Citrix NetScaler for the Cisco Nexus 1100 Series Virtual Services Appliance: Delivering Virtual Services in the Next-Generation Data Center
What You Will Learn
Cisco® Unified Network Services (UNS) addresses the challenges of deploying network services in virtual data centers by creating a framework for multiple services that can be provisioned and configured on demand, dynamically, to suit the service needs of enterprise applications and cloud users. Offering the best-in-class Citrix® NetScaler® application delivery solution on the Cisco Nexus 1110 Virtual Services Appliance (VSA) helps fulfill the vision of Cisco UNS, providing a convenient option for deploying essential application delivery capabilities that simplifies network operations and design while accelerating application performance and boosting data center security. It also provides an attractive option for customers looking to transition from Cisco Application Control Engines, Cisco Global Site Selectors, and Cisco Content Service Switches to a next-generation application delivery controller.

Cisco Unified Network Services
Application delivery and other layered network services – such as application-aware security and performance monitoring – are critical in modern data center designs to accelerate performance for all users while reducing costs by optimizing data center resource utilization. However, the traditional reliance of related solutions on intrusive inline deployment, static network topologies and separate policy management platforms is completely at odds with highly scalable virtual data center designs with mobile workloads, on-demand virtual machine (VM) provisioning and aggressive service level agreements (SLAs). Such solutions are incapable of keeping up with the dynamic nature of today’s computing environments, as well as the need to support custom policy requirements across a steadily increasing population of applications.

Transparent service insertion. Cisco UNS removes the requirement that services be deployed at certain points in a physical network, transforming them into centralized service delivery nodes. Required services can be transparently inserted into a network, on demand, by forwarding traffic to them in accordance with the policies defined for each type of client, application or tenant.

Intelligent traffic steering. Switching, routing and innovative forwarding technologies such as Cisco vPath re-direct application traffic to ensure it passes through invoked network services that are not inline between the client and its destination resource.

On-demand, policy-based service provisioning. Delivery policies are associated with applications and VMs and are untethered from network location. As a result, they can automatically be applied in a virtualization-aware manner to account for migrating workloads and newly provisioned servers used to expand application capacity.

Flexible deployment options. Feature and policy management consistency is delivered for all layered network services across all form factors (i.e., physical appliances, network-integrated service modules, software on dedicated servers, and virtual appliances) and environments (i.e., network, compute, and cloud). IT departments have the flexibility to choose and re-use whichever option best fits – economically and architecturally – for any given scenario.

Compared to point service offerings, Cisco UNS is able to offer a network-integrated framework that allows network services to be deployed in a much more flexible fashion, one that allows organizations and data centers to tap into
the full value of virtualization. With Cisco UNS, enterprises can reduce network complexity, management overhead, and deployment costs while helping ensure maximum application performance and availability for end user clients. Application performance, latency and reliability can be predictably delivered, even in scalable, virtualized environments, allowing for compliance with strict SLAs for the first time.

Cisco Nexus 1100 Series Virtual Services Appliances

Consistent with the Cisco UNS vision to support a full range of deployment options, the Cisco Nexus 1100 Series Virtual Services Appliances offer dedicated hardware platforms for the deployment of network services critical to virtualized data center infrastructure. These appliances host a number of virtual service blades (VSBs), starting with the Cisco Nexus 1000V Virtual Supervisor Module (VSM). The control plane component of the Nexus 1000V virtual access layer switch, the VSM serves as complement to the corresponding data plane component, or Virtual Ethernet Module, which runs in the hypervisor kernel of leading server virtualization solutions as a replacement for native vSwitch capabilities. Having dedicated hardware for the VSM vastly simplifies virtual access switch deployment, allowing organizations to benefit from having a consistent, Nexus-based networking feature set all the way from the VM access layer to the core of their datacenter infrastructure.

Additional network services available for the Nexus 1100 VSAs include:

- Cisco Virtual Security Gateway – for establishing trusted multitenant access with granular, zone-based, and context-aware security policies
- Cisco Network Analysis Module – for obtaining accurate network statistics directly from virtual ports and other data sources
- Cisco Data Center Network Manager – for simplifying management of virtualized data centers via VM-aware path analytics and performance monitoring

Figure 1 shows the internal architecture of the Cisco Nexus 1100 Series. The Cisco Nexus VSA Manager, based on the Cisco NX-OS Software, manages VSBs, installation, and blade configuration. The Cisco Nexus VSA Manager offers a familiar Cisco NX-OS interface for network administrators installing and configuring VSBs. The Cisco Nexus VSA Manager also supports Cisco NX-OS high availability, allowing a standby Cisco Nexus 1100 Series VSA to become active if the primary Cisco Nexus 1100 Series VSA fails.

Figure 1: Cisco Nexus 1100 Configure with 4 Nexus VSMs and 1 Network Analysis Module
A significant advantage of the Cisco Nexus VSA is the ability to deliver multiple services via a single hardware platform. The degree of consolidation that can be achieved will depend on the VSA model and type/combination of VSBs that are implemented. For example, with the Cisco Nexus 1110-X, a network administrator can implement any combination of ten VSGs and VSMs while requiring only a single network appliance.

**Citrix NetScaler**

Ideal for helping fulfill the vision for Unified Network Services, Citrix NetScaler enables IT transformation and helps customers build next-generation networks. Deployed in thousands of enterprise, service provider and public cloud infrastructures globally, NetScaler leads the industry with unparalleled ADC innovation, driving the best price/performance in the market, along with the most advanced feature set. Underpinning the NetScaler architecture is Citrix TriScale™, providing the ability to Scale Up for greater network elasticity, Scale In for delivering powerful multi-tenancy, and Scale Out using advanced clustering to seamlessly expand network capacity. NetScaler is the natural choice for next-generation virtual data centers built using Cisco's Unified Network Services architecture.

With NetScaler, IT leaders obtain a single, easy-to-use platform that provides:

**Guaranteed availability for applications and data.** The proven layer 4-7 load balancing of NetScaler delivers 100 percent application uptime and no single point of failure by directing users to the right application resource. Its powerful load balancing is extended worldwide with integrated Global Server Load Balancing (GSLB) that efficiently and intelligently distributes application traffic across multiple datacenters, enabling an optimized user experience under normal operating conditions, as well as a resilient disaster recovery solution.

NetScaler with DataStream delivers intelligent SQL connection multiplexing, an approach that enhances the performance and scalability of backend database servers by significantly reducing the number of SQL connections they need to handle.

**Optimized network and application performance.** NetScaler accelerates application performance with high-speed data compression that reduces the amount of data sent to users, resulting in significantly faster response times for all web applications and reduced network bandwidth requirements. NetScaler also integrates powerful web caching to serve static and dynamically generated content immediately to application users, avoiding the expense and delay incurred when web applications handle repetitive requests for the same information. Innovative TCP optimizations accelerate application traffic over network links, including those with large delays and significant packet loss that otherwise would compromise application performance.

**Improved server efficiency.** NetScaler server offload capabilities take the load off overburdened networks and servers, reducing server costs by up to 60 percent or more.

NetScaler offloads compute-intensive tasks that general-purpose servers don’t do well, including data compression, TCP connection management and SSL encryption. NetScaler provides more efficient management of these functions,
enabling organizations to deliver more applications to more users with a reduction in servers and network capacity.

**Extensive multi-layer security.** The cornerstone of the NetScaler security capabilities is an integrated application firewall that protects organizations from application-layer attacks and helps prevent the loss of valuable corporate and customer data. This is complemented by a comprehensive set of authentication, authorization and auditing (AAA) features that enable fine-grained control over which users have access to which applications under which conditions. Access control lists (ACLs) and robust TCP connection handling routines that thwart many types of DDoS/flood attacks ensure protection is also provided at lower layers of the computing stack.

**Greater application visibility.** All NetScaler ADC solutions include support for AppFlow, an innovative, open standards-based technology that extends the TCP-level information of NetFlow to include detailed application flow records. Completely non-intrusive, AppFlow eliminates the need for proprietary taps, software agents, or additional devices by leveraging an organization’s existing NetScaler infrastructure to provide invaluable insight into who is using which application resources, when, and to what extent.

**Flexible deployment options.** NetScaler is available as high-performance network appliances and software-based virtual appliances. Unlike competitive appliances and chassis-based systems, each NetScaler solution is capable of running all features simultaneously with no limits.

- NetScaler MPX is a series of hardened network appliances that offers up to 50 Gbps performance.
- NetScaler SDX is a high-density consolidation platform combining Xen-based virtualization and advanced MPX architecture to run up to 40 NetScaler instances simultaneously without sacrificing performance or security.
- NetScaler VPX virtual appliances run as virtual machines on popular hypervisors allowing NetScaler to be provisioned on demand using inexpensive, industry standard servers.

**Integral support for Cisco vPath.** NetScaler incorporates the Cisco sPath library, and, therefore, is fully integrated with the Cisco vPath architecture. The result is a quick and easy mechanism for leveraging NetScaler application delivery capabilities in a virtual environment.

By intercepting traffic at the virtual access layer of the network and intelligently steering it to virtual service nodes in accordance with configured policies, vPath allows NetScaler ADCs – along with other supported network services – to physically reside practically anywhere, including the cloud. Service chaining further allows NetScaler to be one of multiple network services that get flexibly applied in whatever order is appropriate for different applications, regardless of the order or location that the services appear in the network. And because the solution is policy-based, it can inherently account for VM mobility, along with dynamic provisioning of new VMs.
Strengths and Benefits of NetScaler VPX on Nexus 1100

To further deliver on the Unified Network Services strategy, Citrix NetScaler VPX has been added to the list of layered network services supported on the Nexus 1100 Series Virtual Services Appliance. Significant benefits of this arrangement include:

Simplified deployment. NetScaler instances can be created and controlled directly from the Nexus 1110 management console. In addition, customers have the flexibility of assigning either two or six vCPUs to an instance to best meet the performance needs of each use case.

Non-disruptive operational model. NetScaler support for the Nexus 1110 and vPath traffic steering provides a much needed alternative to deploying virtual ADCs on the same hosts as the application workloads they are serving. With the physical separation this approach enables, organizations can maintain clear ownership and administrative boundaries between the IT groups responsible for application servers, networking, and layered network services. Being able to manage network and application networking policies separately from the policies that govern the server virtualization environment also makes it easier to audit requirements, attain compliance, and avoid configuration errors.

Better performance. Offloading application delivery (and other network services) to a dedicated appliance alleviates the burden otherwise placed on the server virtualization infrastructure, thereby enabling performance and scalability improvements for the applications it hosts.

Network simplification and consolidation. By hosting multiple network services simultaneously, Nexus VSAs reduce appliance sprawl, along with the network complexity and increased costs that accompany it.

Consistent application delivery services. Deploying NetScaler on the Nexus 1110 is just one option available to Cisco customers. Full vPath support also enables integrated use of NetScaler VPX running on other available platforms – including general purpose server hardware and NetScaler SDX multi-tenant appliances –while next-generation integration technology provides dynamic reconfiguration between NetScaler and Cisco 7000 Series Switches operating at the data center core. The net result is the ability to leverage the same consistent set of application delivery capabilities throughout the datacenter in a manner that is fully aligned with the Cisco vision for data center architecture and evolution.

Convenient transition path. NetScaler on the Nexus 1110 provides an attractive option for customers looking to migrate from the Cisco Application Control Engine, Cisco Global Site Selector, and Cisco Content Services Switch to a market-leading, next-generation ADC. The solution is not only sold and fully supported by Cisco, but also an integral part of the familiar Nexus line of data center switches.

Delivering Virtual Services in the Next-Generation Data Center

Next-generation virtual datacenters require layered network services, including robust application delivery capabilities for optimizing, securing and controlling the delivery of enterprise applications and cloud services. Having the market-leading Citrix NetScaler application delivery controller available from Cisco as a virtual
service blade for the Cisco Nexus 1100 Virtual Services Appliance addresses this need in a way that fully aligns with the Cisco vision for the next-generation data center featuring Unified Network Services. The result is a convenient option for deploying essential application delivery capabilities that simplifies network operations and design while accelerating application performance and boosting data center security.

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About Citrix
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