Cisco Smart/PLDT Day

Next Generation OSS

Ravichandran Venkataraman - CVG, Cisco
14-Oct-2015

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Cisco ESP Portfolio and Strategy

Evolved Services Platform

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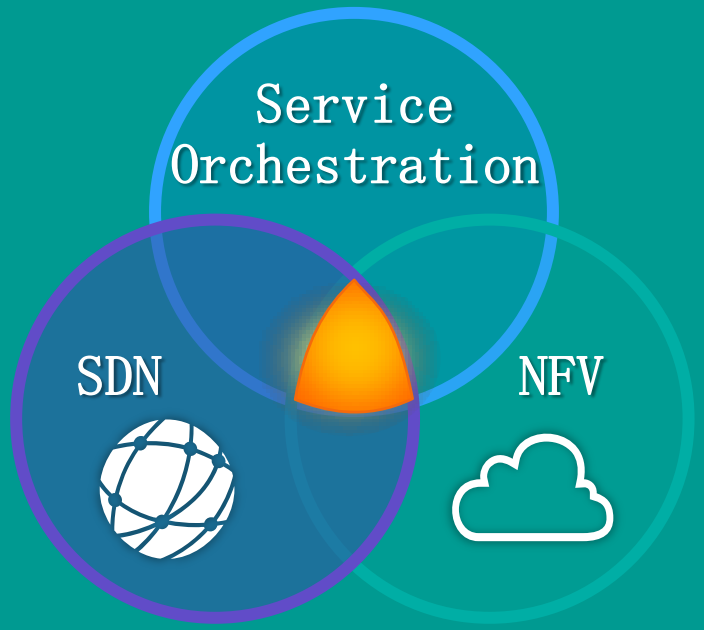
Fundamental Enablers of Cisco SP Strategy

Capabilities Exist: Execution Will Define Success



Orchestration
Automation, provisioning and interworking of physical and virtual resources

NFV
Network functions and software running on any open standards-based hardware

SDN
Separation of control and data plane

Cisco Is Executing on Plan to Integrate All Three

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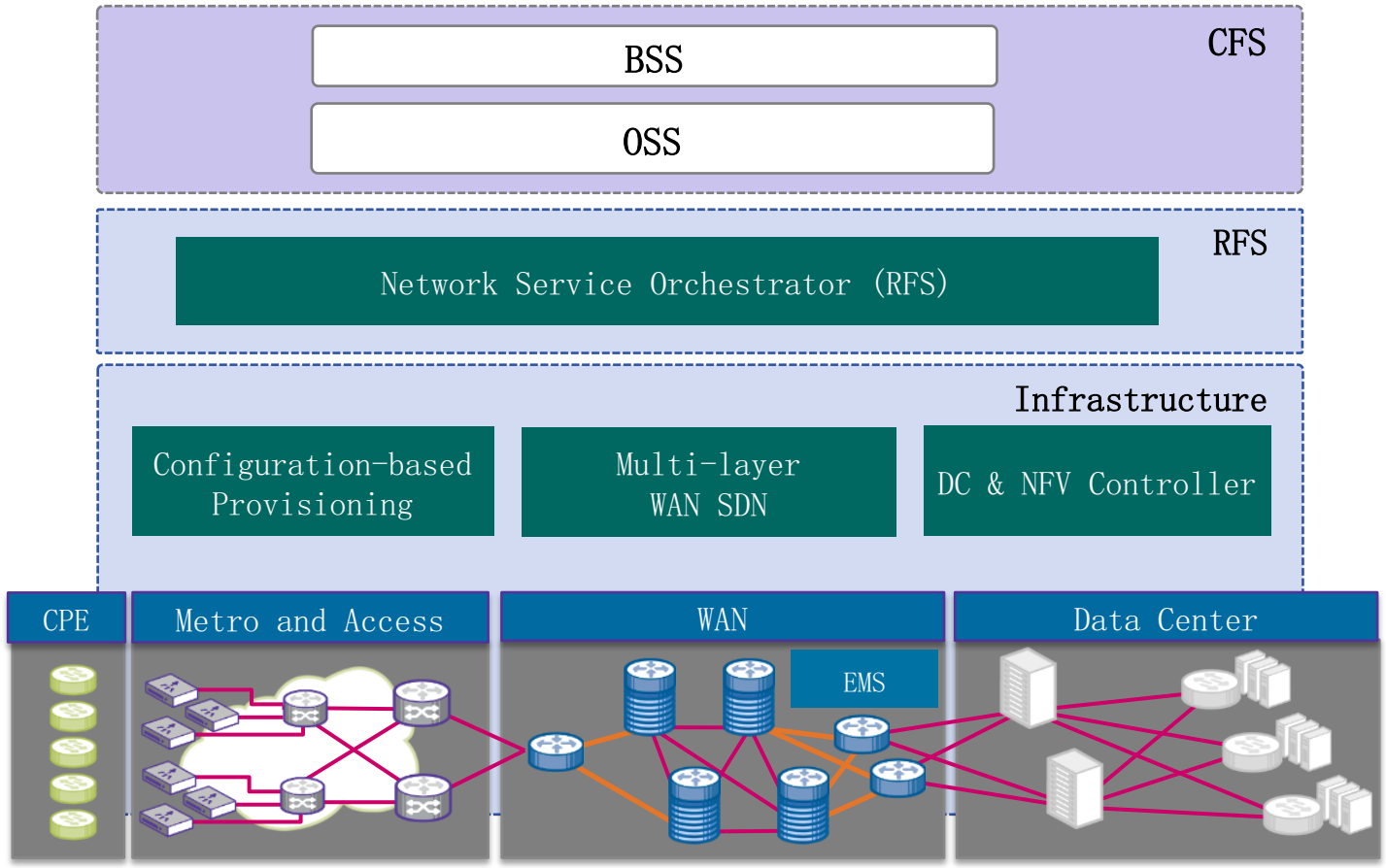
Cisco Orchestration and SDN Strategy

High Level View



- Model-driven end-to-end service lifecycle and customer experience in focus
- Seamless integration with existing and future OSS/BSS environment
- Loosely-coupled and modular architecture leveraging open APIs and standard protocols
- Orchestration across multi-domain and multi-layer for centralized policy and services across entire network

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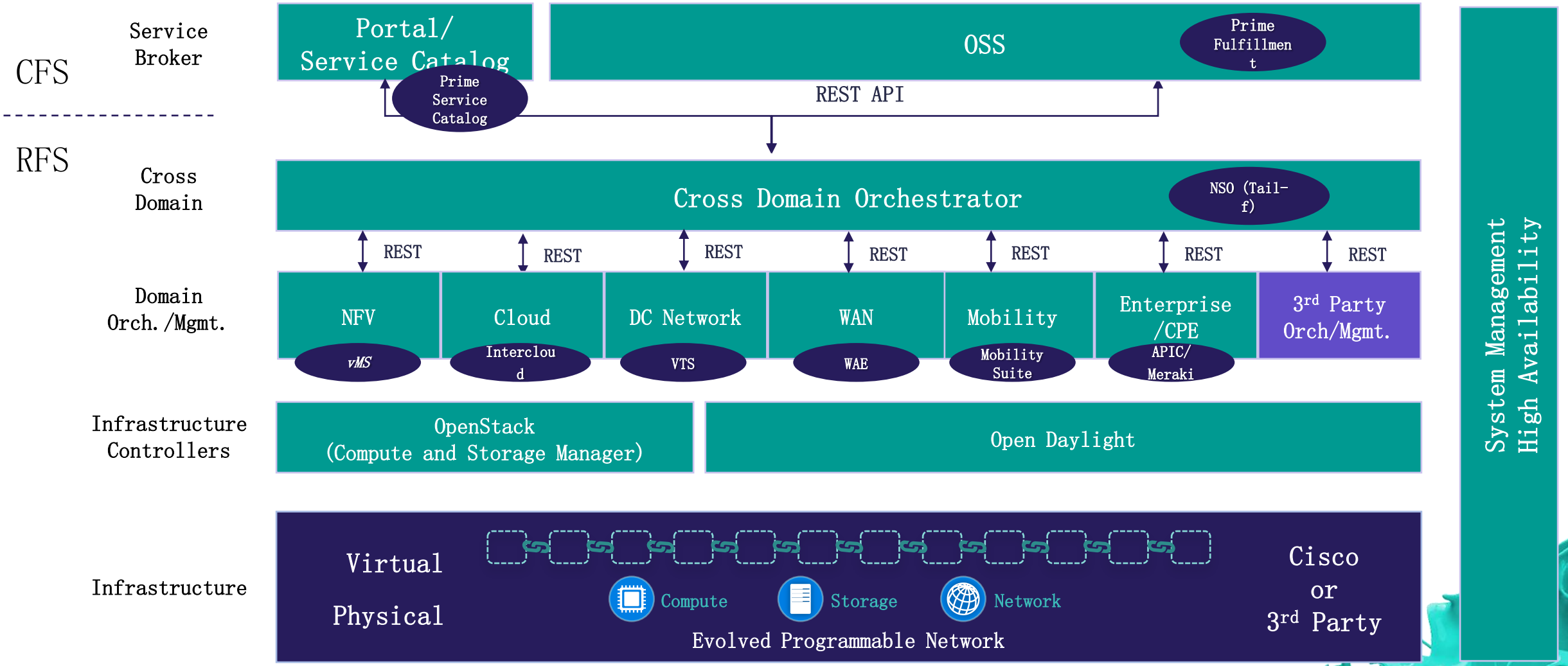
Cisco Evolved Services Platform

Functional Architecture



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NFV/SDN Market and Cisco's Solution

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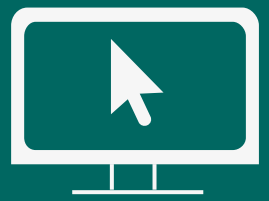
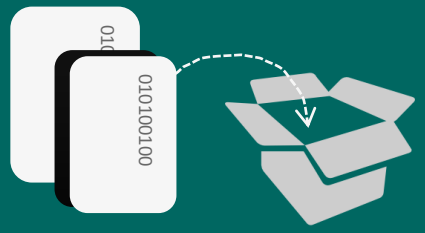
NFV: Service Provider Benefits – Analyst View

Virtual Managed Services

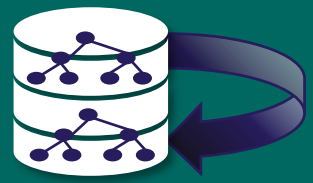


Web-based Service Interface automates service ordering AND activation



Plug & Play Install reduces or eliminates truck rolls

Enterprise-grade Network & Security Services extended to multiple markets



Automated Service Lifecycle Management dramatically reduces operating costs

78% Lower OPEX

200% Improved ROI

Source: ACG Research: Business Case for Virtual Managed Services – Sept 2014

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Reasons for SPs Adopting NFV and SDN – Analyst View

- Agility
  - Quicker time to Revenue
  - More Innovation
- Efficiency
  - Capex Reduction
  - Opex Reduction
- Customer Experience
  - Meet Expectations
  - Self Service

Drivers for NFV Adoption. Source: Heavy Reading

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SP's are Approaching NFV/SDN in Multiple Ways

Different solutions required to address different "Buying Centers"

Use Case Led

- Top-down approach
- Business outcome driven
- Buying Center – BU/Biz Vertical

Orchestration Led

- Common MANO solution for different use cases
- Buying Center – NMS/OSS team

Infrastructure Led

- Bottom-up approach
- Buying Center – Network & DC infrastructure team

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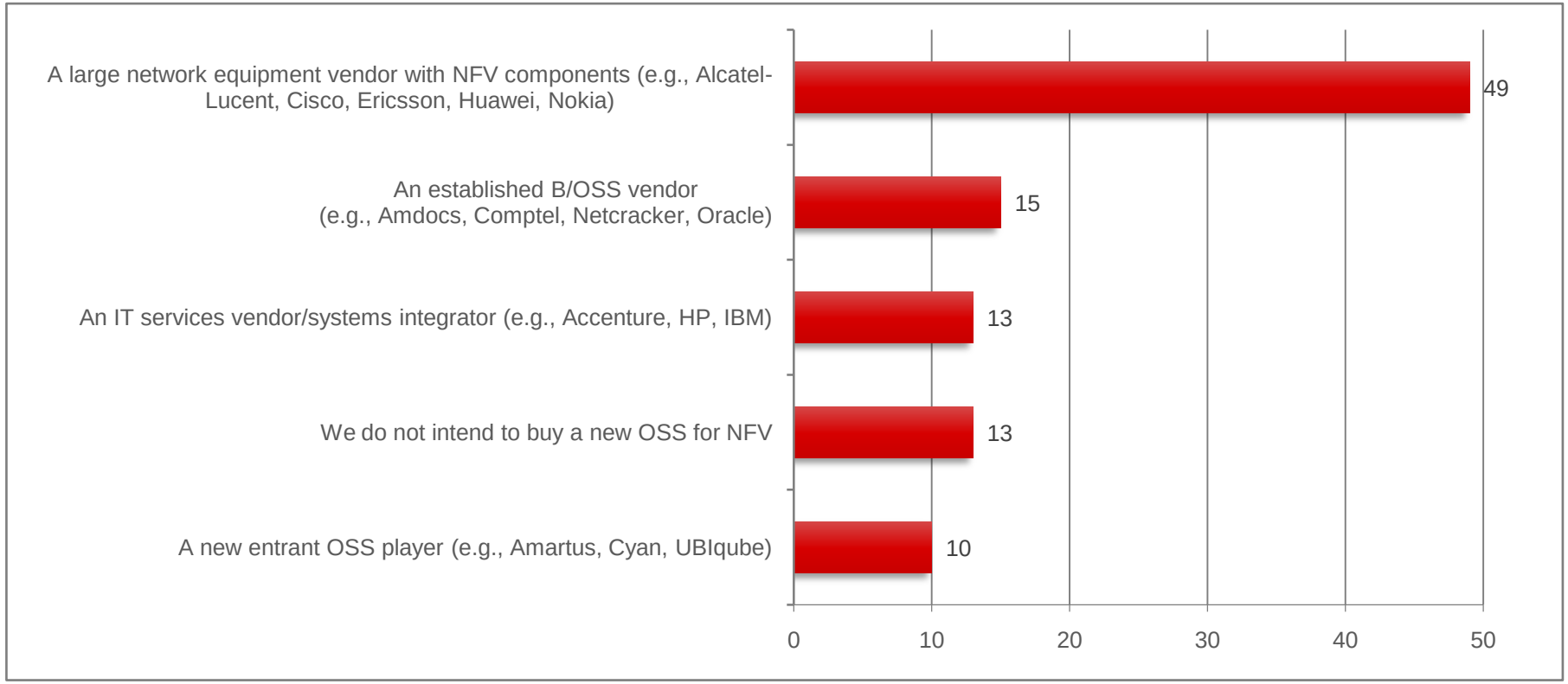
SP Purchasing plans for NFV management – Analyst View

From which type of vendor is your company most likely to buy a new OSS for NFV?



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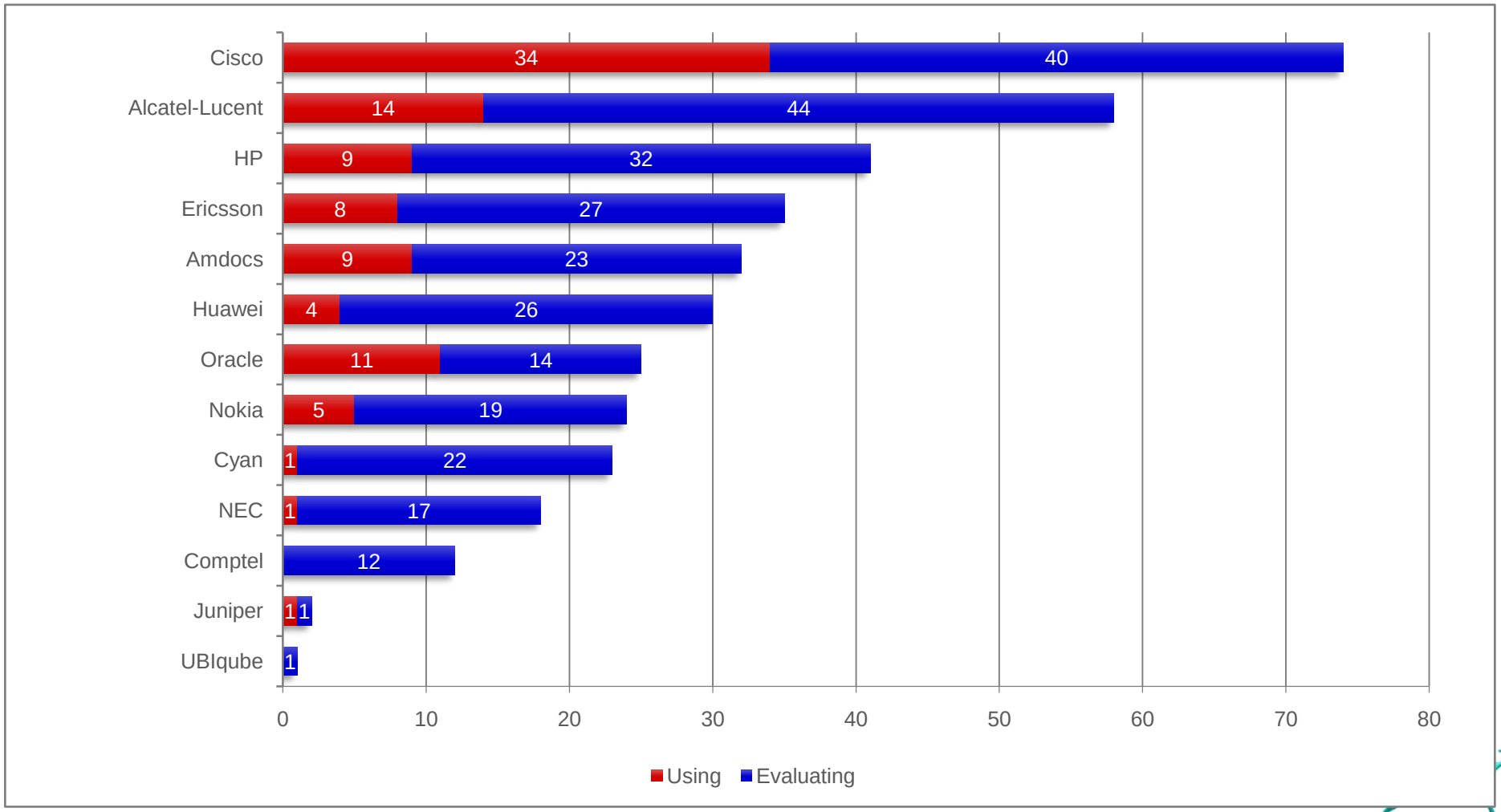
SP: NFV MANO suppliers currently evaluating/using

Which NFV MANO suppliers are you currently using or evaluating?



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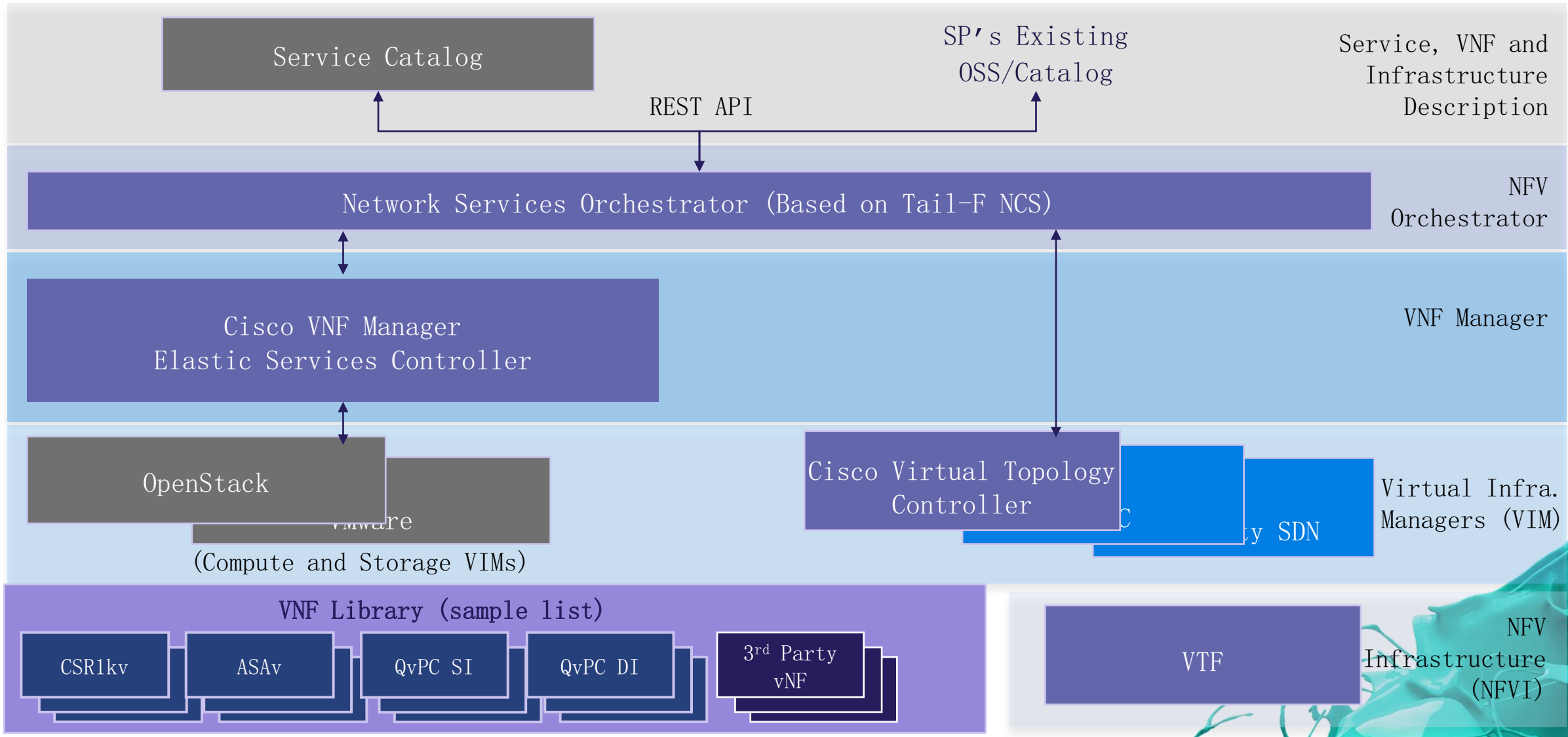
Mapping Cisco vMS Solution to ETSI NFV Framework



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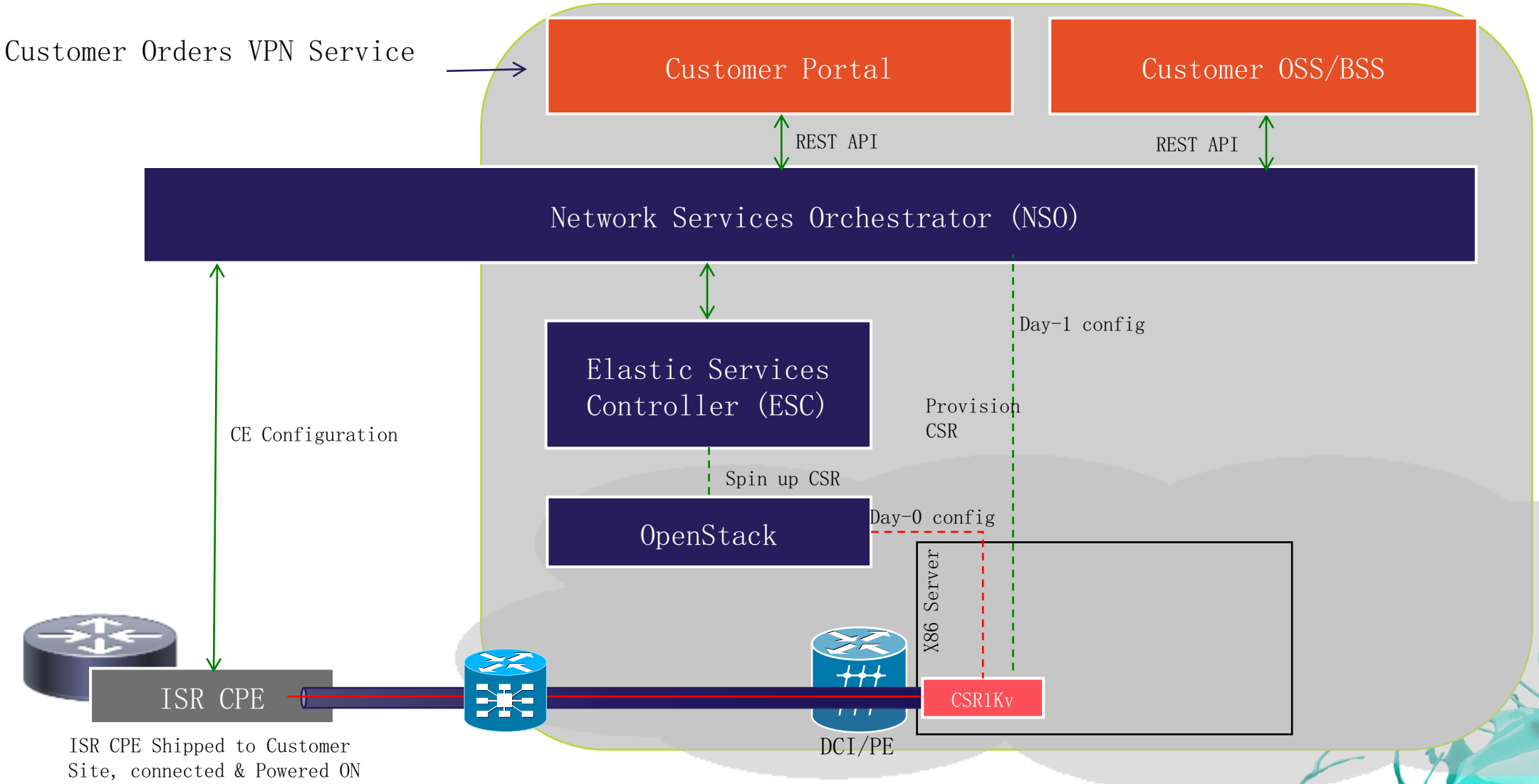
Cisco Solution Flow – Single VNF



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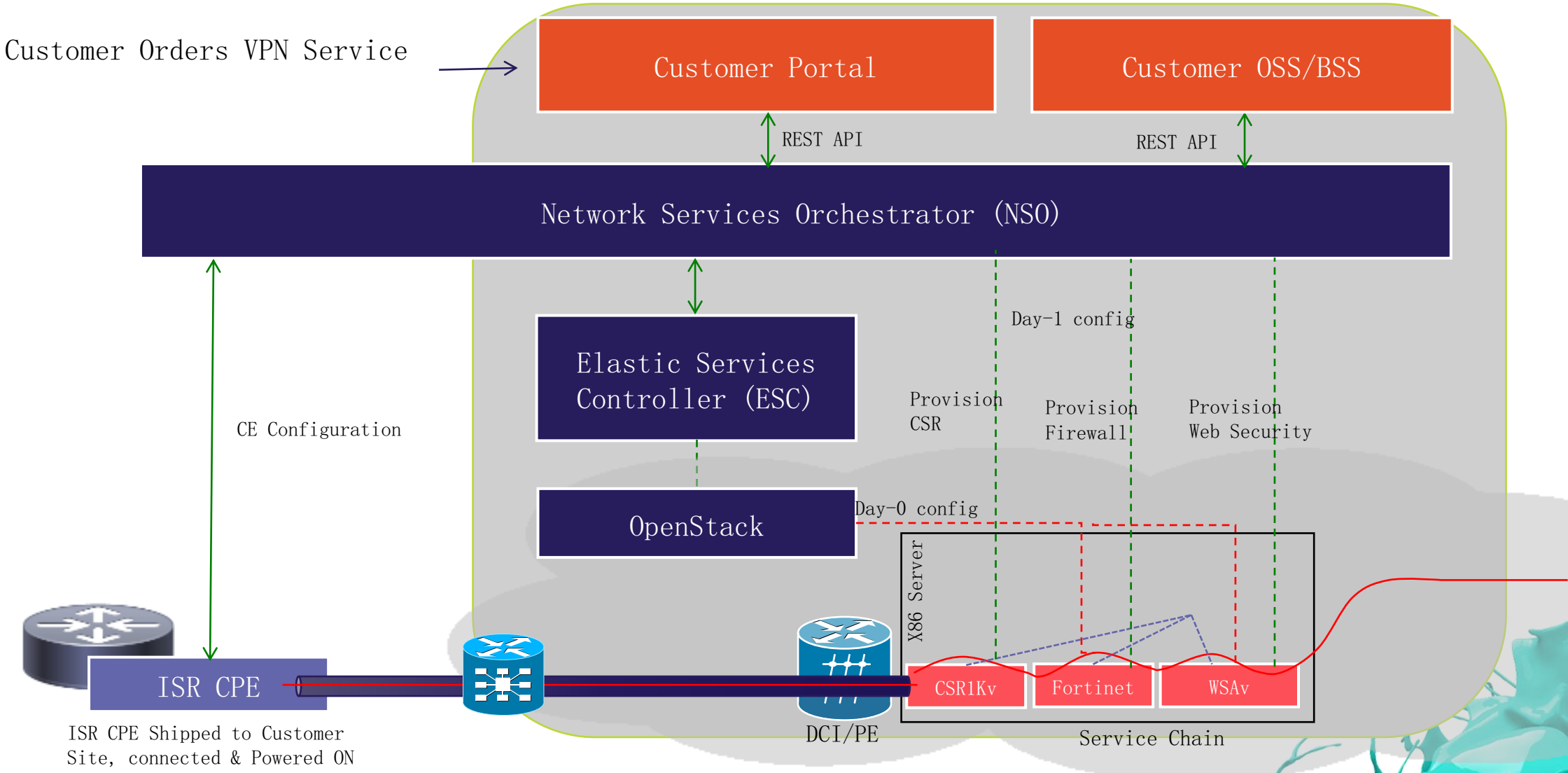
Cisco Solution Flow – Service Chain



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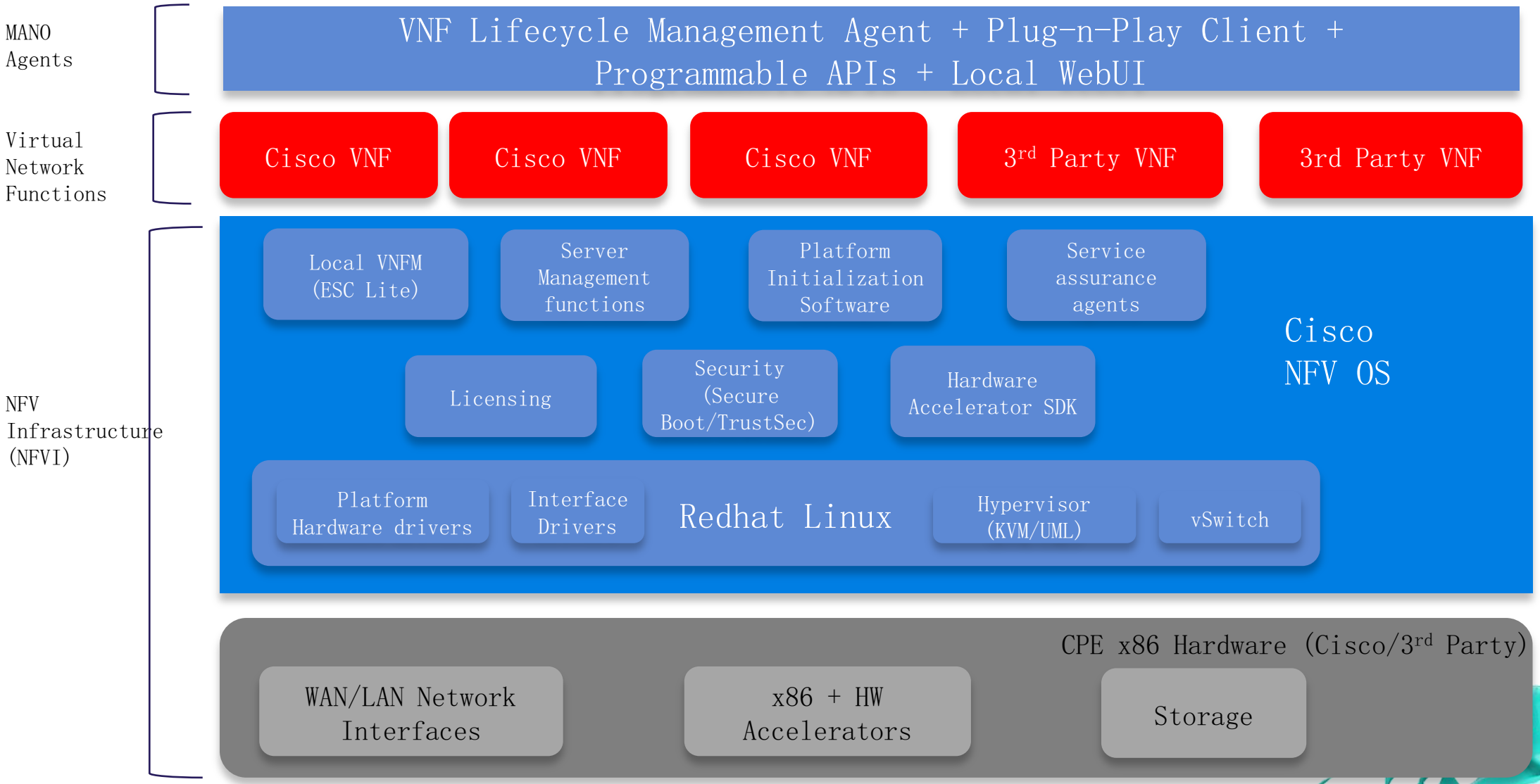
vBranch = x86 Machine running Cisco NFV OS



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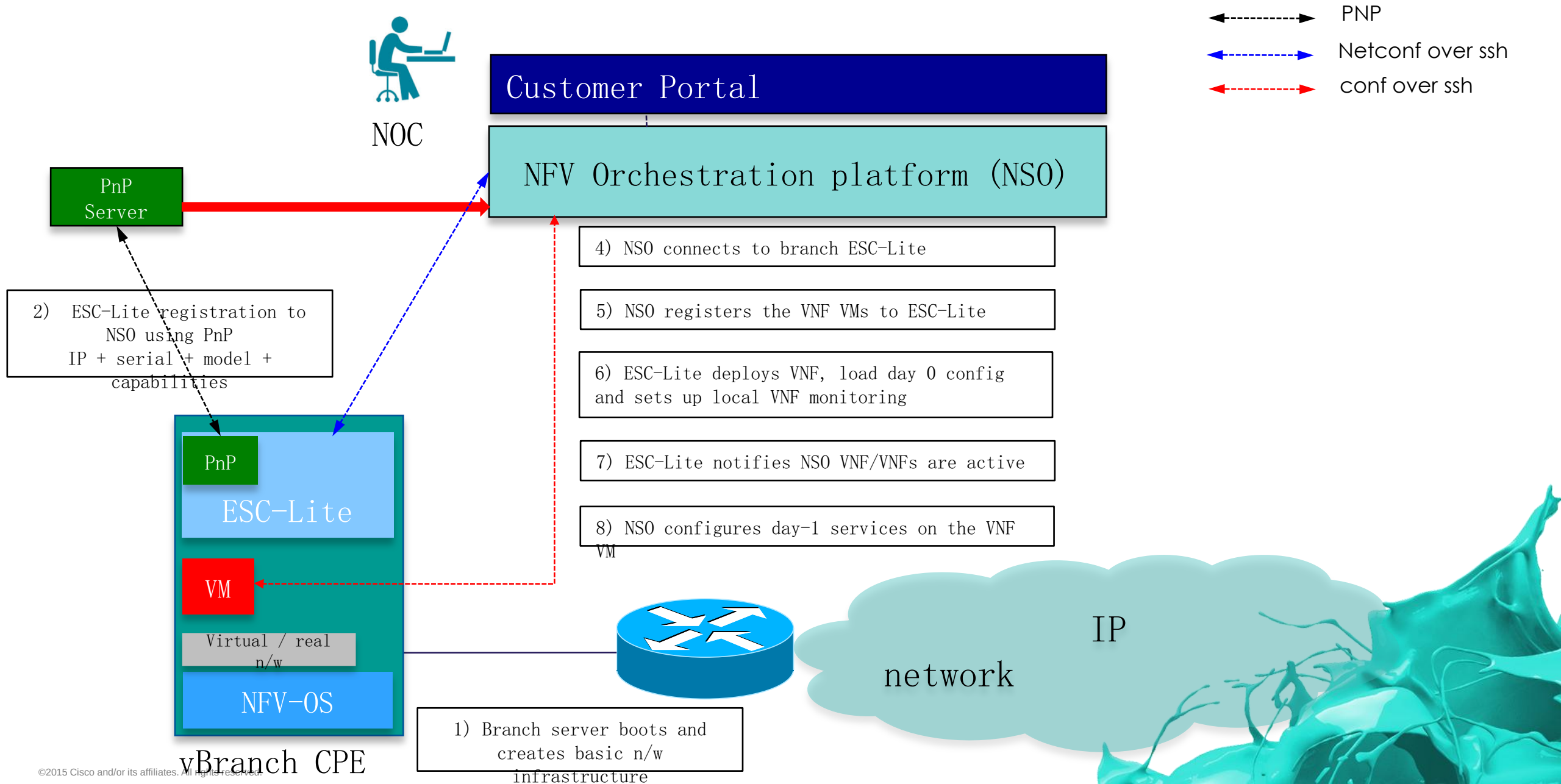
Cisco vBranch zero-touch onboarding



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Cisco NSO (tail-f) Orchestrator

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Tail-f At-a-Glance

Swedish Company
- Founded in 2005
- Offices in Stockholm and Santa Clara

85+ Customers Worldwide
- 7 of the 10 largest network equipment providers
- Multiple Tier-1 service provider deployments

Tail-f is a part of Cisco as of June 2014

Software Product Company
- **ConfD:** On-device software we sell as OEM products to network equipment providers (NEPs)
- **Network Control System (NCS):** Network control system

NCS Target Markets
- Communications service providers
- Managed network and cloud providers
- Enterprises with large data centers

- **Early leader in the fast-growing software-defined networking (SDN) and network function virtualization (NFV) markets**
- **Service orchestration for real-time service provisioning across multivendor networks**

Blue Chip Customers

Deutsche Telekom · at&t · tw telecom · ERICSSON · CISCO · Nokia Siemens Networks

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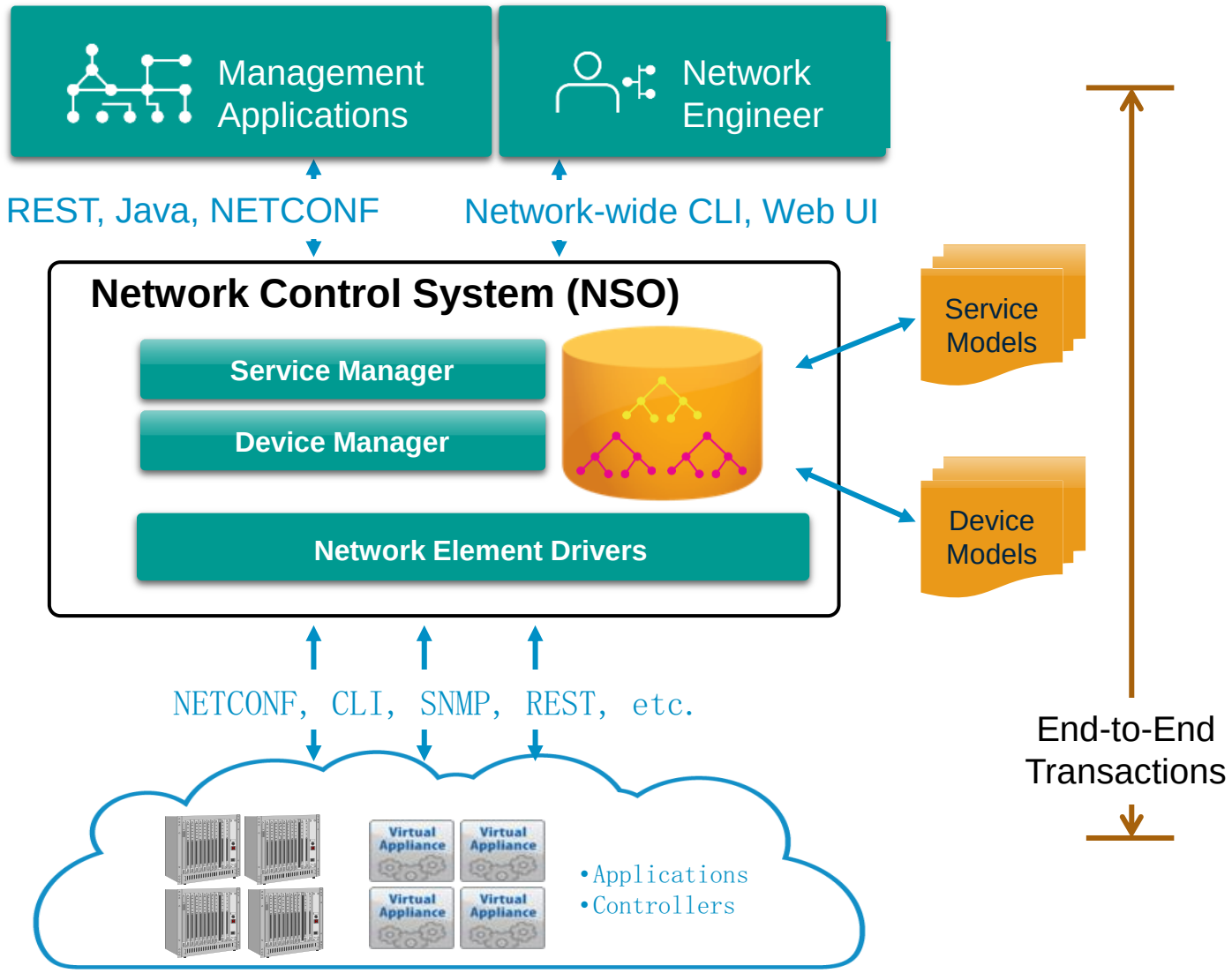
Orchestration Solution: Network Services Orchestrator



- Multi-vendor service orchestrator for existing and future networks
- Single pane of glass for:
  - L2-L7 networking
  - Hardware Devices
  - Virtual Appliances
- Model Driven Orchestration
  - Service Data models (declarative)
  - Device Data Model (for auto config)
  - All Models are YANG Based
- Highly Scalable for large infrastructure
  - One of the existing deployment is managing 60K devices on the network

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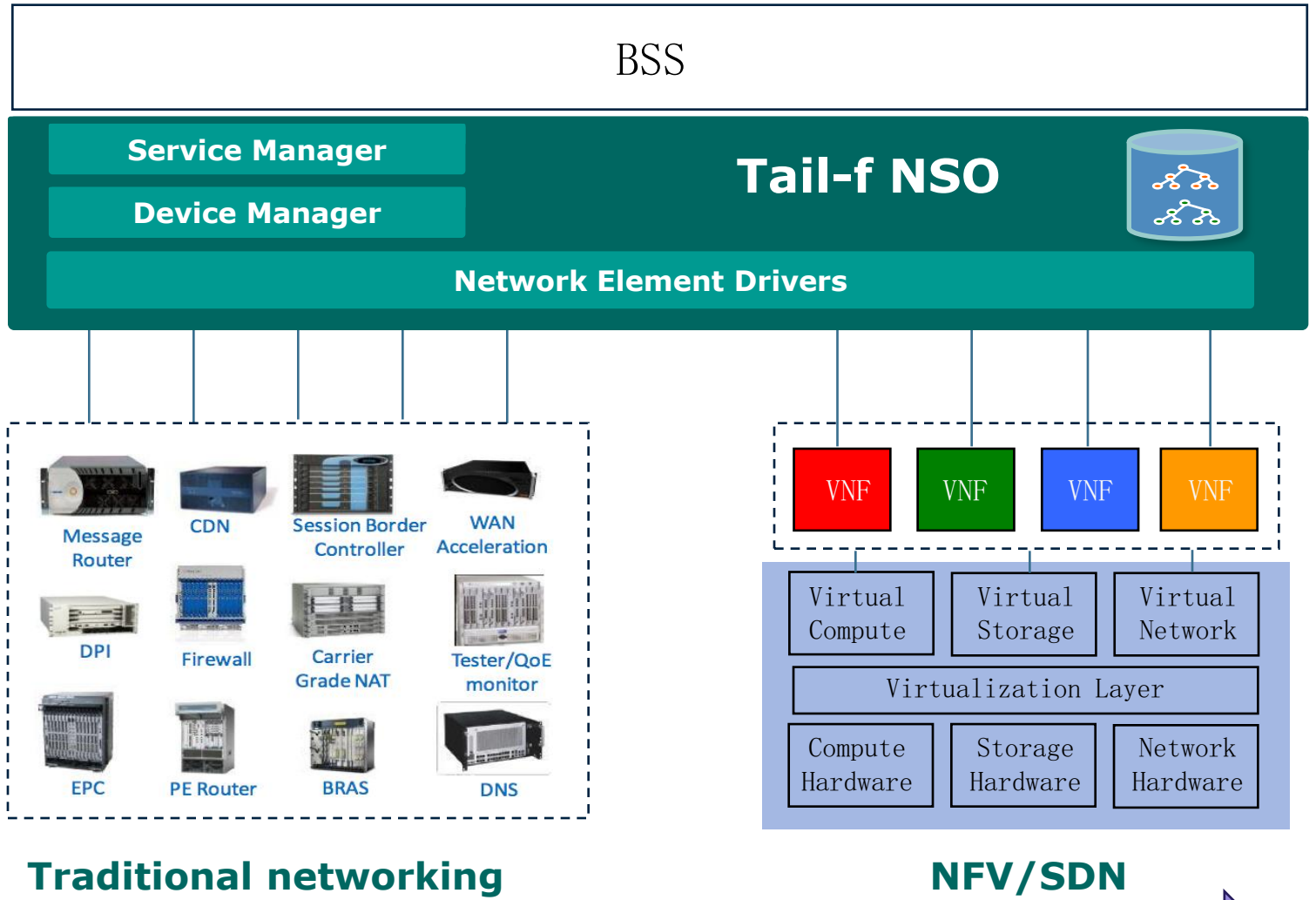
NSO: Providing a migration path to NFV



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NCS: Multi-Vendor, Multi-Technology Support

Vendor	Device/Platform
A10 Networks	ACOS (AX Series AXSoftAX (VM))
Accedian	MetroNID (AMN-1000-TE)
Adtran	Total Access 924e (2nd Gen)
Adva	FSP150CC-825, FSP150CCf-815
Affirmed Networks	Acuitas EMS
Alcatel-Lucent	SR OS (7210, 7705, 7450, 7750) SAM 5620
Allied Telesis	CentreCOM x210
Arista	DCS 7100-series
Avaya	VSP 9000-, SR 8000- and ERS 4000-series
Brocade	MLXe-4, Vyatta Plus
CableLabs	CCAP
Ciena	ESM, ASOS (5150, 5140)
Cisco	ASA-OS ASAv IOS C3500, 2800-, 7000-, ME3K-, Catalyst 2900-, Catalyst 3750-E-, Catalyst 4500-Series IOS XE ASR1001, CSR1000V IOS XR ASR9K-series, IOS-XRv NX-OS 1K-, 5K- and 7K-Series

Vendor	Device/Platform
Cisco	PNR PNR >= 8.1 QPS QPS 7.0.0.5 StarOS ASR 5K Series UCS UCS 2.2.1
Clavister	cOS Core
Dell Force10	FTOS (S4810)
Ericsson	EFN324C, Redback SE
F5 Networks	BIG-IP FW, LB, LTM 1600, LTM VM
Fortinet	FortiOS (Fortigate 3240C, 200B-BDL, VM02)
H3C	Comware (S5800)
Huawei	Quidway S3300
Infinera	DTNX
Juniper	Junos (MX, SRX, etc.) Contrail
NEC	iPASOLINK 400
Nominum	DCS
Openswitch	OVSDB (shell command)
Overture	1400, ISG2200, ISG5000, ISG5100, ISG5500, ISG6000

Vendor	Device/Platform
Palo Alto Networks	PAN-OS (PAN-PA-2020, PAN-PA-3050, PAN-VM-200)
Pulsecom	SuperG
Quagga	BGP
Riverbed	Steelhead CXA 1555-B010, Virtual Steelhead VCX-1555-M
Sonus	SBC 5x00

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A few Service Provider NSO Implementations

at&t

Domain 2.0:
Transformation to cloud-based network (NFV)

Deutsche Telekom

TeraStream:
Transformation to cloud-based network (NFV)

twtelecom

Automated L2/L3 VPN service provisioning

Tier1 SP in Asia

Security-as-a-Service for enterprises (NFV)

Twitter

Network automation of large data centers

NSO has the unique technology that directly addresses two key business drivers :

1. Service agility
2. Automated operations

and a technology migration path from today's networks to NFV

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Cisco WAE (Cariden) WAN Automation

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Cariden At-a-Glance

US Company
- Founded in 2001
- Head office in San Jose

Very large Customer base worldwide
- 85% of Tier-1 SP use Cariden Software
- Niche product for network optimization

Cariden is a part of Cisco as of Dec 2012

Software Product Company
- **MATE Collector:** Collect traffic statistics from multi-vendor networks
- **MATE Design:** Planning and Optimizing engine
- **MATE Live:** Analytics engine

Cariden WAE Target Markets
- Communications service providers
- Managed network and cloud providers
- Enterprises with large data centers

- **Market leader in the WAN optimization and Monitization domains.**
- **Enables SDN across multi-vendor networks.**

Blue Chip Customers

telecom
SingTel
Telstra
Telkom Indonesia
CISCO
FAR EASTONE 遠傳
NTT Communications

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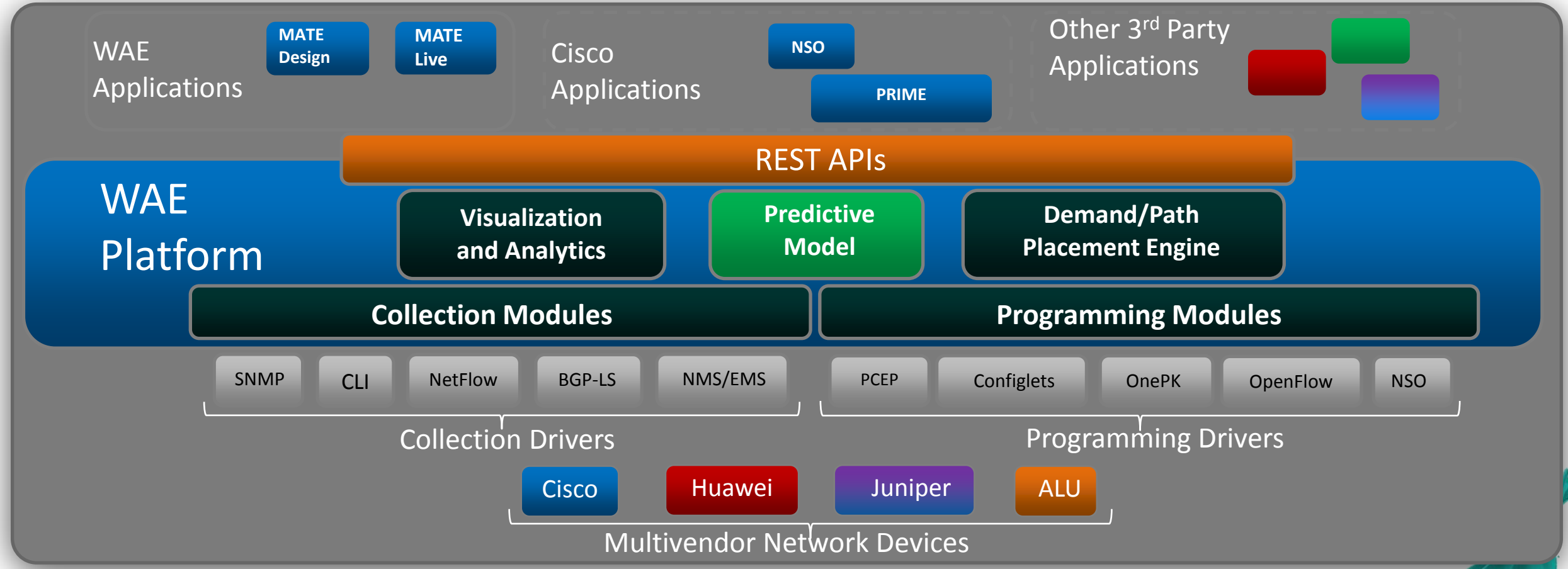
Cisco WAE Architecture



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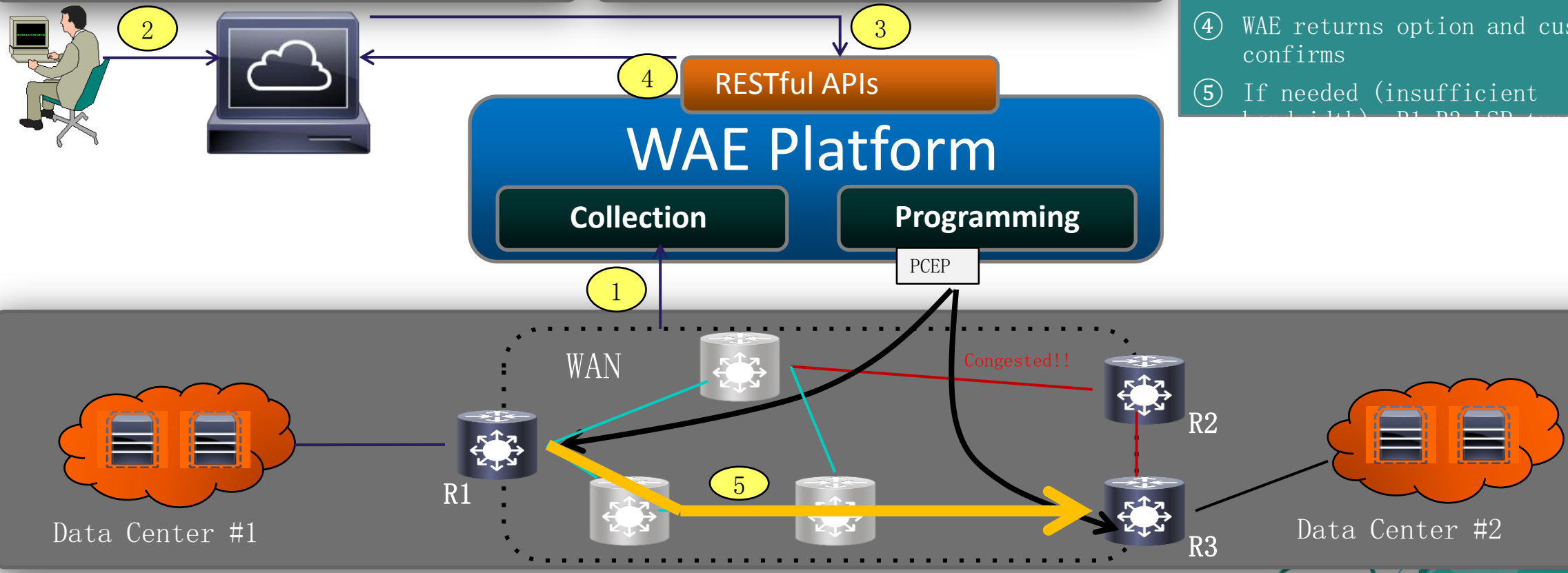
Use-Case: On-Demand Bandwidth Scheduling

Problem:
Customer has an "on demand" need for a DC backup or to move a cache

Solution:
After determining a best path, WAE programs an LSP via PCEP.

① Network conditions reported to collector
② Customer requests DC #1 – DC #2 bandwidth ASAP
③ Demand admission request: <R1-R3, B/W, NOW>
④ WAE returns option and customer confirms
⑤ If needed (insufficient



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WAE Key Values – Network Optimization and Monetization

Optimization

- Global Load Balancing
- Multi Layer Optimization
- Coordinated Maintenance
- LSP splitting and merging
- Network Rearranging
- Segment Routing

Monetization

- Bandwidth Calendaring
- On-Demand Bandwidth
- Premium Routing
  - Path Diversity
  - Latency Based Forwarding
  - High priority traffic engineering

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