Customer Use Cases and Transformation Journey with Juniper Cloud CPE/SD-WAN Solutions

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Agenda

1. Managed Services Delivery Platform and Journey - Juniper
2. IBM Cloud Managed vCPE Solution - IBM
3. Enterprise Differentiated SDWAN Solution - Amdocs
Service Provider CEO Outlook

A recent KPMG survey of Telecom CEO – titled “Embracing Disruption”

**CEO Strategic Priorities**

- Greater Speed-to-Market
- Stronger Client Focus
- Digitization of business
- Become more data driven
- Fostering Innovation

**Execution**

- Agile Service Delivery Platform
- Democratization / Decentralization of Cloud
- New Business Models and Approaches
- Platform/Ecosystem Value
- Enriched Customer Experience
Evolving Managed Services Offering with SDN/NFV
FULLY MANAGED END-TO-END SERVICES/INDUSTRY PLATFORM INTEGRATORS

ORCHESTRATION AND GOVERNANCE

EXPANDED ECOSYSTEM OF PARTNERS AND SERVICES

NETWORKING SERVICES
- Remote access
- Data Center Interconnect
- V-LAN
- Caching
- WAN optimization
- Virtual Edge/RR/PE

SECURITY SERVICES
- Firewall
- Audits and analytics
- IPS/IDP
- UTM
- Cloud security

TRANSPORT SERVICES
- Mobile device management
- WiFi/HotSpot management
- IP VPN/L2 VPN
- IPSEC/SD-WAN

CLOUD SERVICES
- Hosting/private DC
- AWS, Azure, GCP, IBM Softlayer Cloud Connect
- Multi-Cloud
- Analytics & telemetry

APPLICATION SERVICES
- SaaS
- M2M
- IOT
- Blockchain, Payments
- Industry platforms

NETWORK FUNCTION VIRTUALIZATION
SDSN
POLICY DRIVEN NETWORKING
CLOUD, DC AND HYBRID CLOUD SERVICES
APPLICATIONS AND INDUSTRY PLATFORMS

FULLY MANAGED END-TO-END SERVICES/INDUSTRY PLATFORM INTEGRATORS
Service Delivery Platform Building blocks

Orchestration, Management Automation

Systems

Software

Silicon

Contrail Service Orchestration

NFX 250

MX 150

QFX

vNFX

vSRX

vMX

cSRX

Express+

Trio

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Deployment Scenarios

**Virtual Network Functions**

- Centralized Orchestration & Control
- Existing Private/Public Network
- Virtual Network Functions
- Data Centers
- Firewall (vSRX)
- Traffic Optimization
- Analytics

**Existing Data Centers**

- Simple CPE/NID
- CPE w/Compute (NFX)
- Traffic Optimization
- Analytics

**Remote Office**

- Secure VPN connection
- Management connection

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**SDWAN**

Controller (Contrail Service Orchestrator):
- MPLS IP VPN
- Enterprise Data Center
- Cloud-based Applications
- Non-critical Applications

Branch Office A

Branch Office B

Campus

**vCPE**

- AWS cloud
- Virtual private cloud
- Internet

**uCPE**

Contrail Service Orchestration
- Zero Touch Deployment
- Admin/Customer Portal

**Cloud Connect**

Secure VPN connection

Management connection
Managed Services Journey Map

CONSIDERATIONS FOR STARTING JOURNEY

- Business Plan
- Market Segment focus
- Competitive Pressure
- New Customer Pain Points
- Services Upsell/Attach

VIRTUAL CPE
- Virtual Firewall
- Threat Prevention
- Managed DDoS
- Cyber Security Mgmt

UNIVERSAL CPE
- Mgd Router
- Mgd Secure Router
- Mgd Wifi, Mgd LAN
- Mgd Wan opt

SDWAN
- App Visibility
- Managed Internet
- Remote Access VPN
- Hybrid WAN

CLOUD CONNECT
- Cloud Networking
- Managed Storage
- Disaster Recovery
- Managed Multi-cloud

NETWORKING SERVICES
SECURITY SERVICES
TRANSPORT SERVICES
CLOUD SERVICES
APPLICATION SERVICES

START
Phase 1
Phase 2
Phase 3
Phase 4
END

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## Customer Business OUTCOMES with SDN/NFV

<table>
<thead>
<tr>
<th>Reduce / Avoid Expenditures</th>
<th>Business Agility</th>
<th>Operational Excellence</th>
</tr>
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<tbody>
<tr>
<td><strong>25%</strong> Reduction in the number of network elements needed - CapEx and OpEx savings</td>
<td><strong>75%</strong> Service elasticity based on needs, and demands</td>
<td><strong>65%</strong> Single pane of glass management</td>
</tr>
<tr>
<td><strong>50%</strong> Reduce up-front CapEx with Pay-as-you-go business models</td>
<td><strong>50%</strong> Deployment of best-of-breed vs.</td>
<td><strong>70%</strong> Operational efficiencies through virtualization i.e. Scaling, Monitoring, etc.</td>
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<table>
<thead>
<tr>
<th>Risk Mitigation</th>
<th>Accelerate Time to Market</th>
<th>Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>30%</strong> Reduced hardware complexity</td>
<td><strong>40%</strong> Accelerated delivery of new and differentiated services with service chaining</td>
<td><strong>20%</strong> Improved asset utilization</td>
</tr>
<tr>
<td><strong>90%</strong> More deployment options with a unified management process</td>
<td><strong>50%</strong> Faster certification</td>
<td><strong>55%</strong> Speed-up chargeback or revenues</td>
</tr>
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</table>
Summary

Don’t boil the ocean – *Focus on specific business case and use case*

Modernize Service Creation/Delivery Platform – *One Platform Multiple Services increases ROI*

Build Cloud Native Infrastructure - *Its all about Automation, API’s, programmability*

Partner with a sense of urgency – *Partner with Juniper to help you with your Transformation Journey*
Customer Journey with Cloud CPE and SDWAN with IBM Cloud Managed vCPE

Steven Teitzel (steitzel@us.ibm.com)
Global Solution Exec
IBM Telecommunications, Media & Entertainment Industry
December 12, 2017
Steven Teitzel is a global solution executive at IBM, leading strategy and business development for the Global Telecommunications, Media and Entertainment Industry. Steven applies cognitive analytics, cloud, assurance, and agile DevOps to build cloud-based networking for communication service providers and cable operators; hence, enabling cost take out and monetization of the network. Steven has over 30 years of experience in the telecommunications industry.
The Journey to NFV...... open, multifunction, multivendor, cloud native

Stage 0
- Device Dependent Scaling
  - Fixed Scaling
  - Common Platform
  - Sometimes Open or Vendor/Function Specific

Stage 1
- Network ISV’s
- Manual Operations
  - Function Focused Virtual Silos
  - Event Driven
- Network Functions Moved to Cloud
  - Virtualized Functions
  - Siloed Services
  - Limited Shared Infrastructure

Stage 2
- Cloud Native Network Functions
  - Microservice enabled
- Highly Automated Management and Orchestration
  - Service Lifecycle Performance Driven
  - High Agility and Resiliency
  - Open multiple location cloud
  - Factory Approach

Cloud Based Networking
Cloud-based networking trends
– Network virtualization adoption on the rise but challenged

**Key Challenges:**
- **Mindset**: Hardware centric to Software enabled
- **Processes**: Agility to adapt fast changing network demands
- **Skill set**: Cloud, cognitive & agile DevOps

**Biggest Challenges:**
- Integration across multiple vendors
- Hybrid Networking
- Demonstrating Return on Investment

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**NFV and SDN Adoption Curve**

**TBR NFV/SDN Telecom Landscape 3Q 2017**
Operation transformation is required to realize the full value of virtual networking

A transformational approach to operations:

- Requires a path from present mode of operations (PMO) future mode of operations (FMO),
- Provides greatest return on capital investment
- Accelerates Total Cost of Ownership improvement
- Reduced initial cost needed to drive a shorter time to value
Virtual appliances have more automation requirements than traditional appliances.

The **majority** of the today’s physical appliance lifecycles are **performed manually**. **Automated** tasks primarily focus only on **provisioning**.

In a very distributed software environment the **entire lifecycle** of the appliance must be automated.
How can CSPs rapidly begin to gain value from virtualized networks without having to transform their entire operations?

### Old branch
- Multiple devices and redundant scaling
- High operational costs and truck rolls
- Slow time and revenue to market
- Declining revenues
- High touch (configuration)
- Hard-wired service chains

### Modern branch
- Single universal customer premises equipment (CPE) device with customizable services offering
- Service richness based on a pay-as-you-go software model
- Services installed in a branch or telecommunications company (Telco) cloud
- Automated operations and zero touch provisioning (ZTP)

### Application VNFs
- WAN optimization VNF
- Router VNF
- Firewall VNF
- Software-defined WAN VNF
- IT applications VNF

### IT and software models for networking and security
- Reduced branch connectivity costs with software-defined WANs

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1 Intrusion prevention system (IPS); 2 Virtual network functions (VNFs)
IBM Cloud Managed vCPE Service – overall value proposition

**GNPP**

**Distinctive capabilities:**
- Open ecosystem
- Cloud delivery
- Global Network Peering Platform (GNPP)
- Integrated management platform
- GTS network service (design, build, transfer or manage)

**Value:**
- IBM VNF partner ecosystem for service creation
- Supports rapid deployment (in 1-2 days vs. current 3-6 weeks) and can reduce costs by 20% - 30%, based on IBM internal estimates
- Optimized connectivity with SD-WAN, security, hybrid cloud and IoT
- IBM management and support
- Rapid and flexible deployment model for virtualized networks
The Cloud Managed vCPE Service initial implementation can provide the ability to automatically deploy distributed vCPE devices in the CSP infrastructure.

**Phase 1 functionality and features:**
- Distributed virtual CPE model routing such as Border Gateway Protocol (BGP) and Open Shortest Path First (OSPF)
- Full-featured firewall
- ZTP for vCPE
- Managed services to operate, monitor and maintain vCPE deployment service
- Support services and help desk
- WAN optimization
- Silver Peak, Inc.
- Riverbed Technology

**Service catalog**
1. vRouter (vSRX)
2. vFirewall (vSRX)
3. WAN optimization (Silver Peak, Inc. and Riverbed Technology)

**Phase 1 functionality and features:**
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**Service catalog**
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3. WAN optimization (Silver Peak, Inc. and Riverbed Technology)
Pay-as-you-go implementation using as-a-service pricing

<table>
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<tr>
<th>Key features of IBM Cloud Managed vCPE as-a-service capabilities:</th>
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<tbody>
<tr>
<td>▪ Faster time to market</td>
</tr>
<tr>
<td>▪ Less intrusiveness in CSP infrastructure than a centralized CPE model</td>
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<tr>
<td>▪ The ability to move from mostly CAPEX to mostly operating expense (OPEX) spending</td>
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<tr>
<td>▪ Pre-integrated and tested NFV components and functionality including third-party VNFs</td>
</tr>
<tr>
<td>▪ Evergreen technology instead of 3 - 5 year refresh cycles</td>
</tr>
<tr>
<td>▪ Prompt provisioning and deprovisioning with no termination penalties</td>
</tr>
<tr>
<td>▪ Simpler cloud integration with easier access to IBM SoftLayer®, AWS¹, Azure² and other platforms</td>
</tr>
<tr>
<td>▪ Managed vCPE as a service for Tier 2 and 3 service providers</td>
</tr>
<tr>
<td>▪ Pricing strategy of “per device, per month” without termination charges</td>
</tr>
</tbody>
</table>

- Virtualization and cloud use help reduce up-front costs for CSPs
- Orchestration and dynamic provisioning can cut transition cost and time
- Moving to a DevOps, agile model is key to an evergreen strategy

¹ Amazon Web Services (AWS); ² Microsoft Azure
IBM Network and OSS Transformation capabilities

OSS Transformation Services
Set of consulting and integration services to help Communication Service Providers address complexity in a changing world – Tools, Processes and Organization transitions needed to optimize and automate the network operating environment today.

Cloud Managed vCPE
Provides a network platform as-a-service to an operator that allows them to use virtualization to reduce costs and increase service velocity while going through the transformation needed for cloud-based networking enabled through NFV/SDN.

System Integration for Hybrid Networks
End-to-end integration services, leveraging proven reference architectures and integration project methodologies for faster time-to-value and reduced project risks for IP networks and SDN/NFV.

IBM Agile Lifecycle Manager
Provides a complete NFV devops tool chain delivering superior operational lifecycle automation that allows for intent based management throughout a service lifecycle simplifying, optimizing, and automating operations for multi-vendor environment.

Cognitive Field Service Advisor
Enables technicians to resolve field service requests using cognitive insights that elevate the expertise of the field force and drive operational efficiency.

ONAP Integration Services
Provide integrations services for open source ONAP, that enables a real time, policy-driven orchestration and automation of physical and virtual network functions to create new services. This is augmented with IBM cloud and cognitive software and services.

Cognitive Operations
Generate efficiencies and optimization in Network Operations. Applies analytics and cognitive to network operations with IBM Netcool Operations Insight; allowing for simplify and focus operations while enabling proactive operations. Using Service Operations actions can be prioritized based on impact to services and customer experience.

IBM Agile Service Manager
Extend Netcool Operations Insight by providing Operations with a complete up-to-date visibility of highly dynamic hybrid infrastructures and services, both currently and historically that is critical for management of NFV & SDN.

Cognitive Operations
Generate efficiencies and optimization in Network Operations. Applies analytics and cognitive to network operations with IBM Netcool Operations Insight; allowing for simplify and focus operations while enabling proactive operations. Using Service Operations actions can be prioritized based on impact to services and customer experience.

System Integration for Hybrid Networks
End-to-end integration services, leveraging proven reference architectures and integration project methodologies for faster time-to-value and reduced project risks for IP networks and SDN/NFV.
Why IBM?

**IBM deep expertise** in cloud, cognitive, systems integrations, security, and operations along with business and industry perspectives

A **commitment to open** standards and implementation with Open Source to reduce cost and speed time to value for innovation

A **vendor-neutral**, collaborative approach with **partnerships** with the major market leaders for each component

**Transformation and Systems integration experience** for a full lifecycle of standardized and customizable services from assessment to design, deployment and ongoing managed operations

**IBM Research, Industry Solution Centers and Network Innovation Centers** that are available to innovate what is possible in Cloud-based Networking
For More information on cognitive networking and how IBM is helping clients reinvent their networks visit: Living Networks

Enterprise services innovation through differentiated SD-WAN solutions

Challenges in taking SD-WAN solutions to production

Dan Hod
Head of Strategic Alliances & Initiatives

Dec. 2017
Live POC with Tier 1 European CSP

CUSTOMER SELF-SERVICE PORTAL

OPERATIONS

DOMAIN ORCHESTRATION

VNF MANAGER

SDN CONTROL

SDWAN CONTROLLER

JUNIPER NETWORKS

SDN CONTROLLER

JUNIPER NETWORKS

CUSTOMER PREMISES

CPEs

Traditional

Existing physical CPEs

uCPE

Thin

DATA CENTER

SECURITY VNFs

FORTINET

FORTINET

VIM

MIRANTIS

VNFs

silver peak

FORTINET

JUNIPER NETWORKS

ADVA Optical Networking

ADVA Optical Networking

Information Security Level 2 – Sensitive
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Proactive Service Management – Juniper SD-WAN Controller is offloading part of the traffic to the internet connection.
## Hybrid WAN Example (in production)

<table>
<thead>
<tr>
<th>Greenfield SDWAN Deployment</th>
<th>Greenfield SDWAN Deployment</th>
<th>Single End to End Orchestrator</th>
<th>MPLS replacement</th>
</tr>
</thead>
</table>
| Deploy SD-WAN service along with an Internet service to each customer location | **USE CASE 1**  
MPLS and SD-WAN with failover/dynamic path control | **USE CASE 2**  
Mix of MPLS and SDWAN sites with an interconnect | Project, Service Orders, Network (Physical/underlay & Virtual/overlay SD-WAN)  
Future |
| **USE CASE 2**  
Mix of MPLS and SDWAN sites with an interconnect | **USE CASE 3**  
An overlay SD-WAN with IP-VPN tunnels across MPLS and BB (future) | |
| **USE CASE 3**  
An overlay SD-WAN with IP-VPN tunnels across MPLS and BB (future) | | |

### Greenfield SDWAN Deployment
- **USE CASE 1**  
MPLS and SD-WAN with failover/dynamic path control
- **USE CASE 2**  
Mix of MPLS and SDWAN sites with an interconnect
- **USE CASE 3**  
An overlay SD-WAN with IP-VPN tunnels across MPLS and BB (future)

### MPLS replacement
Future

### Use Cases
- **USE CASE 1**  
MPLS and SD-WAN with failover/dynamic path control
- **USE CASE 2**  
Mix of MPLS and SDWAN sites with an interconnect
- **USE CASE 3**  
An overlay SD-WAN with IP-VPN tunnels across MPLS and BB (future)

### Diagram
- **BRANCH**  
Routing  
APP ID  
VPN  
SD-WAN
- **Cloud**  
CGNA  
T  
NG FW  
AV/IPS
- **MPLS**  
Application-aware routing across MPLS and Internet
- **DATA CENTER**  
Centralized policy and control; other security functions
- **Low-cost appliance with SD-WAN + Internet security**
- **Sales & Quote**  
**Service Delivery**  
**Logistics & Field Srv**  
**Charge & Bill**  
**Assure & Support**

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**NFV Orchestration**

**BSS/OSS**
Leading NFV use cases and biggest challenges

Virtual Edge Expanding: The 2016 SD-WAN and vCPE Report
Custom Edition for SD-WAN Summit Sep. 2017
Challenges in deploying an SD-WAN solution

Enriched Hybrid SD-WAN - Service Lifecycle Management
Summary and Key Takeaways

Differentiation is key
Service providers need to leverage their uniqueness when providing SD-WAN – offer as carrier grade hybrid solution bundled with VAS services

Service lifecycle management is key
Management and Orchestration plays a crucial role for adding services connecting to exiting systems and analytics

Existing systems and processes must evolve
Service fulfilment, inventory, assurance and service operations must evolve to meet SD-WAN and other NGN services requirements