed information about multipod environments, see the following documents on Cisco.com:

- *Cisco Application Centric Infrastructure Fundamentals*
- *Cisco Layer 3 Network Configuration Guide*
- *Cisco APIC NX-OS Style Command-Line Interface Configuration Guide*

See the *Cisco ACI Virtual Edge Release Notes* for information about Cisco Application Centric Infrastructure (ACI) Virtual Edge for features not supported with multipod.

