



Fundamentos da Arquitetura de Infraestrutura de Aplicações

BLOCO: ARQUITETURA DE INFRAESTRUTURA DE APLICAÇÕES

PROF. RODRIGO EIRAS, M.SC.

[ETAPA 2] AULA 1 – ENTENDER OS DESAFIOS DA IMPLANTAÇÃO E MANUTENÇÃO DE APLICAÇÕES E OS BENEFÍCIOS DA VIRTUALIZAÇÃO



Na aula anterior...

- Centro de Dados Definido por Software (SDDC)
- Hipervisor
- Tipos de Virtualização
- vMotion
- Gerenciamento de SDDC



Agenda

- Continuação de SDDC (Etapa 1)
- Um poucos mais sobre desafios e benefícios de virtualização



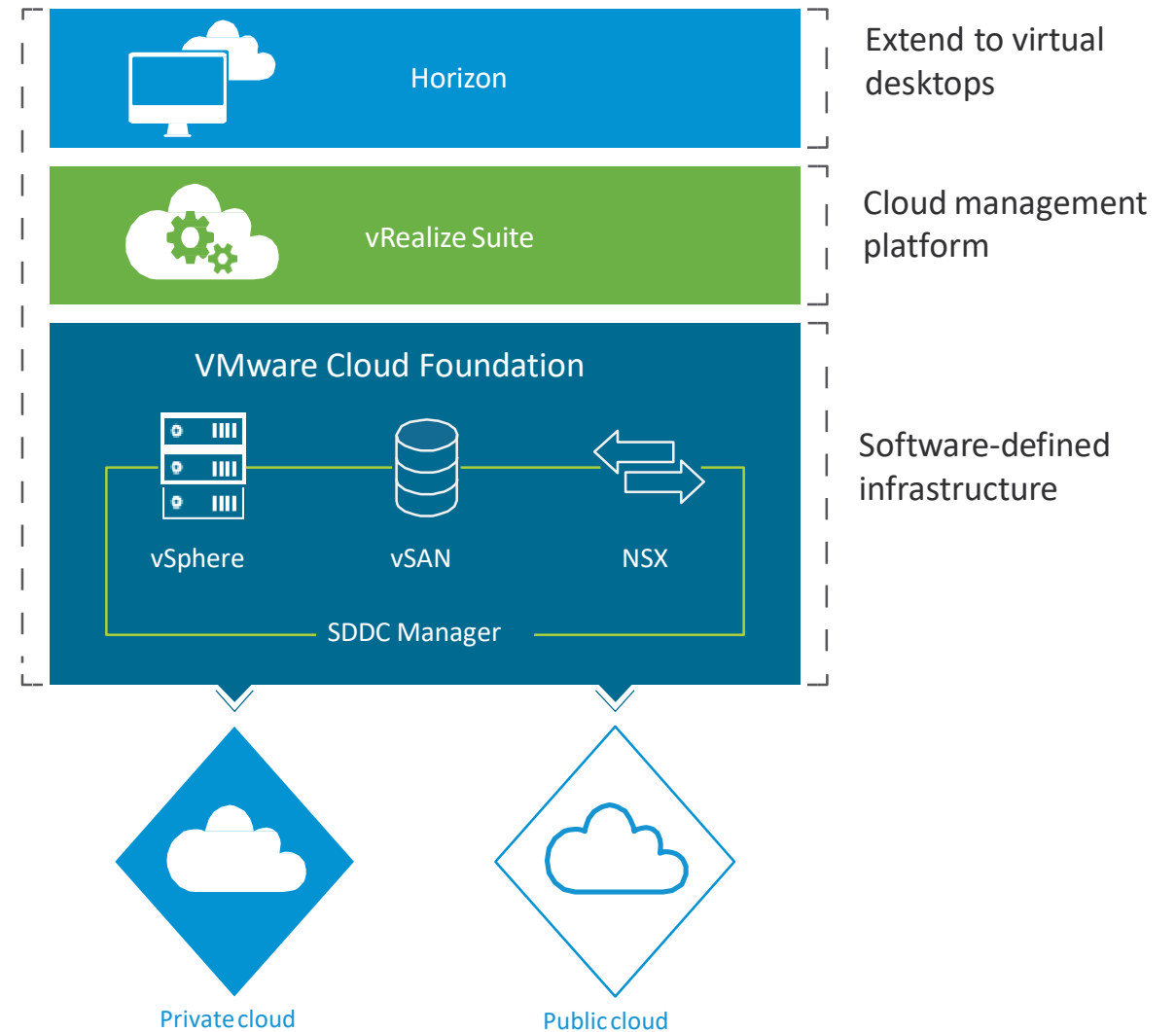
VMware Cloud Foundation Architecture Deep Dive



vmworld® 2017

Briefing

- VMware Cloud Foundation Overview
- Cloud Foundation Architecture Overview
- Deploying Cloud Foundation
- Workload Domain Overview
- Deployment Considerations



Cloud Foundation Overview

Faster and Simpler Path to the SDDC is Now Available...

Past



Do-It-Yourself

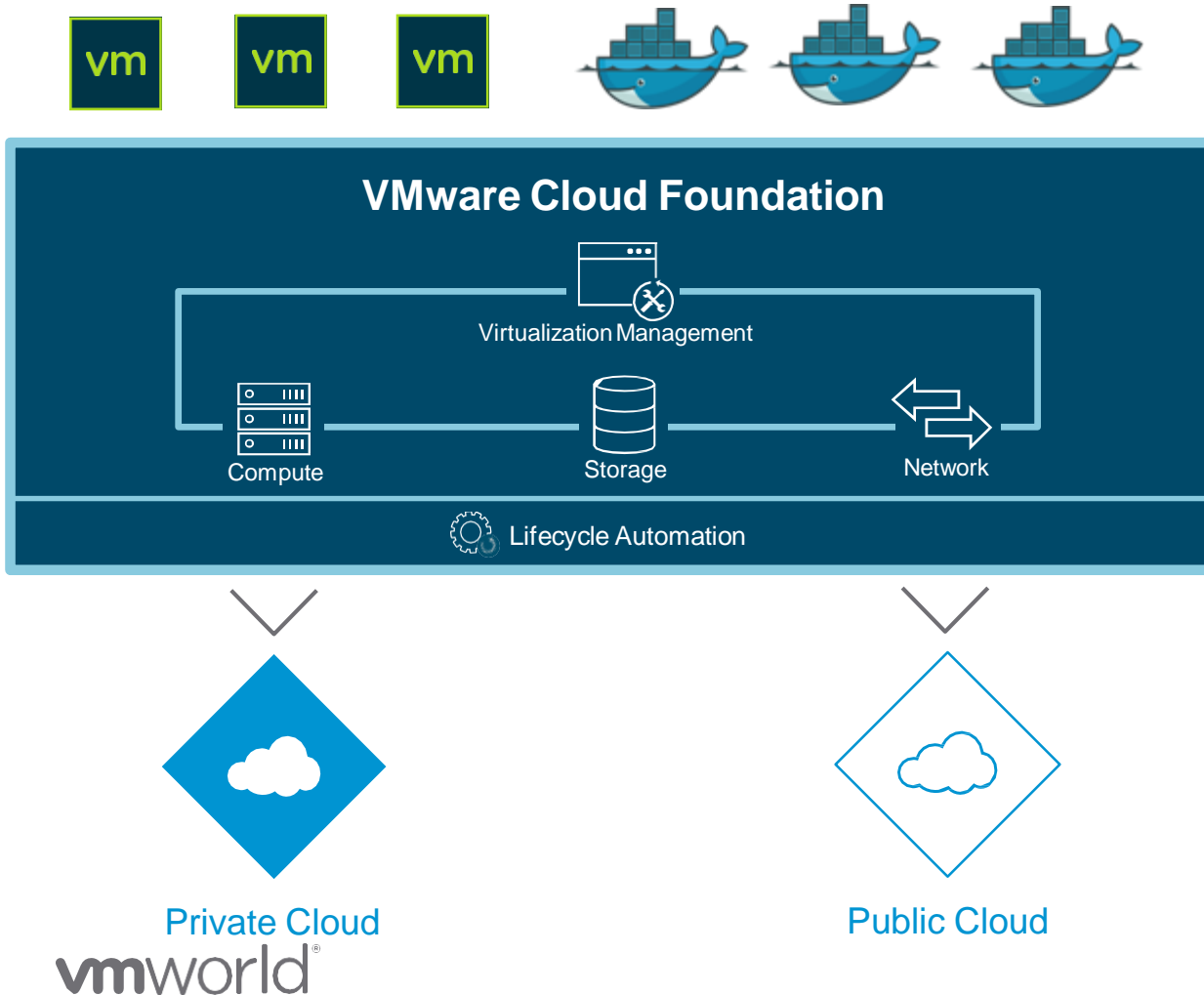
Present



Integrated, automated, easy to use

VMware Cloud Foundation

Simple, agile, and secure cloud infrastructure



- Integrated cloud infrastructure platform
 - Dynamic software-defined infrastructure
 - Virtualization management
- Simplest to deploy and operate
 - Standardized architecture based on VVD
 - Lifecycle automation of the complete stack
- Comprehensive security
- Enables path to hybrid cloud
 - Deploy on premises
 - Consume as a service in the public
- Future proof, ready for VMs and containers

Cloud Foundation Redefines the Enterprise Path to the Hybrid Cloud



Traditional

- ❌ Piece parts
- ❌ Complex planning and architecture
- ❌ High management overhead
- ❌ Incompatible public and private clouds



- ✅ Integrated
- ✅ Standardized and repeatable
- ✅ Automated and simplified operations
- ✅ Common platform across clouds

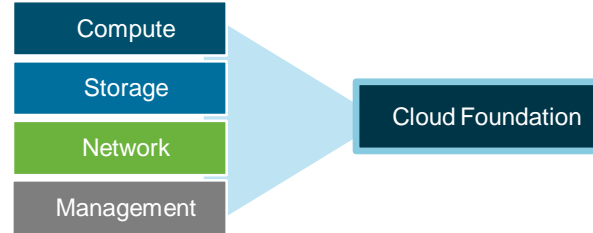
Cloud Foundation simplifies through standardization and automation

Standardized Architecture



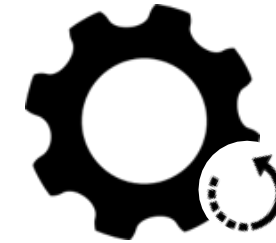
Automated deployment of a standardized VMware Validated Design

Integrated Stack



Engineered integration of entire software defined stack

Simple to Operate



Unique lifecycle management that automates day 0 to 2 operations

Cloud Foundation Architecture Overview

Cloud Foundation Software Building Blocks

VMware Cloud Foundation



Compute

vSphere

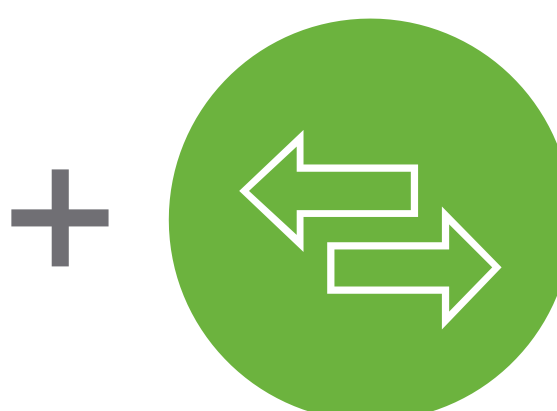
- ESXi
- PSC / vCenter
- HA/DRS
- vMotion



Storage

vSAN

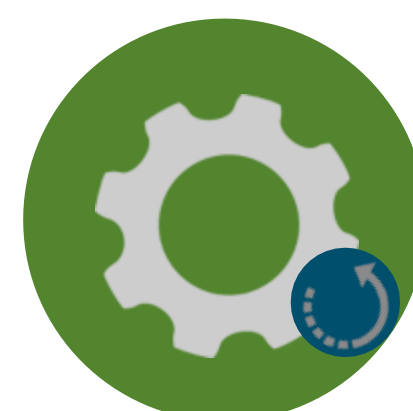
- Hyper-converged object storage
- All flash and hybrid
- Dedup & compression
- Data protection & replication



Network

NSX

- Distributed Firewall / M-Seg
- Logical Switching / App virtual networks
- Distributed switching/routing
- Edge Service Gateways (DHCP, Load balancing, NAT, Firewall)



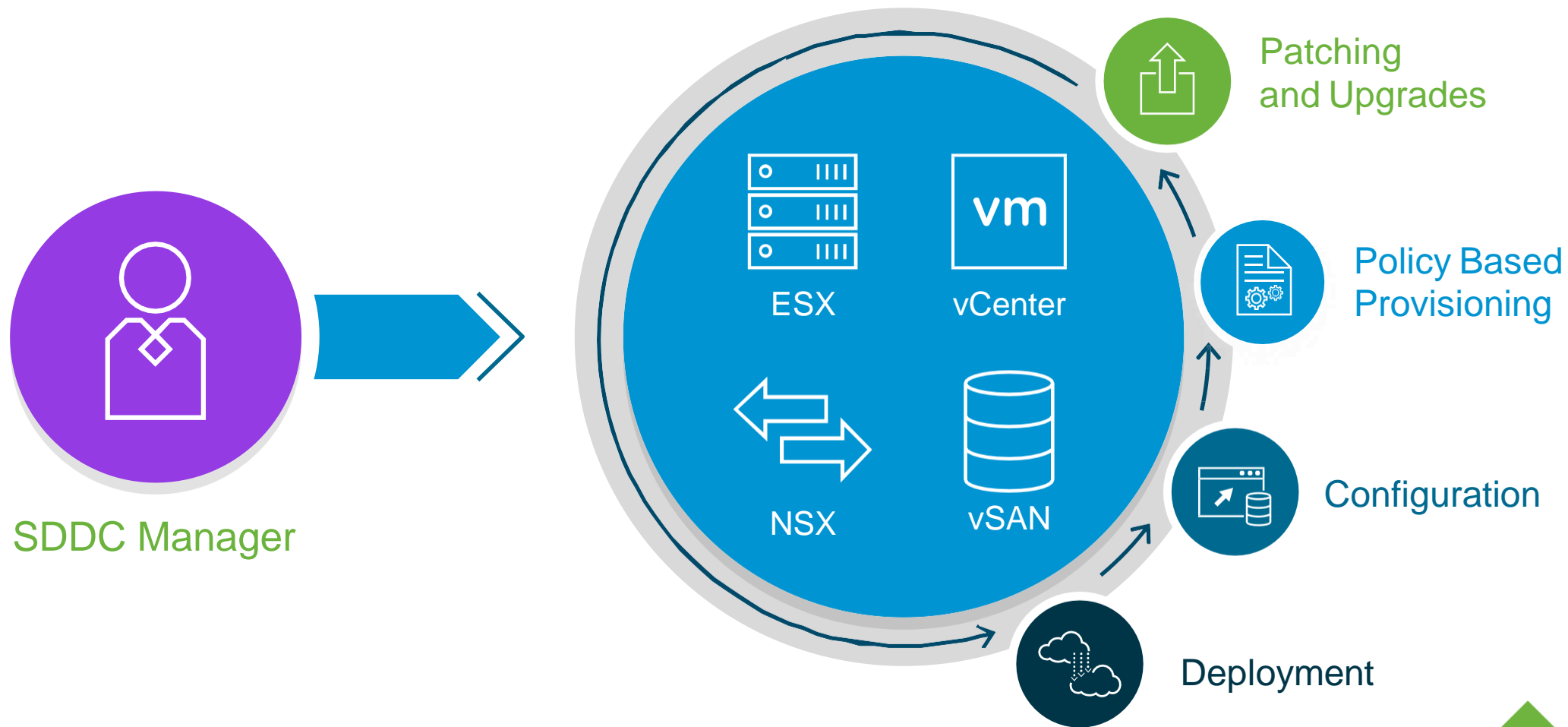
Automation

SDDC Manager

- Automated deployment and bring-up
- Set/enforce capacity, availability, performance and security policies
- Lifecycle management (patch and upgrade)

Simple to Operate with Lifecycle Automation

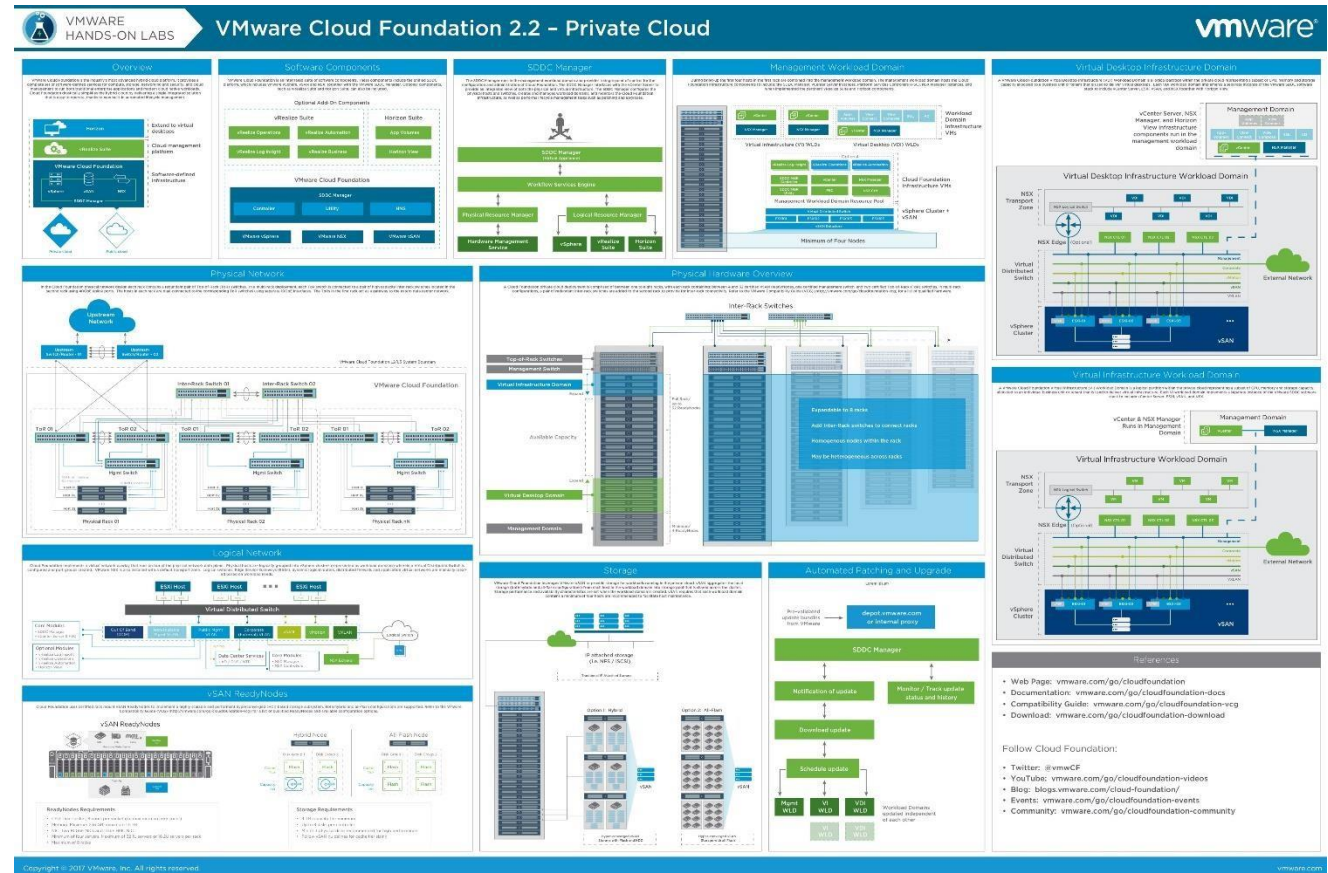
Automated day 0 to day 2 operations of the entire cloud infrastructure



Architecture Overview

VMware Cloud Foundation Architecture Deep Dive

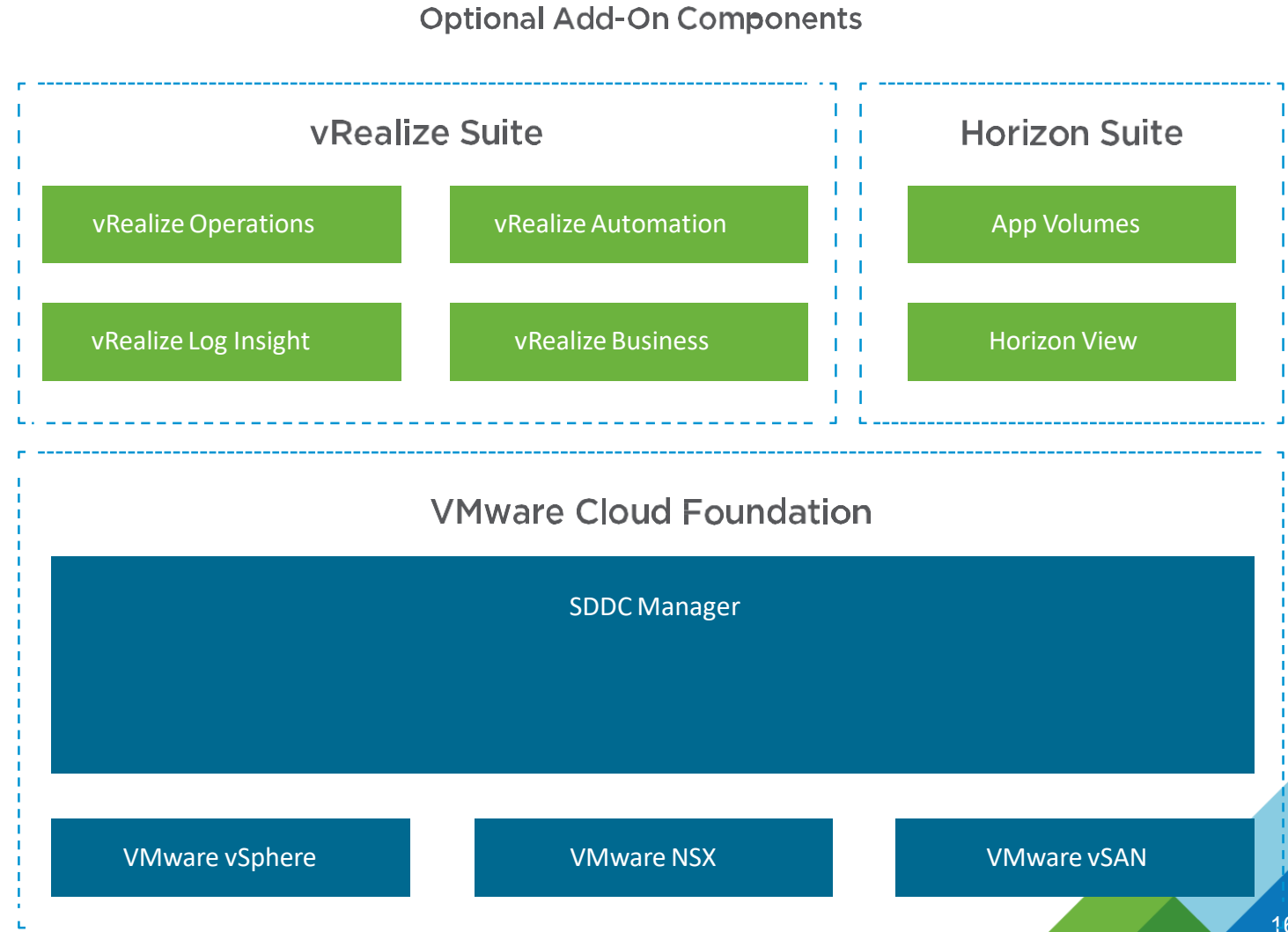
- Modern cloud architecture
- Prescriptive design
- Fully automated deployment
- Covers:
 - Compute (vSphere)
 - Storage (vSAN)
 - Network (NSX)
- Integration with:
 - vRealize Suite
 - Horizon



Software Components

VMware Cloud Foundation Architecture Deep Dive

- Core components:
 - SDDC Manager
 - vSphere (PSC / vCenter / ESXi)
 - vSAN
 - NSX
 - vRealize Log Insight
- Optional components:
 - vRealize Suite
 - Horizon Suite



VMware Cloud Foundation 2.2

Software BOM and Lifecycle Automation Capabilities

Component	Version	Deployment	Patching/Upgrades	When Deployed
ESXi	6.5 U1	Automated	Automated	Bring-up
PSC	6.5 U1	Automated	Automated	Bring-up
vCenter	6.5 U1	Automated	Automated	Bring-up / WLD Creation
vSAN	6.6.1	Automated	Automated	Bring-up / WLD Creation
NSX	6.3.3	Automated	Automated	Bring-up / WLD Creation
SDDC Mgr	2.2	Automated	Automated	Bring-up
Log Insight	4.3.0	Automated	Manual	Bring-up
Horizon	7.2	Automated	Manual	VDI WLD Creation
vRA	7.3	Manual	Manual	Manual
Others (vRNI, vRB, etc.)		Manual	Manual	Manual

Included in the Cloud Foundation software bundle

Download and deploy separately

Cloud Foundation Compatibility Guide

VMware Cloud Foundation Architecture Deep Dive

Expanding Hardware Support

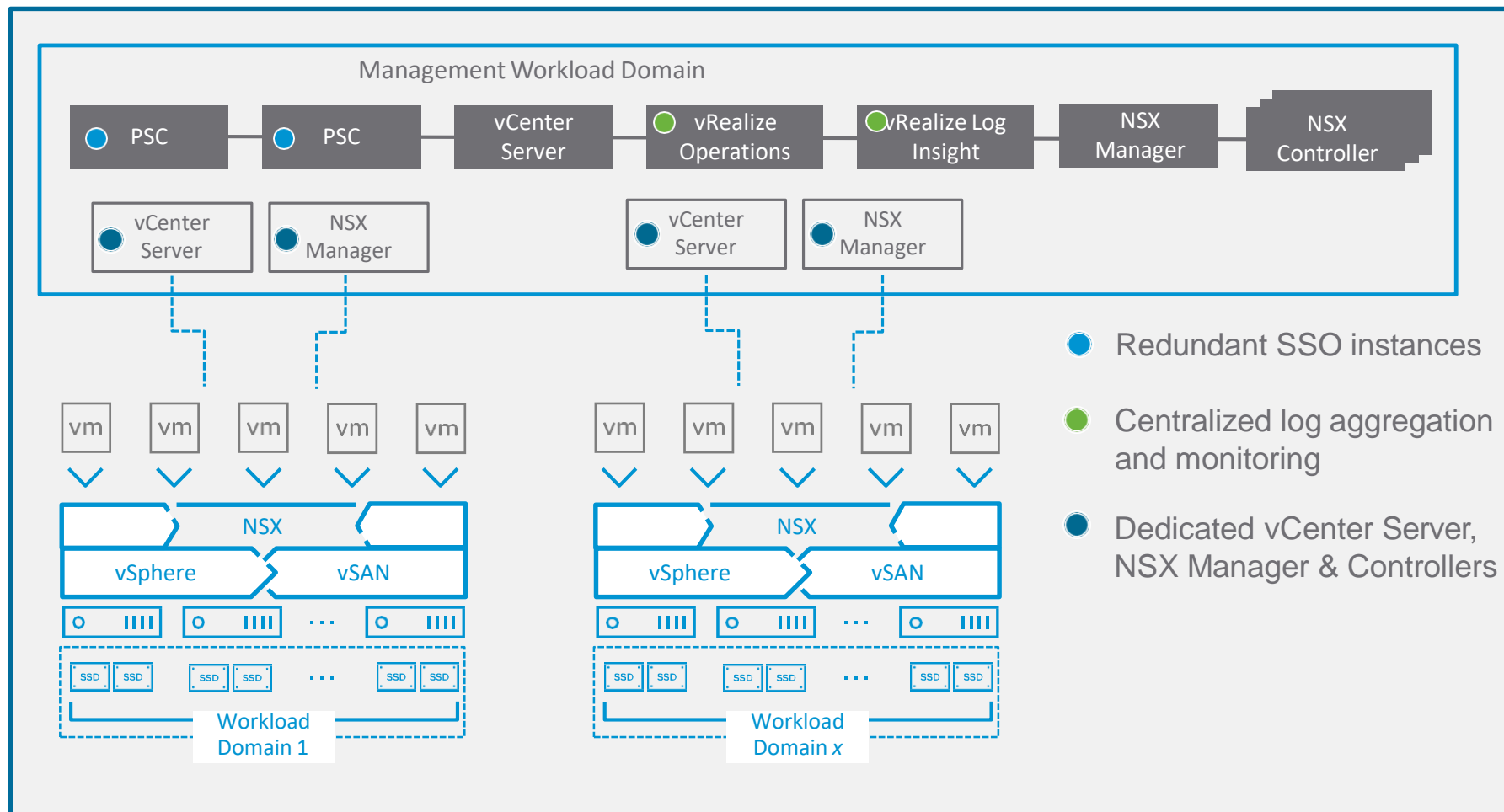
- See [VMware Compatibility Guide \(VCG\)](https://vmware.com/go/cloudfoundation-vcg) for details
 - vmware.com/go/cloudfoundation-vcg
- **Readily identify hardware compatibility by VCF Version**
 - ReadyNode Vendors
 - Management Switches
 - Top-of-Rack (ToR) Switches
 - Inter-Rack Switches

The screenshot shows the VMware Compatibility Guide (VCG) search interface. At the top, there is a breadcrumb trail: Home / Resources / Compatibility Guides. Below this is the main heading "VMware Compatibility Guide". A search bar is present with the placeholder text "Search Compatibility Guide: ? (e.g. compatibility or esx or 3.0)" and a dropdown menu set to "All Listings". A "Search" button is to the right. Below the search bar, a link says "Looking for a simplified search? Use the Guided Search Wizard". The main search area has a dropdown menu set to "VMware Cloud Foundation" and a "Compatibility Guides" dropdown. To the right of these are links for "Help" and "Current Results: 0". The search results are organized into several sections: "Ready Node Vendor:" with a list of vendors (DELL, Hewlett Packard Enterprise, Hitachi Data Systems (HDS), Quanta Computer Inc); "VCF Version:" with a dropdown set to "All"; "Ready Node Profile:" with a list of profiles (All, AF-4 Series, AF-6 Series, AF-8 Series); "Keyword:" with a text input field; "ToR and Inter-Rack Switch Vendor:" with a list of vendors (All, Arista Networks, Cisco); "Management Switch Vendor:" with a list of vendors (All, DELL, Quanta Computer Inc); and "Posted Date Range:" with a dropdown set to "All". At the bottom, there are two buttons: "Update and View Results" and "Reset".

Compute Virtualization

vSphere Design Overview

VMware Cloud Foundation Architecture Deep Dive



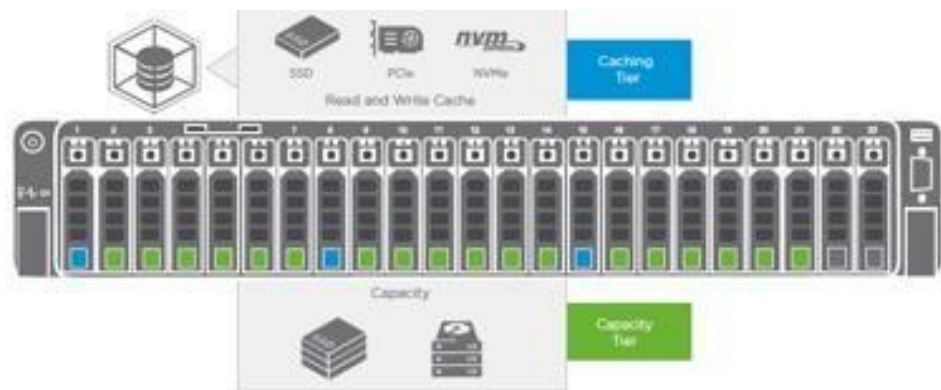
- Highlights:

- vCenters and NSX Managers run in the Management WLD
- All vCenters run in enhanced linked mode
- Max of 15 Workload Domains
- Centralized monitoring and log aggregation

Storage Defined Storage Overview

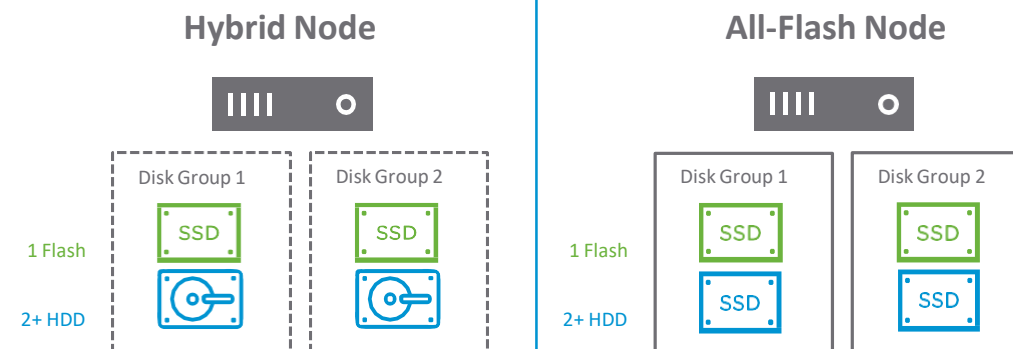
vSAN ReadyNode

VMware Cloud Foundation Architecture Deep Dive



Ready-Node Requirements

- Dual-socket, 8 cores per socket (no maximum core count)
- Minimum 256 GB memory, maximum 1.5 TB
- Two 10 GbE NICs and 1 GbE BMC NIC
- Minimum of four 1U servers / maximum of 32 1U servers



Storage Requirements

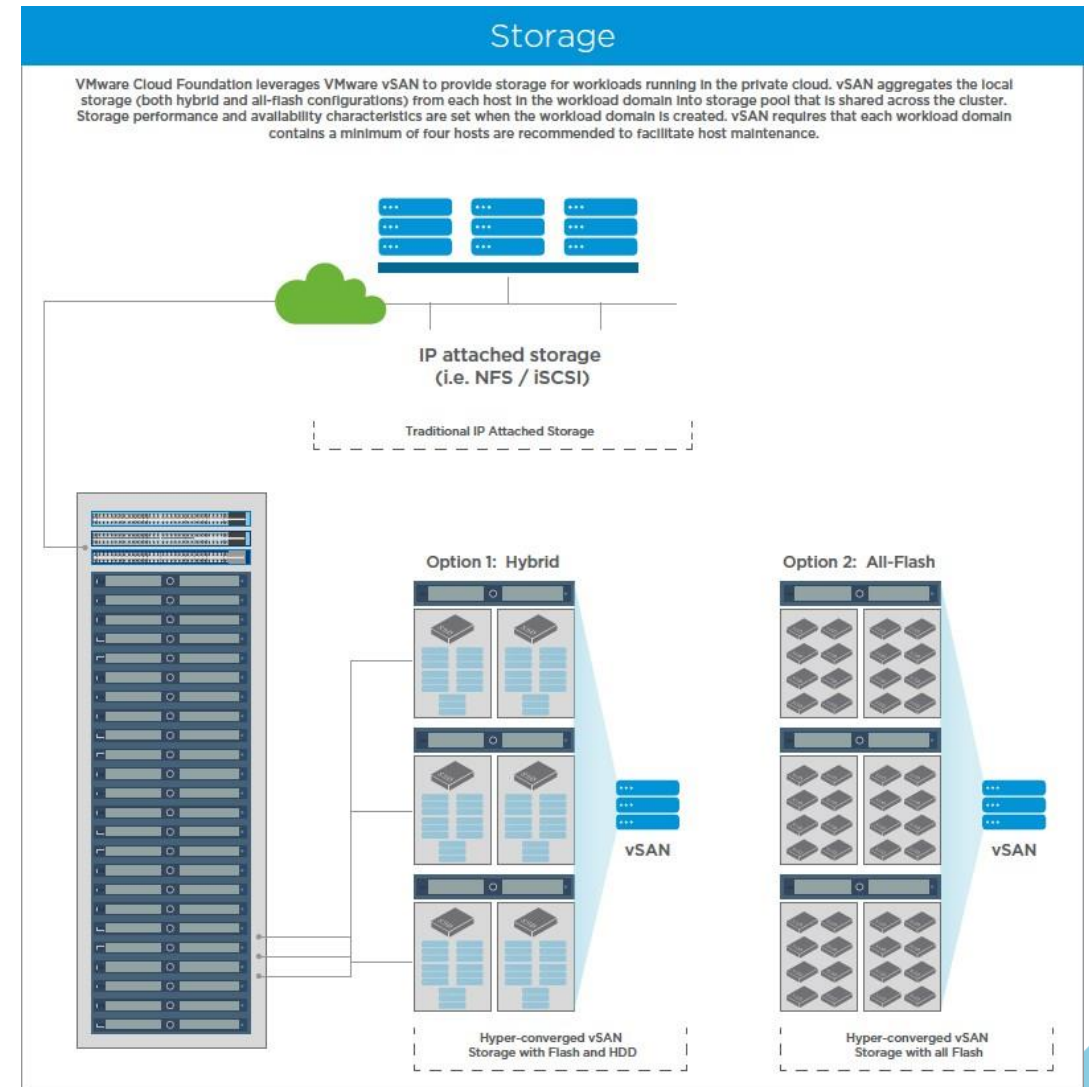
- 4TB capacity tier (minimum)
- Up to 8 disks per controller
- Min of 3 physical disks recommended for high performance

Follow vSAN guidelines for cache tier sizing as described in the vSAN Design and Sizing Guide.

External Storage

VMware Cloud Foundation Architecture Deep Dive

- NFS based storage can be used with Cloud Foundation
- Primarily used for:
 - Data protection (File/Image backups)
 - Data at rest (templates, backups, archives)
- Use vSphere web client to mount storage inside workload domains

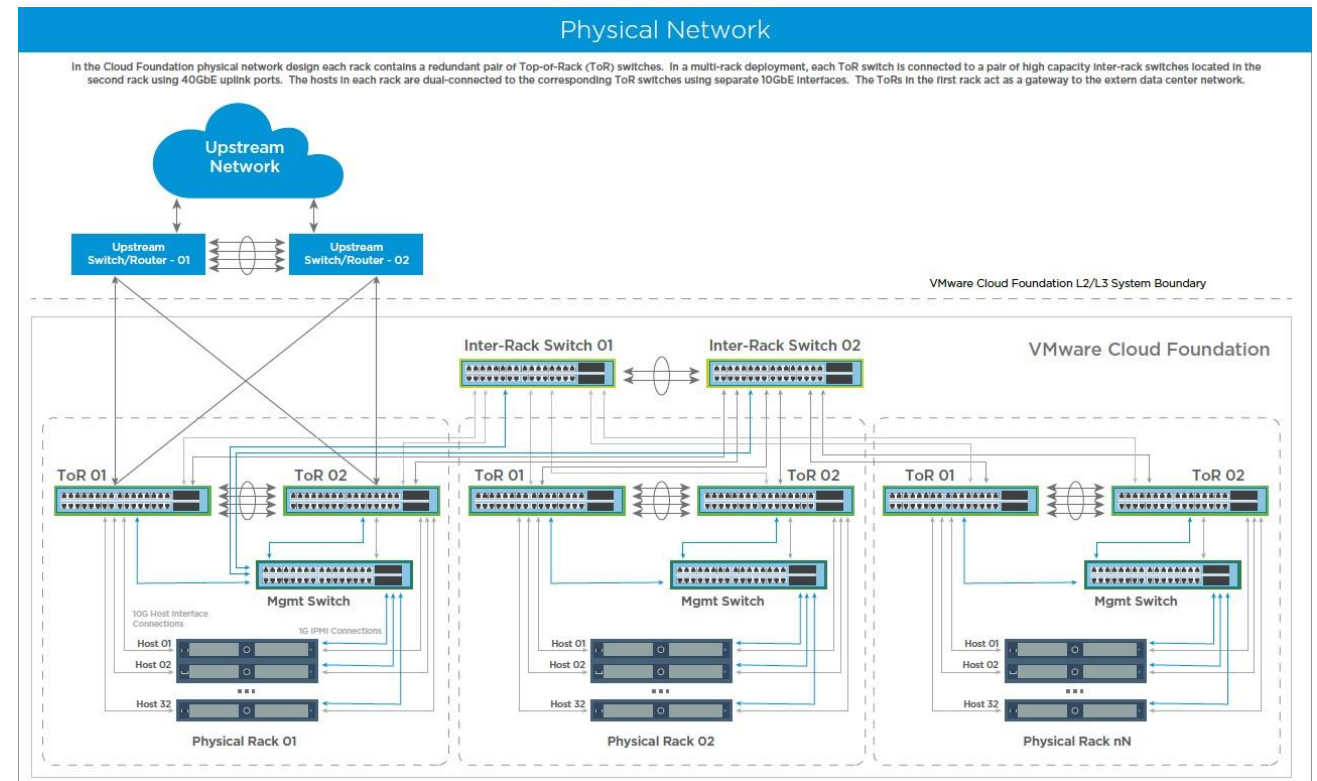


Software Defined Network Overview

Physical Network

VMware Cloud Foundation Architecture Deep Dive

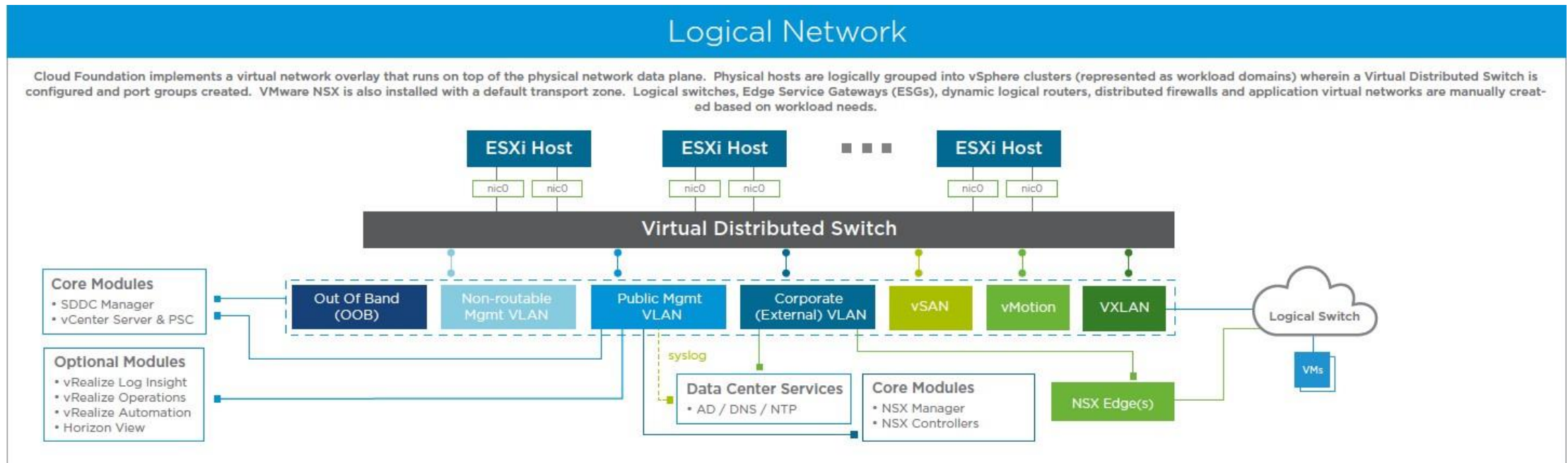
- Cloud Foundation implements a highly scalable network backplane
 - Fully automated – all switches configured and managed by SDDC Manager
 - Easy scales as number of racks increases
- Each rack contains
 - Redundant Top-of-Rack Switches
 - Management Switch
- Redundant inter-rack switches added in multi-rack configurations for rack interconnect
- ToRs in 1st rack act as on/off-ramp to data center network



Logical Network

VMware Cloud Foundation Architecture Deep Dive

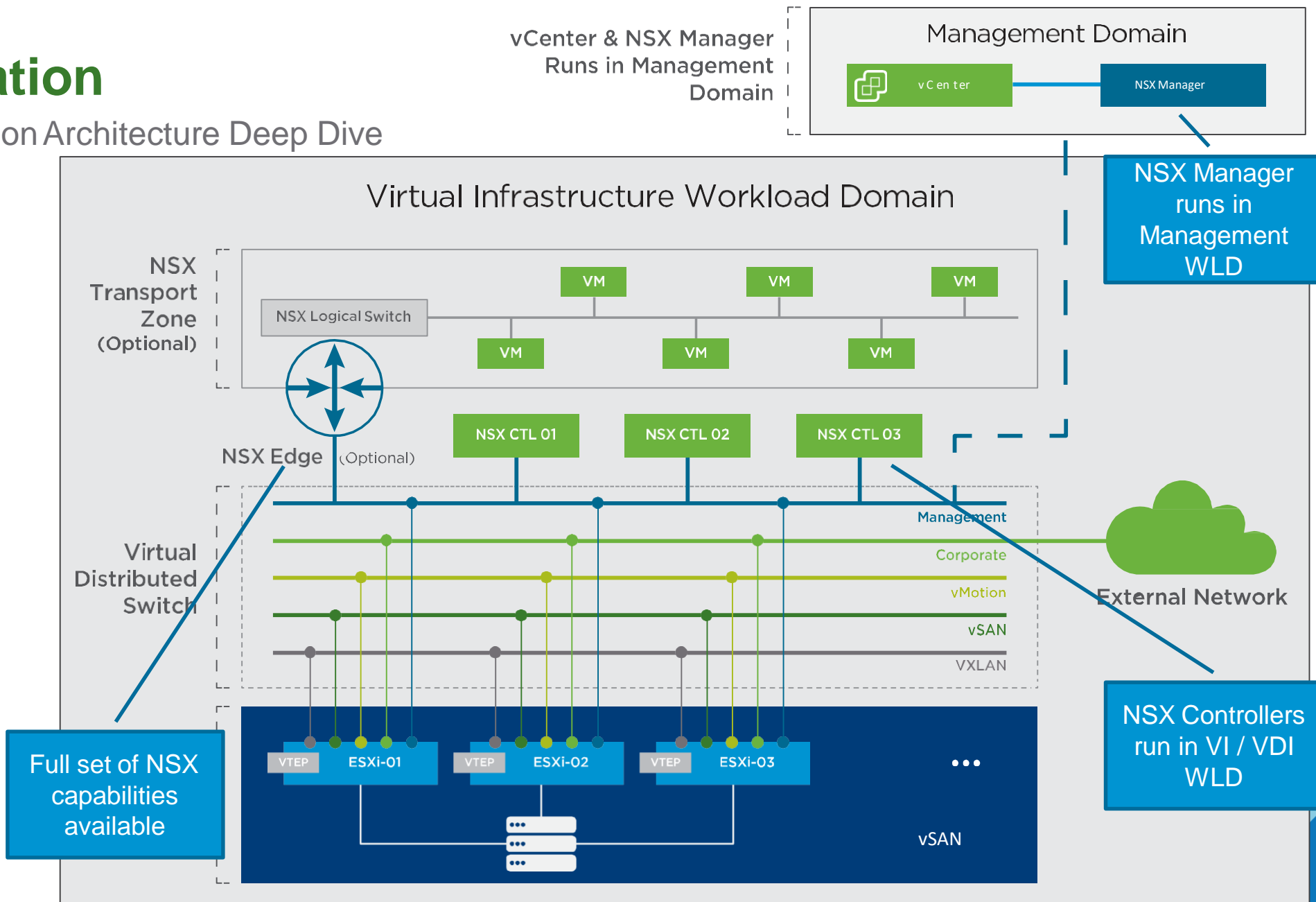
- vSphere Distributed Switch configured for each workload domain
 - Separate VDS for each workload domain
- Switch and port group definitions fully automated by SDDC manager



NSX Configuration

VMware Cloud Foundation Architecture Deep Dive

- Separate NSX instance for each Workload Domain
- NSX Manager runs in the management workload domain
- NSX Controllers run in the workload domain
- Full set of NSX capabilities

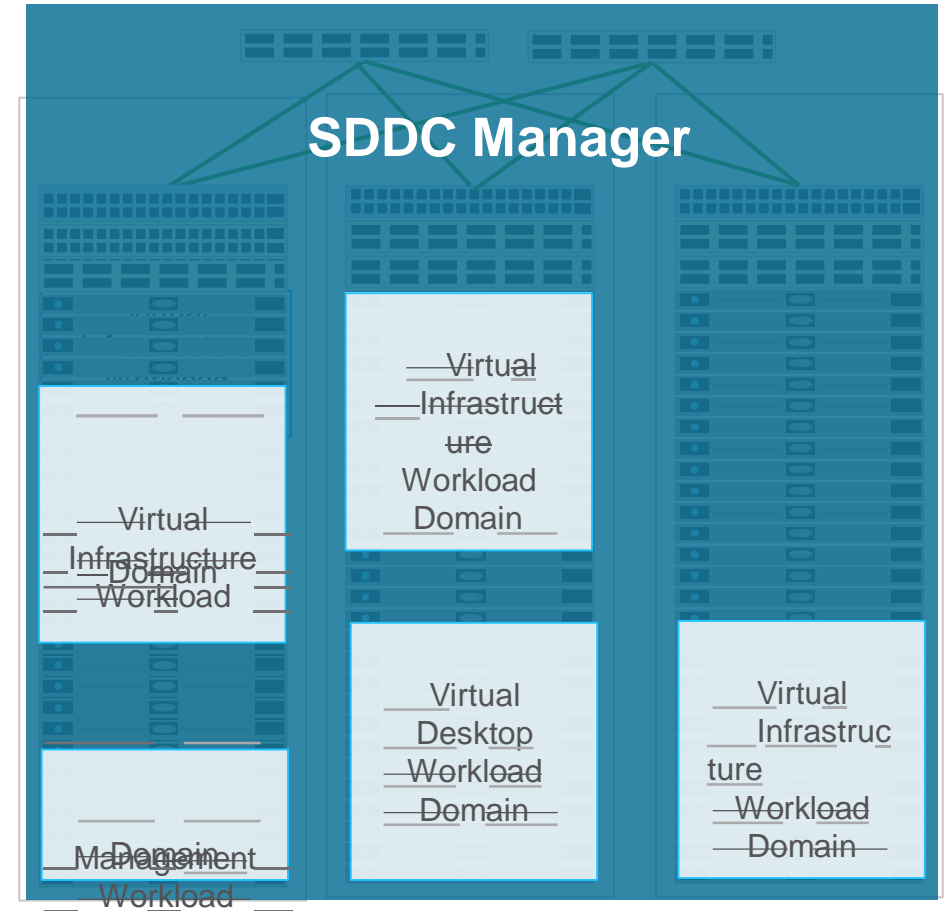


Workload Domain Overview

Workload Domains

VMware Cloud Foundation Architecture Deep Dive

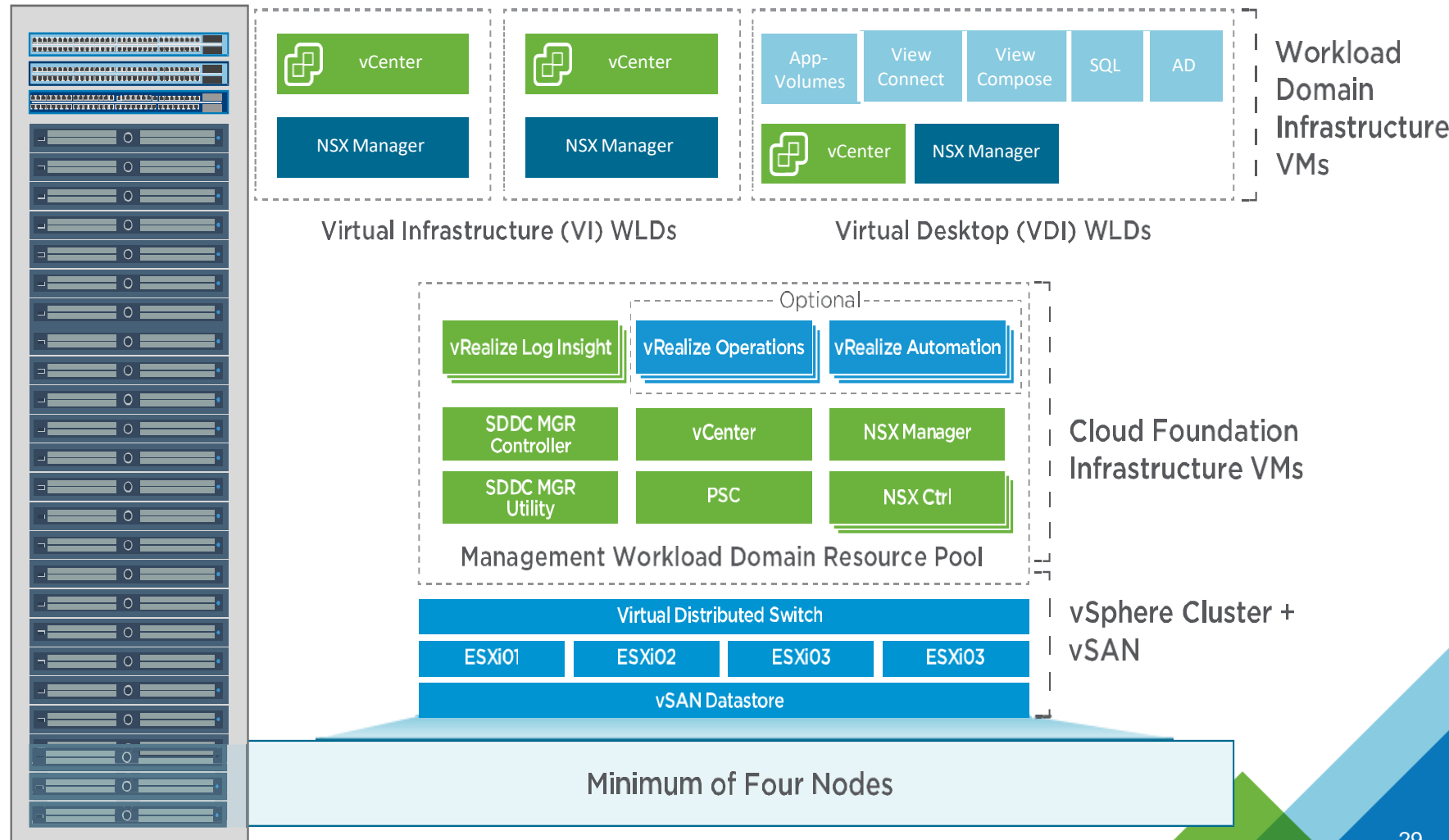
- Dedicated vSphere Cluster
 - Separate capacity, availability, performance and security policies
- Automated provisioning through SDDC Manager
 - vSphere, vSAN, NSX, SDDC manager, Log Insight
- Three types:
 - Management Workload Domain
 - Virtual Infrastructure (VI) Workload Domain
 - Virtual Desktop Infrastructure (VDI) Workload Domain
- Ability to create, expand, and delete
- Up to 10 workload domains run in parallel
 - vCenter Servers run in Enhanced Linked Mode



Management Workload Domain

VMware Cloud Foundation Architecture Deep Dive

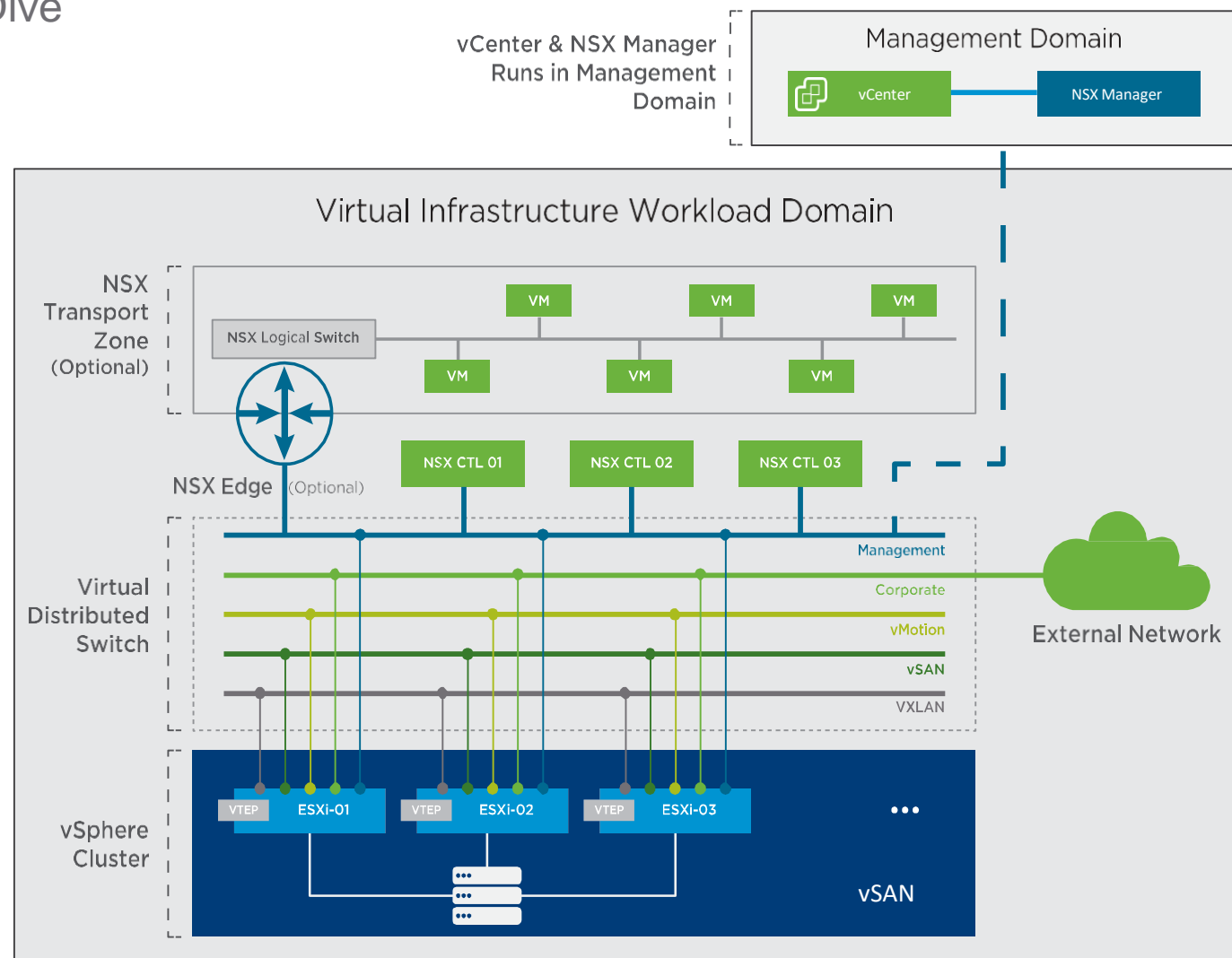
- Created during bring-up
- One per VCF instance
- Runs infrastructure components
- Workload domain vCenter server and NSX manager instances run in the Management Domain



Virtual Infrastructure Workload Domain

VMware Cloud Foundation Architecture Deep Dive

- Dedicated vSphere Cluster (min of 3 hosts)
 - Separate vCenter Server
 - Shared SSO Domain with Management WLD
 - Size calculated based on user inputs
 - Can be expanded later
- vSAN
 - Support for Hybrid and All-Flash
 - 8 disks per controller / 5 disk groups per host
 - One vSAN datastore per workload domain
- VMware NSX
 - NSX Manager deployed in the Management Workload Domain
 - NSX controller cluster deployed in VI / VDI Workload Domain

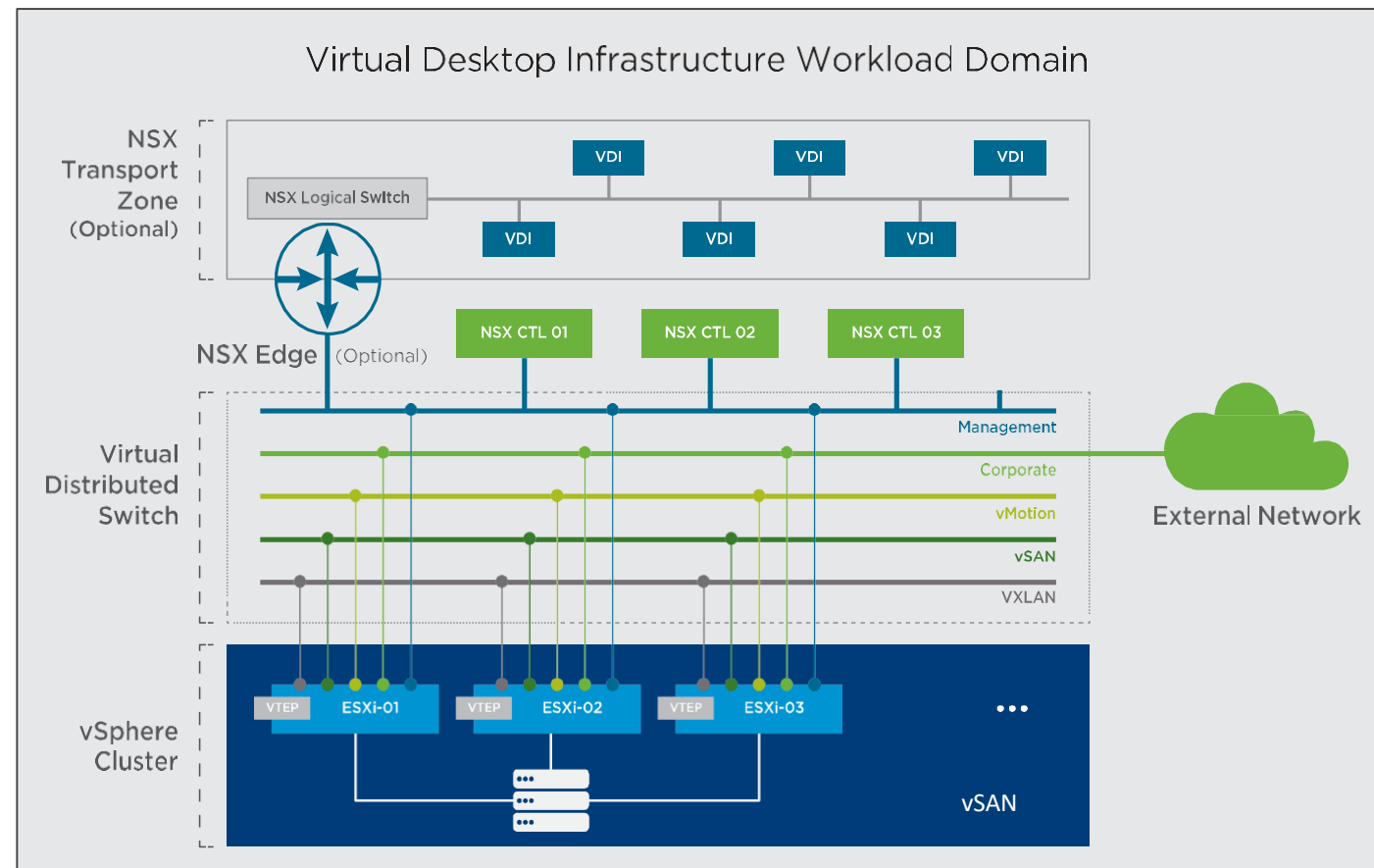
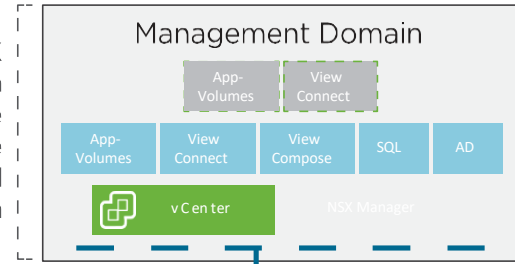


Virtual Desktop Infrastructure Workload Domain

VMware Cloud Foundation Architecture Deep Dive

- All VI Workload Domain Components
- Plus VMware Horizon:
 - Horizon Composer
 - Redundant Horizon Connection Servers
 - Redundant Horizon Security Servers
 - Optional components:
 - Active Directory Server
 - AppVolumes

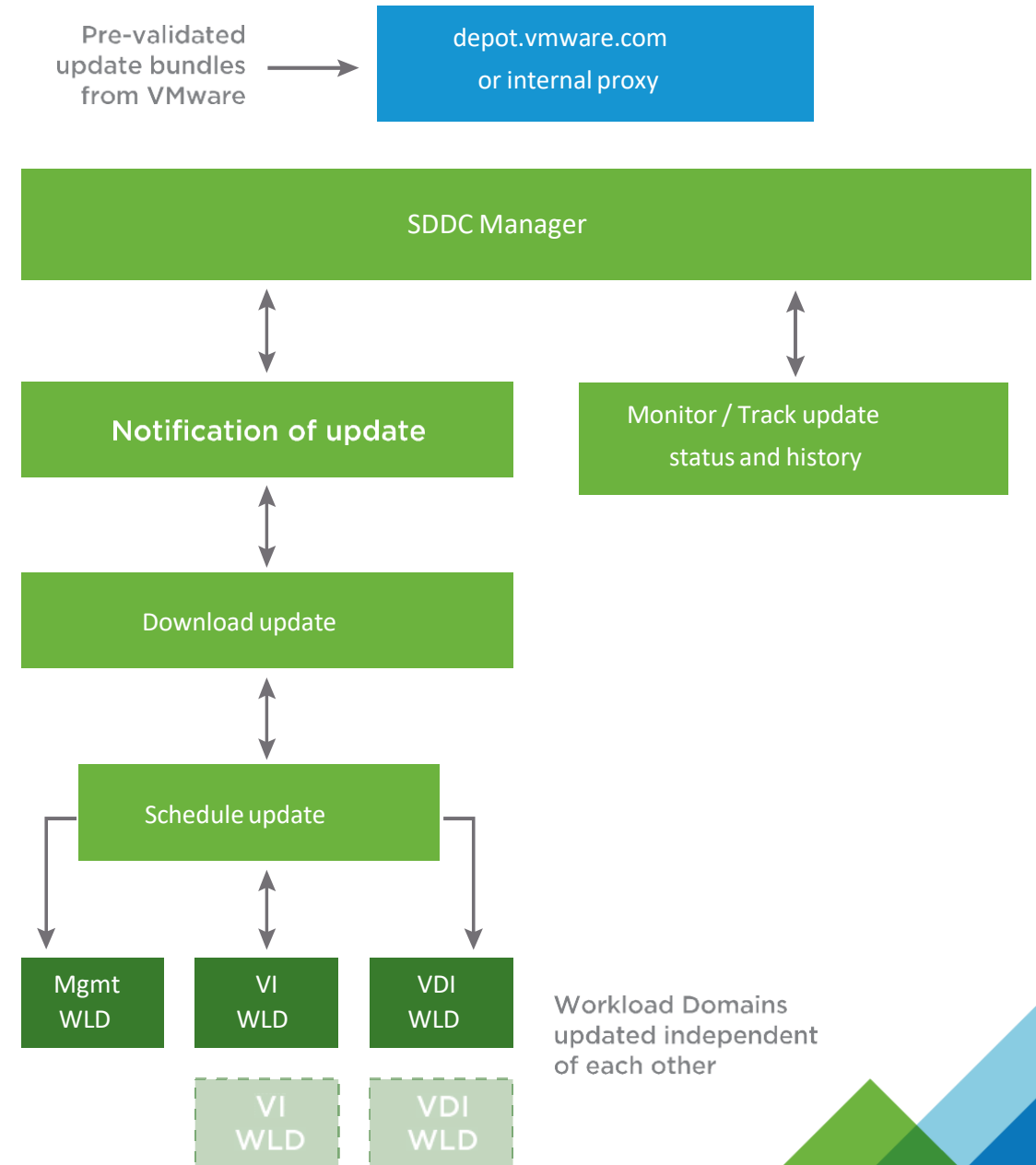
vCenter Server, NSX Manager, and Horizon View infrastructure components run in the management workload domain



Automated Patch and Upgrade

VMware Cloud Foundation Architecture Deep Dive

- Components: vSphere, vSAN, NSX and SDDC Manager
- Product updates first validated by VMware and distributed as update bundles
- Updates automatically picked-up by SDDC Manager
- Upon notification of available update:
 - Download
 - Review
 - Schedule
- Workload Domains updated independently



Deployment Considerations

Deployment Types

What's New VMware Cloud Foundation 2.2

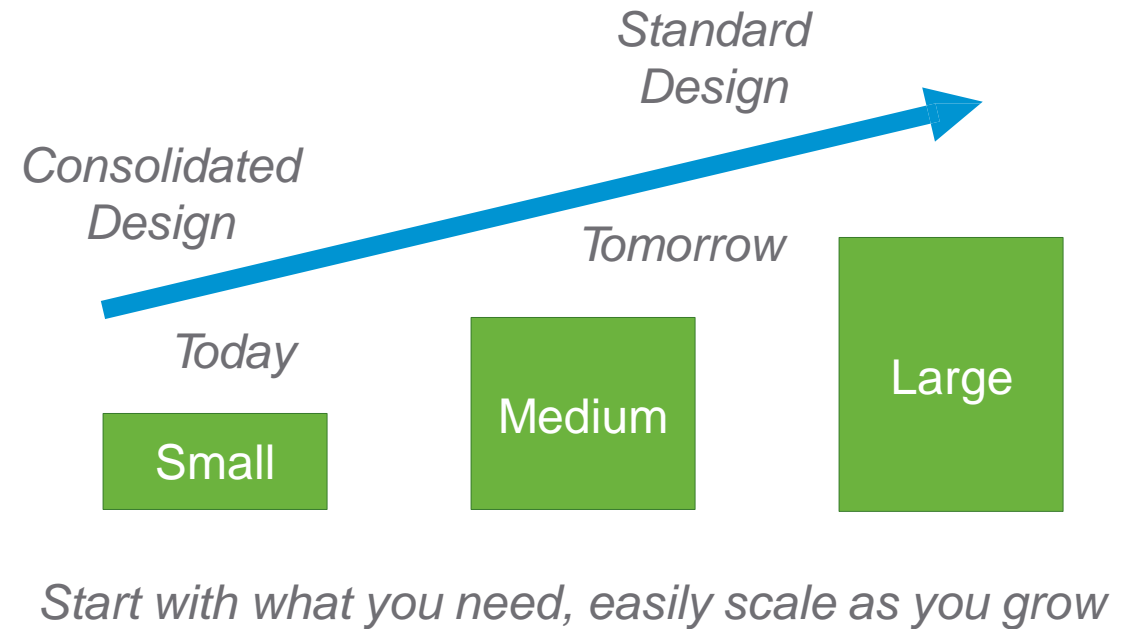
- **VCF Consolidated Architecture**

- Compute workloads co-reside in management workload domain
- Shared vSphere cluster with resource pools

- **VCF Standard Architecture**

- Management workload domain dedicated to infrastructure
- Compute workloads run on separate vSphere clusters

- **Easy to start with consolidated architecture and evolve to standard architecture**

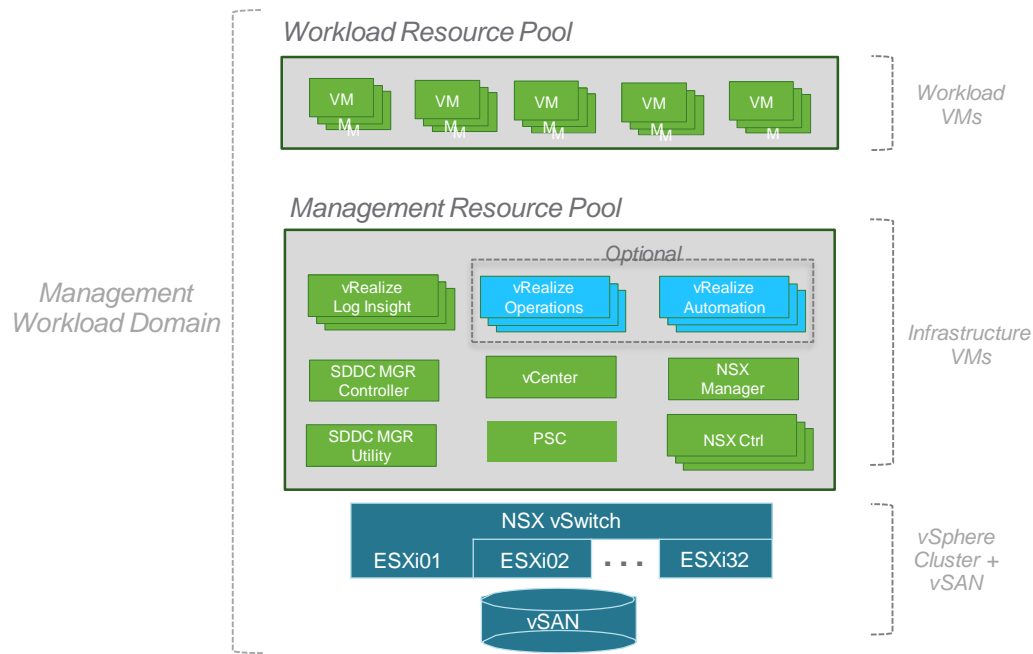


Consolidated Architecture

VMware Cloud Foundation Architecture Deep Dive

Consolidated Architecture

Infrastructure and Workload VMs run together on the Management Workload Domain inside separate resource pools.



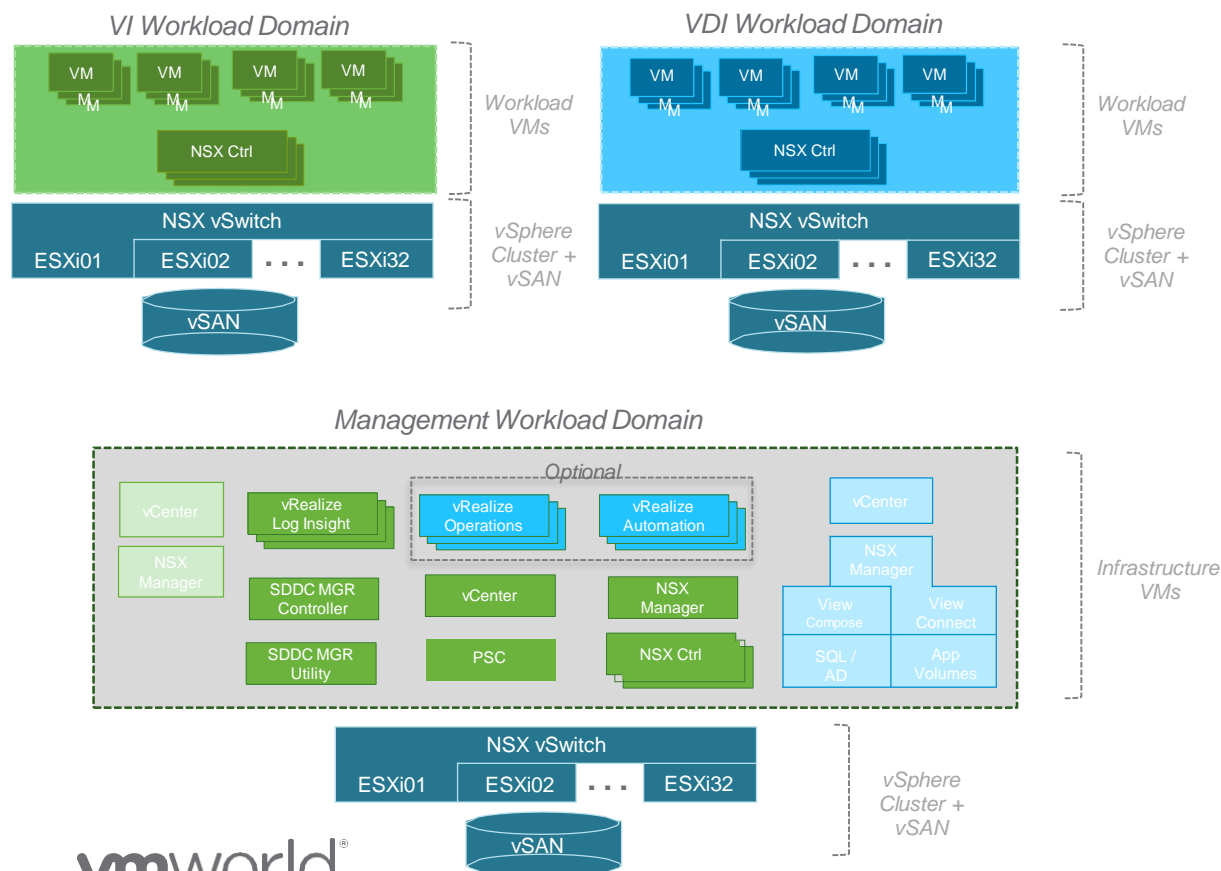
- Targets small deployments
 - Minimum of 4 nodes, maximum of 32-nodes
- Infrastructure and workload VMs run together on management workload domain
- Resource Pools to segregate and isolate workload types
- Evolve to standard deployment in two easy steps
 - Create VI workload domain
 - vMotion VMs out of management workload domain
 - Non-disruptive

Standard Architecture

VMware Cloud Foundation Architecture Deep Dive

Standard Architecture

Infrastructure runs on a dedicated Management Workload Domain. Workload VMs run in dedicated VI and/or VDI workload domains.



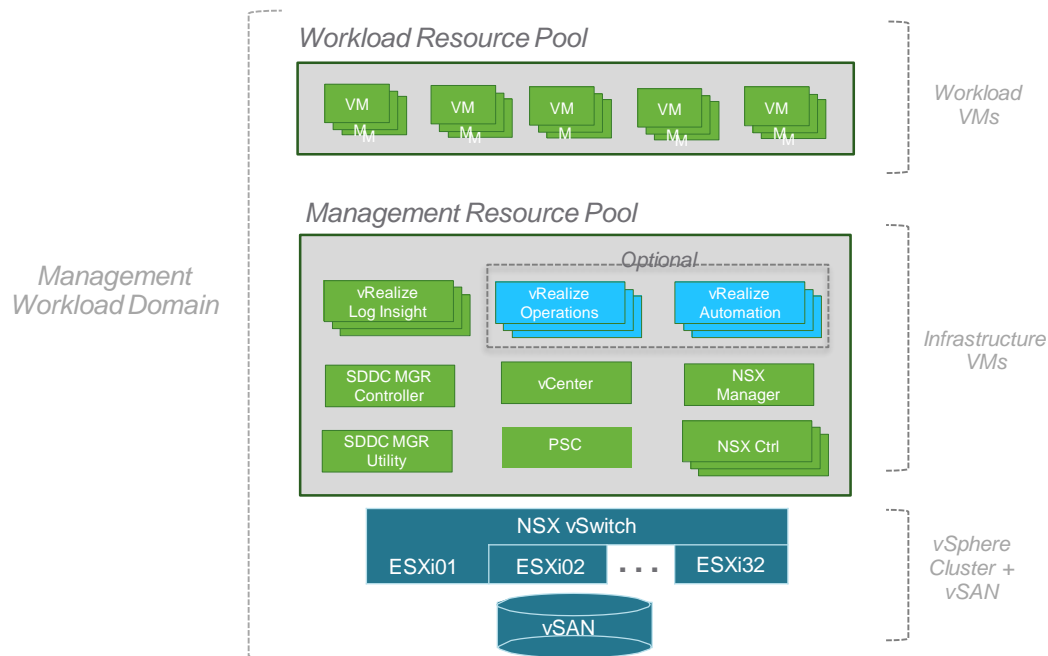
- Targets medium to large deployments
 - Minimum of 8-nodes, max of 256-nodes
- Management workload domain dedicated to infrastructure
- Dedicated vSphere clusters for VI and/or VDI workload domains
- Up to 10 workload domains
 - vCenter Server instances run in linked-mode

Summary of Deployment Architectures

VMware Cloud Foundation Architecture Deep Dive

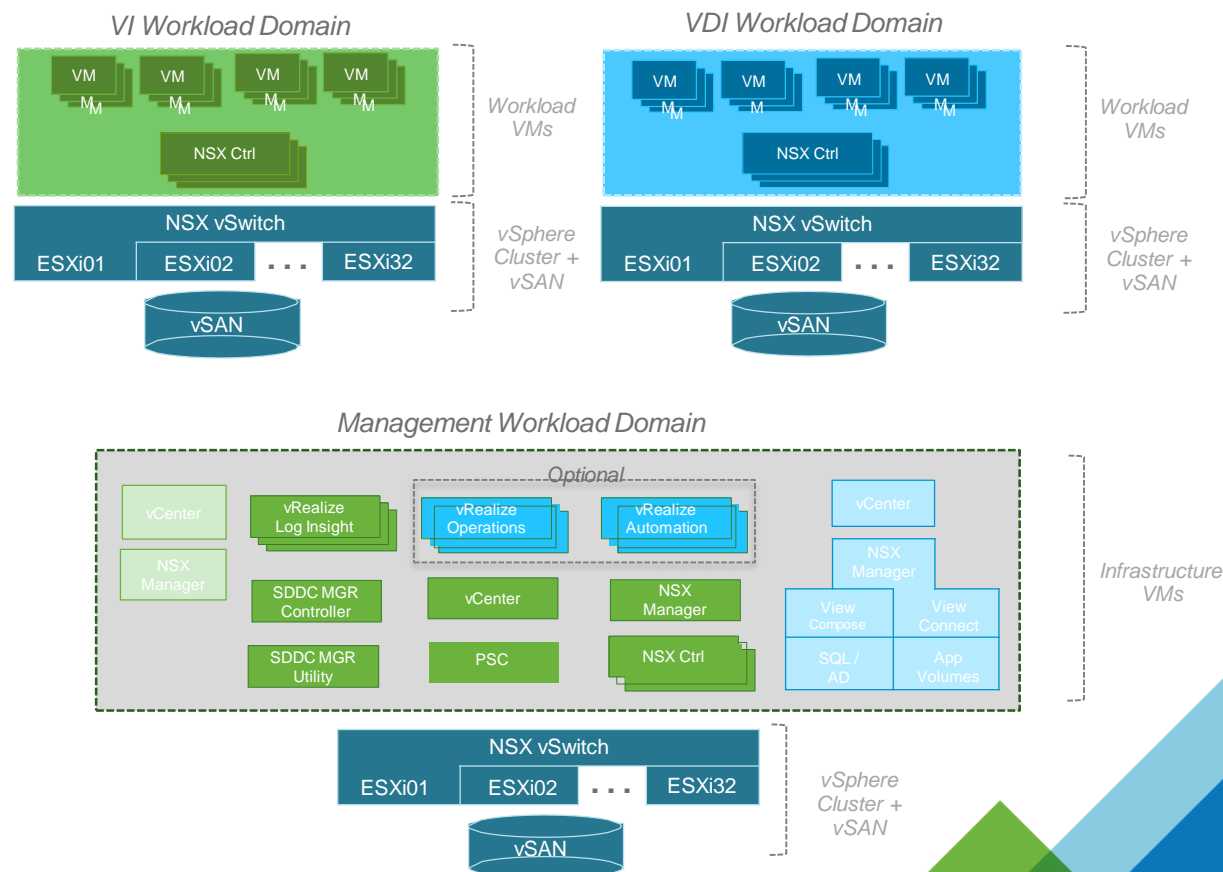
Consolidated Architecture

Infrastructure and Workload VMs run together on the Management Workload Domain inside separate resource pools.



Standard Architecture

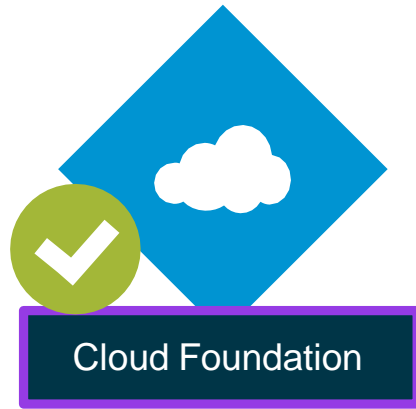
Infrastructure runs on a dedicated Management Workload Domain. Workload VMs run in dedicated VI and/or VDI workload domains.



Deploying Cloud Foundation

Implementing a Private Cloud

VMware Cloud Foundation



Makes private
cloud easy

Private cloud in three easy steps:

Step 1: Deploy imaging appliance (VIA)

Step 2: Image Hardware

Step 3: “Bring Up”

Step 1: Deploy VIA (done by OEM Partner or Customer)

VIA Imaging Appliance

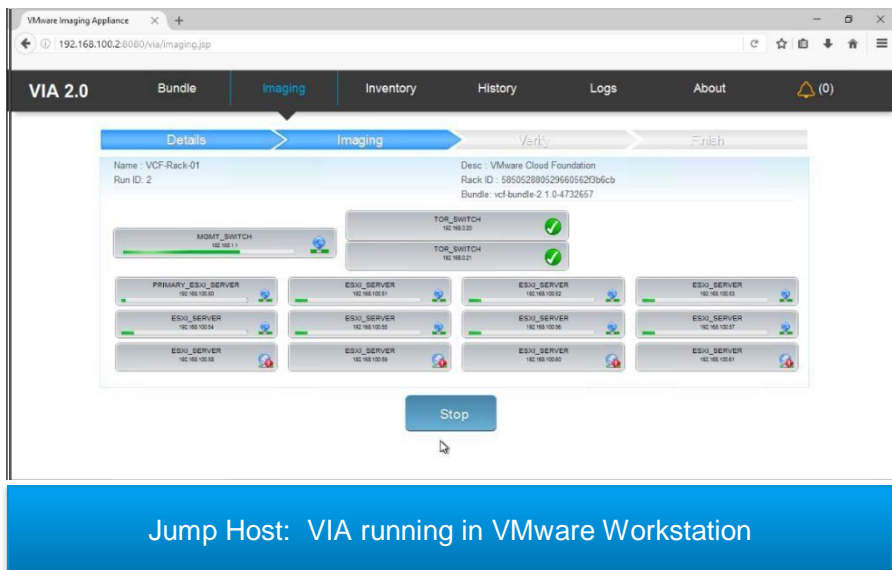


VIA Deployment Demo

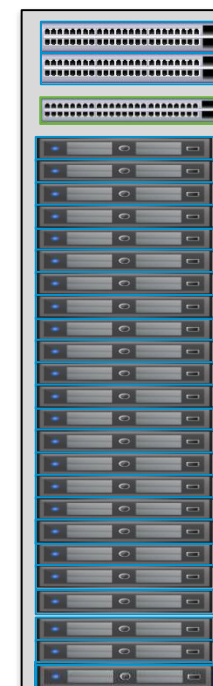
<https://youtu.be/1C3qalpW9ac?list=PL9MeVsU0uG64tNuFHhX-Iq82gn0fEnQ-A>

Step 2: Imaging Hardware (done by OEM Partner or Customer)

Imaging the Physical Rack



- 1 Environment Inputs & Build Inventory
- 2 Configure Switches (VLANs, Subnets, Ports)
- 3 Configure Hosts (deploy ESXi)
- 4 Stage SDDC Software Bundle
- 5 Deploy SDDC Manager and related components



Physical Rack

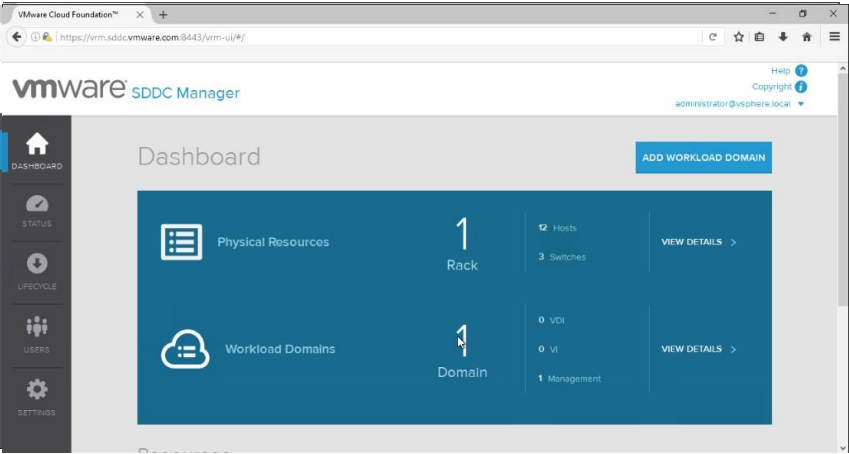


Node 0

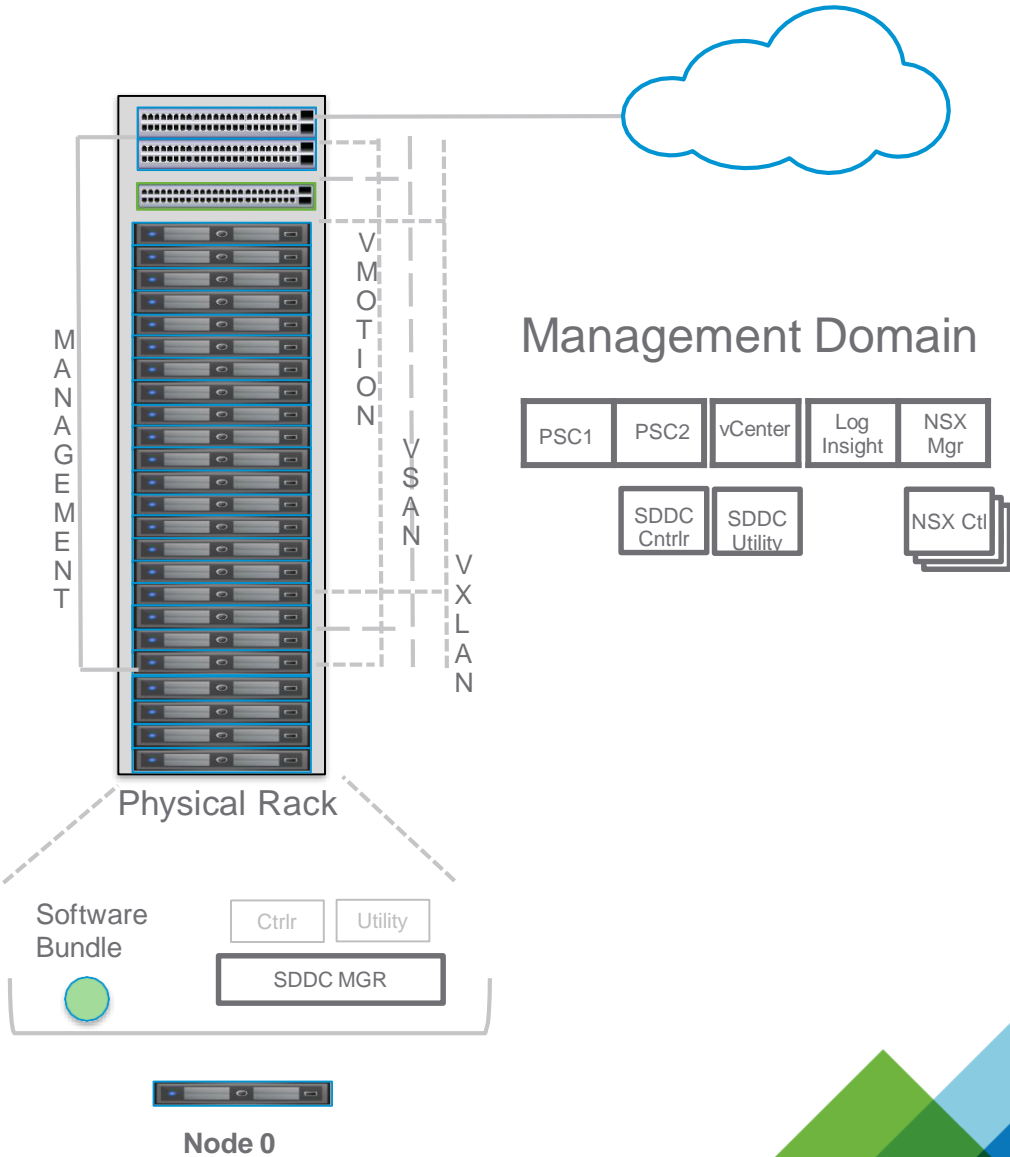
SDDC Manager Demo

<https://www.youtube.com/watch?v=XAMq5KVrHRU>

Step 3: Bring-Up



- 1 Initial Rack Setup / Config (Time Sync, POSV)
- 2 Internal Network Configuration (Hosts, ToRs, Mgmt, vSAN, VXLAN)
- 3 Uplink Network Configuration (ToRs to Data Center)
- 4 Create Management Domain (Deploy SDDC Platform)
- 5 SDDC Ready



VCF Bring-Up Demo

<https://www.youtube.com/watch?v=Vo3dtOvQOhs>



OMEGAFI

"I love it - SDDC Manager makes your life so much easier!"

George Elliston,
Network Administrator

Platform Config

Dell PowerEdge R630
All-Flash

1 site, 1 Rack, 119 VMs

Scales and Grows with M&A Activity with Next-Gen Automated Cloud Platform

IT / Business Objectives

- Efficiently integrate IT environments of acquired companies
- Minimize complexity for "one man" IT staff
- Direct cost-to-scale that aligns with continuous M&A activity

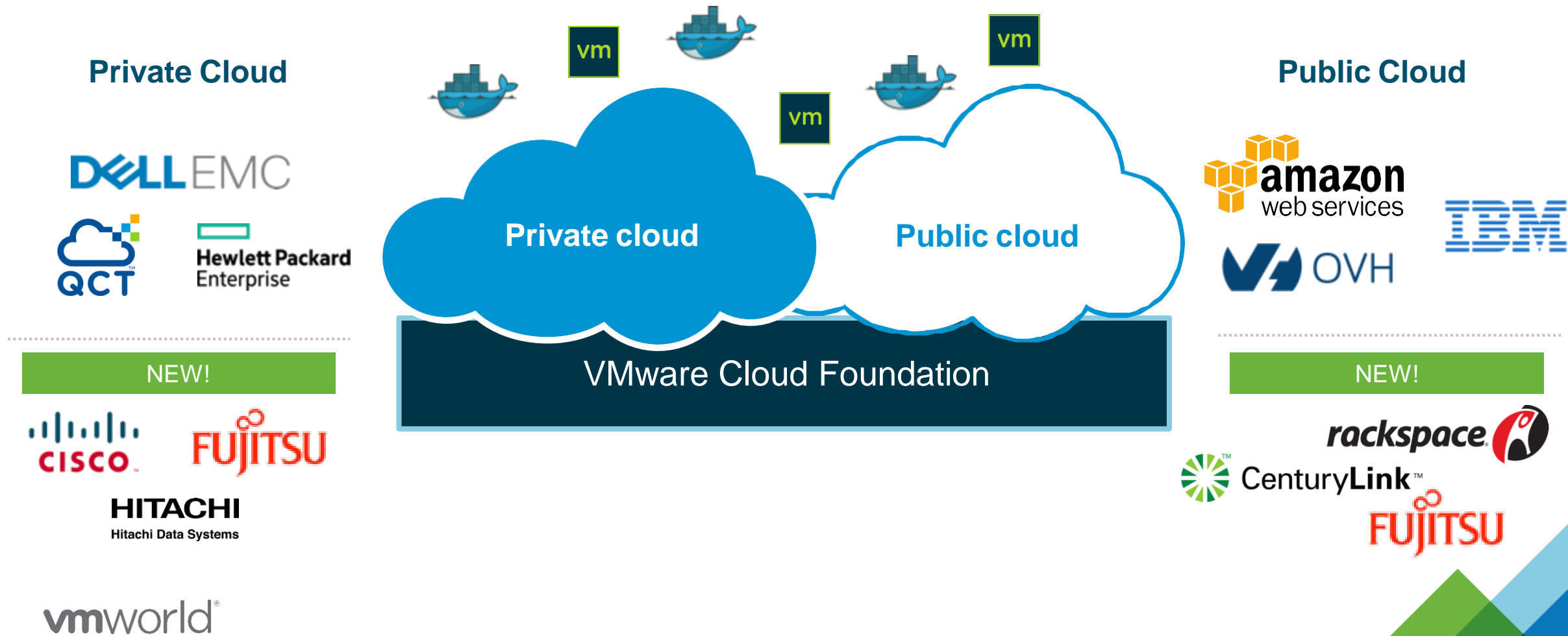
Key Use Cases

- Business-critical apps: payment processing, Exchange, SQL, virtual desktops
- Soft multi-tenancy for acquired companies via workload domains
- Security and compliance through micro-segmentation

Benefits

- **Ability to scale to complete SDDC with just one network admin**
- **Faster time to market – three days to deploy the entire stack**
- **2.5x higher productivity during lifecycle management**
- **40% lower TCO compared to legacy three-tier environment**

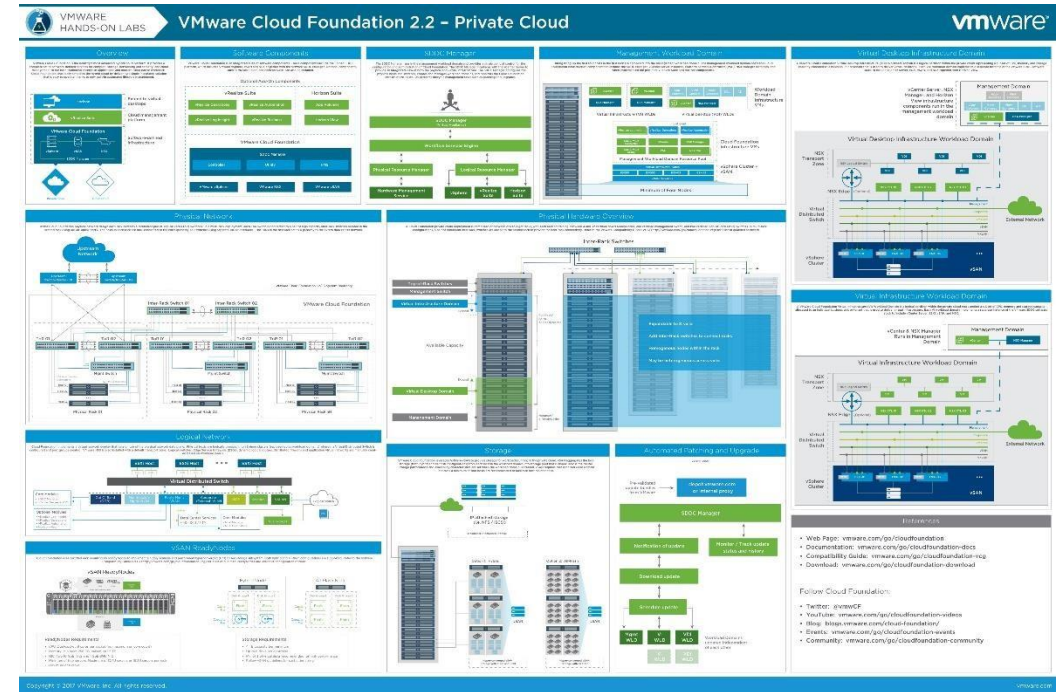
Broad ecosystem of compatible solutions



Resources

VMware Cloud Foundation Architecture Deep Dive

Resource	URL
Product Page	vmware.com/go/cloudfoundation
Documentation	vmware.com/go/cloudfoundation-docs
Poster	vmware.com/go/cloudfoundation-poster
Blog	blogs.vmware.com/cloud-foundation
Community	vmware.com/go/cloudfoundation-community
FAQ	vmware.com/go/cloudfoundation-faq
Twitter	@VMWvCF



Na próxima aula...

Continuaremos abordando os benefícios da virtualização.

* Nesta apresentação, foram utilizadas algumas imagens oriundas de apresentações da VMworld conference