F5 & NFV
Partner Integration & Case Studies

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Agenda

NFV – Concept & Market Drivers

F5 plays at the VNF Layer

F5 on top of NFV Infrastructure (NFVI)

F5 links into Management & Orchestration (MANO)

Case Studies

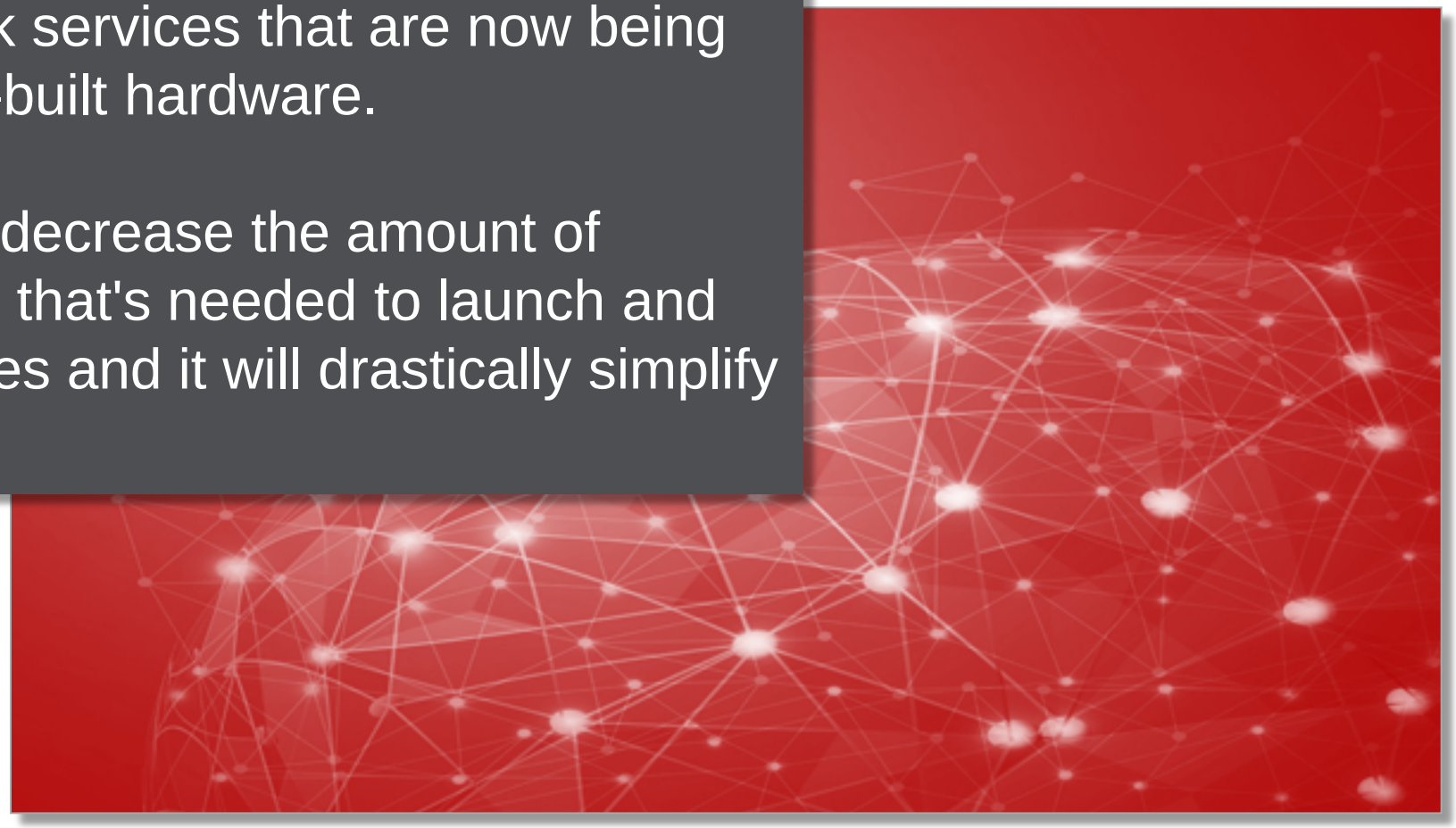
Summary

Concept & Market Drivers

What is Network Functions Virtualization?

Network Functions Virtualization (NFV) is an initiative to virtualize the network services that are now being carried out by purpose-built hardware.

If successfull, NFV will decrease the amount of purpose-built hardware that's needed to launch and operate network services and it will drastically simplify network operations.



Effective Network Evolution via NFV

Scaling the networks, end to end security, profitable new services

Connected cars

Connected homes

Connected cities

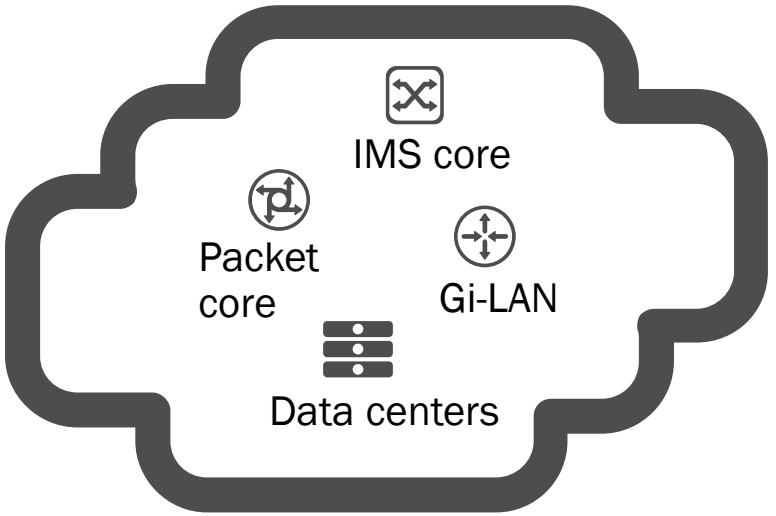
Wearables/Connected devices/Utilities

50B connected devices worldwide by 2020

Surge in connected Devices Accessing SP Networks

Spikes in application usage and signaling

Increasing connection rates (Connections per second)



Data plane and signaling plane scalability

Service agility

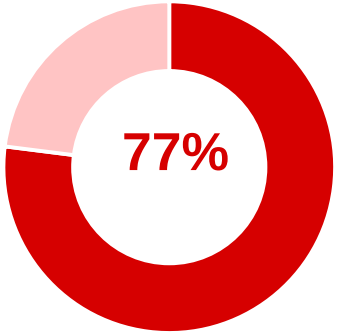
Flexibility and extensibility

Application visibility and control

Dynamic security

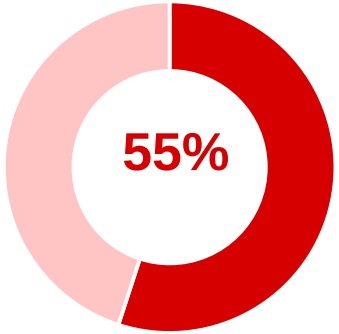
NFV Market Drivers

Service Agility



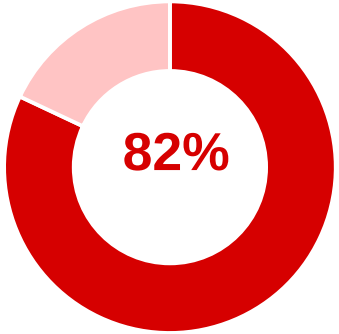
Increased operational efficiency

Network Efficiency



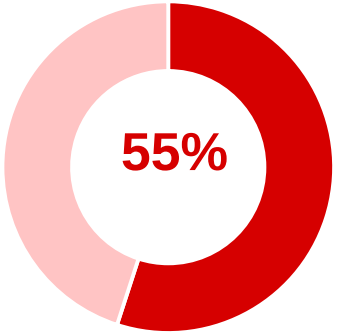
Realised new services that were not possible with current technologies

Revenue Generation



Implementing NFV to accelerate revenue

Automation



Scaling services up or down quickly

68% consider NFV very important/essential in 2018-2020

58% of WW SPs are committed to implanting either SDN, NFV, or both

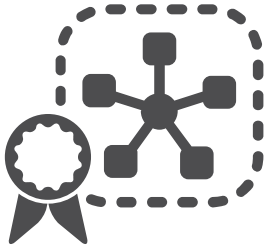
Statistics provided by Infonetics and Heavy Reading

The Pillars of NFV

More than just virtualizing a network function

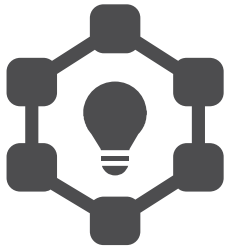
Virtualization

- VNFs
- Multi-tenancy
- High performance
- Comprehensive hypervisor support
- Flexible licensing



Abstraction

- Service and network abstraction
- Configuration templates
- On demand resourcing



Programmability

- Programmable network and VNFs
- Open and standard APIs
- Developer-friendly RESTful APIs
- Large dev community and ecosystem

Orchestration

- Unified multi-vendor, multi-service ecosystem
- Integration with major vendors like HP, Cisco, Alcatel-Lucent, Nokia, Ericsson, VMware, OpenStack, etc.

F5 @ VNF Layer

F5 at the VNF Layer

Broad portfolio of L4-L7 VNFs

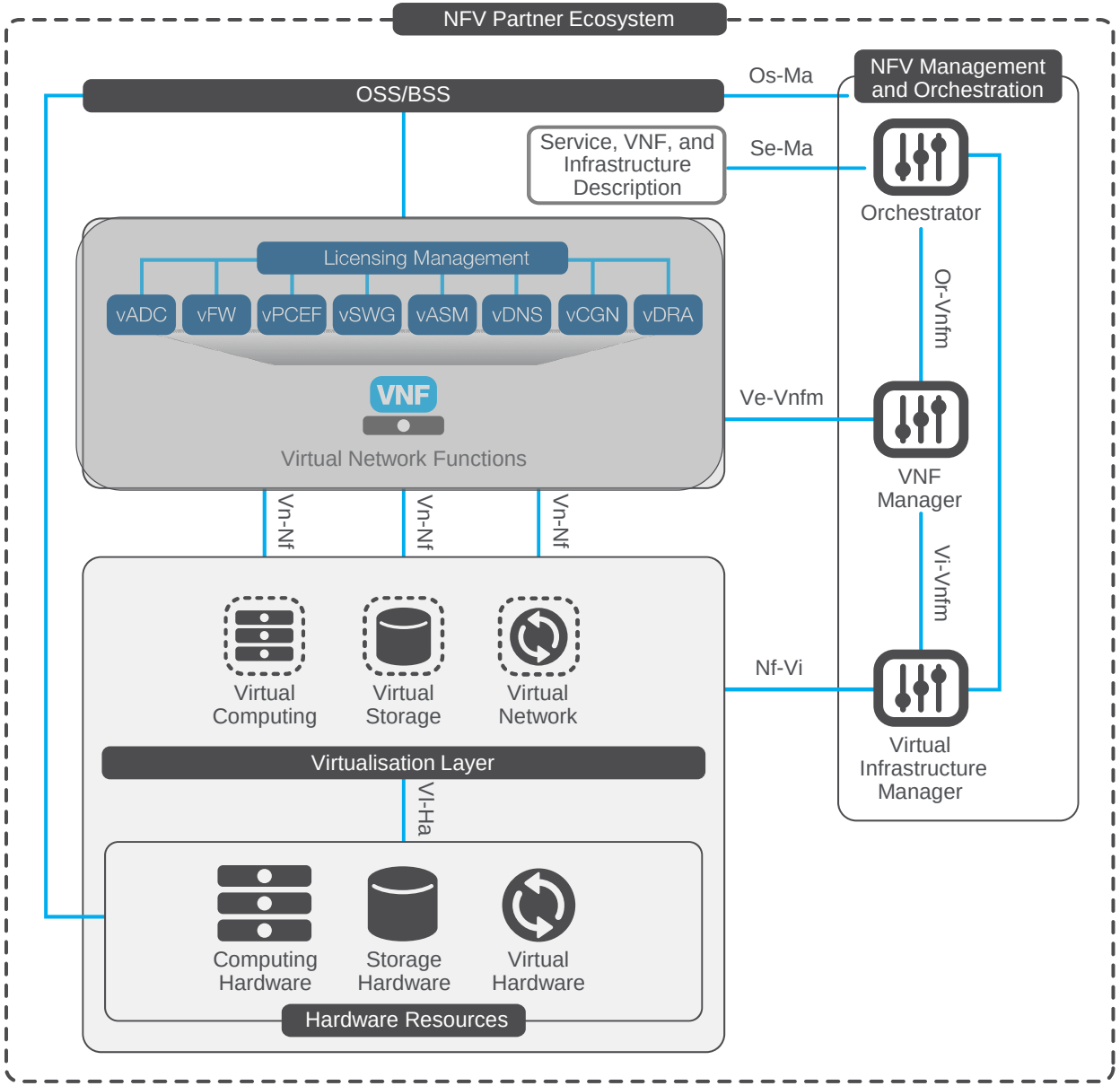
Supports hybrid architecture

Purpose-built hardware and VNF

Elastic scaling of network services

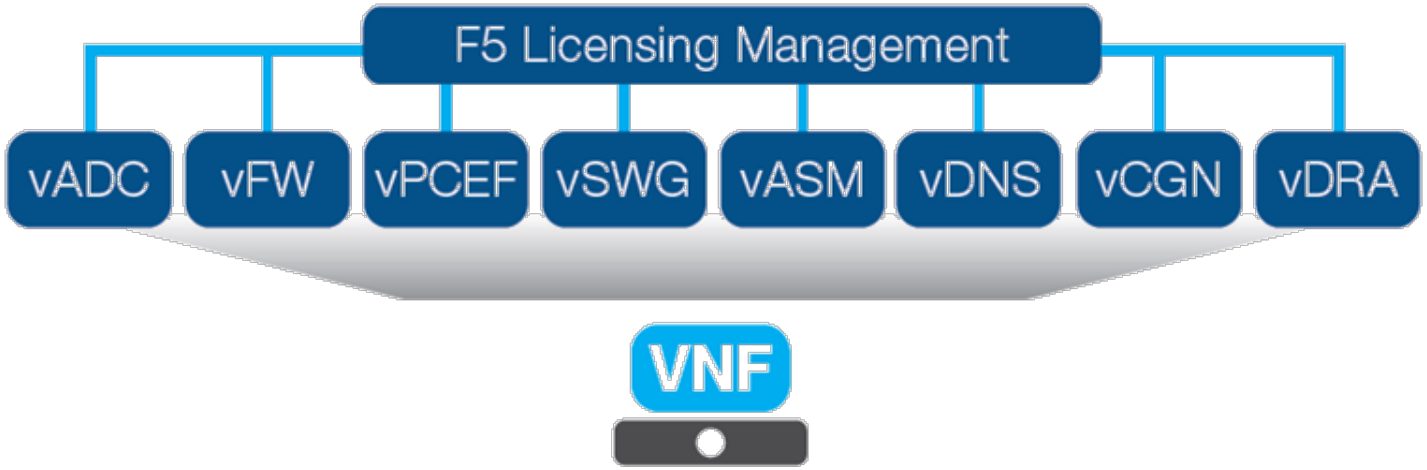
High performance and scalability

Managed via 3rd-party orchestration systems



F5 Virtual Network Functions

Virtualizing L4-L7 service functions for several use cases



Load Balancing

Secure Web Gateway

TCP Optimisation

Gi Firewall & CGNAT

Network Firewall

URL Filtering

DNS Security

Traffic Steering & Service Chaining

DPI

LTE Roaming

DNS Caching

Secure Remote Access

Diameter Routing

Application Firewall

Federated Authentication

SIP Routing

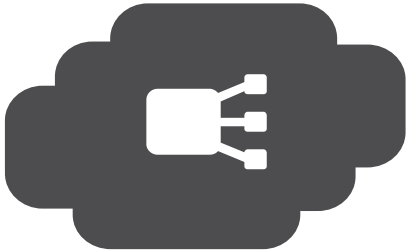
NFV Use Cases Requiring L4-L7 Service Functions

Virtual EPC & Gi-LAN

Virtualized EPC nodes, PCEF, optimisation systems, and L4-L7 VAS services with dynamic service chaining

Virtual IMS & DNS

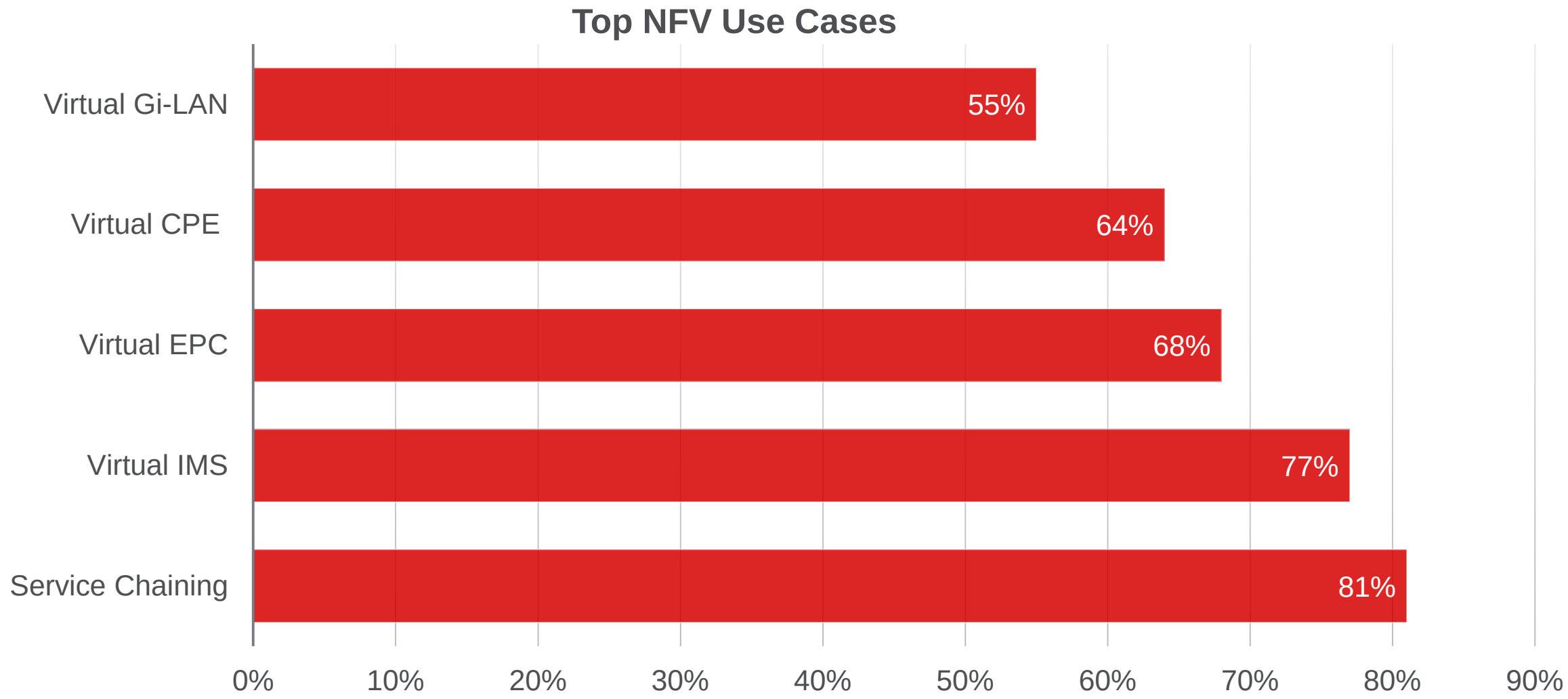
Virtualised SIP, DNS, and diameter traffic processing (load balancing, message routing, protocol security)



Virtual Centralised CPE

Self-provisioned and virtualized L4-L7 networking and security functions as an upsell for standard L2 & L3 VPN services

NFV Use Cases Being Deployed by Service Providers



Statistics provided by Infonetics

F5 on top of NFVI

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Best-in-class partnerships

F5 VE validation on leading NFV Infastructure (NFVI) platforms

Integration with SDN controllers

NOKIA

Hewlett Packard Enterprise

CISCO

nuagenetworks

redhat.

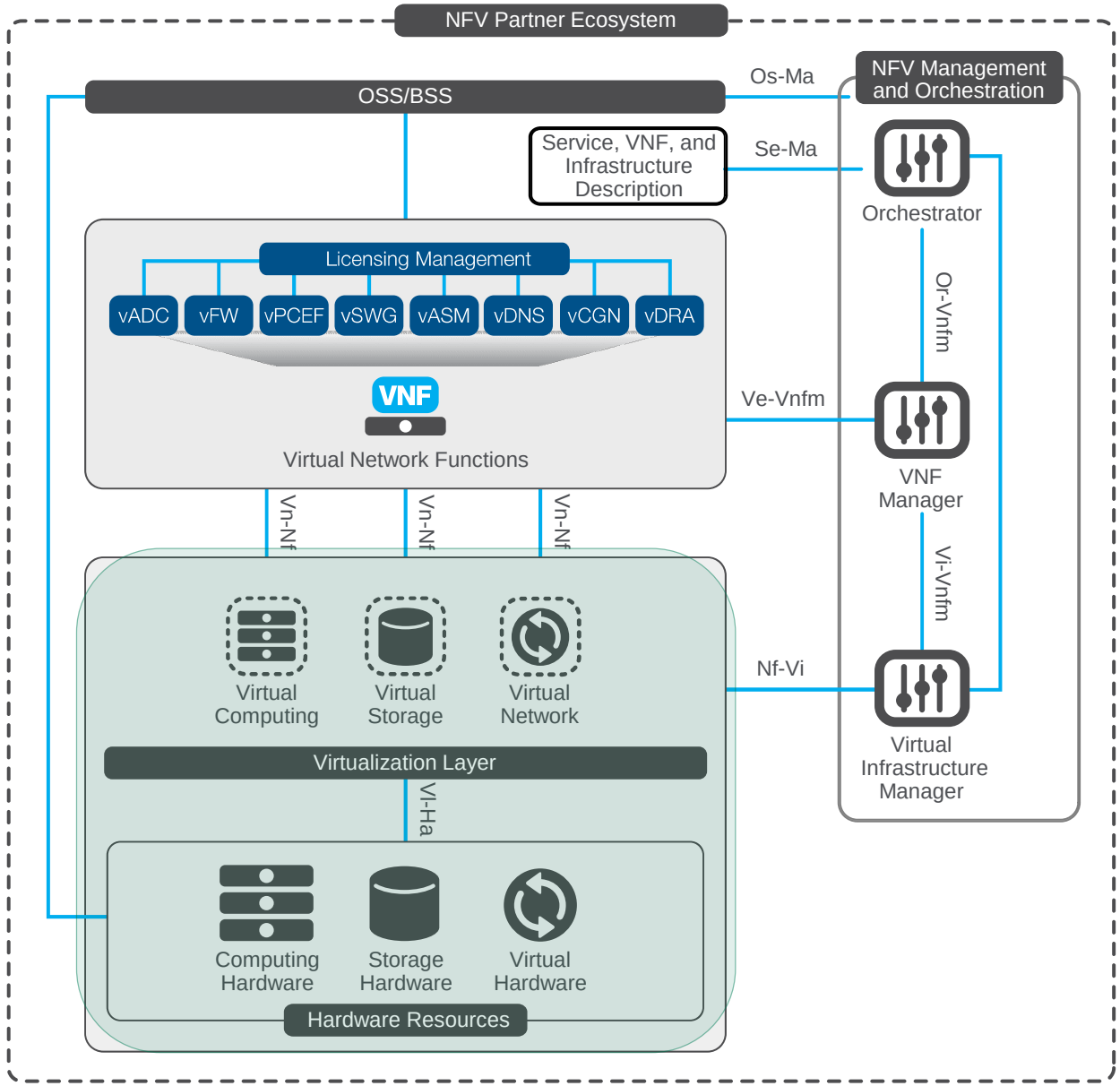
openstack

vmware

MIRANTIS

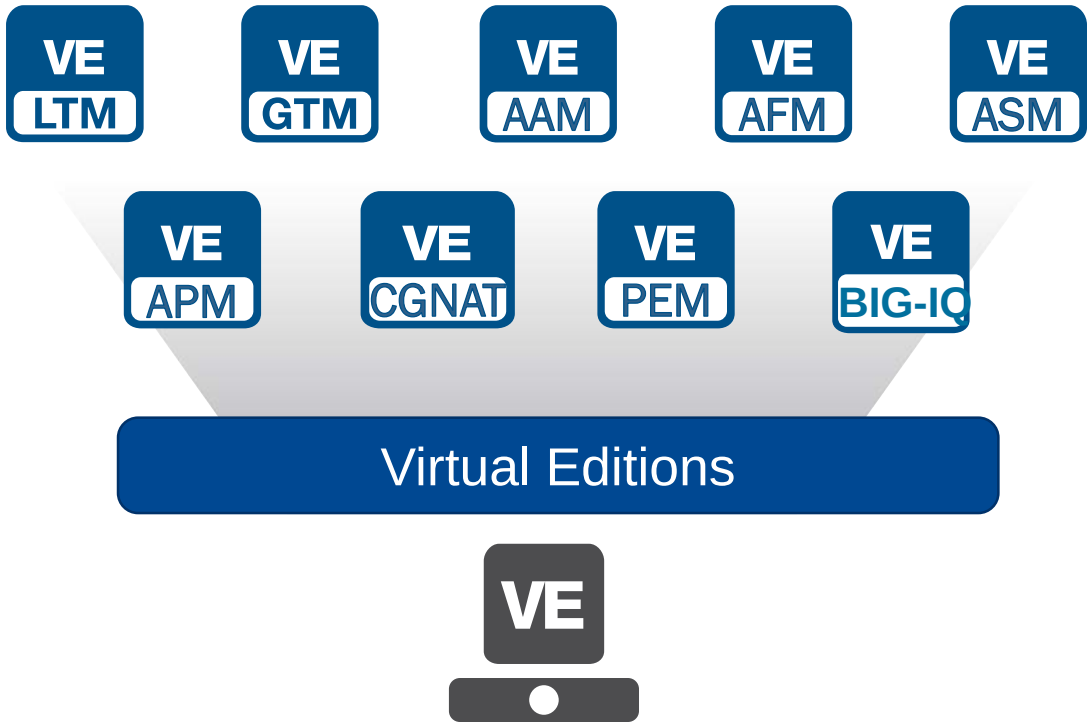
OPENCONTRAIL

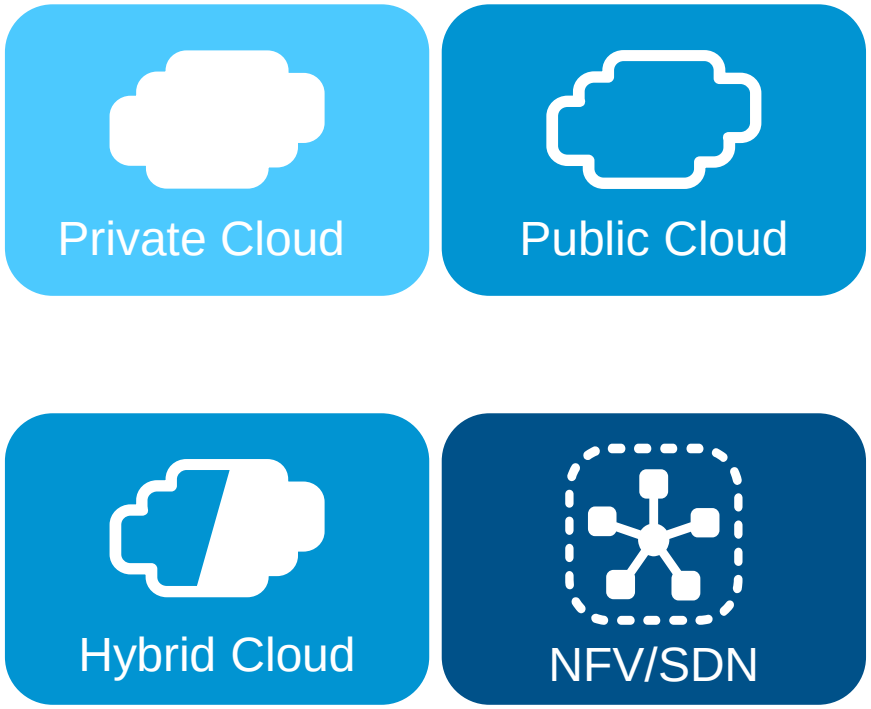
ERICSSON



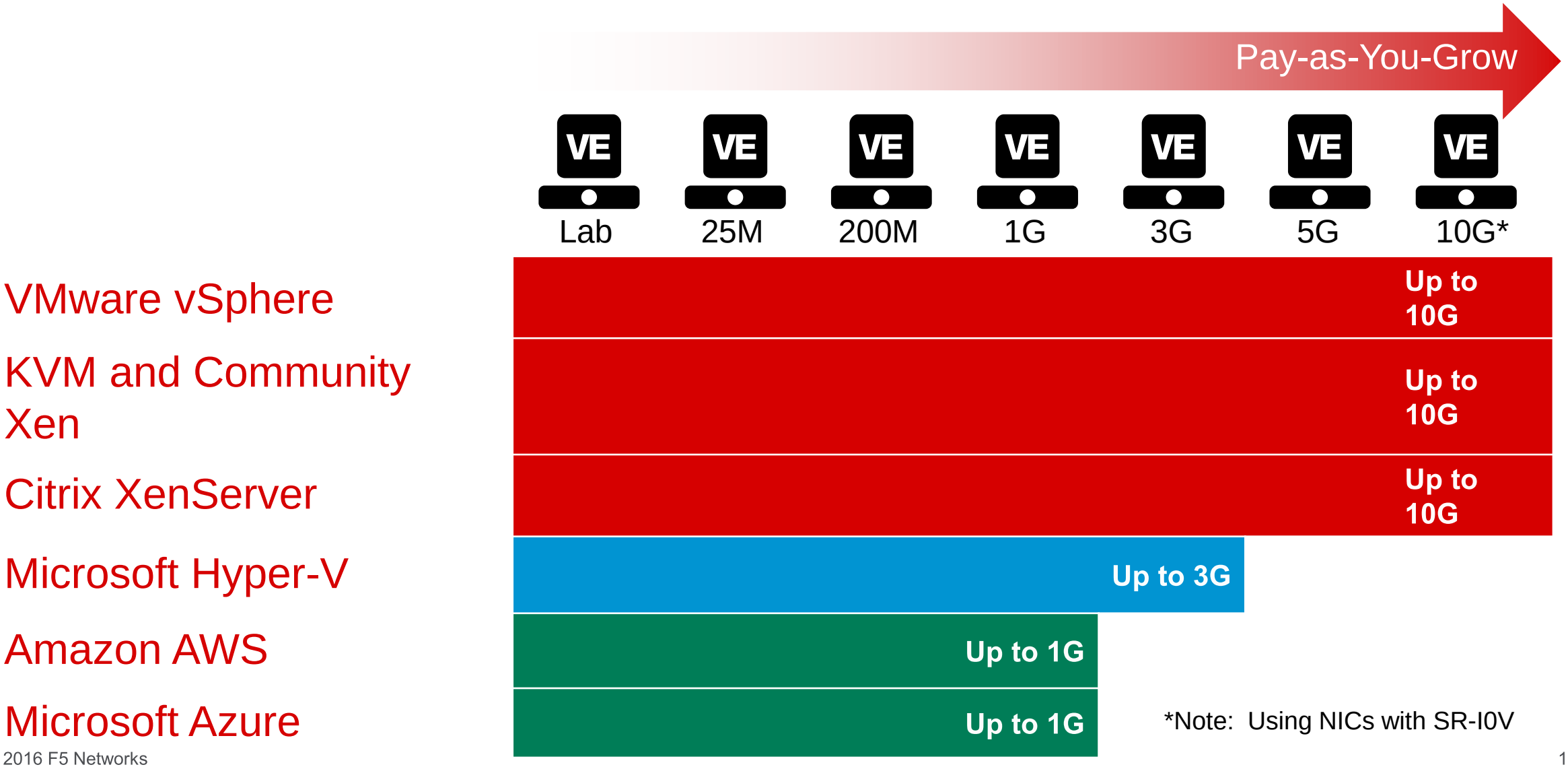
F5 L4-L7 Services delivered via BIG-IP Virtual Edition

BIG-IP Virtual Editions (VE) is a virtual application services platform that delivers market-leading SDAS services with the same user interface, management, programmability, and breadth of features as on BIG-IP Hardware. They can be used in private data centers and available in leading public cloud providers.

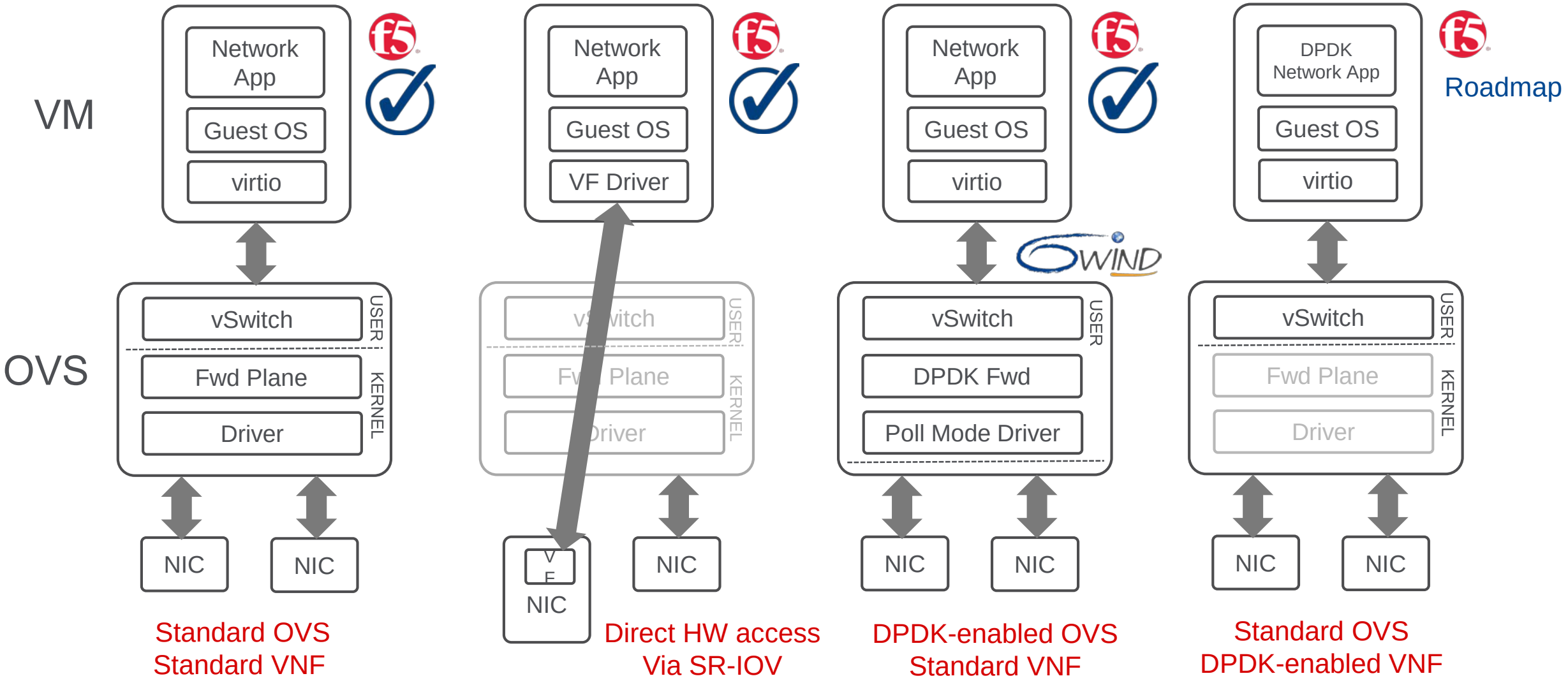




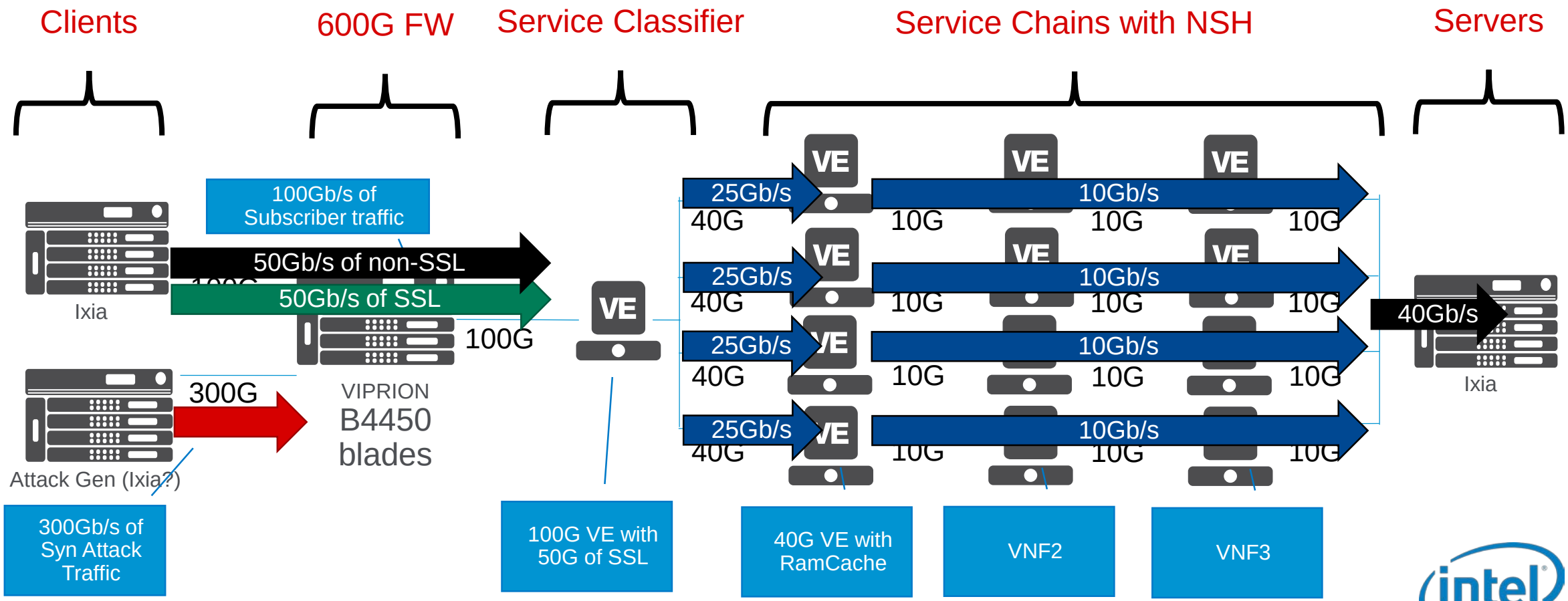
Flexibility – Hypervisor / Bandwidth / Consumption



F5 VE Networking Options: SR-IOV vs DPDK



Intel/F5 Demo @ MWC (100G VE)



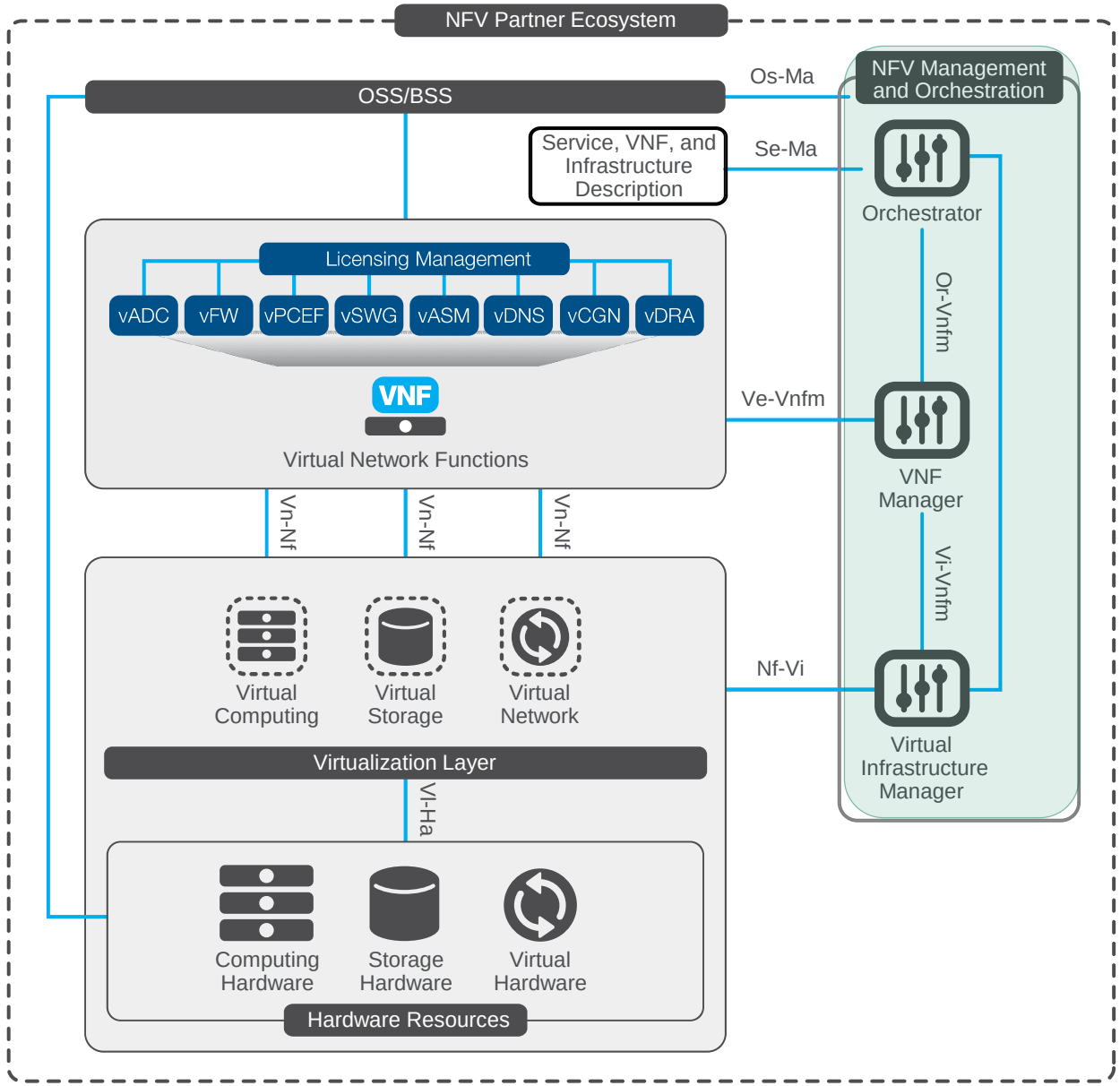
F5 links into MANO

F5 links into MANO

Best-in-class partnerships

F5 integrated with leading players in Management & Orchestration platforms

BIG-IQ Cloud interfaces with Cisco APIC and VMware NSX



iApps – Simplifying Orchestration Integration

A Single View App

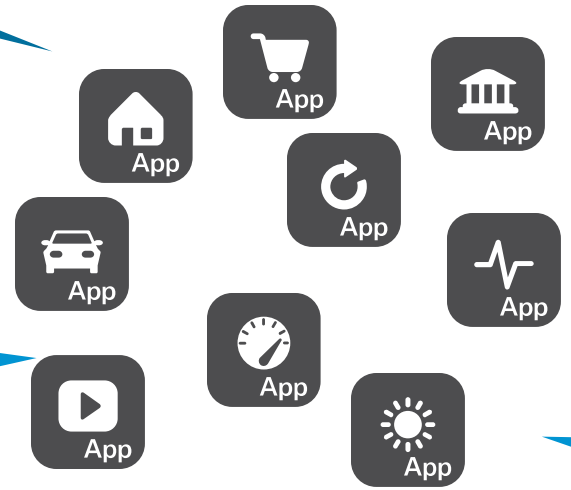
Manage all application components in one place.

An App Lifecycle Tool

Unlike other template/wizard strategies, iApps are fully re-entrant, can manage the full lifecycle of the application.

App Orchestration

Standardize your unique application deployments using iApps, iControl and BIG-IQ.



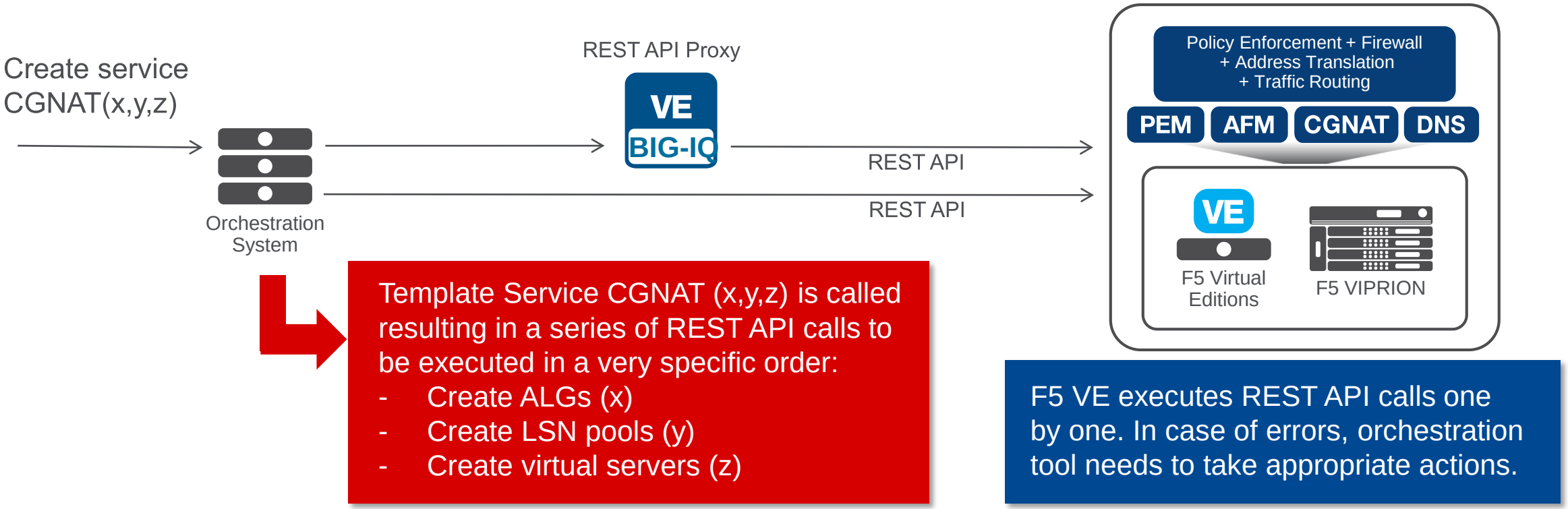
An Easy Button

Use F5-developed iApps to rapidly deploy popular applications with verified and supported configurations.

Standards Enforcement

iApps with strict updates, enforce standards, reducing training and operational risk.

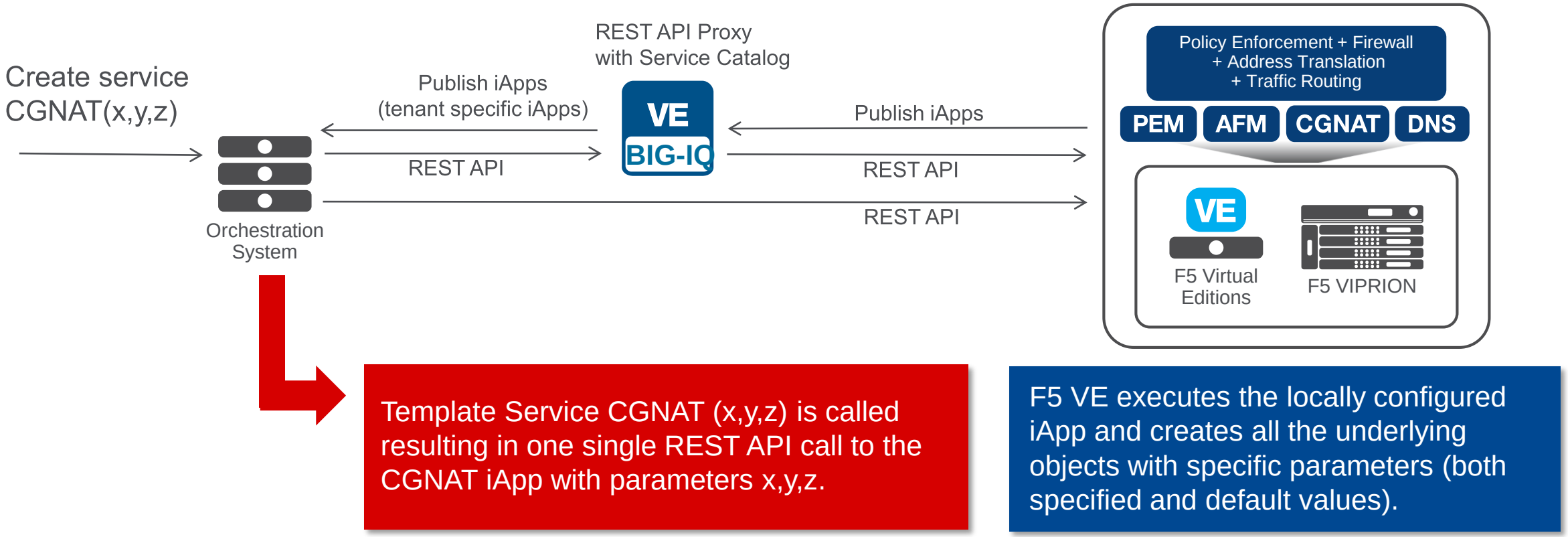
L4-L7 Service Provisioning – Native REST API



Orchestration System needs to have a (complex) data model of all L4-L7 services and needs to translate that data model into ordered REST API calls towards F5 VEs

Full life cycle management of all L4-L7 services is within responsibility of Orchestration tool

L4-L7 Service Provisioning – iApp via REST API



Template Service CGNAT (x,y,z) is called resulting in one single REST API call to the CGNAT iApp with parameters x,y,z.

F5 VE executes the locally configured iApp and creates all the underlying objects with specific parameters (both specified and default values).

Orchestration System is now significantly simplified. It only needs a catalog of iApps representing all L4-L7 services that are available in the service catalog

Full life cycle management for all L4-L7 applications is now managed by F5 VE itself

iApp integration with Orchestration Partners

Integration with Cisco APIC via BIG-IQ Cloud
(BIG-IQ cloud injects catalog of iApps into APIC)

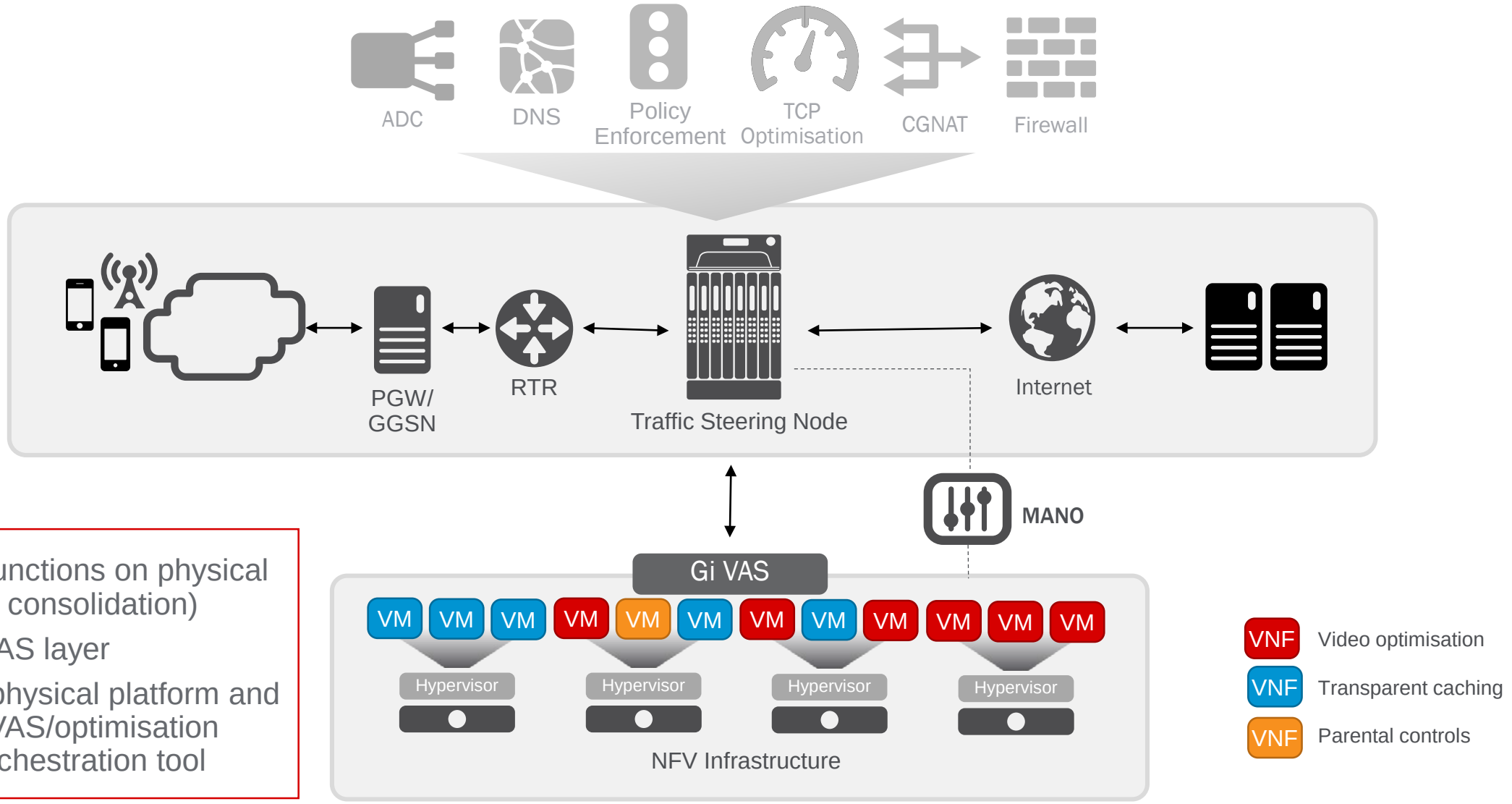
Integration with VMWare NSX via BIG-IQ Cloud
(BIG-IQ cloud injects catalog of iApps into NSX)

HEAT templates being developed to on-board the F5 VE
and then push a config via an iApp within the HEAT template

Applicable to both traditional enterprise cloud as well as SP NFV use cases

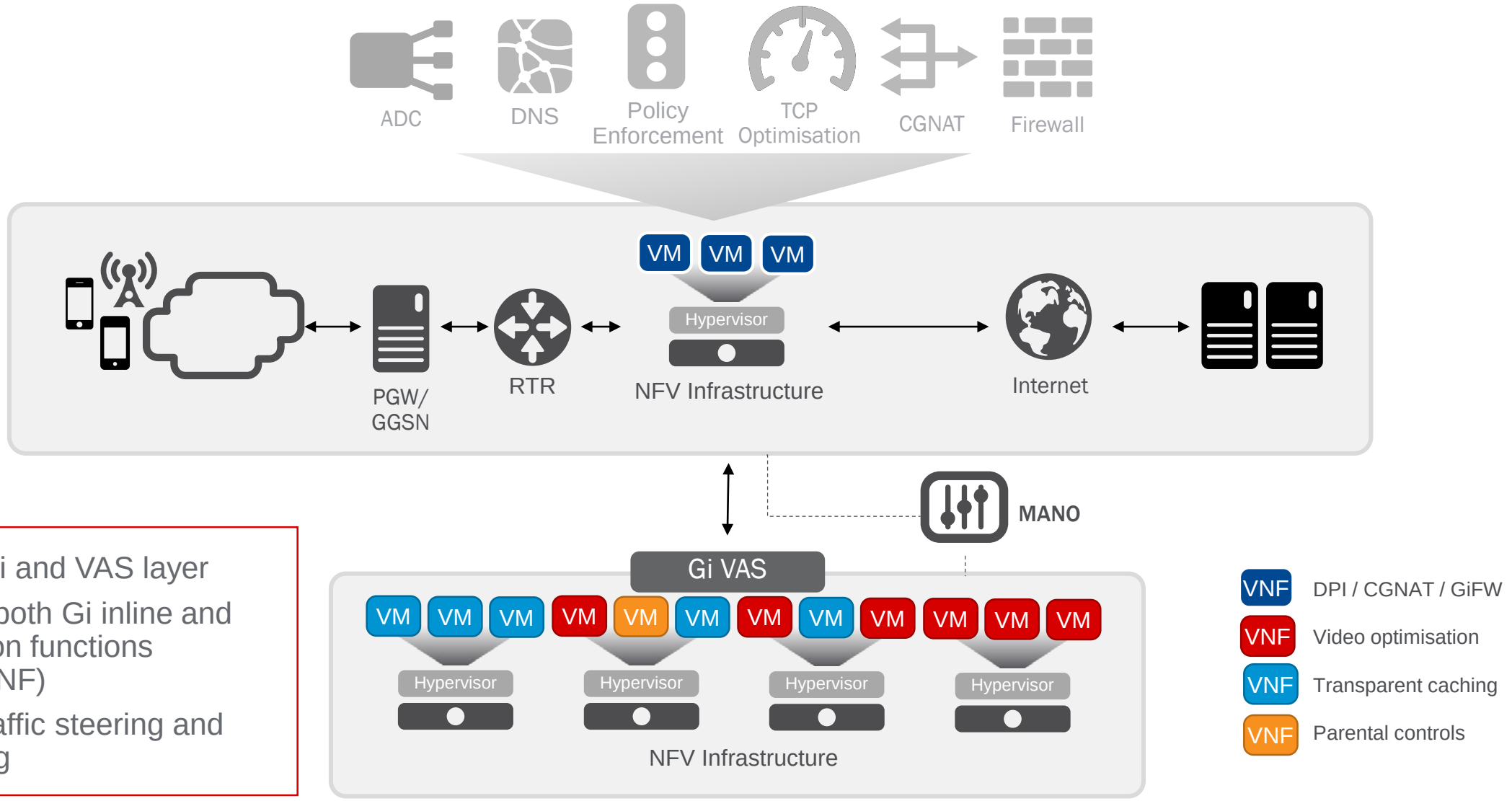
Case Studies

Virtual Gi-LAN – Hybrid Deployment



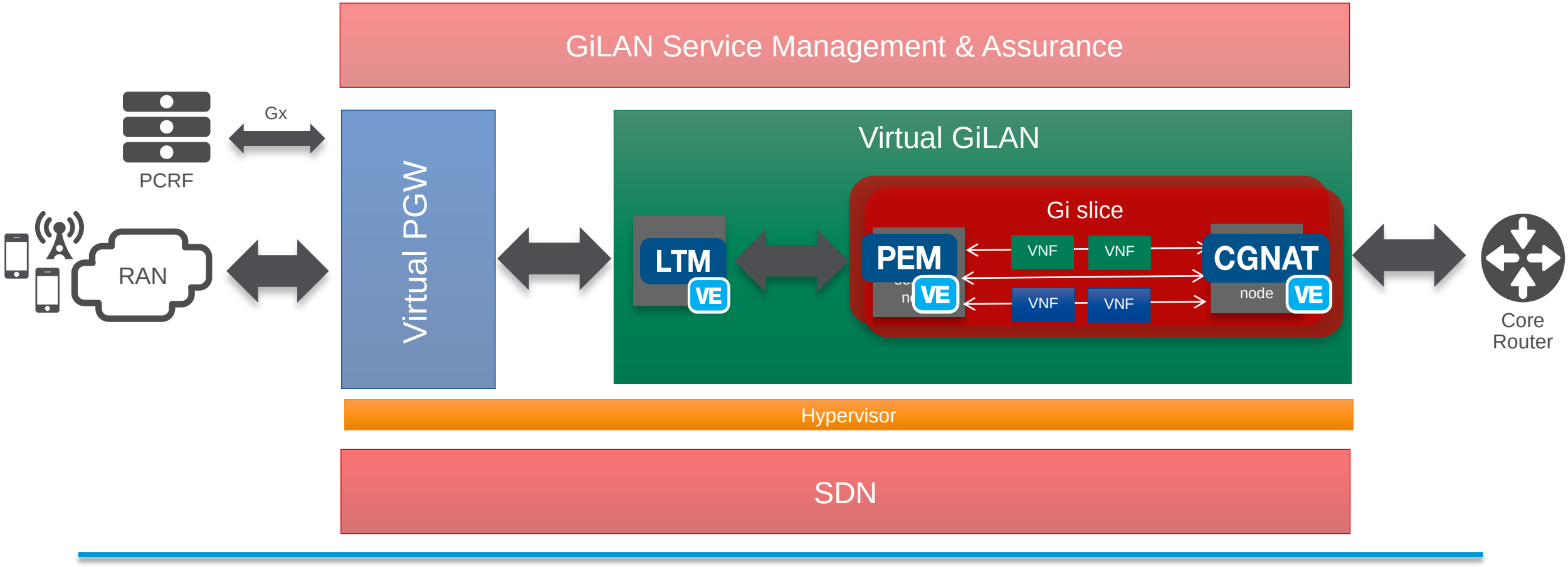
- Keep "in-line" functions on physical platform (L4-L7 consolidation)
- Virtualise the VAS layer
- Integrate both physical platform and VNFs running VAS/optimisation services into orchestration tool

Virtual Gi-LAN – Full NFV Deployment

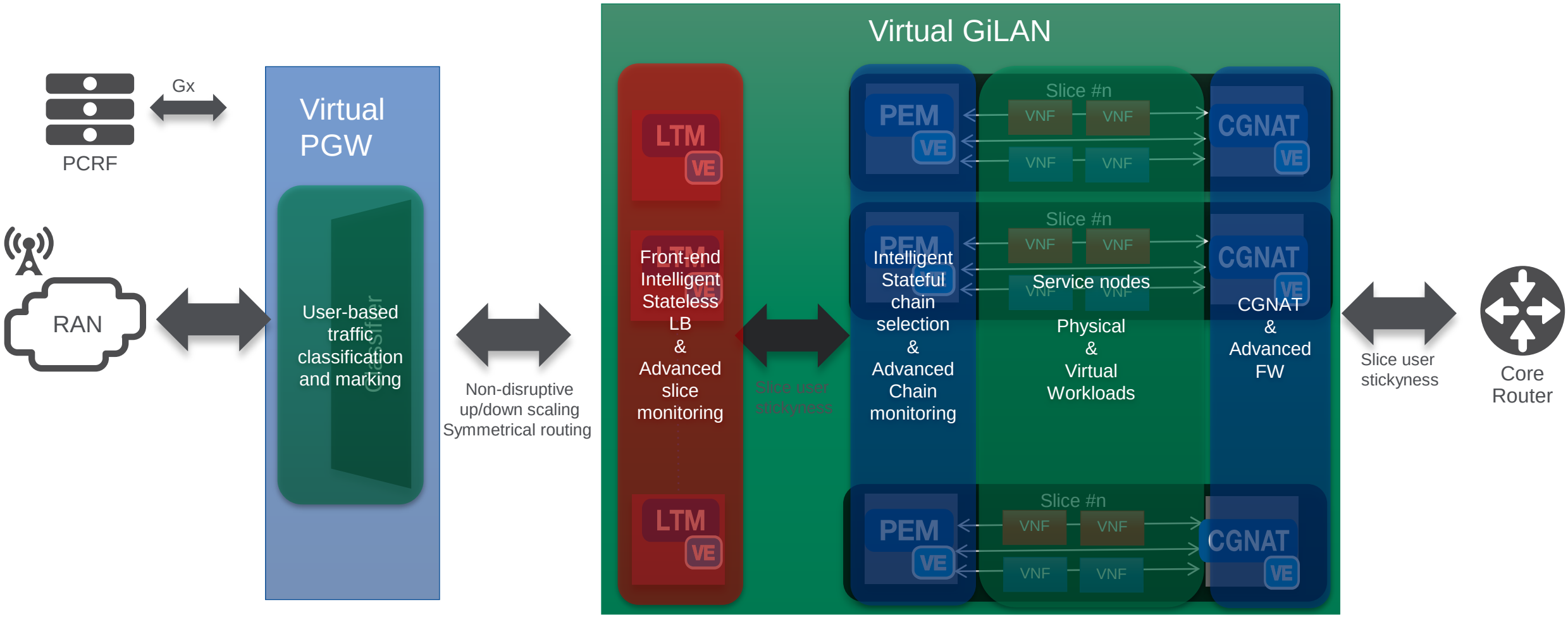


- Virtualise the Gi and VAS layer
- Fully virtualise both Gi inline and VAS/optimisation functions (deployed as VNF)
- Use SDN for traffic steering and service chaining

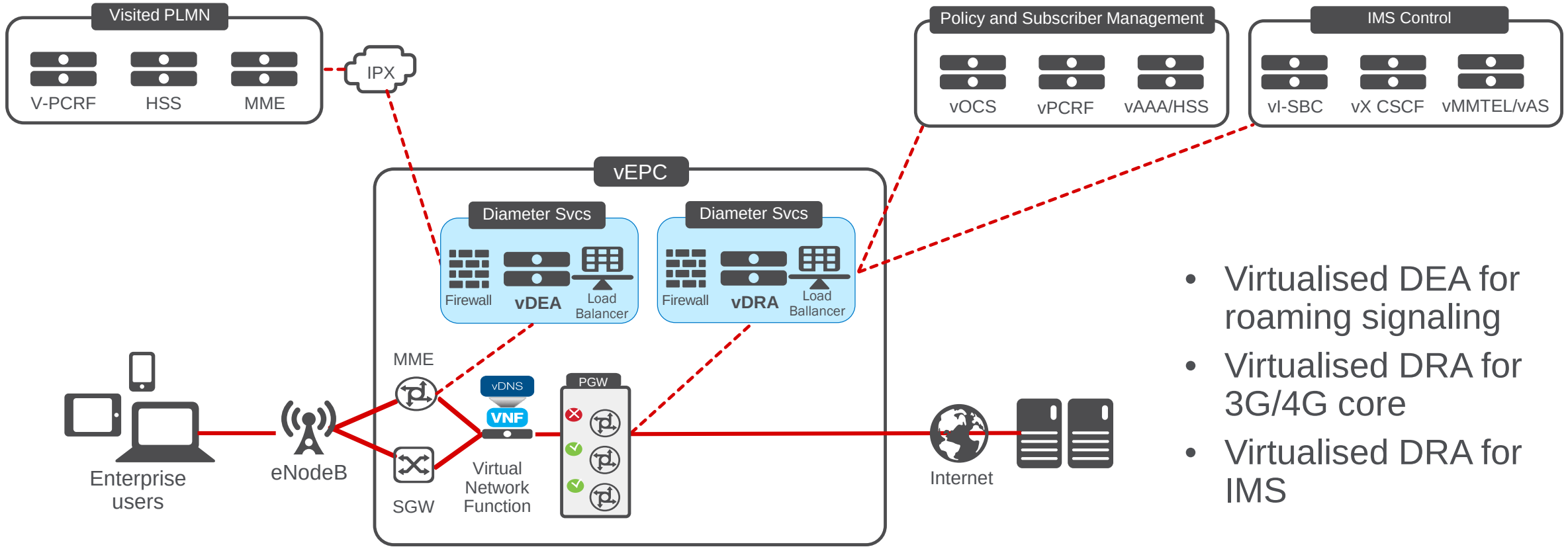
Virtual Gi LAN – Full NFV Deployment



Virtual Gi LAN – Full NFV Deployment



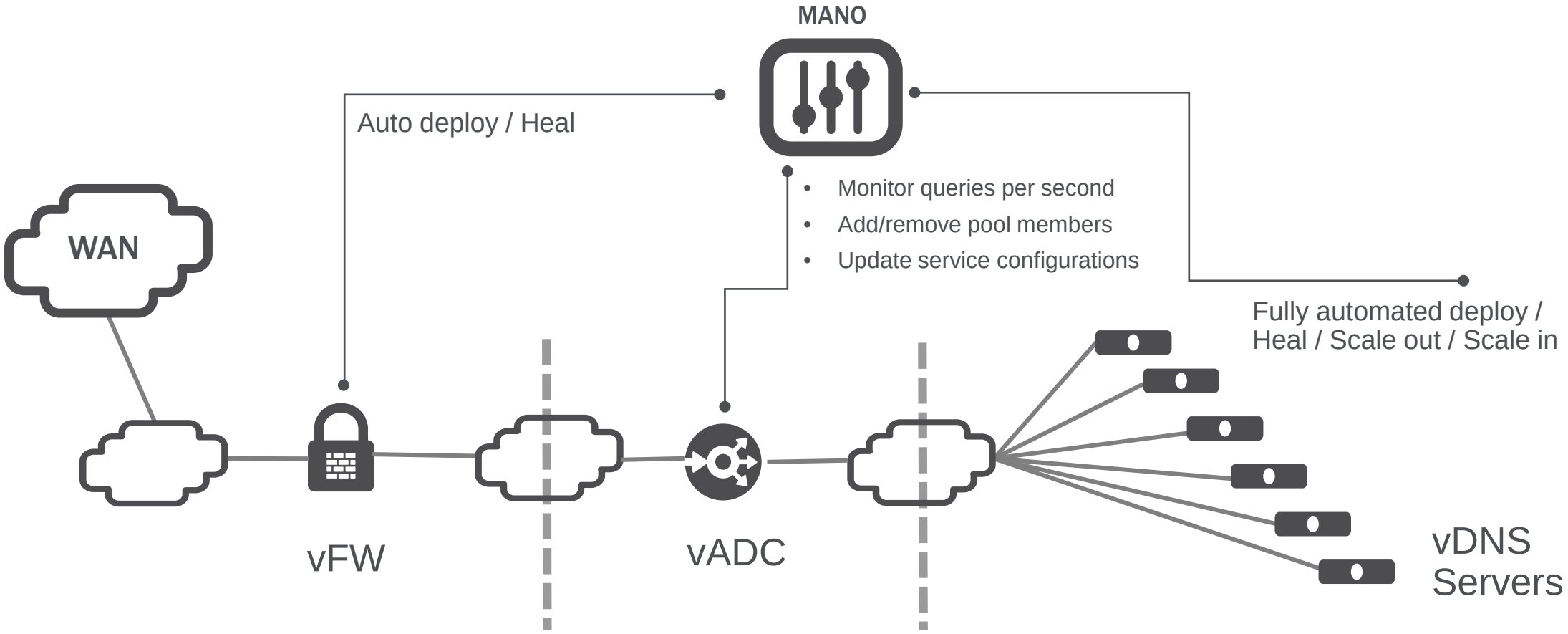
Virtual Diameter Routing/Edge Agent (DRA/DEA)



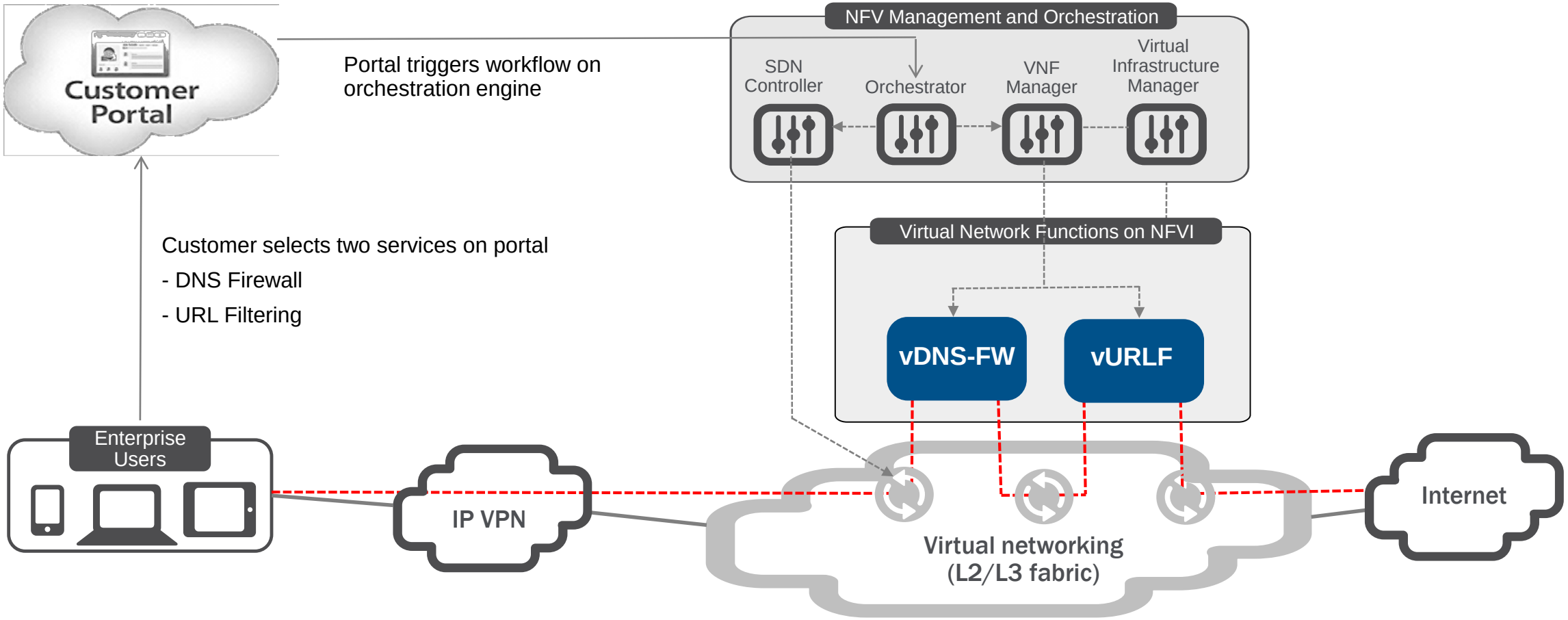
- Virtualised DEA for roaming signaling
- Virtualised DRA for 3G/4G core
- Virtualised DRA for IMS

Reduce OpEx and realise TCO savings by spinning up and down diameter routing resources aligned with network utilisation

Virtual DNS Deployment



Virtual CPE with SDN-Based Service Chaining



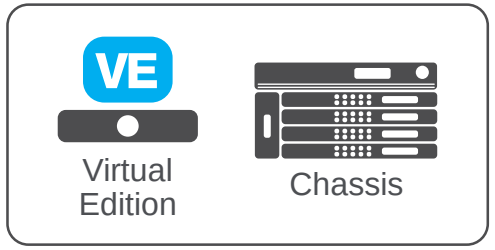
Enterprise network services that are easy to provision, scale, and rapidly deployable

Summary

Critical Success Factors for NFV Migration

Deploy fast revenue services

Virtual CPE
Virtual Gi-LAN
Virtual IMS
Virtual EPC



Best-in-class platform

Broadest portfolio of VNFs
High performance solution
Highly scalable
Secure
Hybrid architecture
Programmable APIs

Best-in-class partnerships

Management and orchestration
Open standards-based ecosystem

SOLUTIONS FOR AN APPLICATION WORLD