WELCOME

Before WE Start

ALU's sdn/nfv solution is
not, h/w box!
not open-flow H/W switch!

We are PURELY 100% SOFTWARE BASE nfv/sdn PLATFORM!

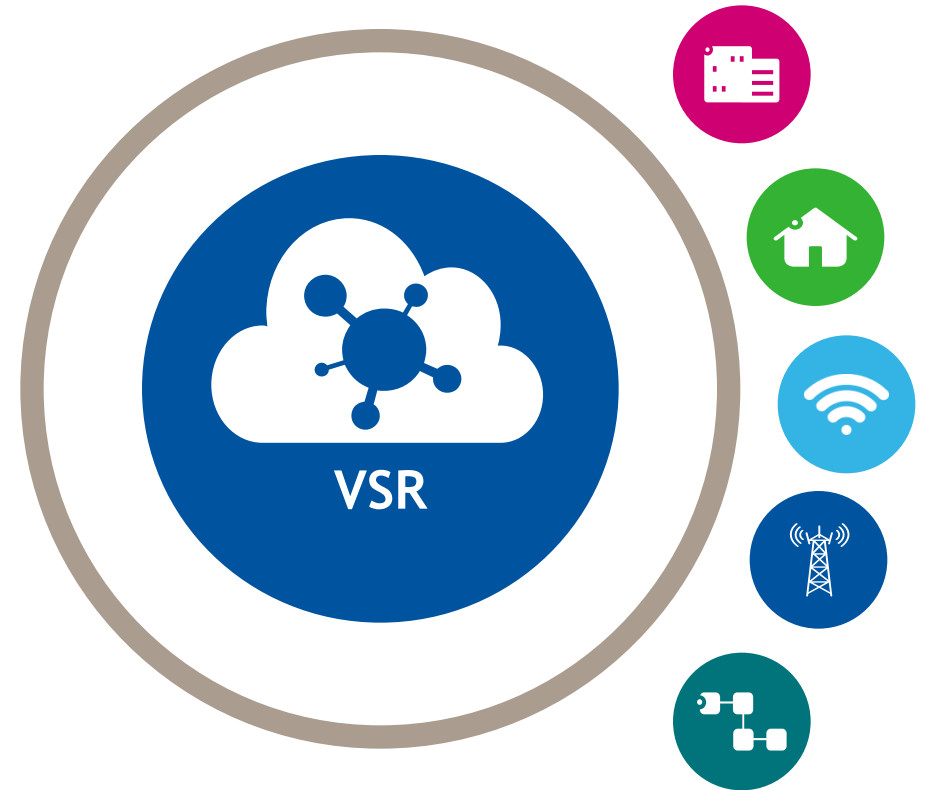# NFV/SDN PLATFORM FOR VIRTUALIZED SERVICE

VSR

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nuagenetworks™

Alcatel·Lucent

AGENDA

- NFV Challenge

- Alcatel-Lucent NFV/SDN Platform

- Summary

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AGENDA

- ## NFV Challenge

- Alcatel-Lucent NFV/SDN Platform

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NFV Challenge
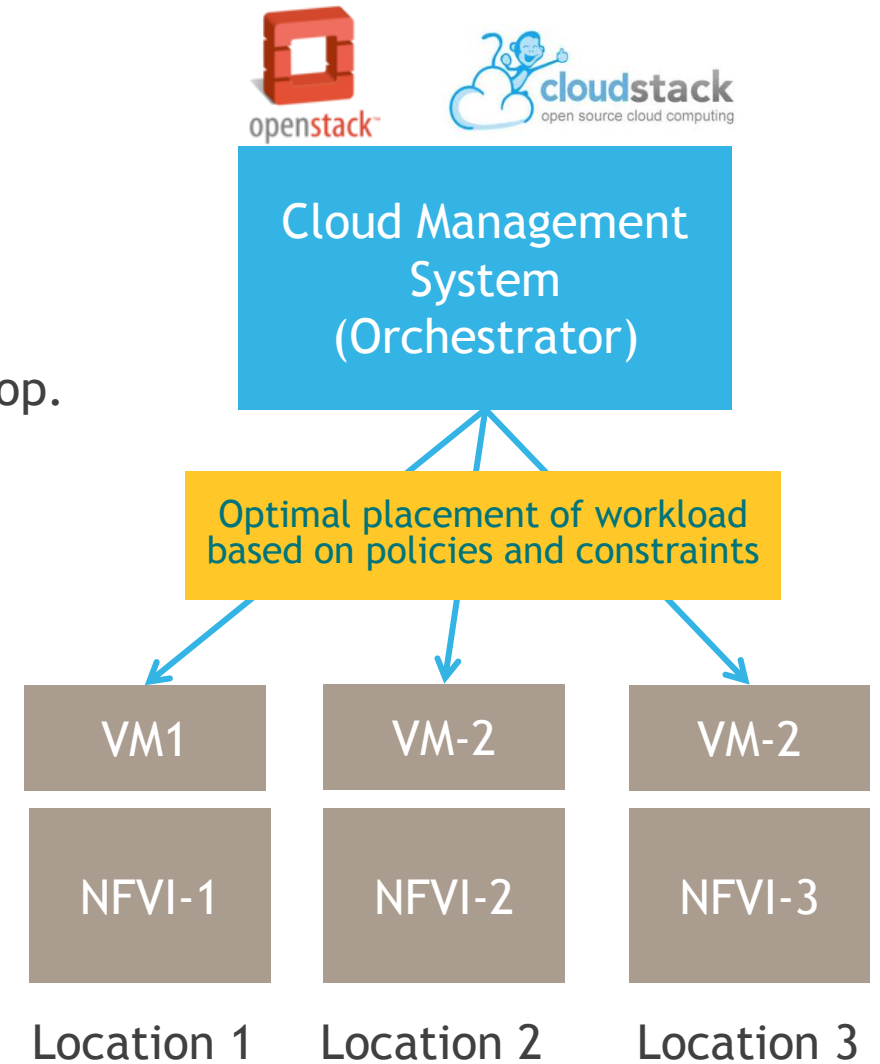
: Life Cycle Management

REQUIREMENT	• Location oriented VNF(application)
	   ie. vCPE, vEPC, vRouter, vCDN
	• VM Distribution at right-on-time!
	   ie. SNS, Game Publishing, XIAOMI on-line shop.

CHALLENGE	• How to DO VM distribution? • How to DO CAPACITY management? • How to PLACE optimal workloads?
CONSIDERATION	• Optimal VM Placement algorithm • End-to-end resource abstraction, : policy based resource allocation

openstack   cloudstack
open source cloud computing

Cloud Management System (Orchestrator)

Optimal placement of workload based on policies and constraints

VM1	VM-2	VM-2
NFVI-1	NFVI-2	NFVI-3
Location 1	Location 2	Location 3

Require Scale In/Out with Optimal VM distribution!

NFV Challenge

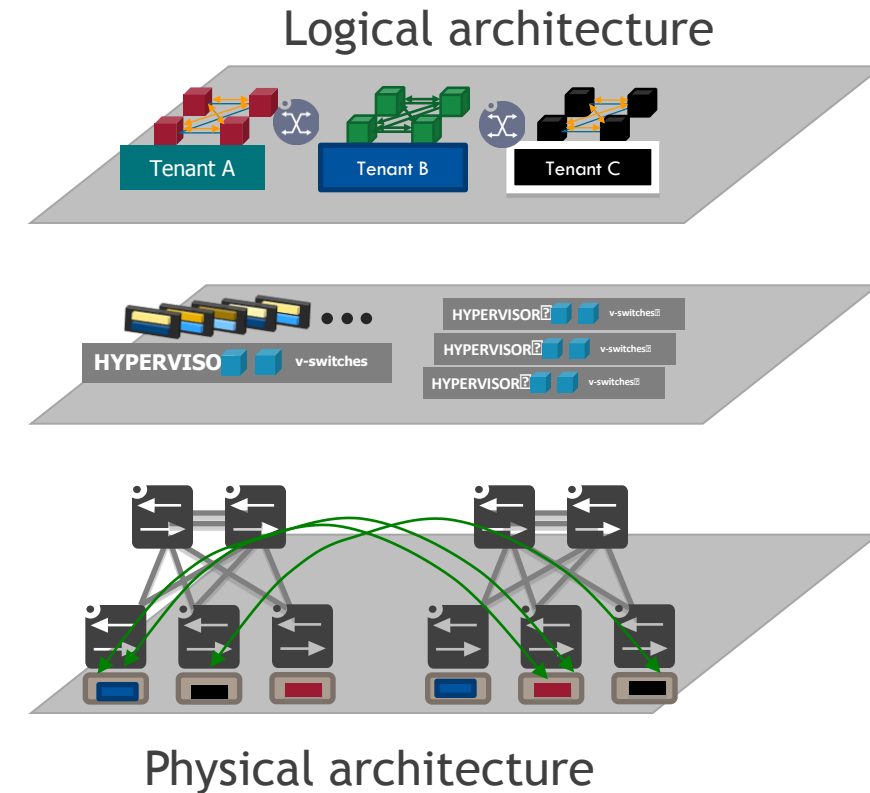## : Network Connectivity

REQUIREMENT

- Multiple virtual network per TENANT/NFV
  ie. AWS VPC
- Require interconnection VM to Users
  ie. VM to MPLS-VPN user

CHALLENGE

- How to SUPPORT virtual network for tenant?
- How to connect to SPAN network across
  different locations?
- How to monitoring underlay and overlay?

CONSIDERATION

- Automated network spanning across locations
- Connecting to MPLS-VPN users
- Rich networking policies(service changing)
- Monitoring both underlay and overlay!

Logical architecture

Tenant A   Tenant B   Tenant C

HYPERVISO v-switches   HYPERVISOR v-switches
                         HYPERVISOR v-switches
                         HYPERVISOR v-switches

Physical architecture

Virtualized Services require SDN and Operation, Maintenance Tool!

NFV Challenge

: Openness

REQUIREMENT

- In order to reach the goal of efficiency, NFV platform must host as many VNFs as possible
- Prevent vendor lock-in

CHALLENGE

- How to allow VNFs from different vendors to run on the same NFV platform?
- How to allow mix-and-match of underlying resources and services?

CONSIDERATION

- Use open-source software and Open APIs
- Modular solution design with plugins
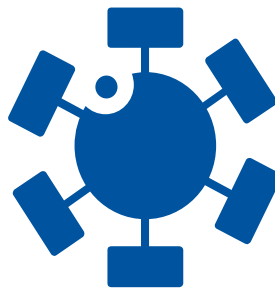
OPEN AND MULTIVENDOR
REDUCE COSTS, AVOID LOCK-IN

ubuntu

openstack™

KVM

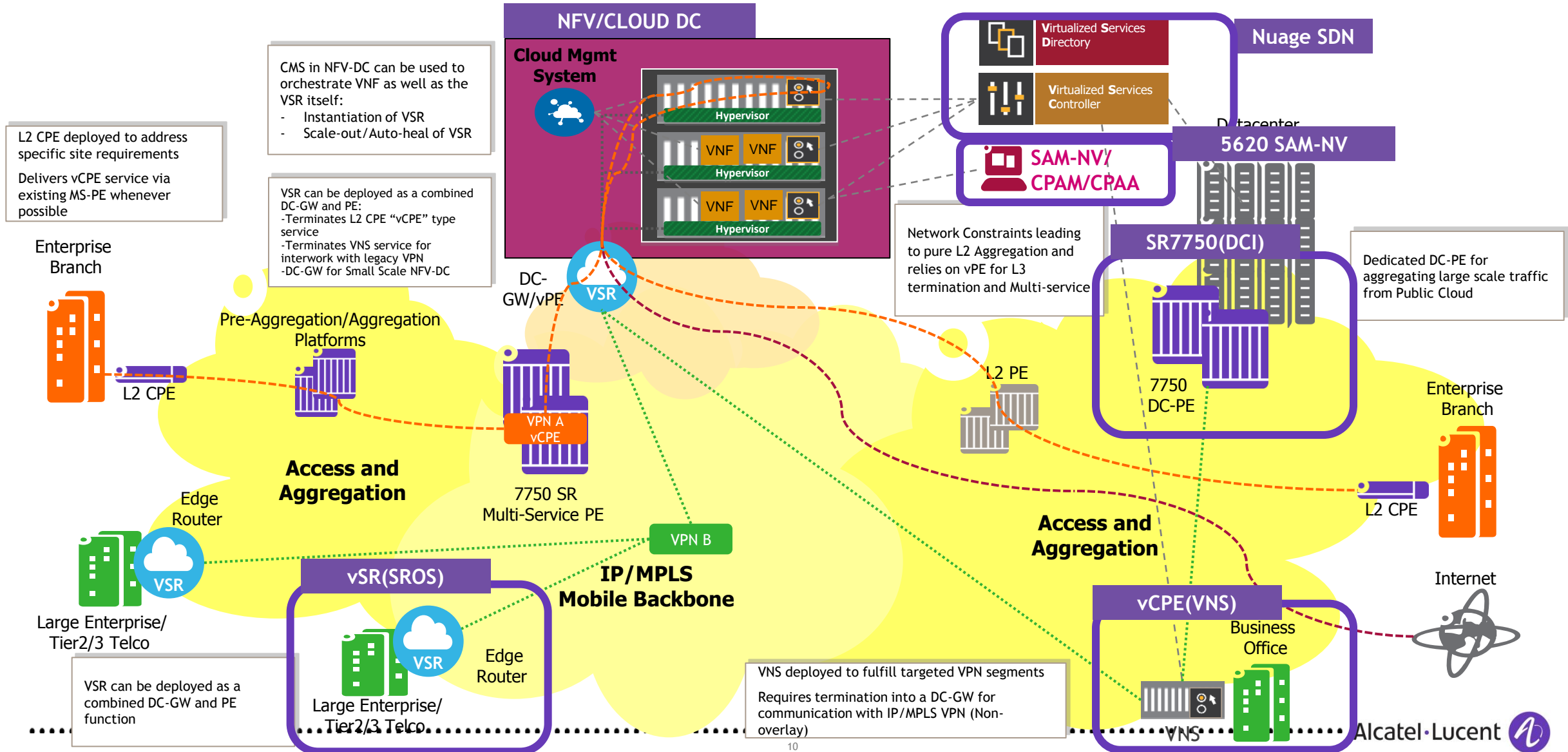Multivendor supported Platform is required for CAPEX reduction!

AGENDA

- SDN/NFV Market Trend

- Alcatel-Lucent NFV/SDN Platform

- Summary
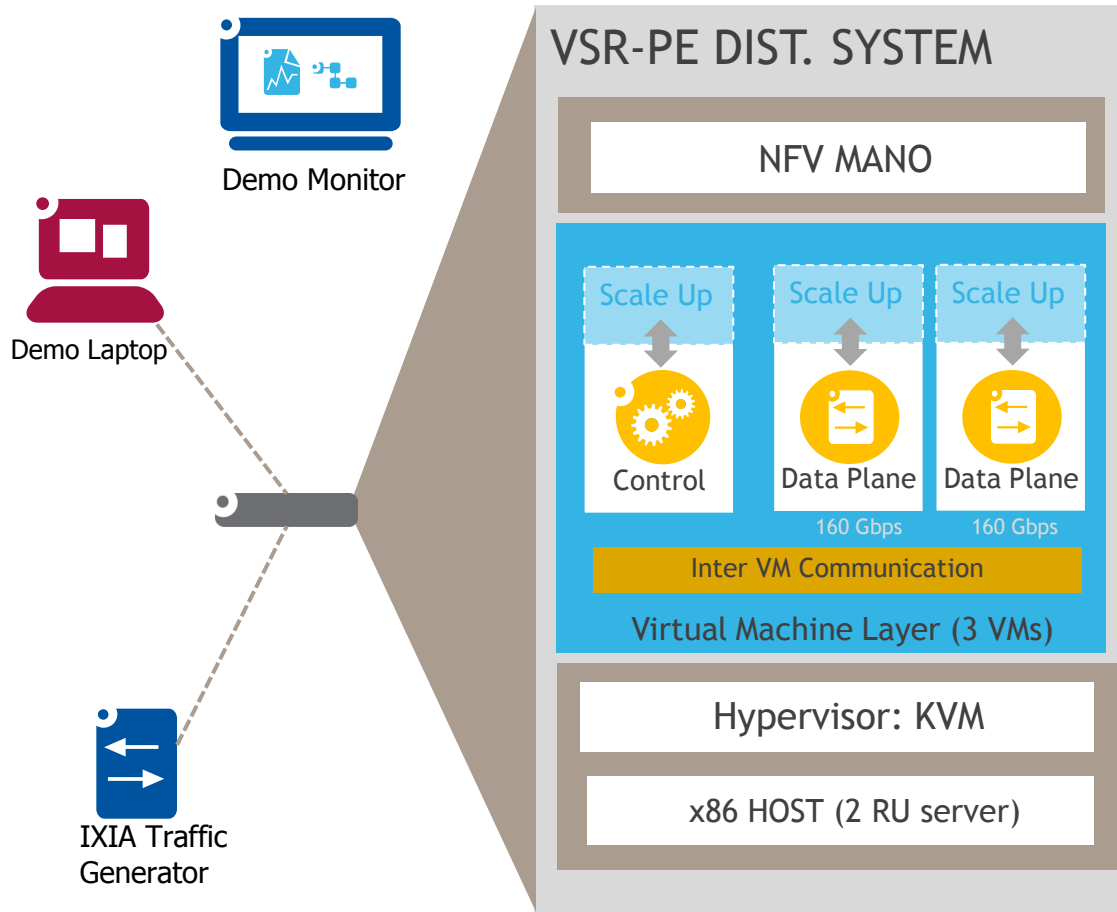
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Alcatel-Lucent NFV/SDN PLATFORM : SOLUTION Positioning

CMS in NFV-DC can be used to orchestrate VNF as well as the VSR itself:
- Instantiation of VSR
- Scale-out/Auto-heal of VSR

L2 CPE deployed to address specific site requirements

Delivers vCPE service via existing MS-PE whenever possible

VSR can be deployed as a combined DC-GW and PE:
-Terminates L2 CPE "vCPE" type service
-Terminates VNS service for interwork with legacy VPN
-DC-GW for Small Scale NFV-DC

NFV/CLOUD DC

Cloud Mgmt System

Hypervisor

VNF | VNF
Hypervisor

VNF | VNF
Hypervisor

Virtualized Services Directory

Virtualized Services Controller

Nuage SDN

SAM-NV/ CPAM/CPAA

Datacenter

5620 SAM-NV

Network Constraints leading to pure L2 Aggregation and relies on vPE for L3 termination and Multi-service

SR7750(DCI)

7750 DC-PE

Dedicated DC-PE for aggregating large scale traffic from Public Cloud

DC-GW/vPE

VSR

Enterprise Branch

L2 CPE

Pre-Aggregation/Aggregation Platforms

VPN A vCPE

7750 SR Multi-Service PE

Access and Aggregation

Edge Router

VSR

Large Enterprise/ Tier2/3 Telco

VSR can be deployed as a combined DC-GW and PE function

vSR(SROS)

VSR

Edge Router

Large Enterprise/ Tier2/3 Telco

VPN B

IP/MPLS Mobile Backbone

L2 PE

Access and Aggregation

Enterprise Branch

L2 CPE

Internet

vCPE(VNS)

Business Office

VNS

VNS deployed to fulfill targeted VPN segments

Requires termination into a DC-GW for communication with IP/MPLS VPN (Non-overlay)

10

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Alcatel-Lucent NFV/SDN PLATFORM
NFV: vsr (VIRTUALIZED SERVICE ROUTER)

VSR

VSR-PE DIST. SYSTEM

NFV MANO

Scale Up	Scale Up	Scale Up
Control	Data Plane	Data Plane
	160 Gbps	160 Gbps

Inter VM Communication

Virtual Machine Layer (3 VMs)

Hypervisor: KVM

x86 HOST (2 RU server)

Demo Monitor

Demo Laptop

IXIA Traffic Generator

DEMO HIGHLIGHTS:

VSR-PE throughput (320 Gbps)

- 4 x 40GE ports @ line rate
- IPv4 forwarding with x M flows
- All in single 2RU server
- Leveraging Intel partnership
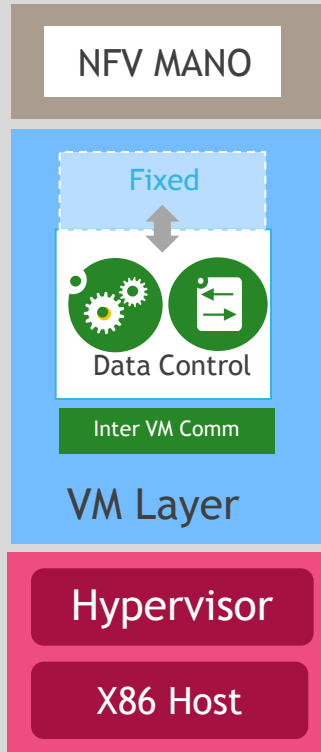- DPDK tool kit
- SRIOV drivers

intel inside™

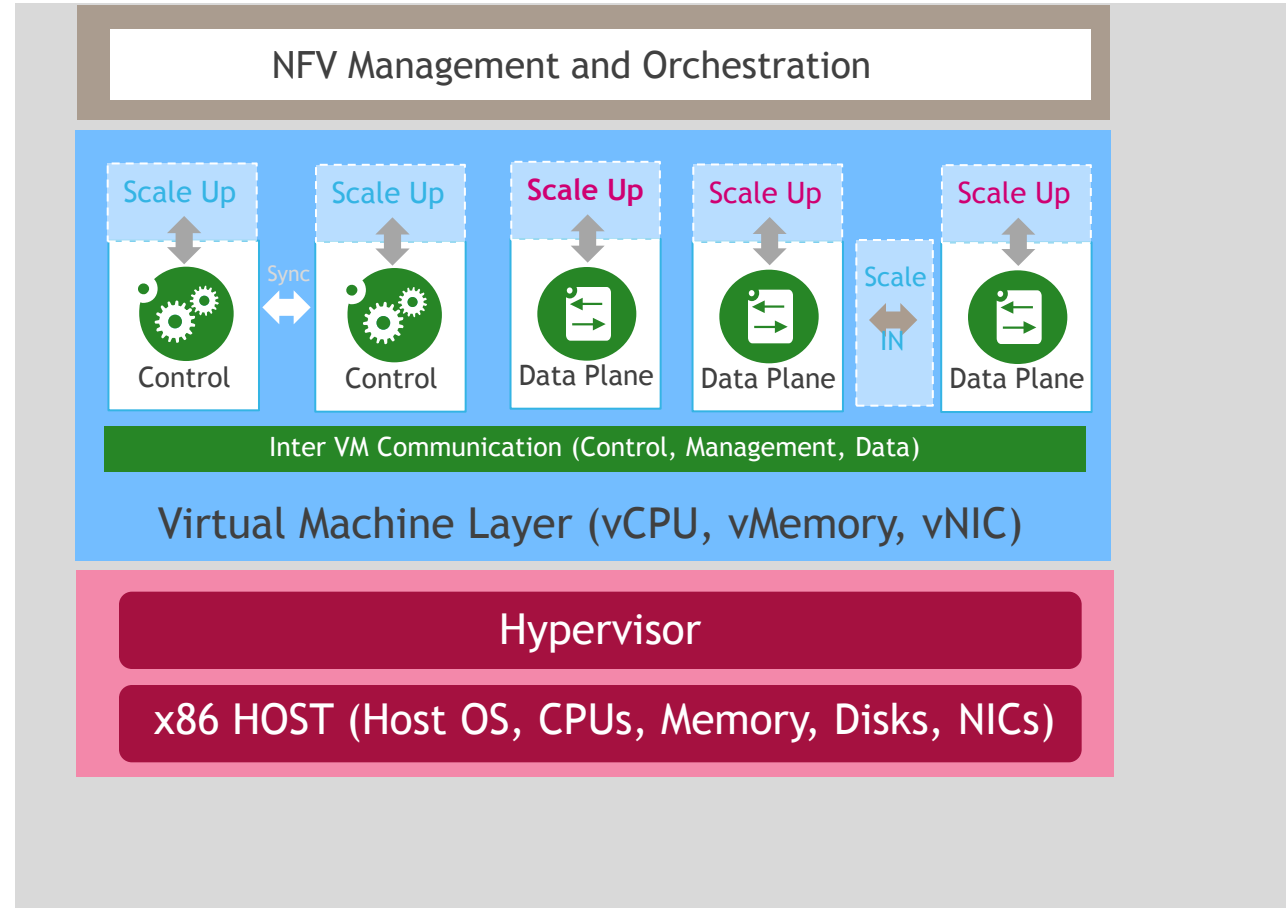# SUPPORTS MPLS-PE, BGP-RR, SIMULATOR Function!

Alcatel-Lucent NFV/SDN PLATFORM
Nfv: vSR FOR SCALE IN/OUT

VSR

VSR INTEGRATED SYSTEM

NFV MANO

Fixed

Data Control

Inter VM Comm

VM Layer

Hypervisor

X86 Host

VSR DISTRIBUTED SYSTEM

NFV Management and Orchestration

Scale Up	Scale Up	Scale Up	Scale Up	Scale Up
Control	Sync — Control	Data Plane	Data Plane	Scale IN — Data Plane

Inter VM Communication (Control, Management, Data)

Virtual Machine Layer (vCPU, vMemory, vNIC)

Hypervisor

x86 HOST (Host OS, CPUs, Memory, Disks, NICs)

Easy to Scale-In/Out. Architecture! No, Multiple Mgmt. IP!

Alcatel-Lucent NFV/SDN PLATFORM
NMS: sam (sERVIcE assurance manager)-nv
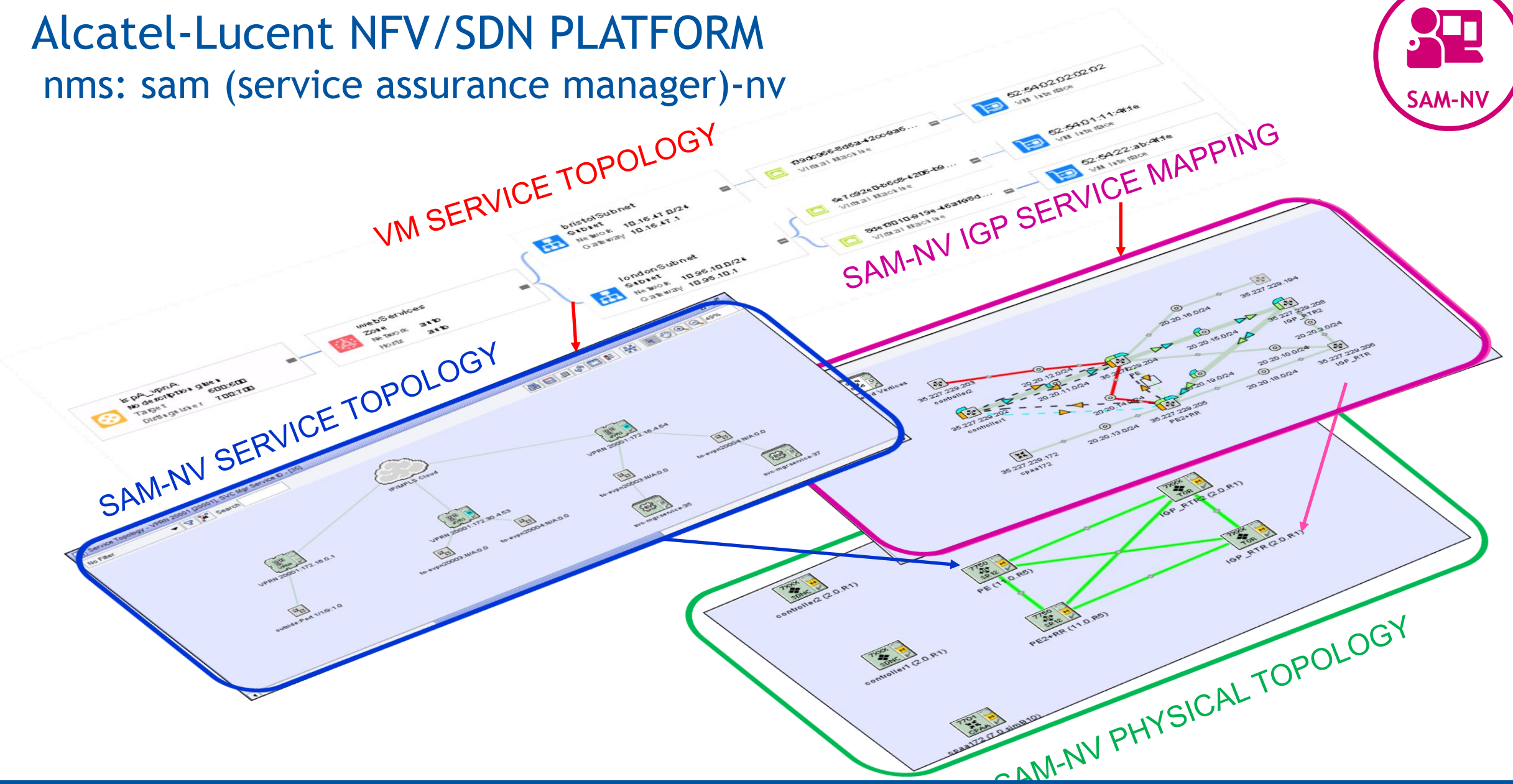
SAM-NV
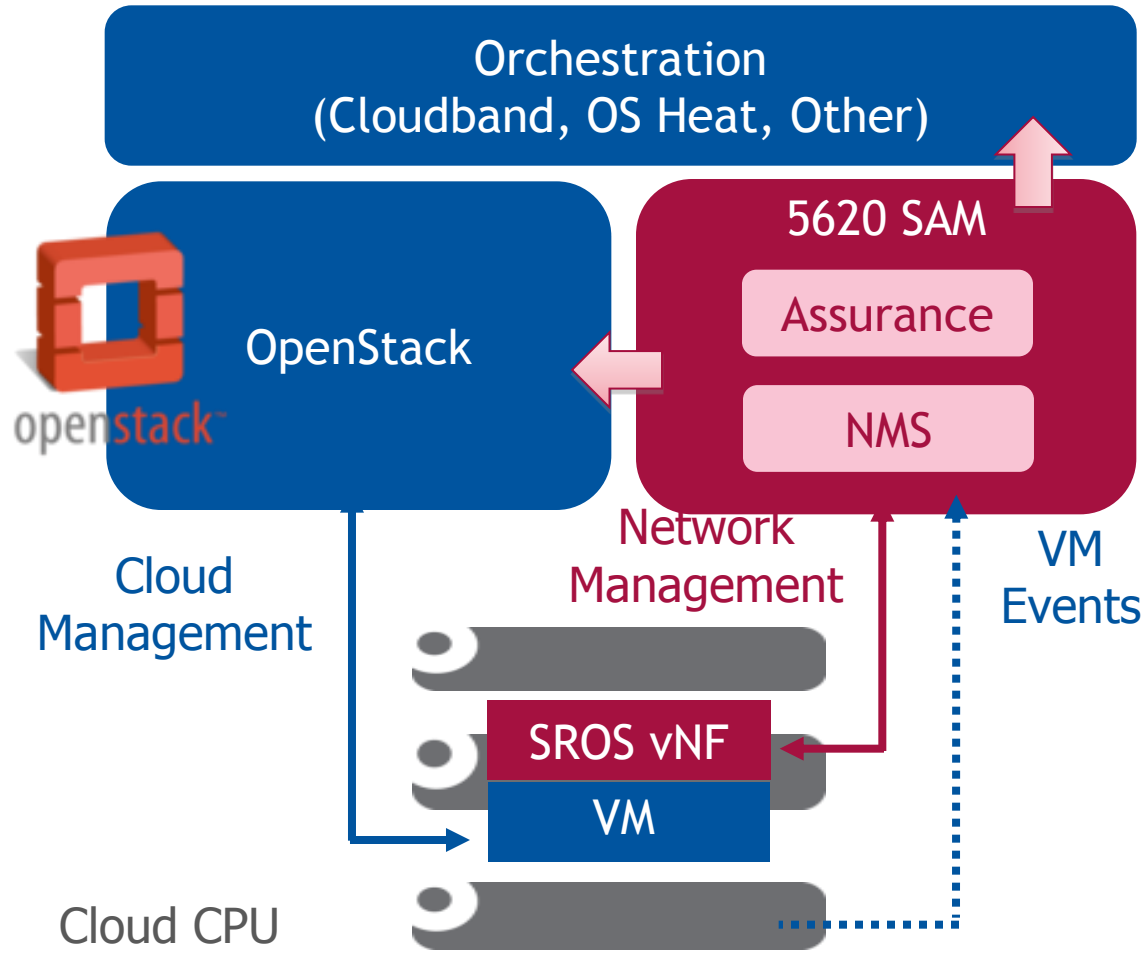
- SROS cloud infrastructure visibility for network operations and assurance

- Network management of vSR(SROS vNF)

    - **Monitoring and Troubleshooting**
    - **Overlay/Underlay Correlation**
    - **Dynamic Virtual Service Discovery**

    - **Capacity monitoring vSR for capacity upgrade**

Service-aware NMS technology enhanced for the SDN environment!

Alcatel-Lucent NFV/SDN PLATFORM
nms: sam (service assurance manager)-nv

SAM-NV

VM SERVICE TOPOLOGY

SAM-NV IGP SERVICE MAPPING
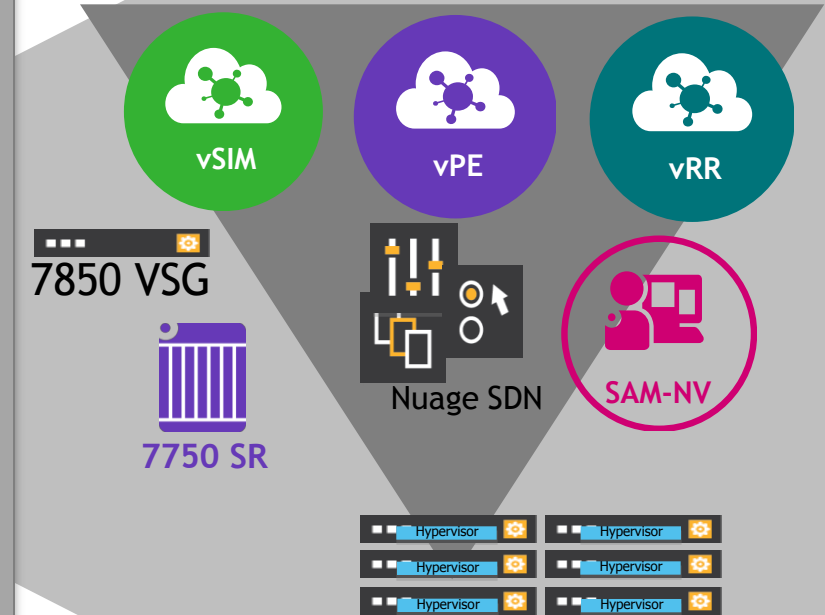
SAM-NV SERVICE TOPOLOGY

SAM-NV PHYSICAL TOPOLOGY

Not Just, Monitoring! SAM supports Routing & Service Topology Simulation!

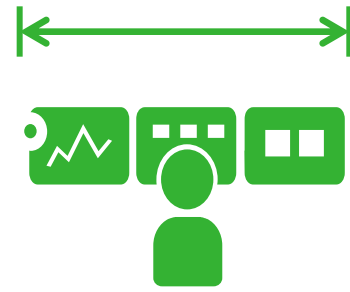# Alcatel-Lucent's Virtualized Solution
: Integrated Package

Package	Use Cases
A — **SIMULATION PACKAGE** :VSIM+VRR+SAM/CPAM/CPAA	✓ **TB/NOC/LAB**
B — **SDN/NFV PACKAGE** :NUAGE+VPE+SAM-NV/CPAM/CPAA	✓ **Mobile SP/ISP for NFV**
C — **SP PACKAGE** :NUAGE+VPE+VRR+SAM-NV/CPAM/CPAA	✓ **Tier 2/3 SP EDGE(PE)** ✓ **Public, Research and eDU net** ✓ **Global XLE(PE)**
D — **DATA CENTER PACKAGE** : NUAGE+SAM-NV/CPAM/CPAA : 7750 SR DCGW (DCI) : 7850 VSG/VRSG (VXLAN G/W)	✓ **Cloud SP (public/private/hybrid)** ✓ **Global XLE(private cloud)** ✓ **Managed Services**
E — **V-CPE PACKAGE** : NUAGE+SAM-NV/CPAM/CPAA : VCPE : VSG (VXLAN G/W)	✓ **ISP** ✓ **Global XLE** ✓ **Managed Services**

vSIM vPE vRR

7850 VSG

7750 SR

Nuage SDN

SAM-NV

Hypervisor   Hypervisor
Hypervisor   Hypervisor
Hypervisor   Hypervisor

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- Alcatel-Lucent Virtualized Solution
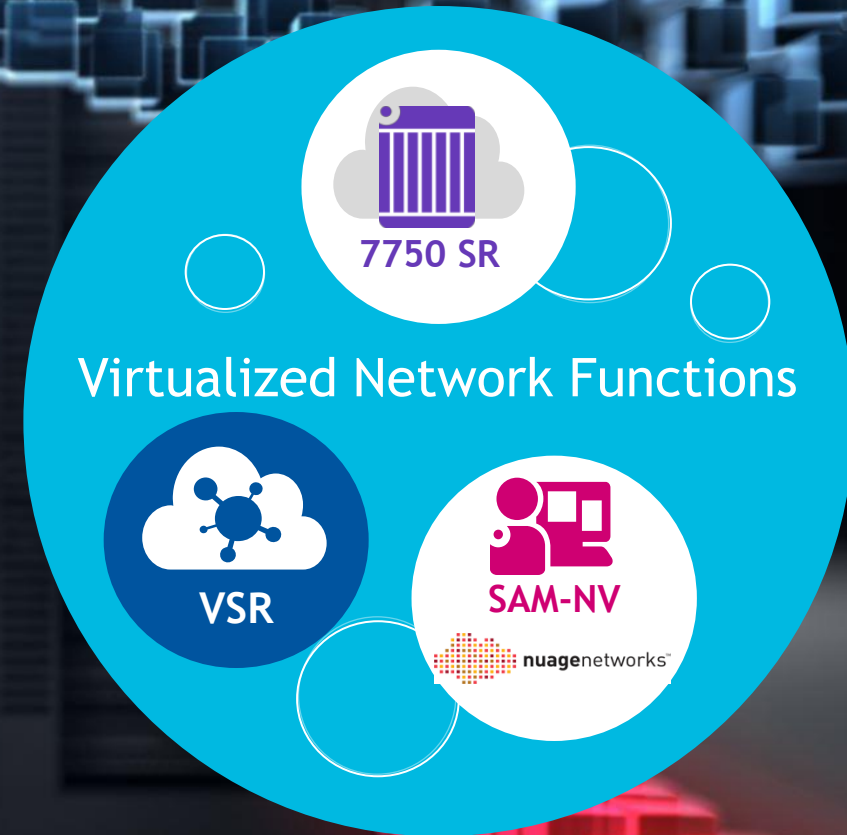
- Summary

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Summary
ALCATEL-LUCENT'S nfv/sdn platform

Our Approach IS Cloud-Enabled :

- open platform!
  : supports ANY HYPERVISOR, ANY CMS!

- Integrated PLATFORM!
  : virtual service router, sdn (nuage)
  : dc gateway(SR 7750 PE)

- Assurance tools!
  : SERVICE MONITORING & simulation tool

7750 SR

Virtualized Network Functions

VSR

SAM-NV

nuagenetworks

www.alcatel-lucent.com