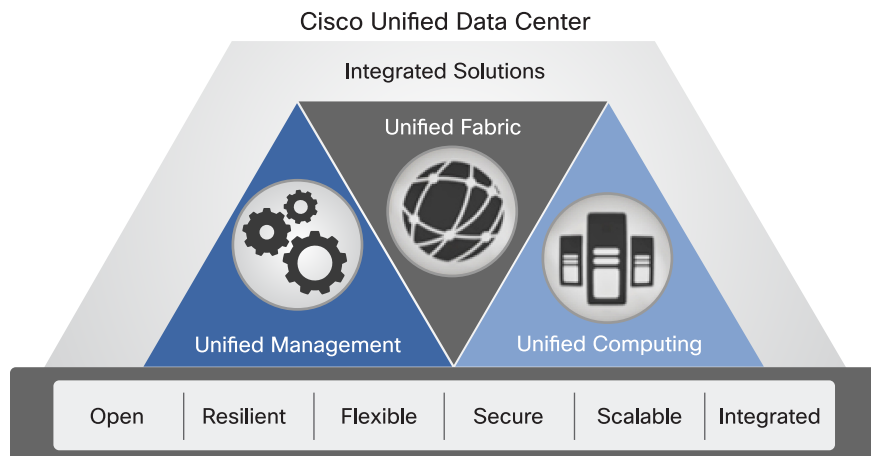


Cisco Virtualization Infrastructure



At the core of the unified data center is Cisco’s holistic virtualization infrastructure, which bridges the evolution from a physical to a virtual to a cloud environment. Cisco’s virtualization infrastructure is designed to bring the operational simplicity and traditional management models of a physical data center to virtual servers, applications, and network services. With the most complete virtualization portfolio in the industry, Cisco provides the fastest path to cloud readiness for your organization’s critical applications. The virtualization infrastructure includes the virtual network, virtual application services, and security, as well as automated virtual workload provisioning and orchestration (Figure 1).

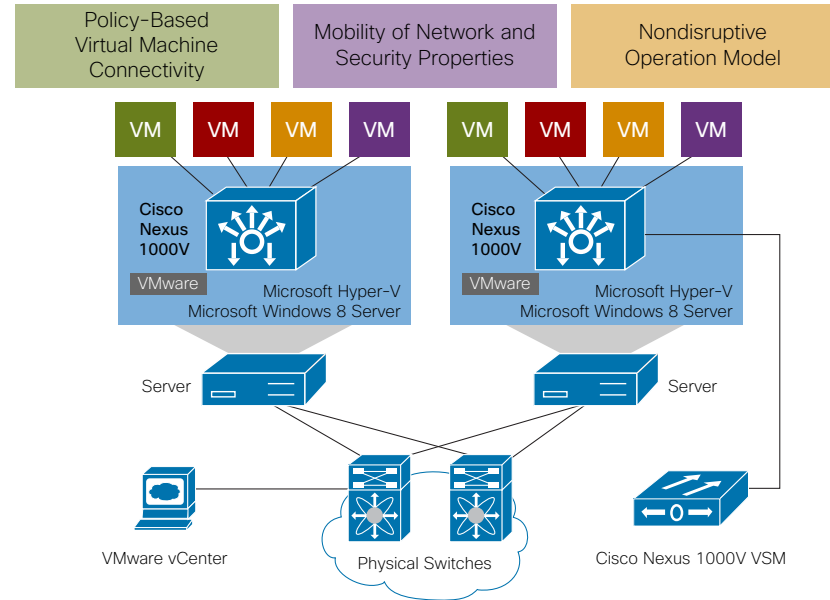
Figure 1. Cisco’s Virtualization Infrastructure Ties Together the Unified Data Center by Providing Consistency and Scalability for Cloud-Ready Applications



Virtual Networking

Cisco transparently extends the physical network to the virtual machine environment to facilitate application virtualization and allow cloud-ready scalability and mobility. At the core of the virtual network is a Cisco Nexus® 1000V Switch, a virtual switch that brings virtualization intelligence to the network edge and virtual machines (Figure 2).

Figure 2. The Cisco Nexus 1000V Virtual Switch Provides Virtualization Intelligence and Consistency with the Physical Network



With the Cisco Nexus 1000V Series Switches and the supporting virtualization infrastructure, you can have a consistent networking feature set and provisioning process all the way from the virtual machine access layer to the core of the data center network infrastructure. Virtual servers can now use the same network configuration, security policy, diagnostic tools, and operation models as their physical server counterparts attached to dedicated physical network ports. Virtualization administrators can access predefined network policy that follows mobile virtual machines to help ensure proper connectivity, saving valuable time for virtual machine administration.

- Cisco Nexus 1000V Series: Analogous to a physical switches, the Cisco Nexus 1000V Series Switches consist of a virtual Ethernet module (VEM) for switching traffic to the virtual machine, and a virtual supervisor module (VSM) for managing traffic flows, networking policies, and quality of service (QoS).



- Cisco Nexus 1010 Virtual Services Appliance: The Cisco Nexus 1010 offers a dedicated hardware platform for hosting services critical to the virtualization infrastructure.
- Cisco® Fabric Extender Technology (FEX Technology): Cisco FEX Technology provides a unified access architecture across any environment – physical, virtual, or high-performance switches – to provide scalability, simplicity, and a single point of management. The Cisco Data Center Virtual Machine Fabric Extender (VM-FEX) collapses the virtual and physical networks into a single infrastructure, eliminating the virtual switch and providing dedicated virtual machine interfaces on the physical switch.
- Virtual Extensible LAN (VXLAN): VXLAN meets the expanding requirements for logically isolated networks in highly scalable cloud environments by extending the virtual LAN (VLAN) concept to more than 16 million logical subnets.
- Cisco vPath: Cisco vPath technology, embedded in the Cisco Nexus 1000V Switch, provides a common traffic steering mechanism to direct packets to the appropriate virtual service, such as the firewall or application controller. This feature helps ensure location independence of the workload, on-demand scalability of the virtual application, and mobility of the security and services policies along with the application.
- Application mobility over Layer 3 networks: Cloud networks require scalability and application mobility across data center locations and hosting facilities. Cisco facilitates extensibility of the Layer 2 network through the Layer 3 networks with technologies such as Location ID Separator Protocol (LISP) and Overlay Transport Virtualization (OTV).
- Convergence of storage network and LAN: Cisco Unified Fabric virtualizes the LAN and storage network through technologies such as Fibre Channel over Ethernet (FCoE) and Small Computer System Interface over IP (iSCSI) for optimal resource utilization and reduced costs.

Virtual Security and Application Networking Services

Security and application performance concerns are frequently cited as the two primary obstacles to application virtualization. Cisco provides a complete portfolio of security and Layer 4 through 7 application networking services that are completely virtualization aware and that run as virtual workloads to provide the scalable, cloud-ready services your critical applications demand.

Unlike other virtual services solutions, Cisco provides consistency across the physical-to-cloud spectrum with consistent policies for virtual and bare-metal workloads and consistency of policy management and administration across physical and virtual appliances, as is the case with the Cisco ASA 1000V Cloud Firewall and the physical Cisco ASA Adaptive Security Appliances. Cisco's virtual security solutions are designed to resolve multi-tenant cloud security concerns as well as more detailed virtual machine or application-specific policies within an enterprise.

- Cisco Virtual Security Gateway (VSG): The Cisco VSG virtual firewall provides logical isolation of virtual machines in trust zones on the basis of traditional firewall policies as well as virtual machine attributes that correspond to the application type, tenant, etc. As a virtual firewall node, Cisco VSG scales easily and allows security policies to migrate easily with application mobility.
- Cisco ASA 1000V: The Cisco ASA 1000V Cloud Firewall provides tenant-edge security services in multi-tenant environments, including VPN, threat detection, Domain Host Configuration Protocol (DHCP), and Network Address Translation (NAT) services. It is operationally consistent with the physical Cisco ASA security appliances and blades for a transparent transition from a physical to a cloud environment.
- Cisco Virtual Wide Area Application Services (vWAAS): Cisco vWAAS provides WAN optimization for improved performance of virtual data center applications to client desktops.
- Virtual Cisco Network Analysis Module (NAM): The Cisco NAM provides deep insight into application and network performance problems, allowing administrators to efficiently identify bottlenecks and optimize resources. The Cisco NAM can be transparently hosted on the Cisco Nexus 1010 for operation simplicity.

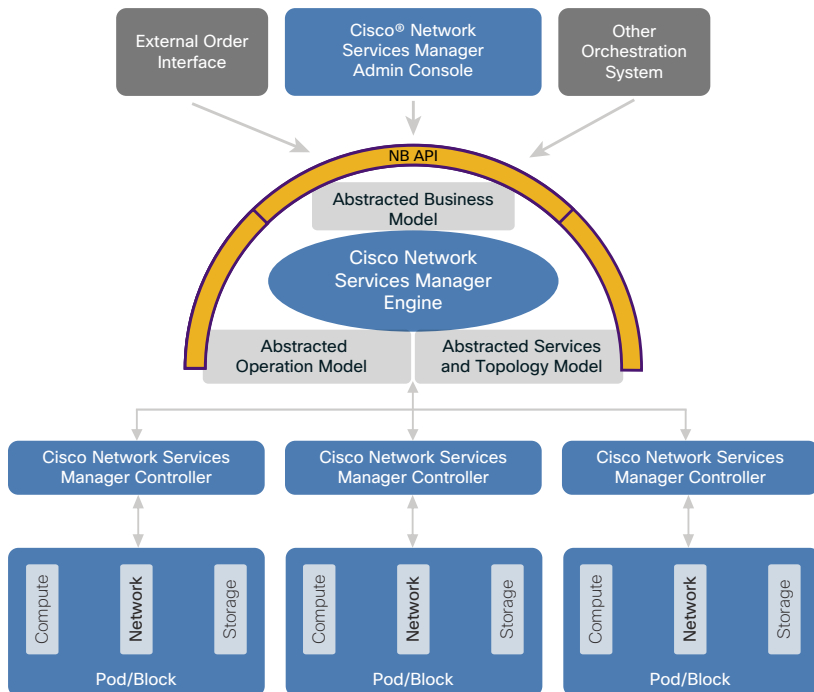
Orchestration and Provisioning

The vision of cloud computing includes automated, on-demand delivery of applications, and capacity expansion using rapidly decreasing cost models. Cisco's virtualization infrastructure achieves this vision with industry-leading orchestration, management, and provisioning tools for virtual applications, network configuration, and service deployments (Figure 3).



- Cisco Network Services Manager (NSM) helps you provision and deploy numerous individual network components as sophisticated network containers to automate the deployment of virtual workloads and the required security and application services. Cisco NSM integrates with Cisco's workflow automation and service catalog solutions for a complete cloud orchestration stack.
- Cisco Virtual Network Management Center (VNMC) integrates the management and deployment of virtual machines and virtual services such as Cisco VSG and ASA 1000V

Figure 3. The Network Services Manager Automates the Deployment and Provisioning of Virtual Workloads with the Right Network Topology and Application Services



For More Information

Cisco Unified Data Center: <http://cisco.com/go/unifieddatacenter>

Cisco Nexus 1000V: <http://cisco.com/go/nexus1000v>

Cisco Nexus 1010: <http://cisco.com/go/nexus1010>

Cisco FEX Technology: <http://cisco.com/go/fex>

FCoE: <http://cisco.com/go/fcoe>

Cisco VSG: <http://cisco.com/go/vsg>

Cisco ASA 1000V Cloud Firewall: <http://cisco.com/go/asa1000v>

Cisco vWAAS: <http://cisco.com/go/vwaas>

Cisco NAM on Nexus 1010: <http://cisco.com/go/nam>

Cisco NSM: <http://cisco.com/go/nsm>