Virtualization & Automation

with **focus on NFV – Cloud CPE's & Automation with Service Chain's SDN/NFV**

SANOG 27, Kathmandu
25-Jan-2016

Gaurav Sethi
gasethi@juniper.net
Senior Systems Engineer – Juniper Networks

Video Introduction

Copyright © 2015 Juniper Networks, Inc.

POP A QUIZ TIME

- Enterprise customer is looking for ICT solutions…
  - Option 1: SP provides ICT on project basis and takes anywhere from 2-3 months to deliver
  - Option 2: SP can deliver ICT services within 1 week
  - Option 3: 3rd. Party SI can deliver ICT services within 1.5 months

==========

- Which option would the customer choose?

- Enterprise customer is looking for ICT solutions…
  - Option 1: SP1 provides ICT by project basis and takes anywhere from 2-3 months to deliver (costs NPR 50K)
  - Option 2: SP2 can deliver ICT services within 1 week (costs NPR 53K)
  - Option 3: 3rd. Party SI can deliver ICT services within 1.5 months (Costs NPR 48K)

==========

- Which option would the customer choose?

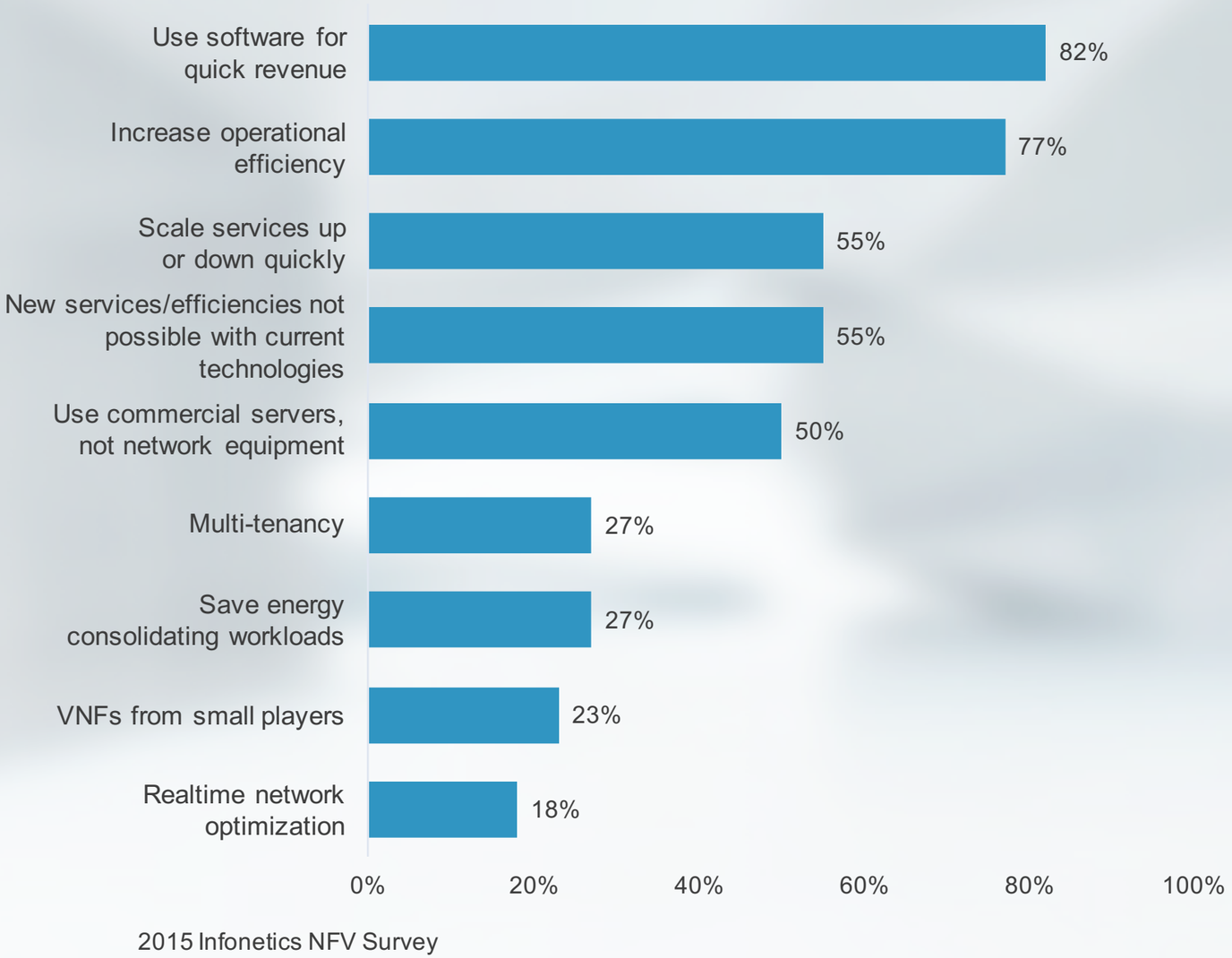
Copyright © 2015 Juniper Networks, Inc.

Agenda

- Establish Automation and Virtualization for Provider’s
- NFV Cloud CPE Use Case
  - NFV Case Studies
- NFV/SDN Automation Mobility Use Case
  - Recap of SDN & NVF Architecture & Ecosystem
- Key Takeaway's

Copyright © 2015 Juniper Networks, Inc.

What are Provider's looking for?



2015 Infonetics NFV Survey

- Decouple and deliver Software and Hardware independently to greatly reduce time to revenue and new services TTM
- Evolve to a more agile and elastic service delivery platform that eases integration with existing OSS/BSS systems
- Provide E2E simplification & automation of network, service provisioning and management
- Enable multi-tenant solution that is scalable with OEM and 3rd party best of breed VNF
- Build a truly open, modular and standards based Orchestration software

Copyright © 2015 Juniper Networks, Inc.

Network Virtualization Technologies automated by SDN

- Network Function:
  - VNF – Virtual Network Function
  - NFV – Network Function Virtualization

  - Firewall is a VNF. DPI is a VNF, CGNAT is a VNF.
  - If an Enterprise implements all 3 VNFs in their network, then Enterprise supports NFV.

- SDN (Software Defined Networking)
  - Purpose => “Network Virtualization”

Copyright © 2015 Juniper Networks, Inc.

Building Blocks for Automated Service

Customer

a person / business who buys goods or services from a shop or business

SelfCare

Provides customer facing interface for service management including :
- Service ordering
- Service management
- Customer support

OSS/BSS

OSS is OSS
BSS is BSS

Orchestrator

Synchronize provisioning actions for service delivery
Discuss with OSS, BSS
and also infrastructure

PNF Manager & Configurator

EMS
Managing the Physical
Devices

SDN Controller

Responsible for Service Chain creation and attachment to customer

VIM

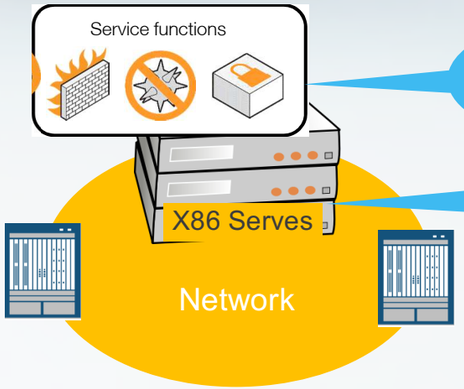
Control and manage the virtual infrastructure resources

VNF Manager & Configurator

Provide lifecycle infrastructure for Virtual Network Functions : creation, deletion ...

CE

Mobile or Wireline
CE



Virtual Network Functions that will provide services to customer

Provides physical resources (CPU + RAM) for virtual functions

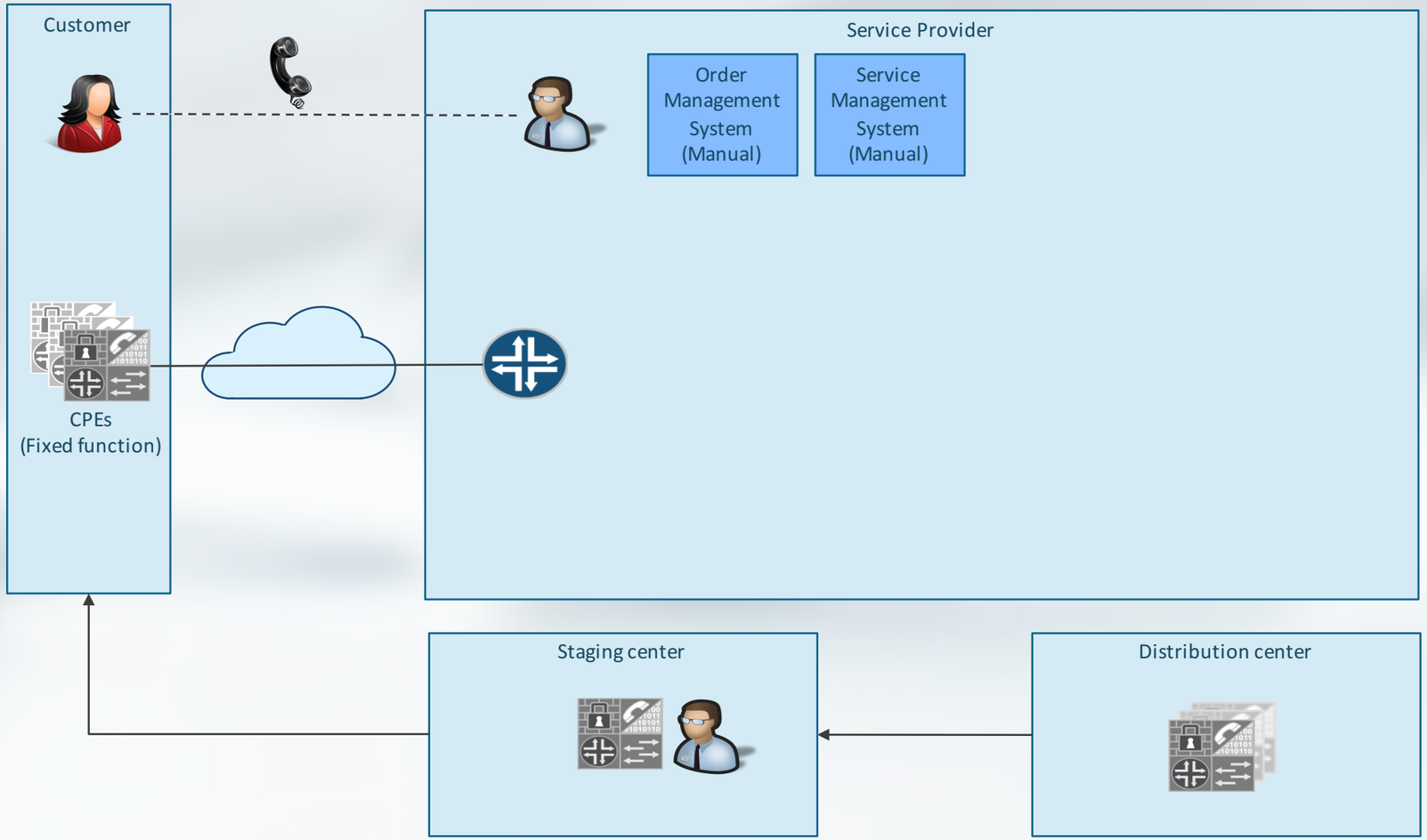
Copyright © 2015 Juniper Networks, Inc.

NFV Use case
Cloud CPE's

Business to Business

Copyright © 2015 Juniper Networks, Inc.

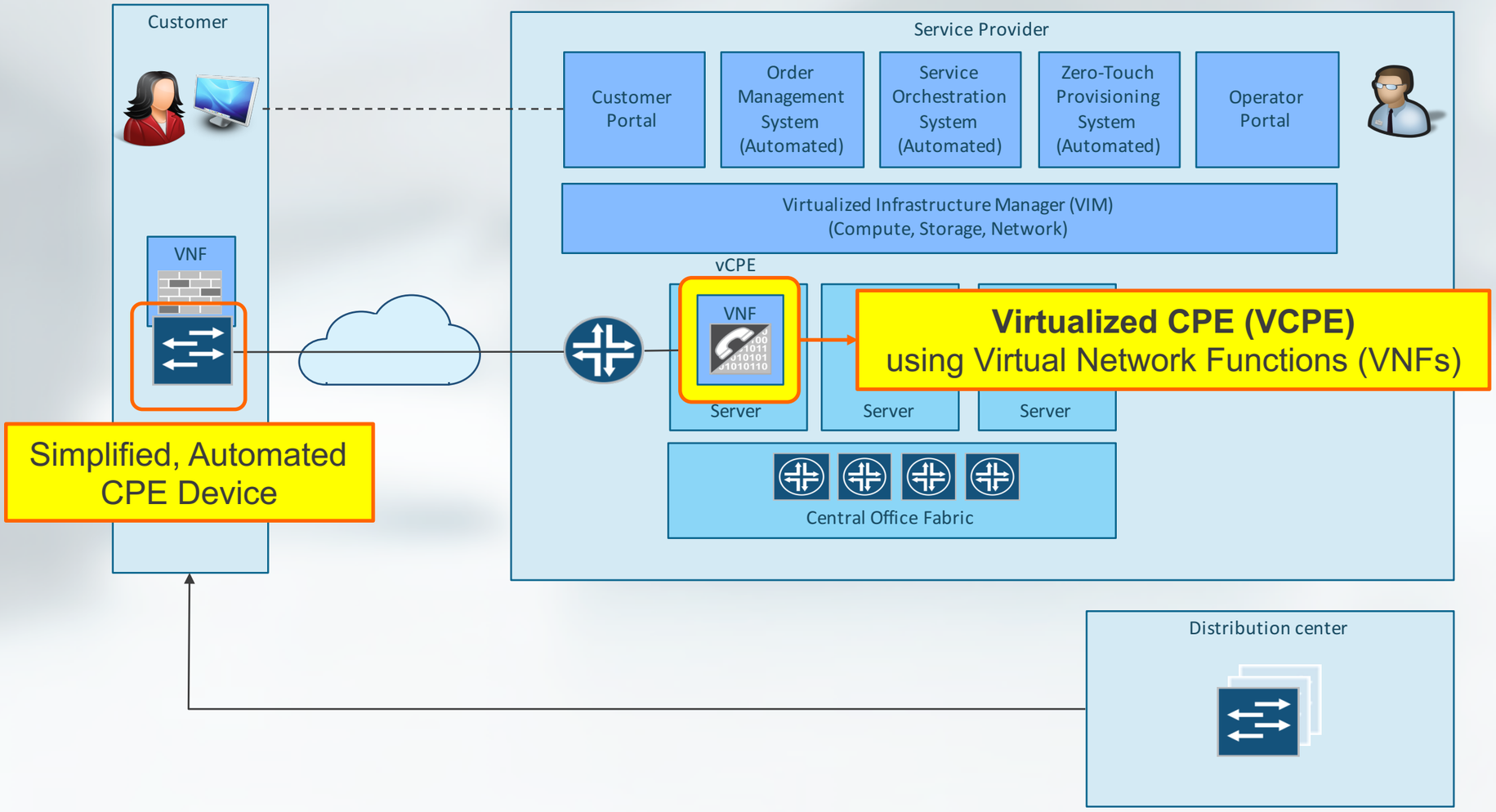
Old Mode of Operation: Legacy CPE



Copyright © 2015 Juniper Networks, Inc.

New Mode of Operation: Virtual CPE (vCPE

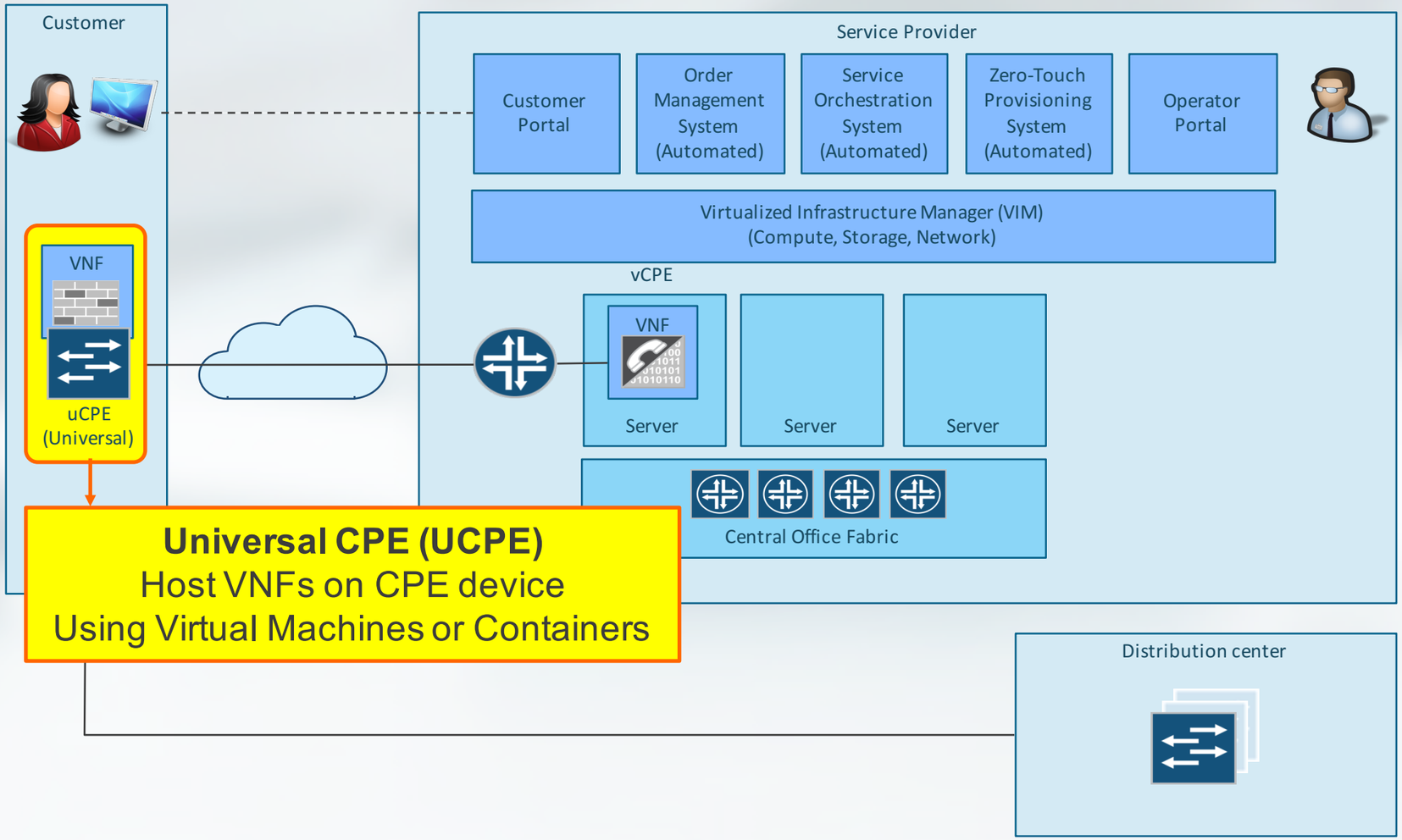
VNF hosted “in the network”, Centralized Deployment Model



Copyright © 2015 Juniper Networks, Inc.

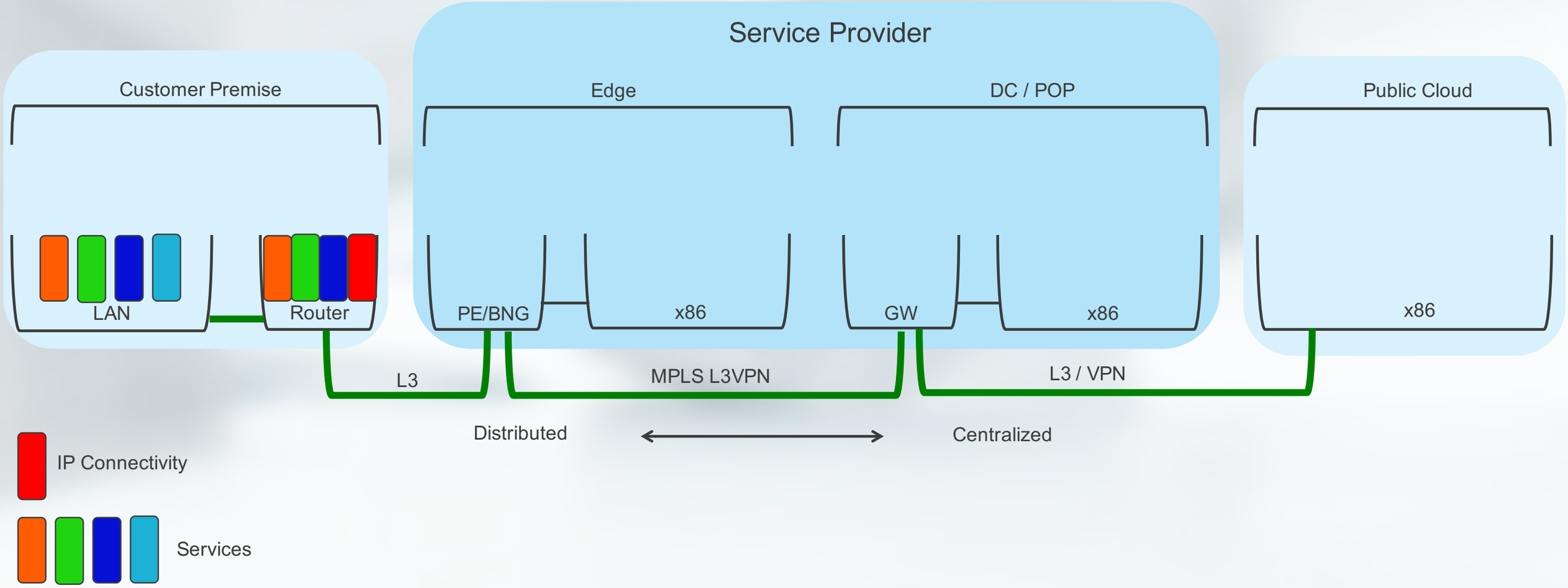
New Mode of Operation: Universal CPE (uCPE)

VNF hosted on the CPE device, Distributed Deployment Model



Copyright © 2015 Juniper Networks, Inc.

Virtual Services Distribution Potential (Distributed vs. Centralized)



Copyright © 2018 Juniper Networks, Inc.

COLT – vCPE Success Story

Virtualized CPE Service for Enterprise Customers

https://www.youtube.com/watch?v=xw65IXPUhfE

- *69% Faster time to market*
- *41% Lower TCO*
- *Service agility with NFV*
- *Lower risk of introducing new services*
- *New commercial models: Pay-as-you-go, CAPEX to OPEX transformation*

http://www.juniper.net/us/en/company/case-studies/service-provider/colt/
http://www.btreport.net/articles/2015/08/building-a-case-for-nfv.html
http://www.colt.net/blog/2014/05/14/network-layer-integration-virtual-cpe/

Copyright © 2015 Juniper Networks, Inc.

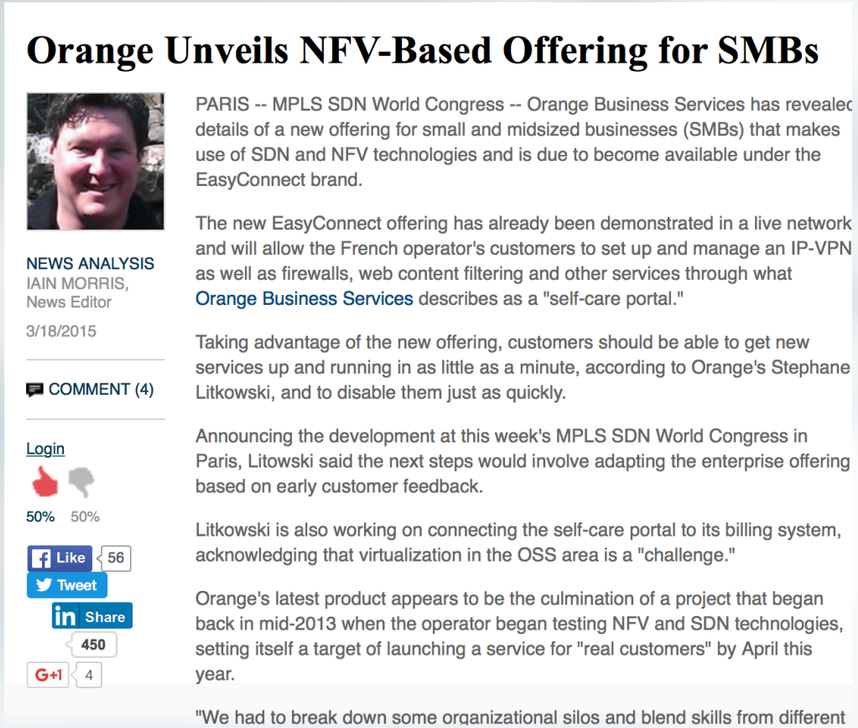
orange™ Business Services

JUNIPER NETWORKS

Easy Connect with VPN Connection offering Dynamic Services for SMBs Over an SDN and NFV-Based Network

- *IPVPN delivered with Self Service Portals*
- *Service agility with NFV*
- *Increase value of VPN Connection thru interconnection with Cloud SP*

- *Service Targets SMB up-to 30 sites*
- *In Market Trials NOW!*



Orange Unveils NFV-Based Offering for SMBs

NEWS ANALYSIS
IAIN MORRIS,
News Editor
3/18/2015

COMMENT (4)

Login

50% 50%

Like 56
Tweet
Share
450
G+1 4

PARIS -- MPLS SDN World Congress -- Orange Business Services has revealed details of a new offering for small and midsized businesses (SMBs) that makes use of SDN and NFV technologies and is due to become available under the EasyConnect brand.

The new EasyConnect offering has already been demonstrated in a live network and will allow the French operator's customers to set up and manage an IP-VPN as well as firewalls, web content filtering and other services through what Orange Business Services describes as a "self-care portal."

Taking advantage of the new offering, customers should be able to get new services up and running in as little as a minute, according to Orange's Stephane Litkowski, and to disable them just as quickly.

Announcing the development at this week's MPLS SDN World Congress in Paris, Litowski said the next steps would involve adapting the enterprise offering based on early customer feedback.

Litkowski is also working on connecting the self-care portal to its billing system, acknowledging that virtualization in the OSS area is a "challenge."

Orange's latest product appears to be the culmination of a project that began back in mid-2013 when the operator began testing NFV and SDN technologies, setting itself a target of launching a service for "real customers" by April this year.

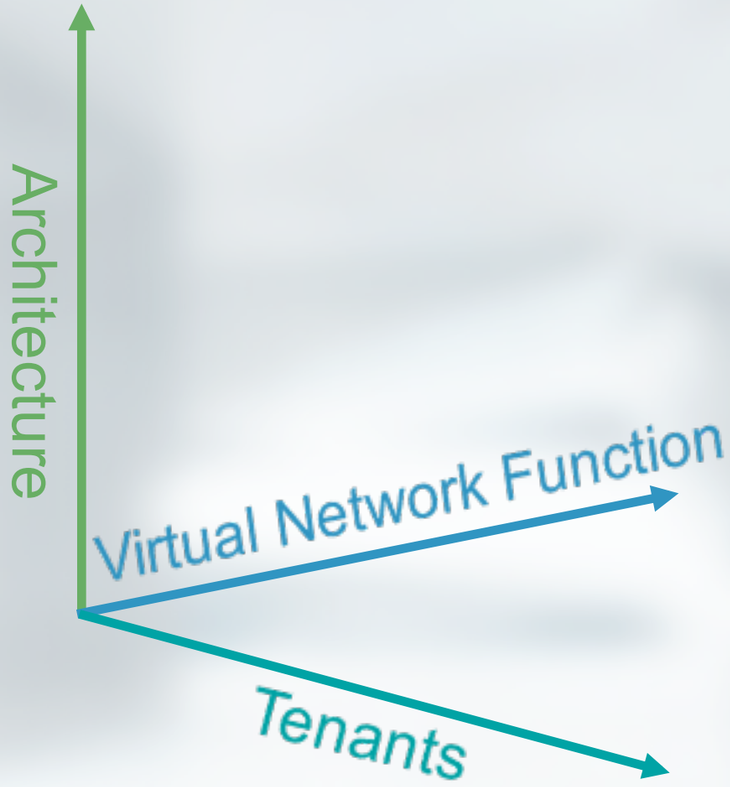
"We had to break down some organizational silos and blend skills from different

OBS Light Reading Article: http://www.lightreading.com/nfv/orange-unveils-nfv-based-offering-for-smbs/d/d-id/714503

MPLS/SDN WC OBS Talk: https://www.youtube.com/watch?v=c3C-HlwCYyQ

Copyright © 2015 Juniper Networks, Inc.

Cloud CPE deployment considerations



Architecture

- Centralized versus Distributed
- High Availability
- Infrastructure Elasticity, Fixed versus Variability in infrastructure

VNF's

- Type of VNF's
- VNF Scalability – CPU, RAM, Storage
- Location of VNF – CPE, POP, DC

Tenants

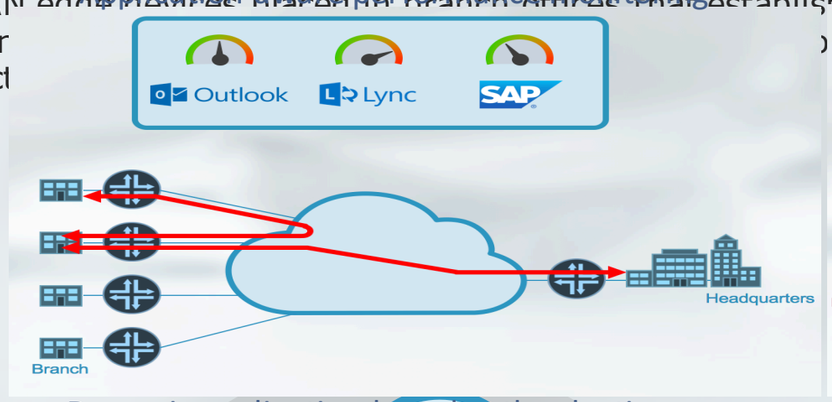
- Number of Tenants
- Site's per Tenant
- Site Connectivity speeds
- Number of VNF's per site

Copyright © 2015 Juniper Networks, Inc.

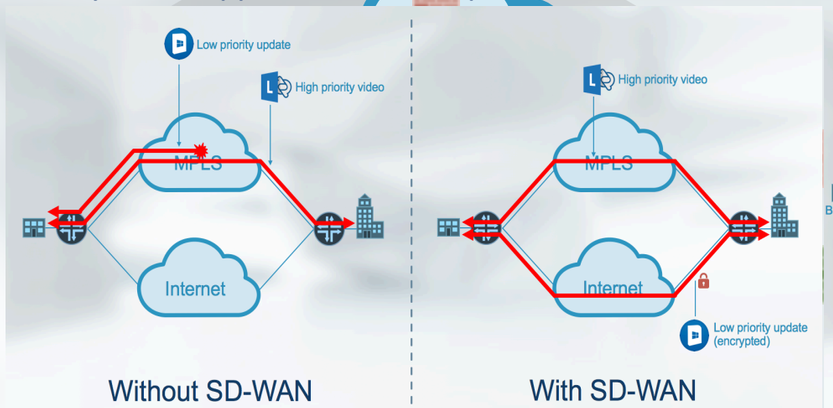
Evolution of Cloud CPE's to enable SD-WAN for SP's

SD-WAN solutions employ centrally managed WAN edge devices, placed in branch offices that establish logical connections with other branch edge devices across a physical WAN. These logical conn
and multiprotocol label switching (MPLS) architect

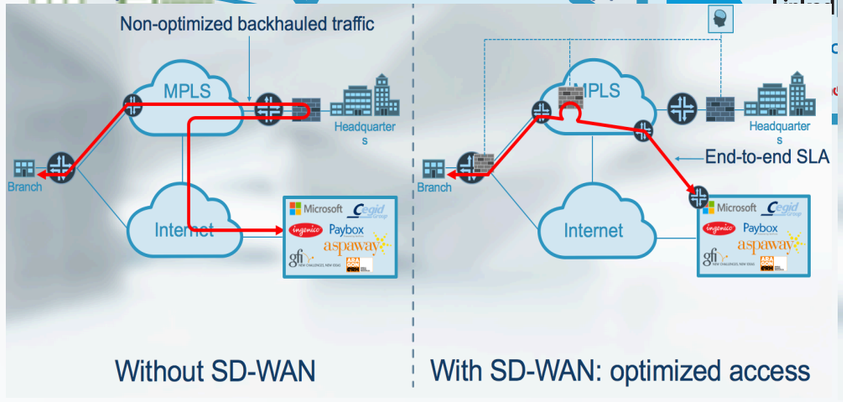
Application-aware performance monitoring



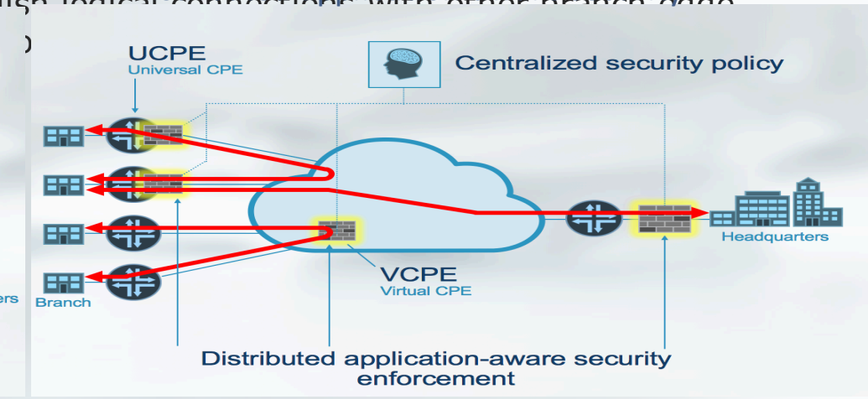
Dynamic application-based path selection



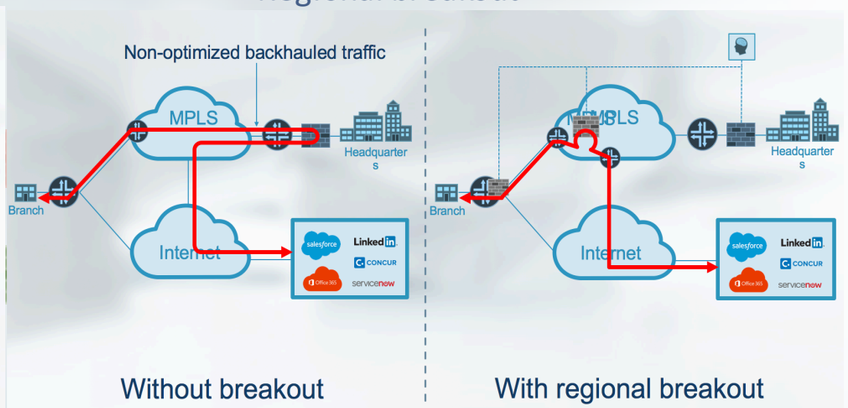
Optimized access to cloud-based applications



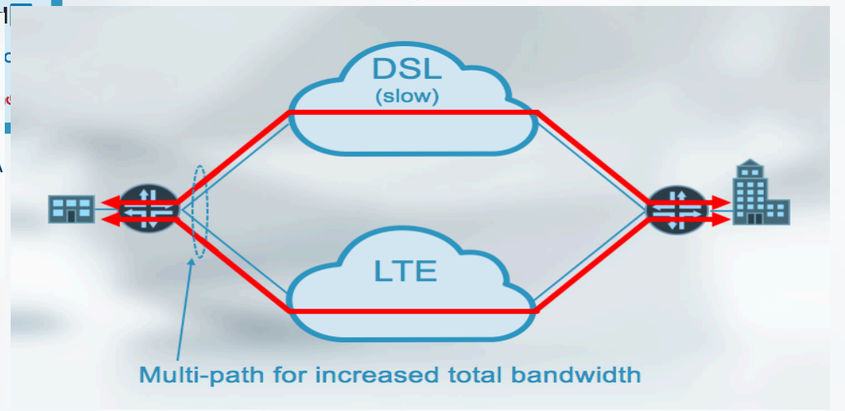
Distributed application-aware security



Regional breakout



Bandwidth Augmentation



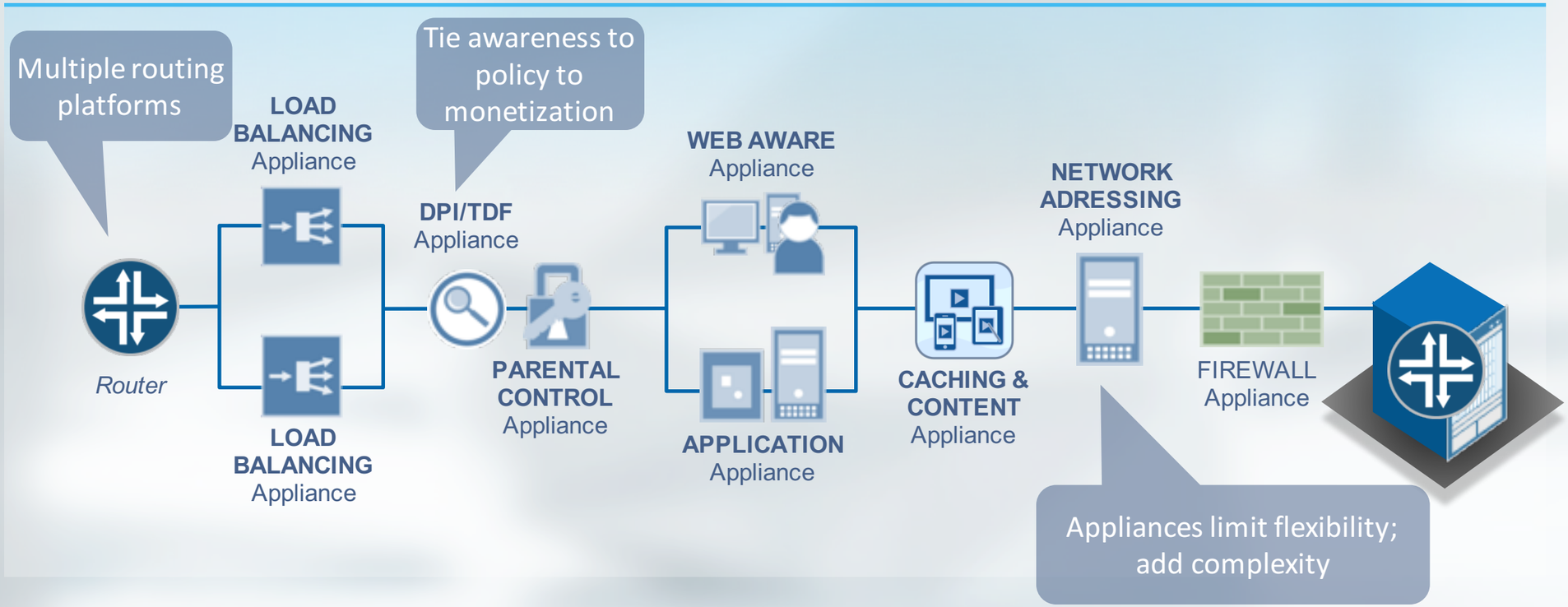
Service Control Gateway Provisioning & Service Chaining

Business to Consumer

Copyright © 2015 Juniper Networks, Inc.

MOBILE SERVICE COMPLEX TODAY

How to insert a new service or function?



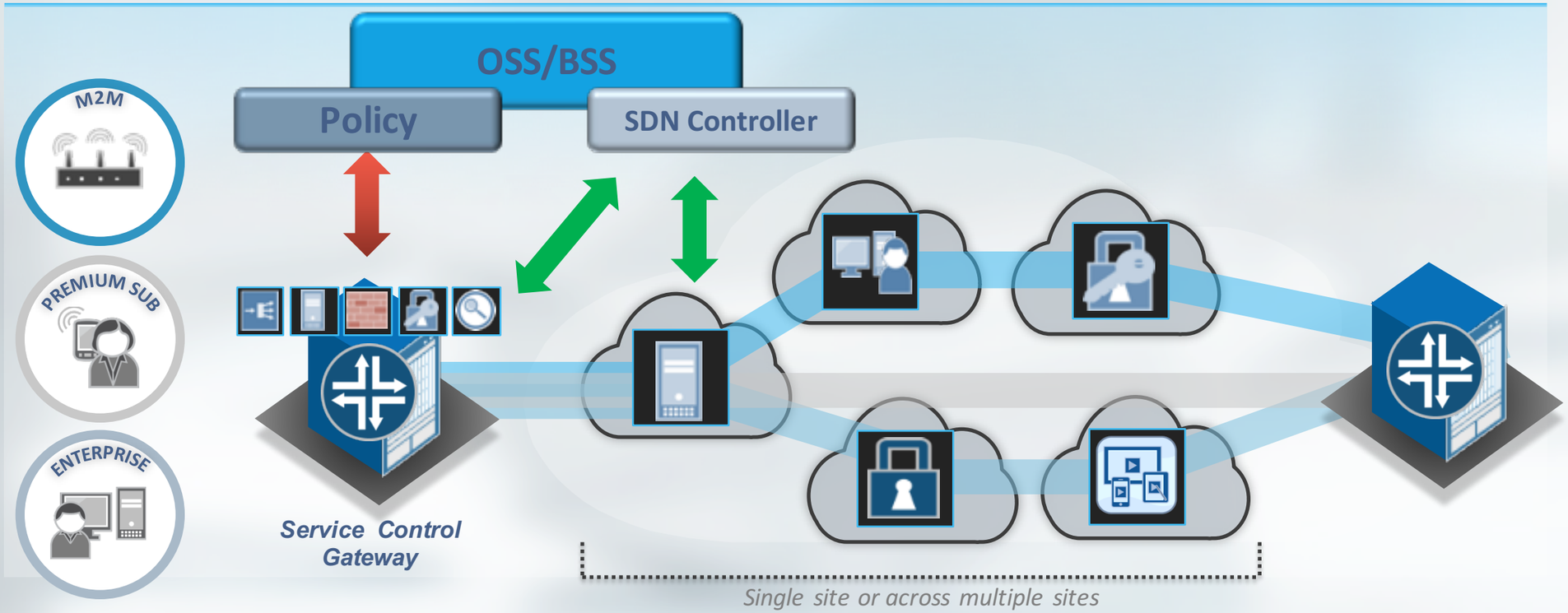
LIMITATIONS

- Even coarse service chains are complex
- Over provisioned network appliances to meet total demand
- Simplified tenant isolation for security and regulation compliance
- Inefficient chains with duplicate packet processing

Copyright © 2015 Juniper Networks, Inc.

OPTIMIZE SERVICE DELIVERY

Subscriber and application-aware service chaining

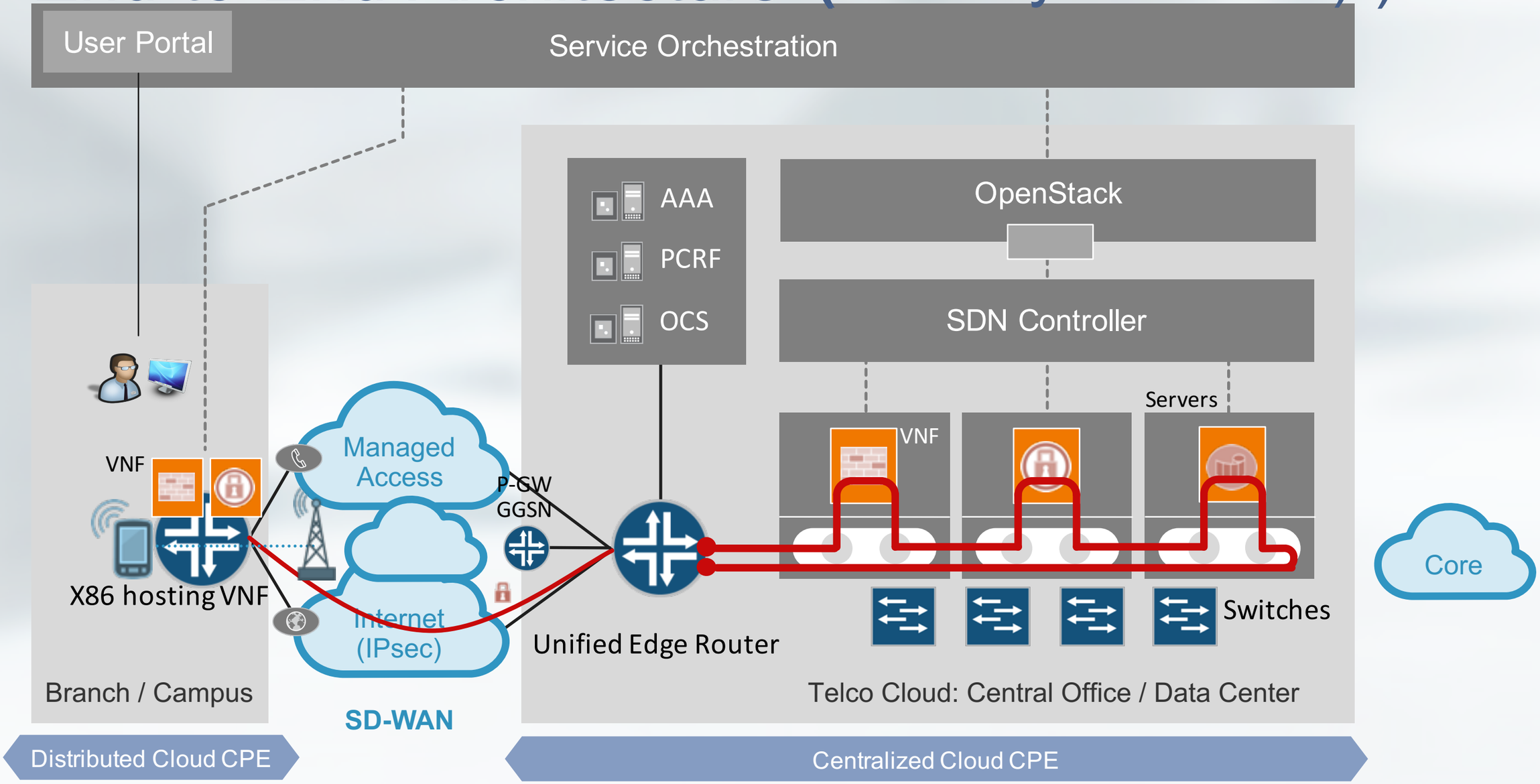


ADVANTAGE

- Create a custom network experience for different subscriber types
- Adapt network to subscriber demands, requirements
- Flexibility in service chains enables greater network reliability

Copyright © 2015 Juniper Networks, Inc.

Unified NFV and SDN End-to-End Architecture (Business Services)



Copyright © 2015 Juniper Networks, Inc.

Potential Automation & Virtualization Benefits

CAPEX

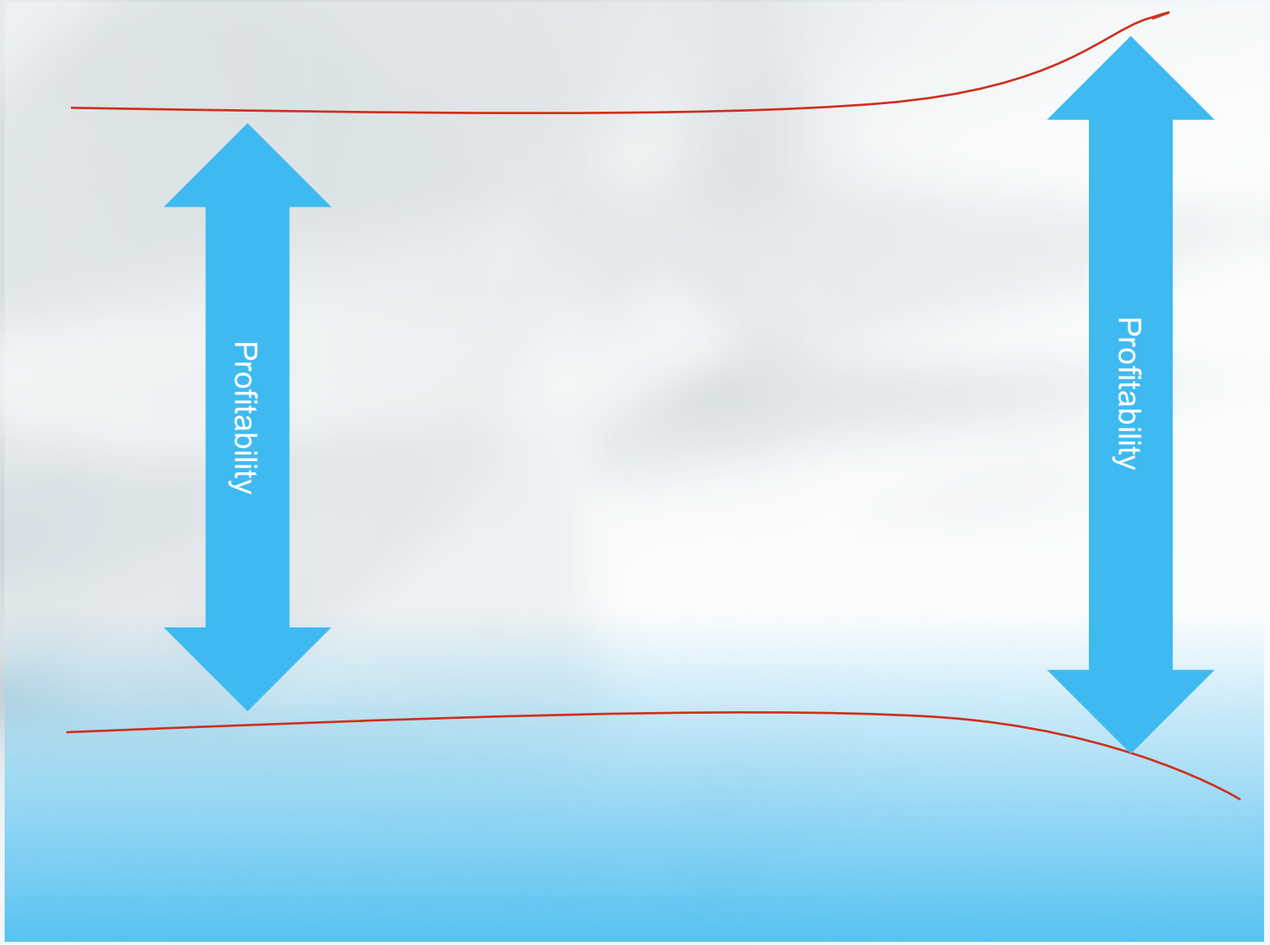
- Reduced equipment cost
- Reduced space/storage requirements
- Running production, test and reference facilities on same infra
- Rapidly scaling services up and down based on usage requirements

OPEX

- Reduced power consumption/cooling
- Reduced space/storage requirements
- Running production, test and reference facilities on same infra
- Rapidly scaling services up and down based on usage requirements
- Automate maintenance/repair window via auto reconfiguration and traffic redirection
- Potential to support ISSU with ability for easy reversion

REVENUE

- Increased velocity to Time-to-Market
- "Trial and buy"
- Targeted service introduction



Copyright © 2015 Juniper Networks, Inc.

KEY TAKEAWAYS

1. Independence of service creation from topology, infrastructure

2. Play with services as Web 2.0 org's do!
   Service innovation becomes a matter of days, not months

3. From un-known to friend of Marketing and CFO
   Monetization, flexible creation, no lengthy design cycles.

Copyright © 2015 Juniper Networks, Inc.

Q&A
THANK YOU

Copyright © 2015 Juniper Networks, Inc.