



Overview

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Cisco Prime Network Services Controller Overview

The dynamic nature of cloud environments requires organizations to apply and enforce frequent changes to networks. These networks can consist of thousands of virtual services elements, such as firewalls, load balancers, routers, and switches. Cisco Prime Network Services Controller simplifies operations with centralized, automated multi-device and policy management for Cisco network virtual services. For the latest Prime Network Services Controller release updates and overview, see the corresponding Prime Network Services Controller [data sheet](#).

Cisco Prime Network Services Controller (Prime Network Services Controller) is the primary management element for Cisco Nexus 1000V (Nexus 1000V) Switches and Services that can enable a transparent, scalable, and automation-centric network management solution for virtualized data center and hybrid cloud environments. Nexus 1000V switches and services deliver a highly secure multitenant environment by adding virtualization intelligence to the data center network. These virtual switches are built to scale for cloud networks. Support for Virtual Extensible LAN (VXLAN) helps enable a highly scalable LAN segmentation and broader virtual machine (VM) mobility.

Prime Network Services Controller enables the centralized management of Cisco virtual services to be performed by an administrator, through its GUI, or programmatically through its XML API. Prime Network Services Controller is built on an information-model architecture in which each managed device is represented by its subcomponents (or objects), which are parametrically defined. This model-centric approach enables a flexible and simple mechanism for provisioning and securing virtualized infrastructure using Cisco VSG and Cisco Adaptive Security Appliance 1000V (ASA 1000V) Cloud Firewall virtual security services.

InterCloud

With Cisco Nexus 1000V InterCloud, the enterprise network can be securely extended to the cloud, with its enterprise network and security configurations such as VLANs and policies extended to the cloud. Using Prime Network Services Controller, workloads can be migrated from the enterprise data center to the public

cloud while retaining the same IP addresses and other networking parameters, thus avoiding the need to redesign the application.

Using Prime Network Services Controller, workloads in the public cloud can use the same security policies as their counterparts in the enterprise data center. System administrators get the policy consistency and network visibility that they require while retaining control of the cloud environment as a transparent extension of the enterprise data center.

With Prime Network Services Controller, customers have a unified view of the workloads across the enterprise data center (private cloud) and public cloud. They can select and migrate workloads from the enterprise data center to the public cloud.

Hypervisor Support

The Prime Network Services Controller platform supports multiple VM Managers through their APIs and through tight integration with Nexus 1000V Virtual Supervisor Modules (VSMs) and Virtual Ethernet Modules (VEMs).

Cisco Dynamic Fabric Automation Integration Support

Cisco Dynamic Fabric Automation (DFA) delivers fabric optimization, management, and automation capabilities under Cisco Unified Fabric. Prime Network Services Controller plays a critical role in the Cisco DFA solution with L4-7 services integration. Prime Network Services Controller integrates with Cisco Data Center Network Manager (DCNM) to support the managed resources and services in a VMware vSphere environment.

Consistent and Efficient Security Policies

Prime Network Services Controller uses security profiles for template-based configuration of security policies. A security profile is a collection of security policy sets and integrated policies and rules that can be predefined and applied on demand at the time of virtual machine instantiation. This profile-based approach significantly simplifies authoring, deployment, and management of security policies, including dense multi-tenant environments, while enhancing deployment agility and scaling. Security profiles also help reduce administrative errors and simplify audits.

The XML API for Prime Network Services Controller facilitates integration with northbound network provisioning tools for programmatic network and security provisioning and management of Cisco VSG (VSG) and ASA 1000V. The option of programmatic control of those virtual appliances can greatly simplify operational processes and reduce infrastructure management costs.

Nondisruptive Administration Model

By providing visual and programmatic controls, Prime Network Services Controller can enable the security operations team to author and manage security policies for virtualized infrastructure and enhance collaboration with the server and network operations teams. This nondisruptive administration model helps ensure administrative segregation of duties to reduce errors and simplify regulatory compliance and auditing:

- Security administrators can author and manage security profiles and manage VSG and ASA 1000V instances. Security profiles are referenced in Nexus 1000V port profiles.
- Network administrators can author and manage port profiles, and manage Nexus 1000V switches. Port profiles with referenced security profiles are available in VMware vCenter through the Nexus 1000V VSM programmatic interface with VMware vCenter.
- Server administrators can select an appropriate port profile in VMware vCenter when instantiating a virtual machine.

Efficient Management for Easier Scalability

Prime Network Services Controller implements an information-model architecture in which each managed device, such as VSG or Cisco ASA 1000V, is represented by the device's object-information model. This model-based architecture helps enable the use of:

- Stateless managed devices—Security policies (security templates) and object configurations are abstracted into a centralized repository and used as templates against any virtual device type.
- Dynamic device allocation—A centralized resource management function manages pools of devices that are commissioned (deployed) in service and a pool of devices that are available for commissioning. This approach simplifies large-scale deployments because managed devices can be preinstantiated and then configured on demand, and devices can be allocated and deallocated dynamically across commissioned and noncommissioned pools.
- Scalable management—A distributed management-plane function is implemented using an embedded agent on each managed device that helps enable greater scalability.

Topology Examples

The following figures show virtual data center and InterCloud topology examples.

Figure 1: Virtual Data Center Topology Example

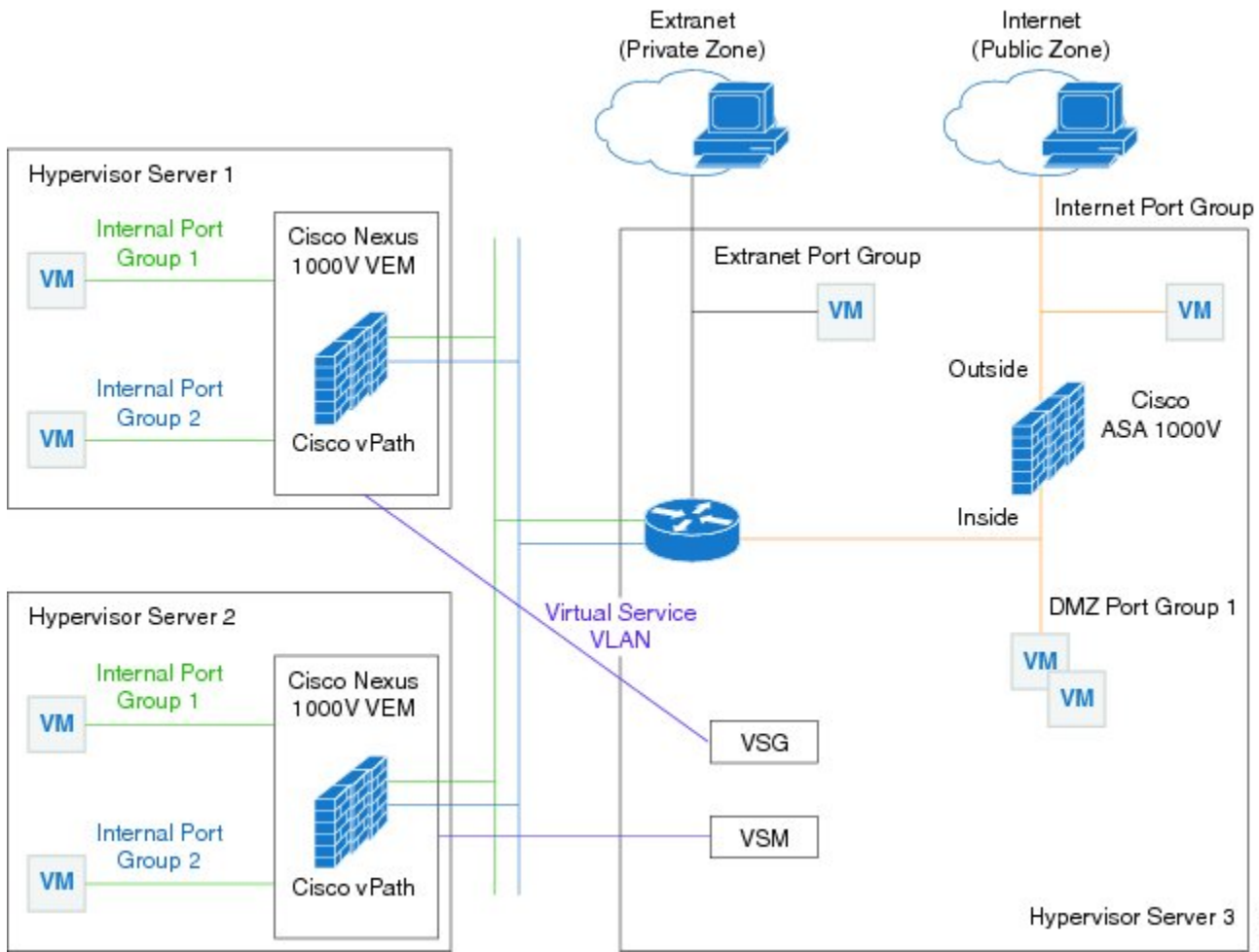
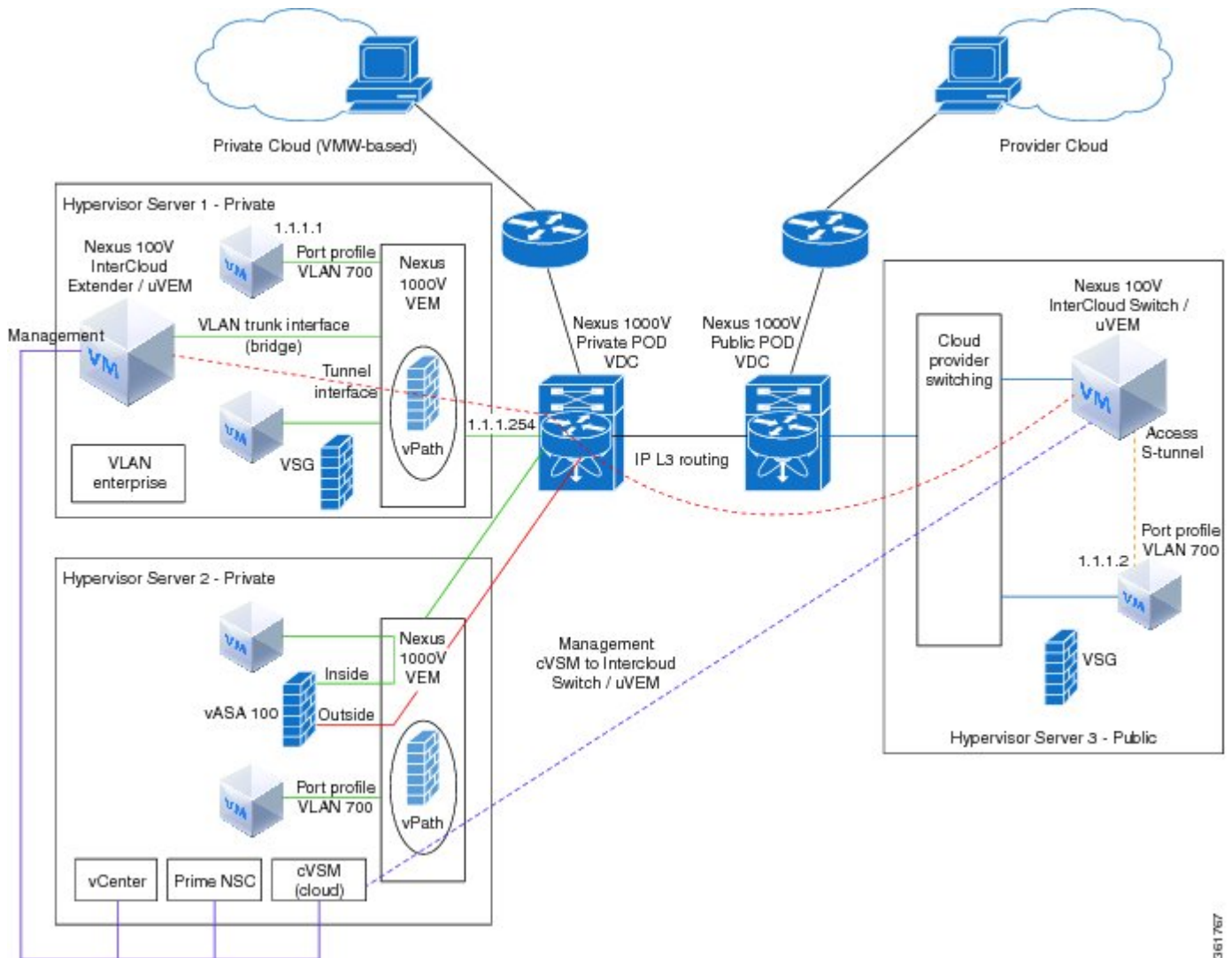


Figure 2: InterCloud Topology Example



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Features and Benefits

The following table lists the features and benefits of using Prime Network Services Controller. For the latest Prime Network Services Controller release description and overview, see the latest Prime Network Services Controller [data sheet](#) and [Release Notes](#).

Features	Description	Benefits
InterCloud Management	Prime Network Services Controller extends your enterprise data center into a public cloud through the configuration and management of InterCloud resources.	<ul style="list-style-type: none"> • Provides secure connections to the cloud via InterCloud links using VMware ESXi hypervisors. • Enables easy creation of templates and VMs on the cloud. • Supports high availability across the InterCloud link.
Multiple-Device Management	Prime Network Services Controller provides central management of VSG, CSR 1000V, ASA 1000V, Citrix NetScaler VPX and Nexus 1000V .	Simplifies provisioning and troubleshooting in a scaled-out data center.
Load Balancing Profiles	An application network profile represents load balancer server farms and related features and attributes.	Simplifies provisioning, reduces administrative errors during load balancing policy changes, reduces audit complexities, and helps enable a highly scale-out data center environment.
Routing Profiles	A network profile represents edge router routing policies and related features and attributes.	Simplifies provisioning, reduces administrative errors during routing policy changes, reduces audit complexities, and helps enable a highly scale-out data center environment.
Security Profiles	A security profile represents the VSG or ASA 1000V security policy configuration in a profile (template).	Simplifies provisioning, reduces administrative errors during security policy changes, reduces audit complexities, and helps enable a highly scaled-out data center environment.
Stateless Device Provisioning	The management agents in VSG and ASA 1000V are stateless, receiving information from Prime Network Services Controller.	<ul style="list-style-type: none"> • Enhances scalability. • Provides robust endpoint failure recovery without loss of configuration state.

Features	Description	Benefits
Security Policy Management	Security policies are authored, edited, and provisioned centrally.	<ul style="list-style-type: none"> • Simplifies operation and management of security policies. • Helps ensure that security intent is accurately represented in the associated security policies.
Context-Aware Security Policies	Prime Network Services Controller obtains virtual machine contexts from VMware vCenter.	Allows a security administrator to institute highly specific policy controls across the entire virtual infrastructure.
Support virtual services for DFA environments	Cisco Prime NSC obtains tenant information and allows virtual services to be added to DFA virtual overlay networks.	—
Dynamic Security Policy and Zone Provisioning	Prime Network Services Controller interacts with the Nexus 1000V VSM to bind the security profile to the corresponding Nexus 1000V port profile. When virtual machines are dynamically instantiated by server administrators and appropriate port profiles applied, their association with trust zones is also established.	Helps enable security profiles to stay aligned with rapid changes in the virtual data center.
Multi-Tenant (Scale-Out) Management	Prime Network Services Controller is designed to manage VSG and ASA 1000V security policies in a dense multi-tenant environment so that administrators can rapidly add and delete tenants and update tenant-specific configurations and security policies.	Reduces administrative errors, helps ensure segregation of duties in administrative teams, and simplifies audit procedures.
Role-Based Access Control (RBAC)	RBAC simplifies operational tasks across different types of administrators, while allowing subject-matter experts to continue with their normal procedures.	<ul style="list-style-type: none"> • Reduces administrative errors. • Enables detailed control of user privileges. • Simplifies auditing requirements.

Features	Description	Benefits
XML-Based API	Prime Network Services Controller XML API allows external system management and orchestration tools to programmatically provision VSG and ASA 1000V.	<ul style="list-style-type: none"><li data-bbox="1159 306 1455 401">• Allows the use of the best-in-class management software.<li data-bbox="1159 432 1414 527">• Offers transparent and scalable operation management.