Dell EMC NFV Ready Bundle for VMware

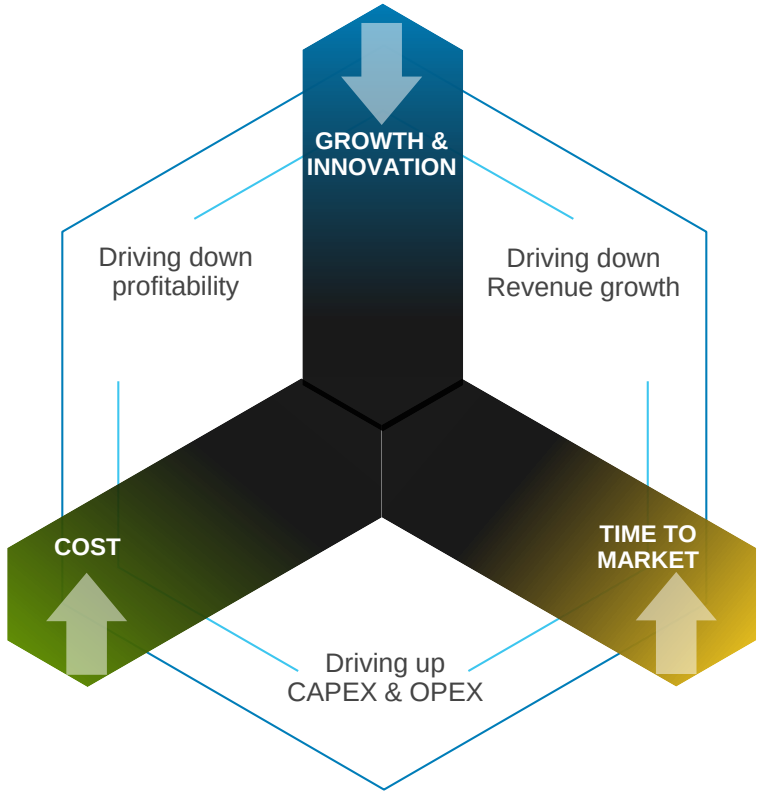
Overview Presentation

September 2017

DELL EMC

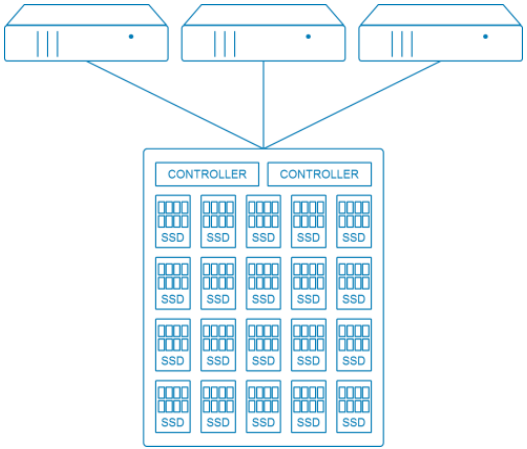
Business challenges for service providers

- **Growing CAPEX and OPEX for existing network infrastructure**
- **Long time to market for new or updated services delays time to revenue**
- **Price and margin erosion in existing businesses models**
- **Slowing growth & innovation to capture new revenue opportunities**

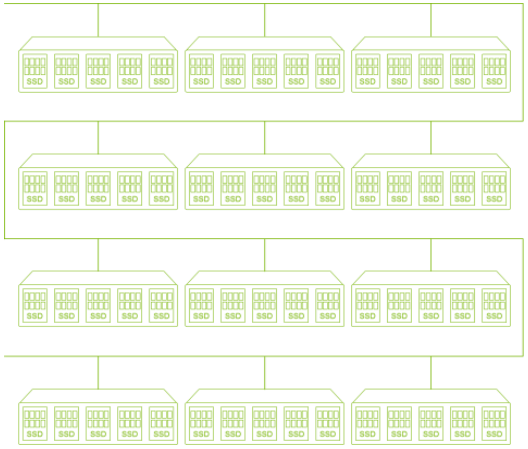


Need for Modern Service Provider Infrastructure

Traditional Data Center Workloads



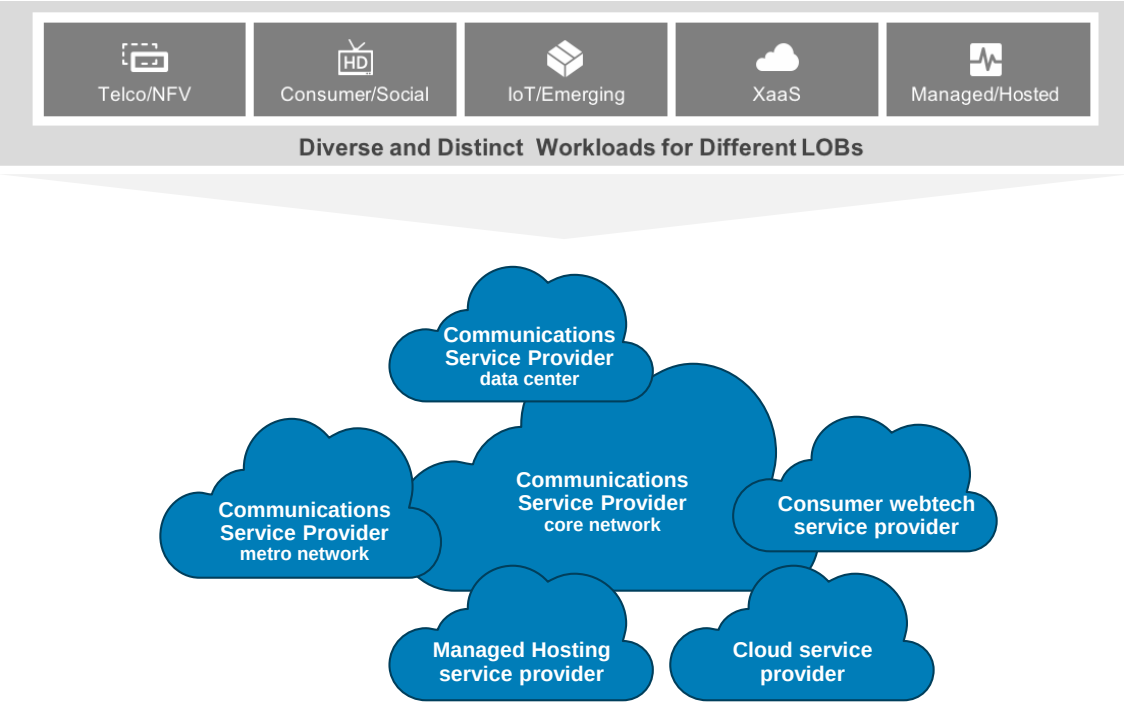
Cloud-Native Workloads



Modern Cloud Infrastructure

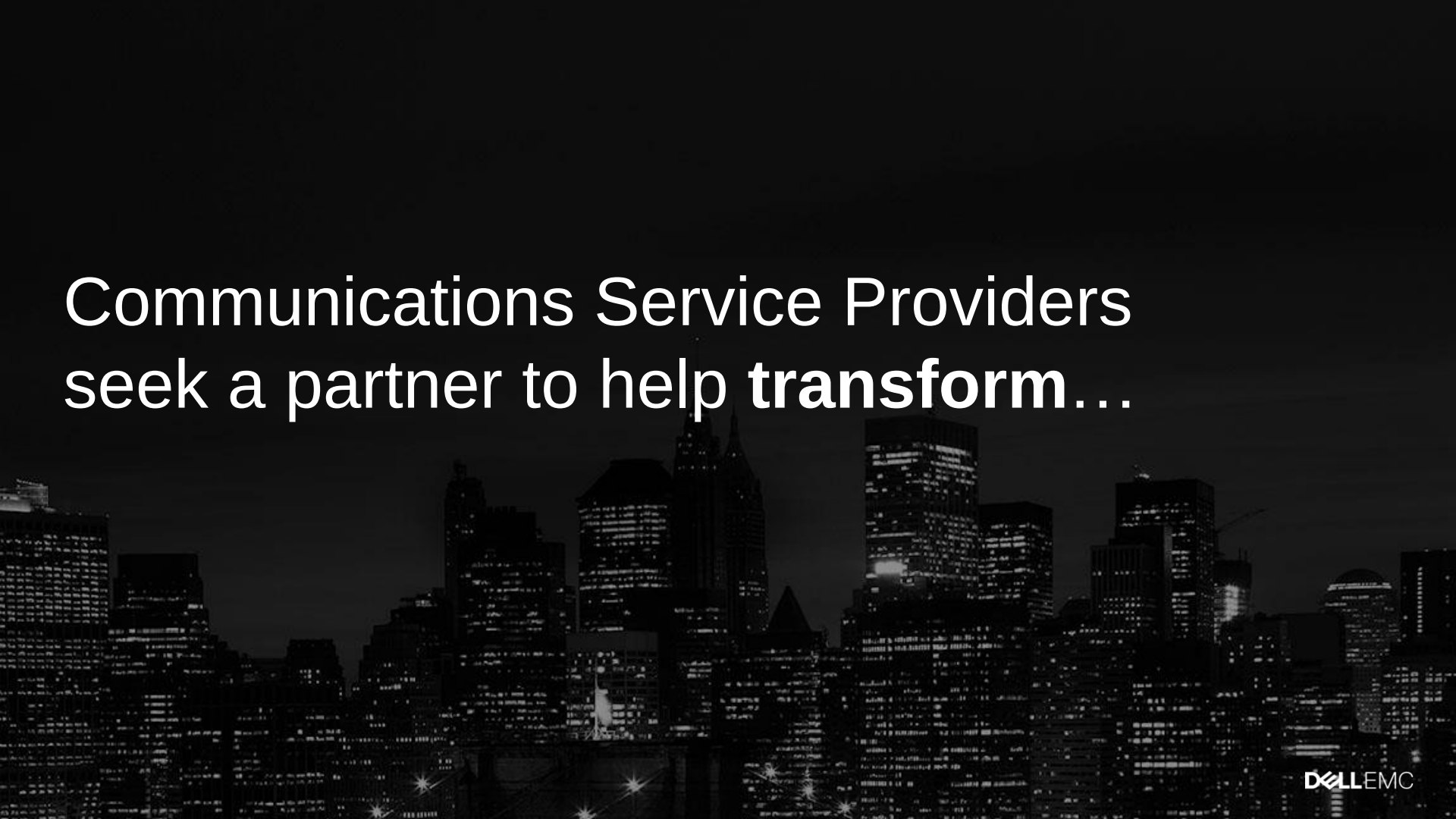
- Compute-centric
- Modular open architecture
- Support both client-server scale-up apps and distributed scale-out apps
- Infrastructure and application resiliency
- Enable both traditional IT operations and DevOps

Profile of the Modern Service Provider



The Modern Service Provider

- Network Functions Virtualization
- Cloud-Native Infrastructure
- Containerization
- Multi-Cloud Management
- Hybrid Cloud Management
- DevOps Management
- Modern Workspace Infrastructure

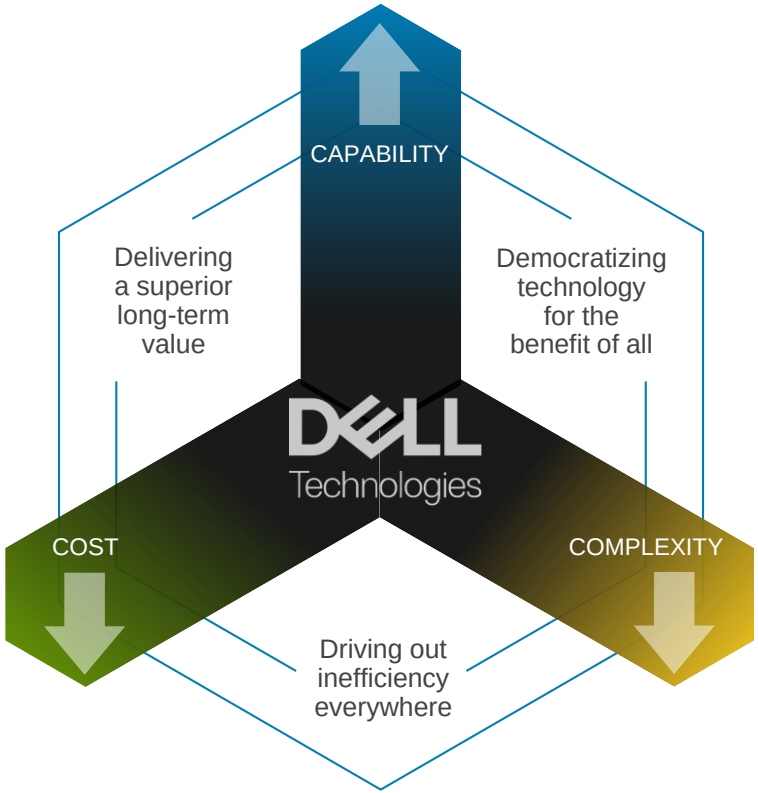

Communications Service Providers
seek a partner to help **transform**…
DELL EMC

Dell Technologies is that partner

Technology powerhouse combining **industry-leading digital transformation capabilities** and **global expertise**

Solutions designed to work for your business

Delivering cutting-edge innovation to service provider customers globally



Our design philosophy

Open Architectures

Maximum choice, flexibility and investment protection, without forklift upgrades

Modern Portfolio

Modern systems and technologies no vested interest in legacy systems

Modular Systems

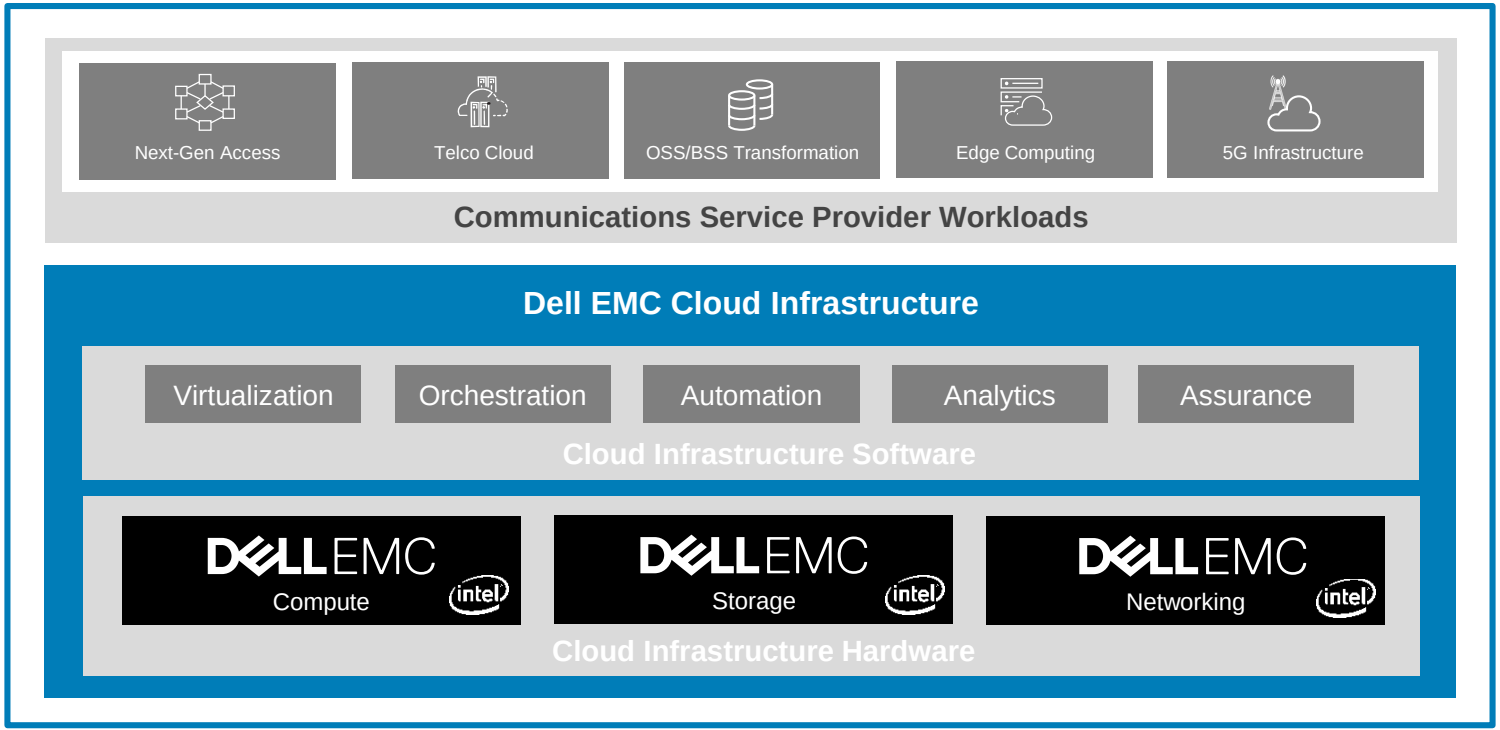
Open building blocks enabling mix-and-match interoperability up and down the stack

Scalable Solutions

Systems tailored to your workloads and designed to grow with your business

Service Provider Cloud Infrastructure and Use Cases

Dell EMC Cloud Infrastructure for Communications Service Providers



Compute-Centric | Software-Defined | Future-Ready

Dell EMC Priorities For Telecommunications Use Cases

Solutions			Advanced Architecture	
 Next Generation Access	 Telco Cloud	 OSS Transformation	 Network Edge	 5G Networks
SD-WAN, vCPE/uCPE	NFV, SDN	SAS, Big Data, Real-Time Visibility	CORD, MEC, MDC	C-RAN, CUPS, Network Slicing

Dell EMC Ecosystem for Telecommunications Use Cases

Solutions and Ecosystem

Advanced Architecture

Next Generation Access

Telco Cloud

OSS Transformation

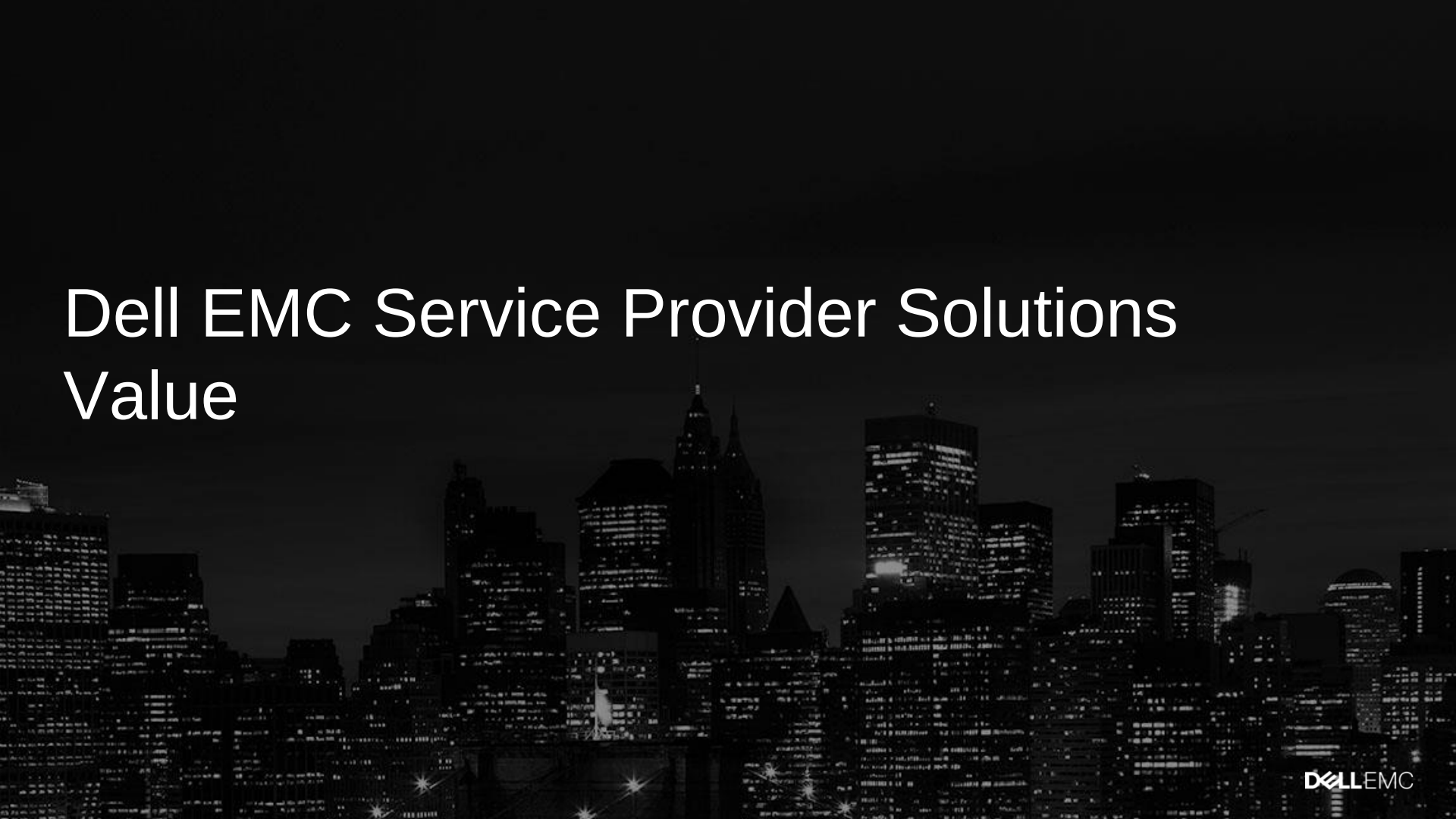
Network Edge

5G Networks

SD-WAN, vCPE/uCPE	NFV, SDN	SAS, Big Data, Real-Time Visibility	CORD, MEC, MDC	C-RAN, CUPS, Network Slicing
silver peak, velocloud, VERSA NETWORKS	affirmed, big switch networks, casa systems, CISCO, NOKIA, metaswitch, ERICSSON, MAVENIR	cloudera, HORTONWORKS, Pivotal, ZALONI THE DATA LAKE COMPANY	Saguna, intel, NDA	intel, NDA

vmware, redhat, ubuntu CANONICAL, OPNFV, WIND

Dell EMC Service Provider Solutions Value

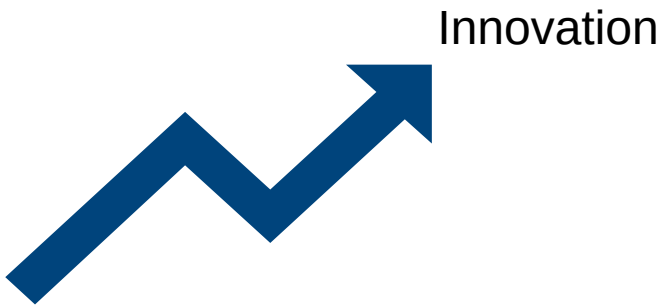


Promise of virtualized architecture

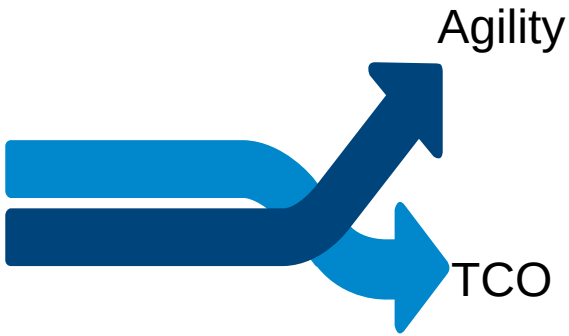
Software based functions running on COTS – no vendor lock

Automation, orchestration & analytics

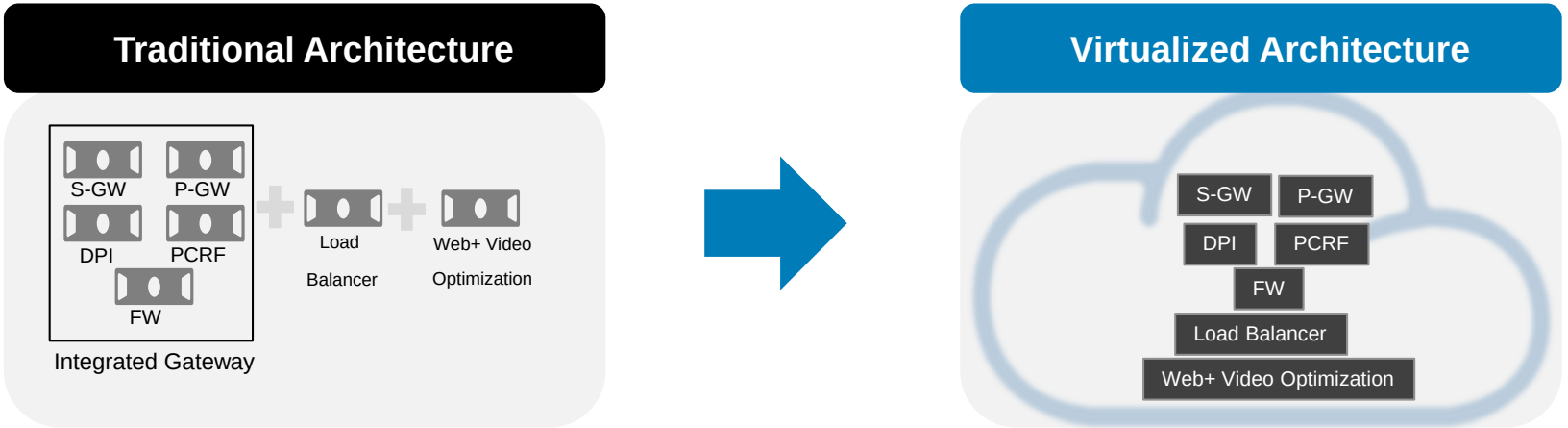
Software Defined Data Center & Network, Network Function Virtualization



Cloud, Microservices, Decomposable architecture



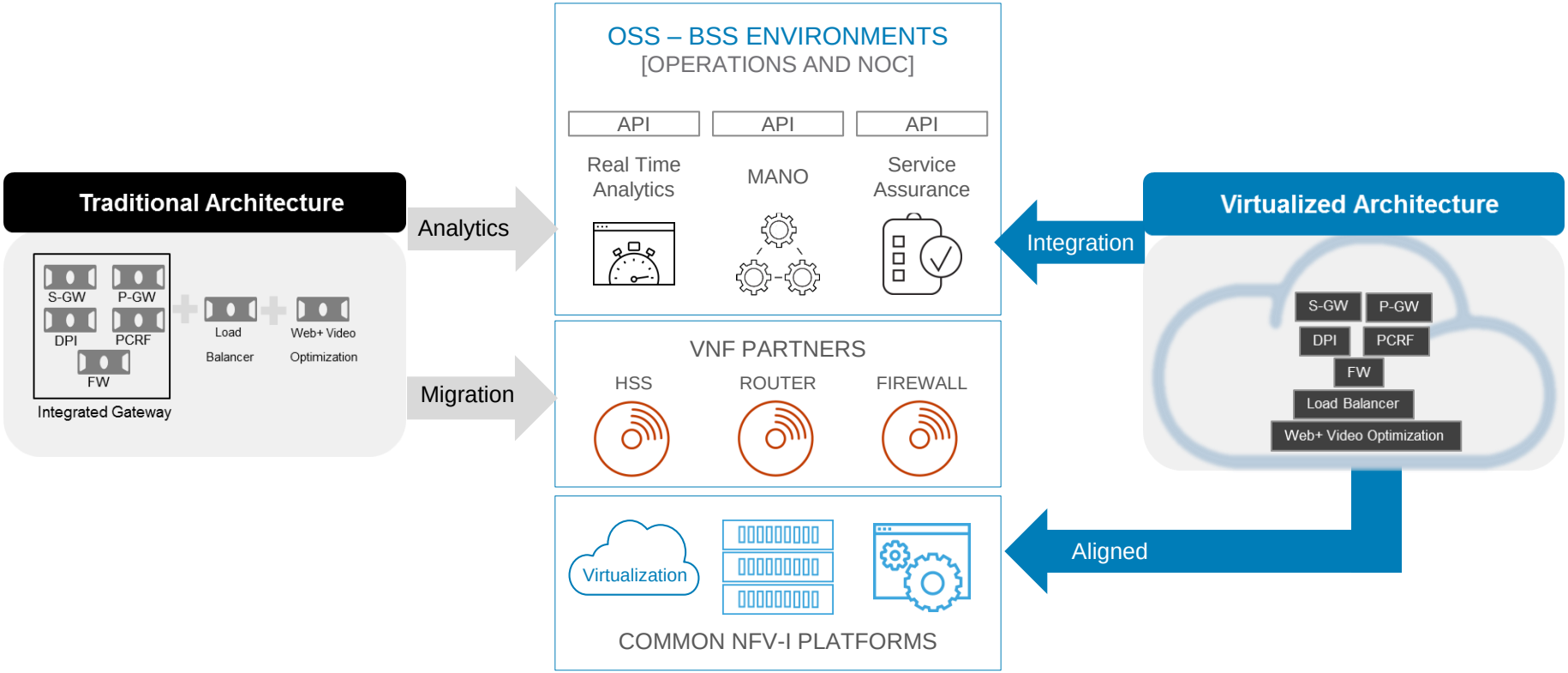
Industry response – paradigm shift



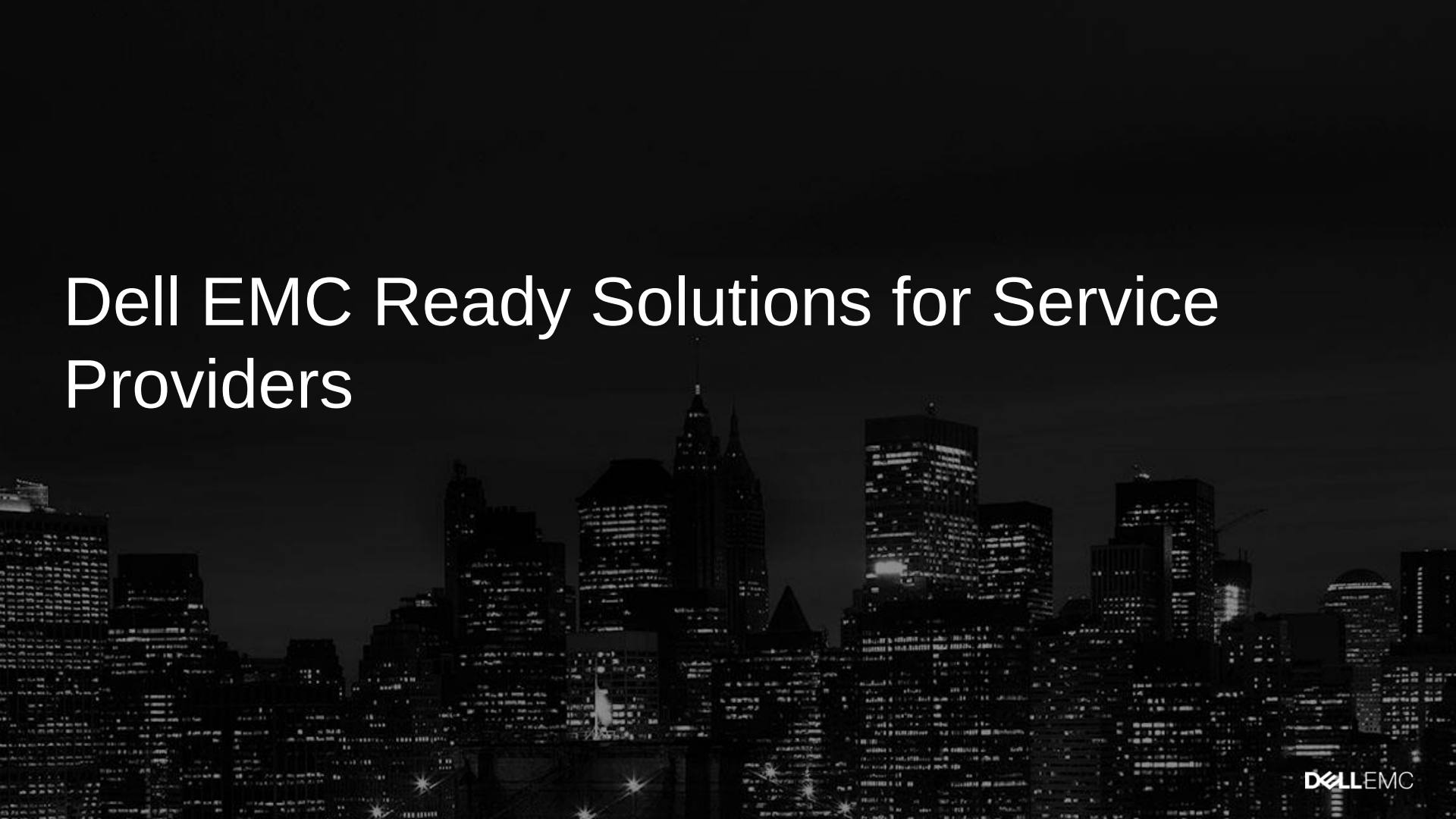
- Proprietary architecture & hardware
- Rigid scalability, over-provisioned
- Dedicated resources, geo dependency
- Restricted redundancy
- Multiple management planes

- Open architecture & COTS hardware
- Dynamic scalability, scale-up & scale-out
- Pooled resources, geo independence
- N-Way redundancy & Always-On availability
- Service chaining & orchestration

Overnight transformation is not realistic



Dell EMC Ready Solutions for Service Providers



Introducing
Ready Solutions for Service Providers

CSP/Telco Ready Solutions

- Telco Cloud
- Next-gen Access
- OSS/BSS Transformation
- Edge Computing
- 5G Infrastructure

xSP Ready Solutions

- Network Services
- Storage/Data Protection/Big Data
- Cloud Services
- Enterprise Services
- Security Services

READY Nodes

Not just a bare server

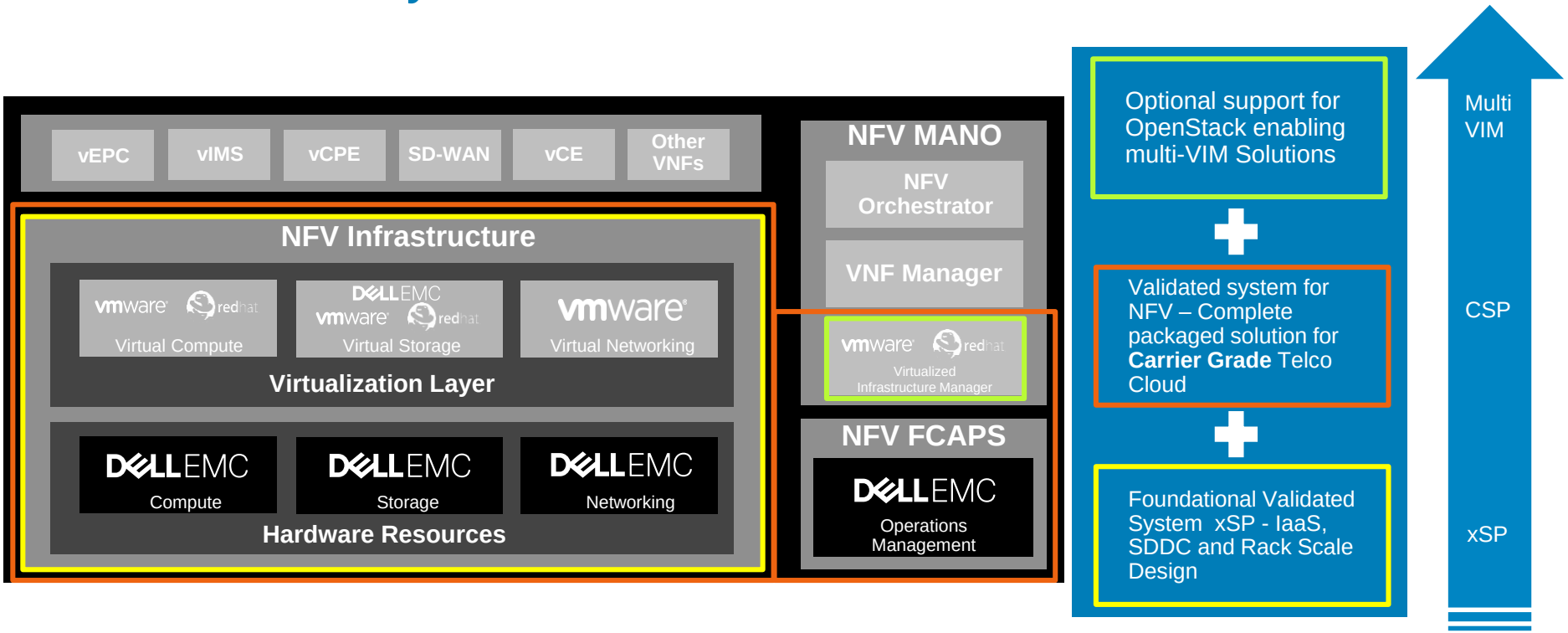
- Hardware & software integrated on single node
- Tested & validated
- Deployment guides
- Sizing guides
- Factory or merge center configuration
- Accelerated quoting

READY Bundles

Not just a bundle

- Hardware & software integrated across multiple nodes
- Tested & validated
- Deployment guides
- Sizing guides
- Deployment services
- Accelerated quoting
- Additional value adds (ie Benchmarking)

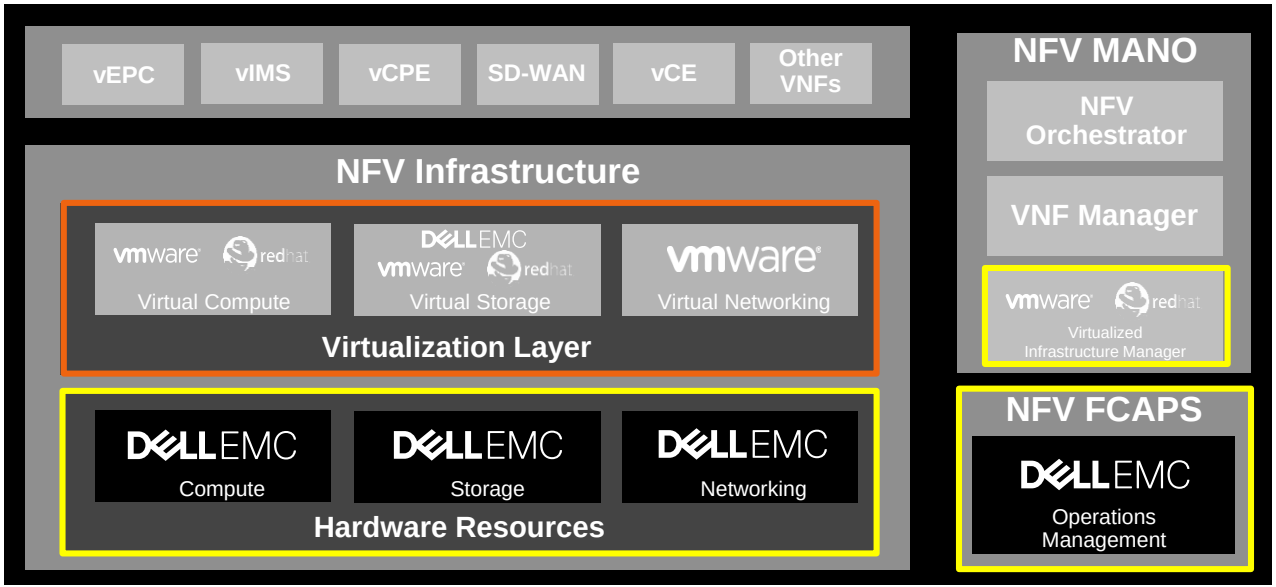
Dell EMC Ready Solutions for Service Providers Overview



Pre-validated system to facilitate adoption & reducing time to service

Ready Solutions for NFV

From palette to production with ease



- Solution guide with VNF
- On-boarding recipes
- Functionality & benchmarking test report

+

- Integration with VIM, FCAPs, visibility & telemetry tools

+

- Virtual compute – VMware vSphere, KVM
- Virtual storage – VMware vSAN/ScaleIO/Ceph
- External storage
- Virtual networking – VMware NSX, Big Switch Networks

+

- Customized infrastructure for optimal workflow performance (Dell EMC + VMware/Red Hat)

Prescriptive but not restrictive, customizable to meet the needs of any workload

Ready Solutions for NFV

From palette to production with ease

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+

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Adaptive Workflows
- VNF onboarding & PLC guide
- Workflow optimization & tuning guidelines
- Test & benchmark testing (under NDA)

Seamless Operations
- Day 2 operations guide
- Expansion guide

Easy Button for Deployment
- Mapped to VMware/Red Hat NFV solution
- Virtual infrastructure setup
- Deployment guide
- Recipes & scripts for ease of deployment

Hardware Guide
- BOM mapped to solution
- Physical infrastructure setup
- Easy to order sales ordering ID

Dell EMC
Ready Solutions for Service Providers
Value

VNF Ecosystem

vmware

redhat

DELL EMC

intel

Reduced upfront investment & increased agility enabling faster time to production

Dell EMC NFV Ready Bundle for VMware Overview

Dell EMC NFV Ready Bundle for VMware Overview

Turnkey solution optimized to simplify and accelerate production deployments for CSPs

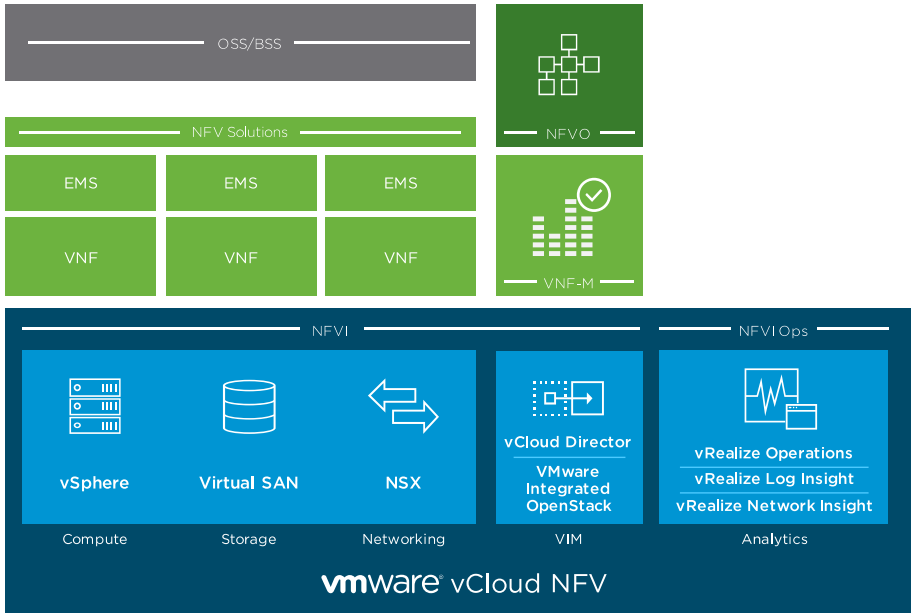
Pre-validated with Dell EMC cloud infrastructure hardware and VMware vCloud NFV Platform software, the Dell EMC NFV Ready Bundle for VMware reduces the time it takes to procure, validate, and integrate components.

The Dell EMC NFV Ready Bundle for VMware key values:

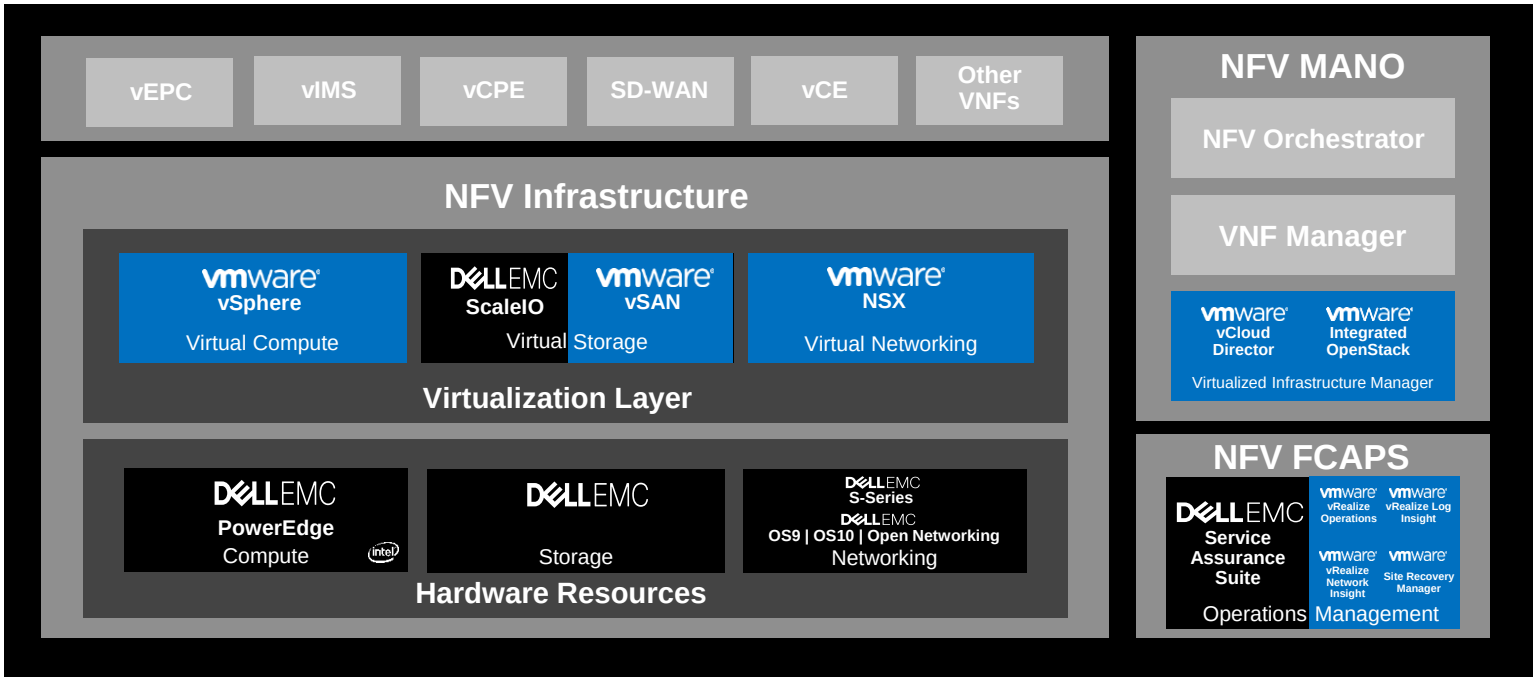
- Fully integrated and validated
- Enables CSPs to immediately launch their own services
- Carrier-grade to meet SLA requirements
- Prescriptive yet customizable to meet workload needs of CSPs
- Complete solution orderable from Dell EMC
- Full end-to-end support from Dell EMC

Dell EMC NFV Ready Bundle for VMware Components

- VMware vCloud NFV Platform
  - vSphere virtualization platform
  - vSAN (optionally Dell EMC ScaleIO)
  - NSX
  - vCloud Director and VMware Integrated OpenStack for Virtualized Infrastructure Manager (VIM)
  - vRealize Suite for operations management
- Dell EMC infrastructure
  - Dell EMC Networking
    - 2 x S6010-ON
    - 1 x S4048T-ON
  - PowerEdge Rack Servers
    - 8 or 12 x R630/R730



Dell EMC NFV Ready Bundle for VMware Shown in ETSI diagram



A proven, optimized NFV infrastructure solution for CSPs to deploy rapidly

Dell EMC NFV Ready Bundle for VMware Advantages

Ready-to-use solution

- Fully validated and tested by Dell EMC
- Decreases your deployment risk
- Enables faster deployment time

Ease of ordering

- Full bundle orderable from Dell EMC
- No need to buy software separately
- Eliminates hassle of ordering from two different vendors

Long lifecycle support

- Long-life Intel® Xeon® processors
- Reduces your investment risk
- Protects your investment for the long-haul

Seamless customer experience

- Single point of contact for entire solution – Dell EMC
- Support for full length of deployment
- Provides peace of mind

World-class professional services

- Dell EMC professional services included
- Consulting, deployment, and design support
- Guides your deployment needs

Customizable solution

- Prescriptive solution yet not restrictive
- Customize to address your unique VNF workload requirements

Delivers exceptional scalability and agility in an integrated, optimized, and cost-effective package

Value of Dell EMC Service Provider Solutions

Software based functions running on COTS – no vendor lock

Open, standards based, carrier grade, modular infrastructure – prescriptive to NFV workloads

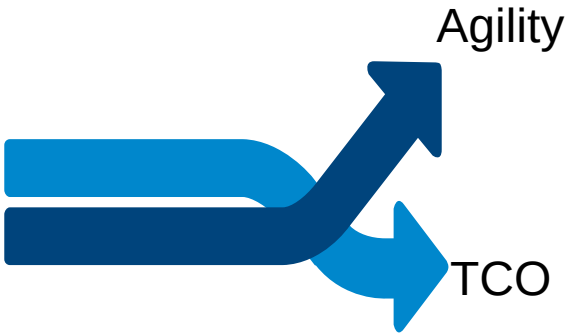
Automation, orchestration & analytics

Multi-VIM orchestration with 360 visibility from applications to infrastructure & everything in-between

Software Defined Data Center & Network, Network Function Virtualization

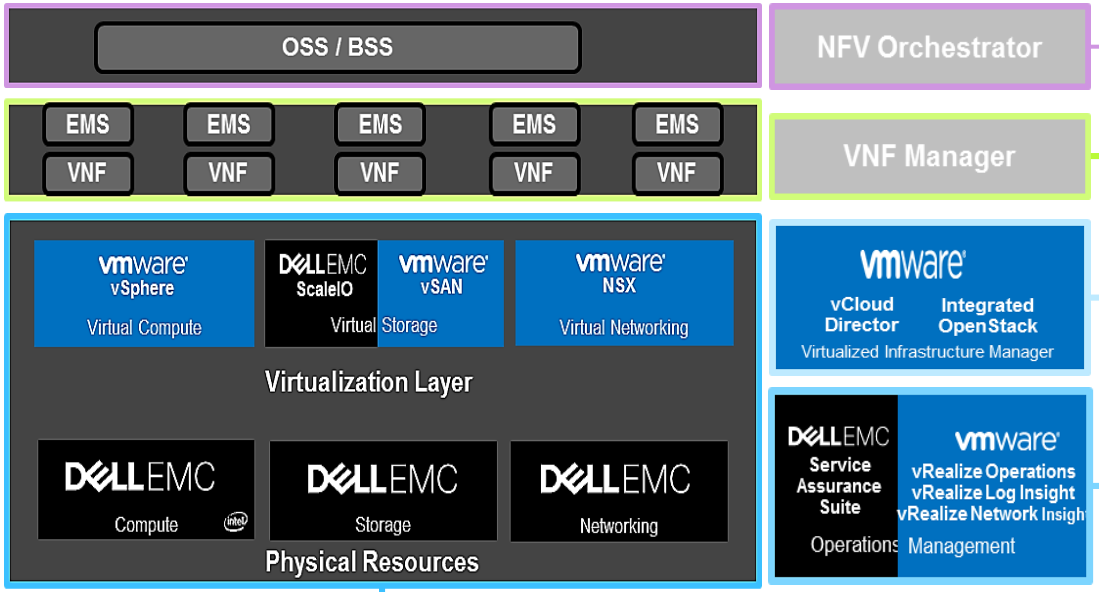
SDDC with NFV optimizations customized to Telco workloads with complete solution support reducing Time to Service

Cloud, Microservices, Decomposable architecture



Dell EMC NFV Ready Bundle for VMware - Technical Details

Key technical highlights



NFV Orchestrator

VNF Manager

vmware vCloud Director Integrated OpenStack
Virtualized Infrastructure Manager

DELL EMC Service Assurance Suite
vmware vRealize Operations vRealize Log Insight vRealize Network Insight
Operations Management

Partner driven total NFV solution orchestration

Open ecosystem with joint VNF onboarding, testing & benchmarking

Key use cases: Mobility (vEPC, vIMS, VoLTE), vCPE, SD-WAN

Increased choices with multi-VIM support (VMware & OpenStack) – Open platform & open API's

Integrated management & operations from infrastructure to application with complete visibility, fault isolation & recovery

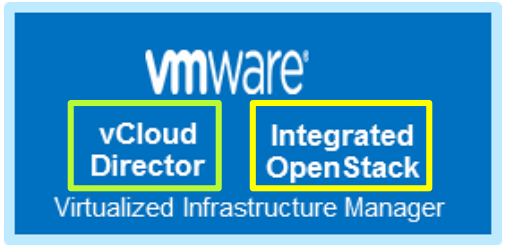
Pre-validated Dell EMC + VMware vCloud NFV Platform solution

Certified, tested, optimized & customizable for carrier deployments

Multiple VIM options

vCloud Director for SP

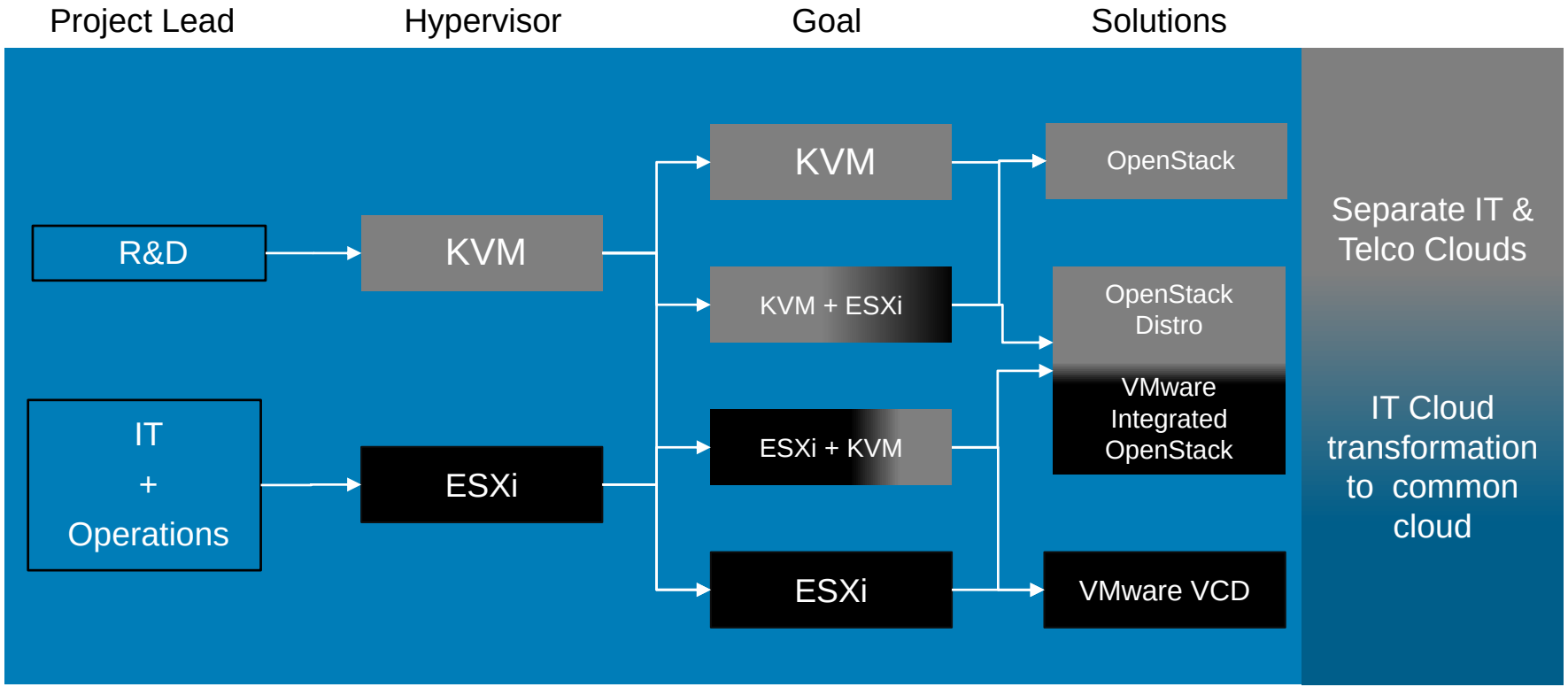
- Enterprise tried & trusted heritage – Carrier grade for SP requirements
- Orchestrates the provisioning of SDDC as complete virtual DC
- Available for consumption in minutes, optimized for required workloads
- Comprehensive catalogue available through vApp for rapid deployment
- Integrated VMware software assets
- NB API for OSS/BSS



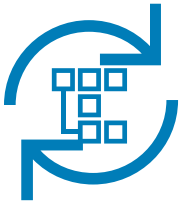
VMware Integrated OpenStack (VIO)

- SP driven carrier grade OpenStack on stable environment
- Extends ESXi through standard OpenStack using Horizon
- Multi-tenant carrier grade OpenStack distribution for ESXi
- Extends VMware catalogue with VIO distribution to enable consumption in minutes with quality & reliability
- Integrated VMware software assets
- Standard OpenStack APIs

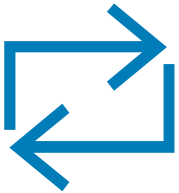
Choosing the right VIM



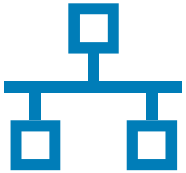
Integrated operations management



Service Assurance
- Visualize application relationships
- Analyze availability, performance & events for RCA & SLA violations
- Optimize to meet the SLA



Services Tier
- VNF service logs
- PM & FM events
- Service/VNF catalog
- DPI (Future)



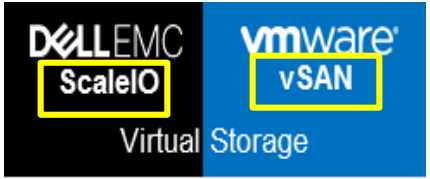
Network Tier
- E-W, N-S topology
- Virtual to Physical map
- Micro segmentation profile
- Security policies
- Configurations

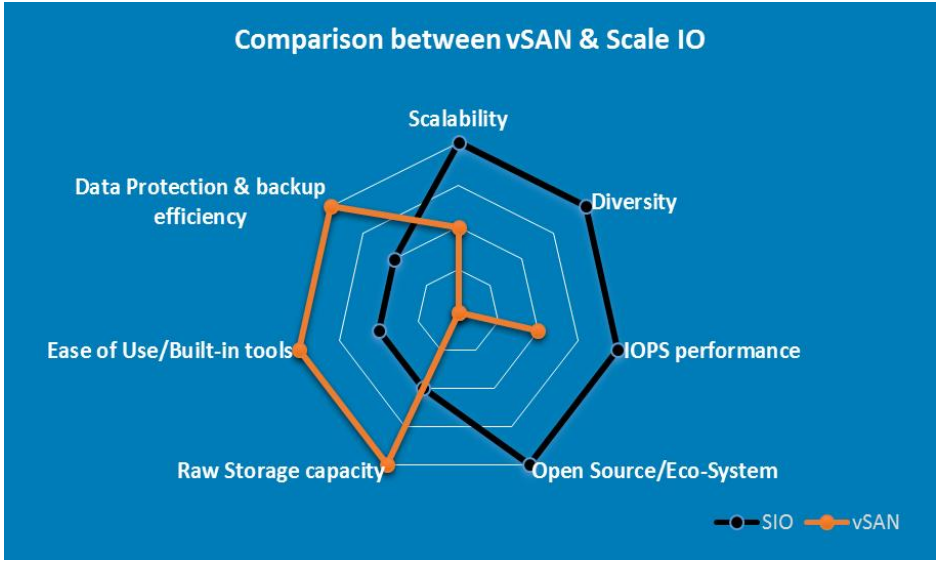
Infrastructure Tier
- Hypervisor & OS
- Infrastructure FM/PM
- Logical switching & routing
- Utilization

DELL EMC Service Assurance Suite
vmware vRealize Operations vRealize Log Insight vRealize Network Insight
Operations Management

Virtual storage options

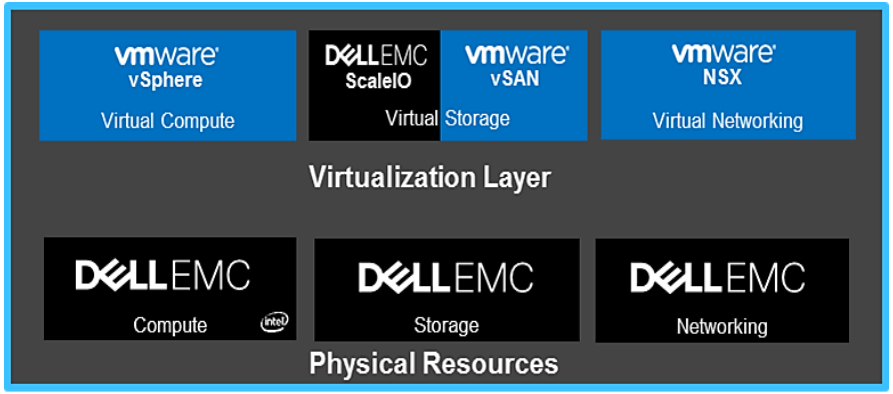
- **Dell EMC ScaleIO**
  - Large scale deployments
  - Wide range of OS, Hypervisor coverage required or external storage integration desired
  - IOPS performance key decision factor
  - Open source ecosystem
- **vSAN**
  - Ease of use with built-in ready to use tools
  - Data protection & backup efficiency required
  - Raw storage efficiency critical to maximize available resources





Infrastructure

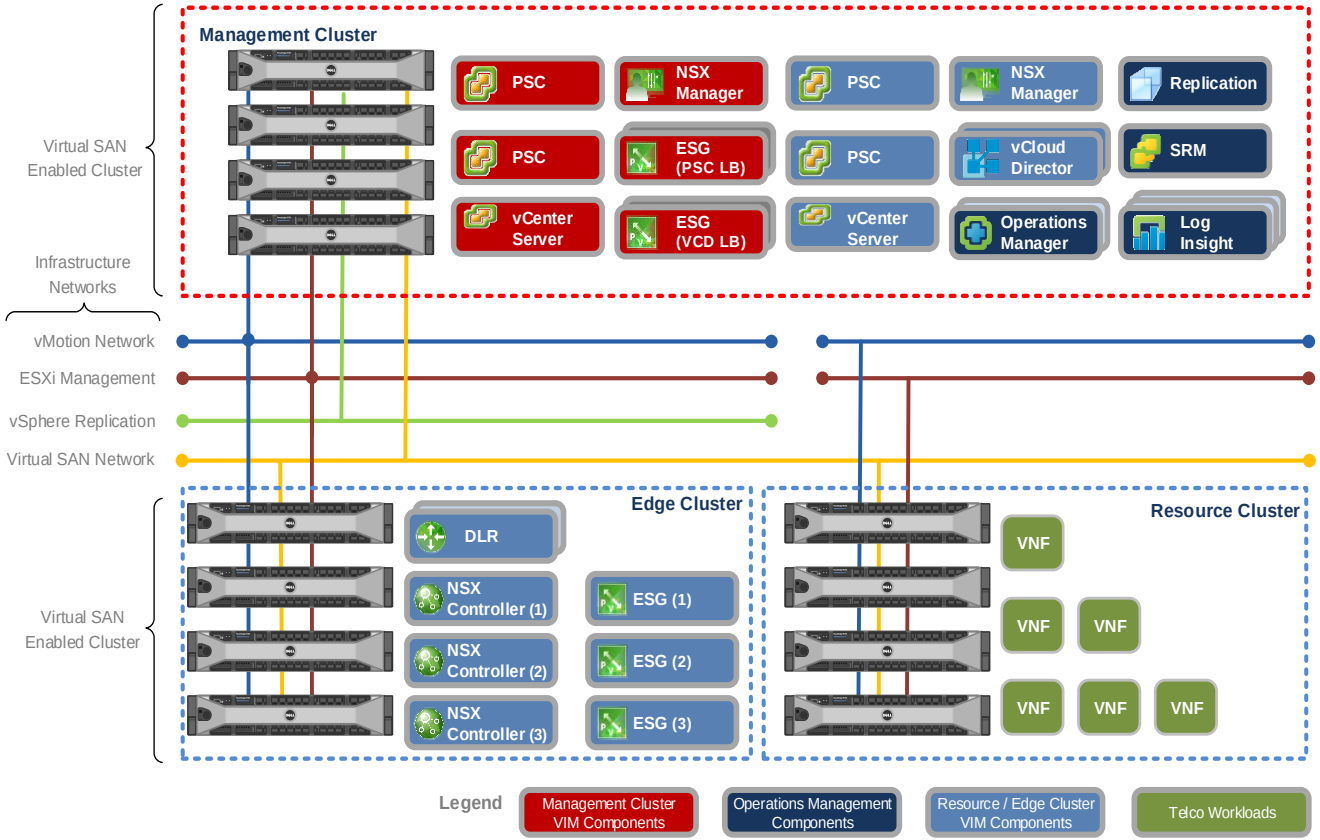
- **Physical Resources**
  - NFV optimized carrier grade compute platform – Power Edge Rack servers
  - Open networking switches for 1/10/50/100G network requirements
- **Virtualization**
  - VMware ESXi as the virtual compute optimized to map the virtual workloads to physical resources
  - Multiple options with virtual storage to address the scalability requirements
  - NSX for virtual networking to enable the creation of secure networks mapping the physical & virtual environments
- **NFV optimizations**
  - Platform optimization to increase optimal utilization and throughput
  - Use case specific fine tuning with VNF providers



Open, Standards based, Carrier Grade

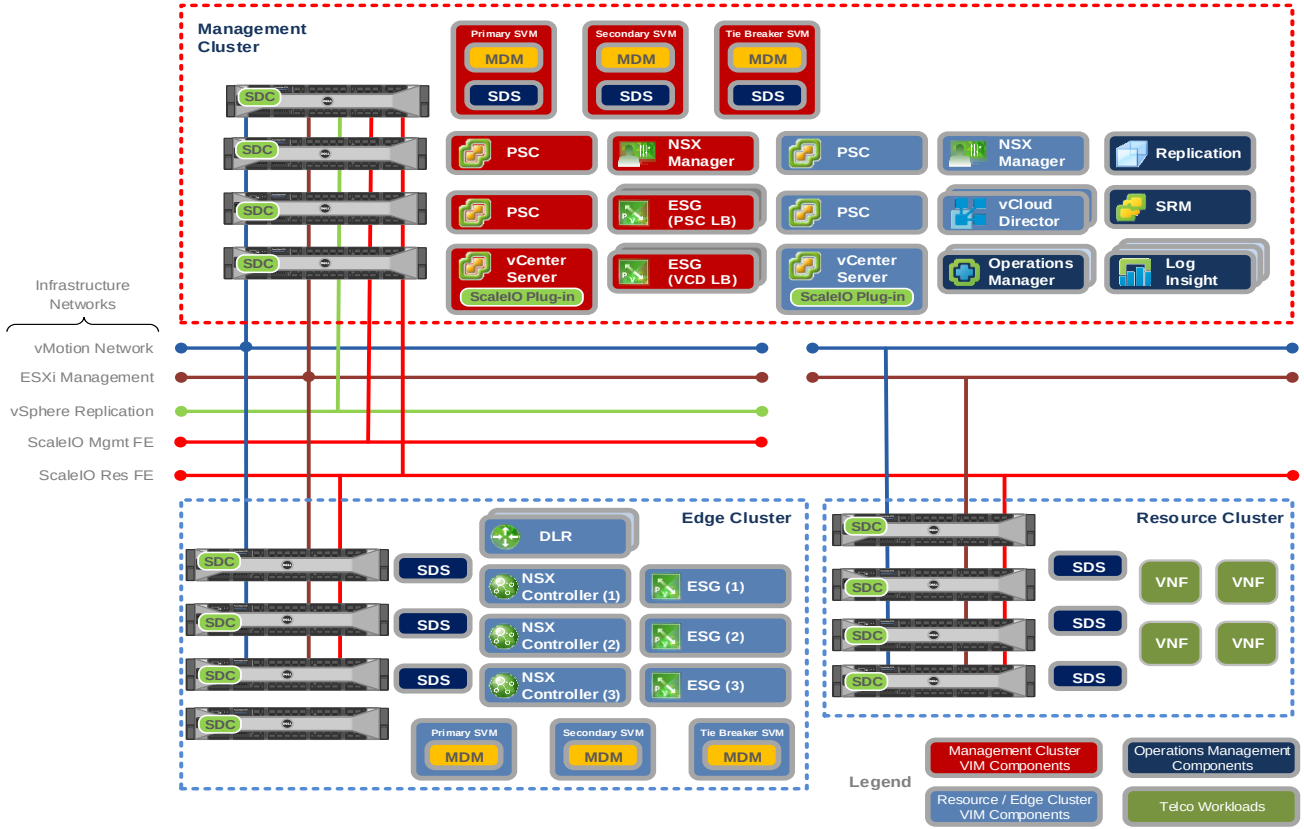
High-level cluster design with vSAN

Platform Services Controller = PSC
Edge Services Gateway = ESG



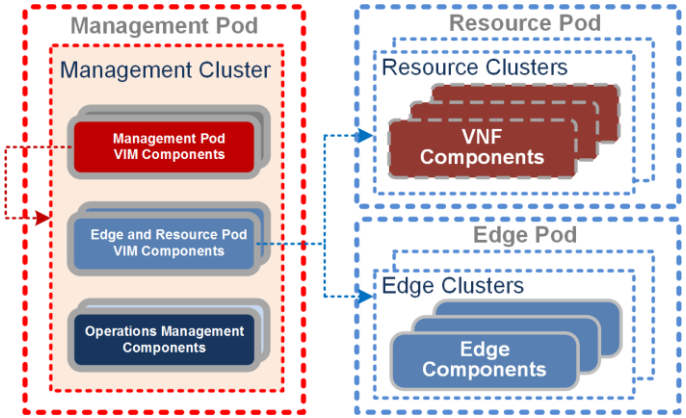
Each cluster can scale to 64 nodes independently

High-level cluster design with ScaleIO



 Each cluster can scale to 1024 nodes independently

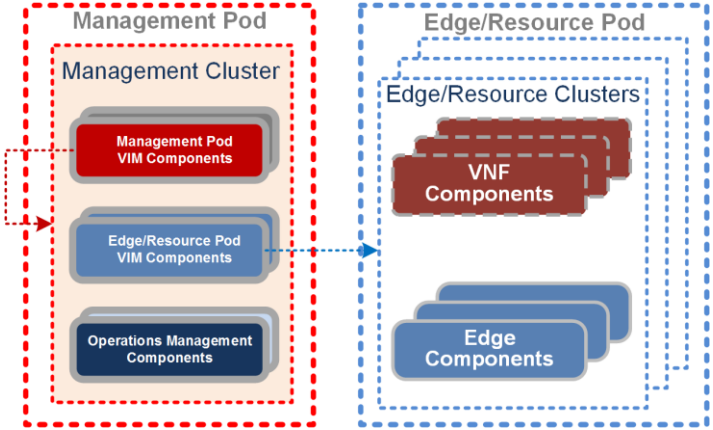
POD designs in vCloud NFV 2.0



3 POD Design

- All edge functions are managed directly through the NSX manager.
- Independent scaling plans can be created for both edge and resource pod.

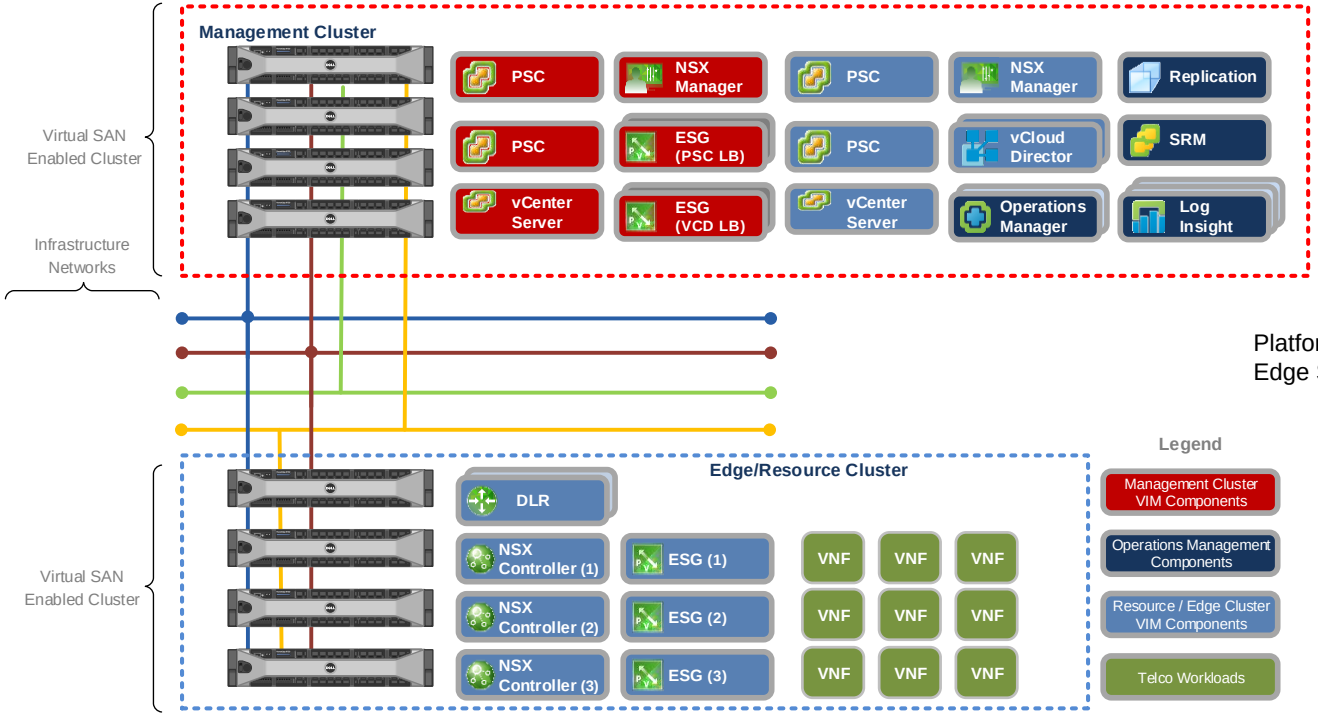
New



2 POD Design

- The edge functions are managed by vCloud Director and its tenants..
- Adding clusters to edge/resource pod requires potential VNF workload migration to provide room for the edge functions growth.

2 POD High-level cluster design with vSAN



Platform Services Controller = PSC
Edge Services Gateway = ESG

Each cluster can scale to 64 nodes independently

Let us be your partner for the **future**…

DELL EMC

Take the next steps – with Dell EMC

Foundation for the Modern Service Provider

Start today

Engage with our executives & engineers

Request a workshop and technical deep-dive

Customize your own proof-of concept


DELL EMC