

# VMware NSX

## AT A GLANCE

NSX Network Virtualization brings the simplicity of cloud operating model to networking in VMware Cloud Foundation (VCF), allowing you to streamline, accelerate, and scale both traditional and modern applications in private/hybrid clouds.

## KEY BENEFITS

- Reduce network provisioning time from days to seconds and improve operational efficiency through automation.
- Gain consistent management of network policies independent of physical network topology across data centers and public clouds.
- Ensure network infrastructure and services resiliency with simplified disaster recovery.
- Reduce overall TCO of private cloud deployments.
- Future-proof your infrastructure investments with support for any app running on VCF, both traditional and cloud-native containerized.

Data centers continue to evolve to support next-generation applications and high-performance workloads. The massive growth in east-west traffic requires a scalable, high-speed, highly reliable network with a cloud-like operating model.

VMware NSX® is a powerful network virtualization solution for VMware Cloud Foundation™ (VCF) that enables network connectivity, operations, and scale. NSX takes a software-defined approach to networking that extends across data centers, clouds, and application frameworks. With NSX, network services are brought closer to the application wherever it's running, from virtual machines (VMs) to containers to physical servers. NSX delivers cloud operational efficiency for the network independent of underlying hardware. NSX reproduces the entire network model in software, enabling any network topology—from simple to complex multitier networks—to be created and provisioned in seconds. Users can create multiple virtual networks with diverse requirements, leveraging a combination of the services offered via NSX or from a broad ecosystem of third-party integrations to build inherently more agile and secure environments. These services can then be extended to a variety of endpoints within and across clouds.

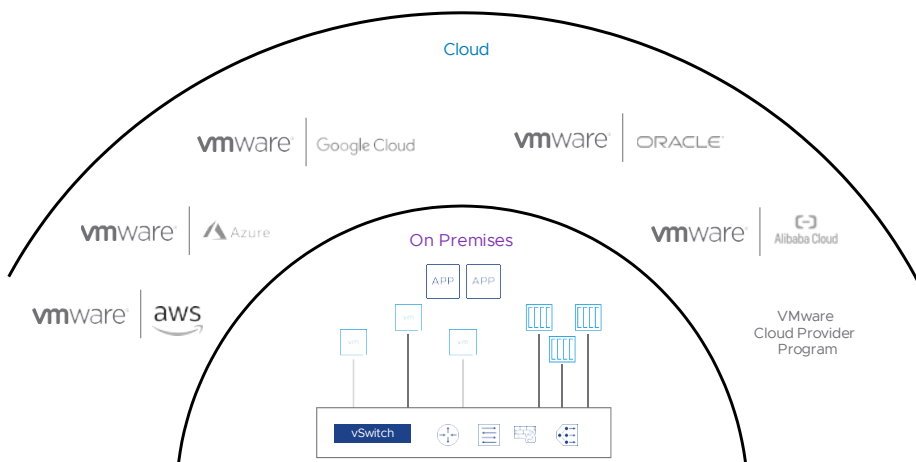


Figure 1: The NSX network virtualization

## Networking in software

VMware NSX delivers a completely new operational model for networking defined in software, forming the foundation of the software-defined data center (SDDC) and extending to a cloud network. Data center operators can now achieve levels of agility, security and economics that were previously unreachable when the data center network was tied solely to physical hardware components. NSX provides a complete set of logical networking capabilities and services, including logical switching, routing, distributed load balancing, virtual private network (VPN), quality of service (QoS), and monitoring. These services are provisioned in virtual networks through any cloud management platform leveraging NSX APIs. Virtual networks are deployed non-disruptively over any existing networking hardware and can extend across data centers, public and private clouds, container platforms, and physical servers.

Key features <sup>2</sup>	
Switching	Enable logical Layer 2 overlay extensions across a routed (Layer 3) fabric within and across data center boundaries.
Routing	Dynamic routing between virtual networks that is performed in a distributed manner in the hypervisor kernel, and scale-out routing with active-active failover with physical routers. Static routing and dynamic routing protocols are supported, including support for IPv6.
Virtual routing and forwarding (VRF)	Complete data plane isolation among tenants with a separate routing table, network address translation (NAT), and edge firewall support in each VRF on the NSX Tier-0 gateway.
NSX gateway <sup>3</sup>	Support for bridging between VLANs configured on the physical network and NSX overlay networks, for seamless connectivity between virtual and physical workloads.
VPN	Site-to-site and unmanaged VPN for cloud gateway services.
DPU-based acceleration for NSX	Delivers high performance networking and security services implemented on DPUs <sup>1</sup> connected to the application hosts. Offloading NSX services from the hypervisor to DPU frees up host computing resources, enabling accelerated switching and routing, high performance security, and enhanced observability while preserving your existing NSX user experience.
Federation	Centralized policy configuration and enforcement across multiple locations from a single pane of glass, enabling network-wide consistent policy, operational simplicity, and simplified disaster recovery architecture.
Multi-cloud networking	Enable consistent networking and security across data center sites, and across private and public cloud boundaries, irrespective of underlying physical topology or cloud platform.

Key features	
Project <sup>6</sup>	Enable multi-tenant deployment and consumption of NSX services for the Enterprise Admin (Provider) and the Project users (Tenants). The Provider can create Projects, assign users and groups, and allocate quotas to restrict the configurations available to the Tenants.
Virtual private cloud (VPC) <sup>6</sup>	<p>A secure, isolated private cloud construct that offers a second level of tenancy below Projects with a streamlined UI and API that allow teams to easily deploy networking and security.</p> <p>The VPC allows self-service consumption and scaling of NSX networking and security services for the tenants while allowing the admin to implement the necessary isolation.</p>
Container networking	<p>VMware NSX Container Plugin provides container networking for VMware Tanzu® Kubernetes Grid™, VMware Tanzu Application Service™, VMware vSphere® with Tanzu, Red Hat OpenShift, and upstream Kubernetes.</p> <p>VMware Container Networking™ with Antrea™ provides in-cluster networking and Kubernetes network policy with commercial support and signed binaries. Integration with NSX provides multi-cluster network policy management and centralized connectivity troubleshooting via traceflow through the NSX management plane.</p>
NSX API	RESTful API based on JSON for integration with cloud management platforms, DevOps automation tools and custom automation.
Operations	Native operations capabilities such as central CLI, traceflow, overlay logical SPAN and IPFIX to troubleshoot and proactively monitor the virtual network infrastructure. Integration with tools such as VMware Aria Operations™ for Logs <sup>4</sup> (formerly VMware vRealize® Log Insight™) for highly scalable log management, and VMware Aria Operations for Networks <sup>5</sup> (formerly VMware vRealize Network Insight™) for advanced analytics and troubleshooting.
Automation and cloud management <sup>5</sup>	Native integration with VMware Aria Automation™ (formerly VMware vRealize Automation™/vRealize Automation Cloud™) and more. Fully supported Ansible modules, fully supported Terraform provider and PowerShell integration.
Third-party partner integration	Support for management, control plane, and data plane integration with third-party partners in a wide variety of categories such as switching, operations and visibility, Distributed Network Introspection, and more.

## Additional Resources

- [VMware Cloud Foundation datasheet](#)
- [VMware Container Networking with Antrea datasheet](#)
- [VMware Aria Operations for Networks datasheet](#)
- [VMware HCX datasheet](#)
- [VMware Firewall datasheet](#)
- [VMware Advanced Load Balancer datasheet](#)

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877-4-VMWARE (outside North America, +1-650-427-5000)

### VISIT

<http://www.vmware.com/go/nsx>

### VIEW

[VMware Compatibility Guide](#)

## Use Cases

### Cloud networking

NSX delivers a network virtualization solution that delivers consistent network policy and management across heterogeneous sites to streamline multi-cloud operations. It allows network and operations teams to consume and operate NSX services from a centralized console across private and hybrid clouds, optimizing business-critical network availability, performance, scale, and cost.

### Datacenter Consolidation, App Mobility, and Disaster Recovery

NSX unifies the network across racks and data centers with centralized federated management and resource pooling for active-active and active-standby deployments. Network overlays make it easy to move, rebalance, and migrate workloads allowing you to optimize data center utilization without facing physical networking constraints like complex re-routing, traffic engineering, or security policy changes. This significantly improves application uptime and disaster recovery and simplifies application migration for data center refresh and consolidation, and pooling.

### Network Automation

By virtualizing networking and security services, NSX enables faster provisioning and deployment of full-stack applications by removing the bottleneck of manually managed networking and security services and policies. NSX natively integrates with cloud management platforms and other automation tools, such as VMware Aria Automation, Terraform, Ansible and more, to empower developers and IT teams to provision, deploy and manage apps at the speed business demands.

### High-Performance Networking

New applications are driving higher performance and scale requirements of the underlying network infrastructure. NSX uses Enhanced Data Path (EDP) to deliver high performance network services for workloads running on vSphere. Furthermore, implementing NSX network services on Data Processing Units (DPUs)<sup>1</sup> connected to application hosts frees up host computing resources and enables high-throughput, low-latency switching and routing, and enhanced observability.

### Networking for Modern Applications

NSX provides integrated, full-stack networking and security for containerized applications and microservices, delivering granular policy on a per-container basis as new applications are developed. This enables native container-to-container L3 networking, and end-to-end visibility of networking and security policy across traditional and new applications.

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1. Supports several leading DPU/NIC vendors and server OEMs. Please contact your VMware representative for more details.
  2. For detailed feature capabilities and entitlements, please refer to the [NSX Feature and Edition Guide](#).
  3. L2, L3 and NSX gateway integration only. No consumption of security groups.
  4. For more information, please read the [VMware Aria Operations for Logs datasheet](#).
  5. VMware Cloud Foundation includes full versions of VMware Aria Operations for Networks and VMware HCX. For more information, please see the [VMware Aria Operations for Networks datasheet](#) and the [VMware HCX datasheet](#).
  6. For configuration maximums, please refer to the [VMware Configuration Maximum Tool](#).

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