VMware Cloud Foundation

Cloud Maturity Model – Network

Adoption Path for VCF 5.2

Table of contents

Maturity Stage 1: Virtualized Networking

Basic Switching: Layer 2 Switching

Centrally configure Logical Switches (vCenter VSS/VDS PortGroups) via the vCenter component in VCF.

Important Note: The configuration of the physical fabric (switches/routers) must be updated so the VMs have a default gateway to communicate with other networks and access the Internet.

- 101 Documentation: [Introduction to vSphere Networking](#)
- 101 Documentation: [How do I Set Up Networking with vSphere Standard Switches](#)
- 101 Documentation: [How do I Set Up Networking with vSphere Distributed Switches](#)

Maturity Stage 2: Advanced Virtualized Networking

Move to a full private cloud with Network Virtualization (on top of Compute Virtualization and Storage Virtualization).

Advanced Switching: Logical Switching

Centrally configure Logical Switches (Overlay-Segments) via the NSX component in VCF, without touching the physical fabric. Seamlessly provides vCenter PortGroups for your VMs, which are accessible across all your ESXi hosts regardless of their physical location.

- Hands-on Lab: [HoL 2540-01-VCF-L - Module 4](#)
- 101 Documentation (presentation): [NSX Admin Guide - Chapter Segment](#)
- 301 Documentation (deep-dive): [NSX Design Guide:- Chapter 3](#)

Advanced Routing: Logical Routing

Centrally configure Logical Routers (T0/T1) via the NSX component in VCF, without touching the physical fabric. Instantly enable your VMs default gateway to communicate with other networks and access the Internet.

- Hands-on Lab: [HoL 2540-01-VCF-L - Module 5](#)
- 101 Documentation (presentation): [NSX Admin Guide - Chapter Tier-0](#) and [NSX Admin Guide - Chapter Tier-1](#)
- 301 Documentation (deep-dive): [NSX Design Guide:- Chapter 4](#)

DHCP

Centrally configure DHCP Server or DHCP Relay via the NSX component in VCF, without touching the physical fabric. Instantly enable DHCP for your VMs in vCenter.

- 101 Documentation (presentation): [NSX Admin Guide - Chapter DHCP](#)
- 301 Documentation (deep-dive): [DHCP 301 ToI](#)

Cloud Maturity Model - Network Adoption Path – VCF 5.2

Maturity Stage 2: Microsegmentation

Control the flow of traffic within the private cloud to protect applications and services from cyber attacks.

Infrastructure Policies

Create Infrastructure level security policies to protect common network protocols and services.

To learn more about it:

- 101 Documentation (White Paper): Ransomware Lateral Security
- 101 Documentation (White Paper): Five Critical Requirements for Internal Firewalling in the Data Center
- Hands-On Lab: VMware vDefend Firewall Getting Started (HOL-2570-01-ANS-L)

Note: This service is offered via the Add-On VMware vDefend Firewall.

Environmental Zoning Policies

Create Environmental level security policies to establish secure zones of acceptable communication within the enterprise.

To learn more about it:

- 101 Documentation (White Paper): IT and Security Leaders Turn to Lateral Security to Mitigate Ransomware
- 101 Documentation (White Paper):Five Critical Requirements for Internal Firewalling in the Data Center
- Hands-On Lab: VMware vDefend Firewall Getting Started (HOL-2570-01-ANS-L)

Note: This service is offered via the Add-On VMware vDefend Firewall.

Application Policies

Create Application level security policies to control traffic between and within applications.

To learn more about it:

- 101 Documentation (Solution Brief): NSX/NSX+ Intelligence
- 101 Documentation (White Paper): Five Critical Requirements for Internal Firewalling in the Data Center
- Hands-On Lab: VMware vDefend Firewall Getting Started (HOL-2570-01-ANS-L)

Note: This service is offered via the Add-On VMware vDefend Firewall.

Maturity Stage 3: Stateful Services

Move to a full private cloud with Advanced Network Virtualization (on top of Compute Virtualization and Storage Virtualization).

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Network Address Translation (NSX - NAT)

Centrally configure Logical Routers (T0/T1) with NAT (DNAT, SNAT, Reflexive NAT, NAT64) via the NSX component in VCF, without touching the physical fabric. Instantly enable your VMs with private IPs to communicate with other networks and access the Internet.

To learn more about it:

- Hands-on Lab: HoL 2540-01-VCF-L - Module 6
- 101 Documentation (presentation): NSX Admin Guide - Chapter NAT
- 301 Documentation (deep-dive): NSX Design Guide:- Chapter 4.10.2 and NAT 301 ToI

Virtual Private Network (VPN)

Centrally configure Logical Routers (T0/T1) with VPN Service (IPSec VPN and L2 VPN) via the NSX component in VCF, without modifying the physical fabric. Instantly enable site-to-site connectivity.

To learn more about it:

- Hands-on Lab: HoL 2540-02-VCF-L - Module 4
- 101 Documentation (presentation): NSX Admin Guide - Chapter VPN

NSX Load Balancer

Centrally configure Load Balancers (L4 and L7 VIP) via the AVI component in VCF, without modifying the physical fabric. Instantly enable scale and high availability to the applications running on your VMs.

To learn more about it:

- 101 Documentation (presentation): NSX-T LB ToI

- 301 Documentation (presentation): NSX-T LB Encyclopedia

Avi Load Balancer

Centrally configure Load Balancers (L4 and L7 VIP) via the Avi component in VCF, without modifying the physical fabric. Instantly enable scale and high availability to the applications running on your VMs.

To learn more about it:

- 101 Documentation (White Paper): Advanced Load Balancing from VMware

- Hands-on Lab: Getting Started VMware Avi Load Balancer

- Hands-on Lab: Boost App Security With VMware AVI Load Balancer

Note: This service is offered via the Add-On VMware AVI Load Balancer.

Maturity Stage 3: Gateway Firewall

Gateway Firewall

Extend the boundary of control to the physical network or create multi-tenant seecurity with a consistent management plane using th next generation VMware Gateway Firewall

To learn more about it:

- VMware vDefend Gateway Firewall

Note: This service is offered via the Add-On VMware vDefend Firewall.

Maturity Stage 4: Multi-Tenancy

Multi-Tenancy / Virtual Private Cloud (Projects and VPC)

Add tenancy and offer self-management on Network and Security services in your VCF private cloud.

To learn more about it:

- Hands-on Lab: HoL 2540-01-VCF-L - Module 3 and HoL 2540-02-VCF-L - Module 3
- VMware Explore: VMware Explore: VCFB1406LV NSX VPC: The Network Consumption Model for Private Cloud
- Blog and Demo: NSX VPC in vCenter and VCF 5.2.1 – Virtual Private Cloud latest enhancements
- 301 Documentation (deep-dive): NSX Design Guide:- Chapter 2.3.6

Maturity Stage 4: Networking for Modern Applications

K8s Service Load Balancer (NSX LB)

Configure NSX to provide basic connectivity to Supervisor control plane VMs, services, and workloads.

To learn more about it:

- Documentation: Supervisor Networking with NSX

K8s Advanced Service Load Balancing (Avi LB)

Provide comprehensive load balancing, analytics, and security services for Kubernetes.

To learn more about it:

- Whitepaper: WP - Deliver Elastic Kubernetes Ingress Controller and Services

- Case Study: Deutsche Bank Everything-as-a-Service

- Solution Brief: Kubernetes Ingress Services by Avi

- Blog: Three Eras of Load Balancing in Kubernetes

- Hands-on Lab: Container Services Security with Avi AKO and Antrea-vDefend (HOL-2571-04-ANS-L)

Note: This service is offered via the Add-On VMware AVI Load Balancer.

Maturity Stage 4: Basic Automation

Automating NSX Network Resources (VCF Automation)

VCF Automation provides application delivery with enhanced networking and security provided by VMware NSX. Both modern containerized and traditional applications can benefit from this solution. By applying DevOps principles to network infrastructure delivery, this solution ensures network policies are managed along with workloads.

To learn more about it:

- Blog: VMware Network Automation with NSX-T and vRealize Automation
- YouTube: Everything VMware Aria - Automate the VMware Cloud (VCF)
- Documentation: Automation Template Examples
- Hands-on Lab: HoL 2501-09-VCF-L - Module 6

Automating Avi Network Resources (VCF Automation)

The AVI Load Balancer features within VCF Automation provide the ability to design templates that take advantage of extensive L4-L7 load balancing scenarios that AVI support.

To learn more about it:

- YouTube: VCF Automation and AVI Webinar
- Documentation: Automation Template (AVI)
- Blog: Deploying VMware Avi Load Balancer resources with VMware Aria Automation Templates

Automating Security (VCF Automation)

VCF Automation can create and manage NSX Security Groups using Policy APIs, enabling security automation without impacting the business.

To learn more about it:

- Documentation: VCF Automation Template Examples (NSX Security Groups)

Maturity Stage 5: Multi-Site / Federation

Stretch your private cloud cross-locations for compute mobility, higher scale, and high availability without compromising on security.

Multi-Location Datacenters Networking: Federation

Stretch your networks (T0/T1/Segments) via the NSX Global Manager (GM), without touching the physical fabric. Instantly enable compute mobility cross-locations and simple high availability to your VMs.

To learn more about it:

- Hands-on Lab: HoL 2540-02-VCF-L - Module 5
- 301 Documentation (deep-dive): NSX Multi-Location Design Guide - Chapter 4
- Blog + Demo: VCF Networking for Multi-Location Use-Case

Maturity Stage 5: Global Policy Management

Multi-Location Datacenters Security: Federation

Stretch your security (Groups / Microsegmentation) via the NSX Global Manager (GM), without touching the physical fabric. Instantly enable cross-location security to your VMs.

To learn more about it:

- Hands-on Lab: HoL 2540-02-VCF-L - Module 5
- 301 Documentation (deep-dive): NSX Multi-Location Design Guide - Chapter 4
- Blog + Demo: VCF Networking for Multi-Location Use-Case

Note: This service is offered via the Add-On VMware vDefend Firewall.
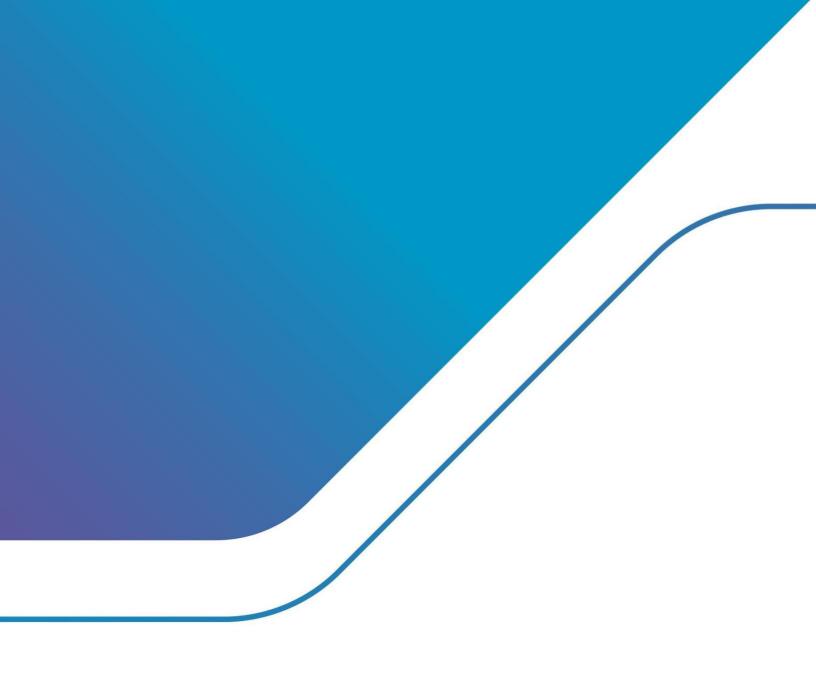
Maturity Stage 5: Advanced Automation

Orchestrate the Network and Security services of your private cloud with open-source tools, such as Terraform and Ansible or plan API.

Advanced Automation (API / Ansible / Terraform / etc)

Orchestrate the NSX component of VCF with open-source tools, such as Terraform and Ansible or plan API.

To learn more about it:

- VMware Explore: NSX-T and Infrastructure as Code