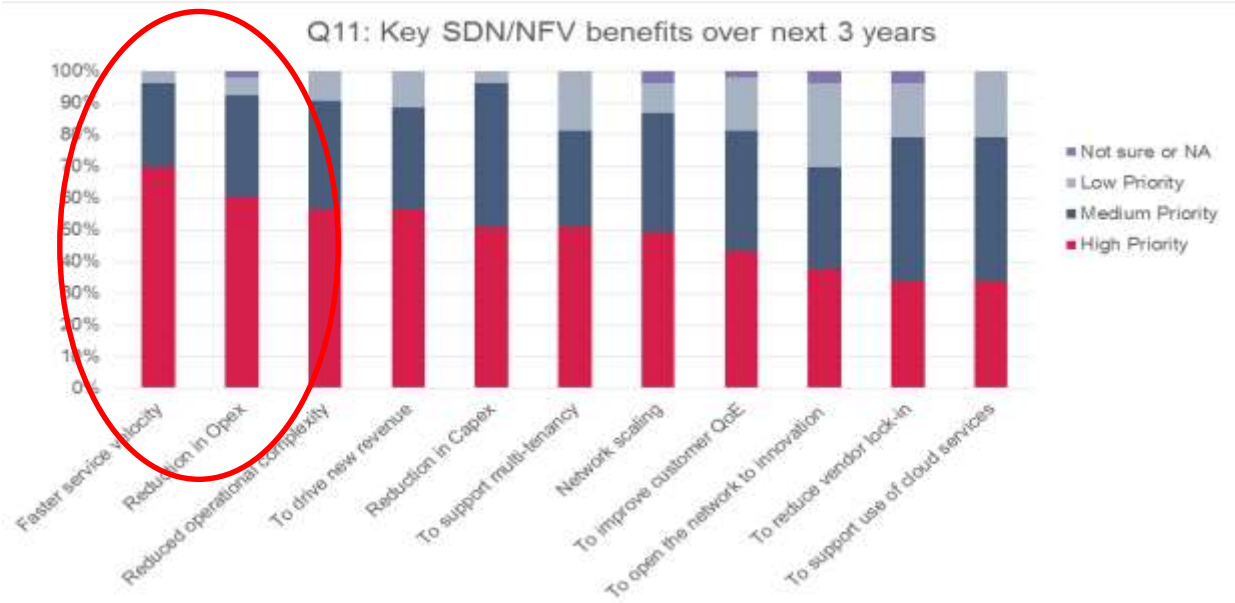
Practical SDN use cases for Service Providers

Paolo Campoli

Snr Director
Head of Global SP Sales, Technical Operations and Channels
Cisco Italy

SP Market Dynamics
SDN/NFV Operational Priorities Drive Agenda

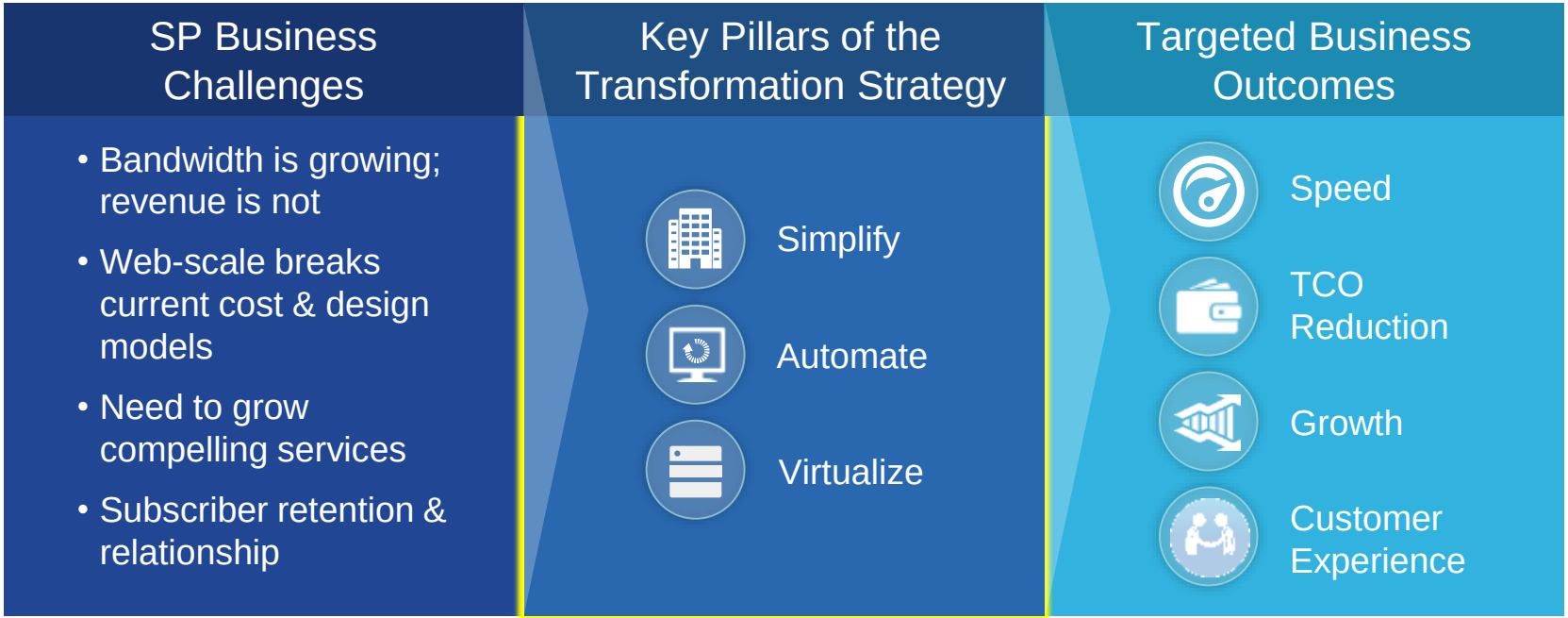


ovum

*CSP NFV spending growth is far outpacing both cloud computing and SDN growth, but SDN in support of more flexible business services — particularly SD-WAN-based services -- moved rapidly to deployment in 2016***

** Analysis Mason - Software-controlled networking: worldwide forecast 2016–2020

Cisco's SP Transformation Strategy



India Tier-1 SP Zero Touch Deployment

Use-Case

Zero Touch & Secure Access Router deployment in Delhi

Engineer/ Technician needs to Power-ON & connect WAN Link

New Device Security authentication

SDN Layer automates Day-0 / Day-1 configuration

Technical Outcome

Plug and Play
Using NSO + ANI

Security
New Device Authentication

Network Automation & Audit

NFV Introduction
vANR deployed on UCS Server

SDN Enabled Network Architecture for centralized programmability.

Business Outcome

Access Router deployed and integrated to NOC in 40 Mins

Router deployment time reduce from 5 to 2 days (3 days saved)

2.5X Faster rollout of Radio Sites leads to incremental revenue.

Additional Value

Audit and golden configuration check efforts.(NSO will perform this 24x7)

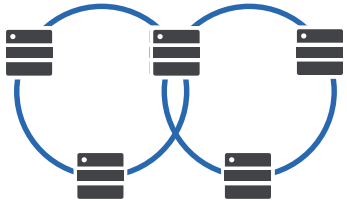
Reducing L2 visits to site

Visibility, Control and Automation

Enablers – Programmability, Open APIs, Models and Streaming Telemetry

1 Extract Data from the Network

Phase 1



Streaming Telemetry

Multi Layer Topology
Optical, Routing, Overlay

2

Phase 2

Derive Actionable Insight (Data Analytics)

Network Data Platform

Machine Learning and Analytics

Data Collectors

Configure, Provision

3 Automate Network Operations

Apps

Phase 1

Open APIs and data models

Service Deployment Automation

Deploy, Manage, Optimize

Network Planning

Path Optimization

Network State

Device Life Cycle Management

Security

Dos, DDoS: Detection, Prevention, Remediation

Closed Loop Analytics

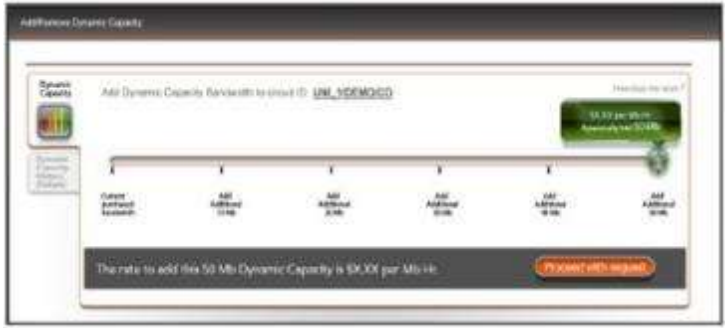
Automation Benefits – OTT's has Validated

Net device: Net Operator 1,500:1
Net Device: Net Engineer 2,500:1
Server: Sysadmin 25,000:1
Total Network Team: ~60

42.5B streaming hours in 2015
190 Countries
5 Engineers

9B Annual Searches
300 Apps
90M machine sensors
50M service sensors
40TB of new data/day
400 Engineers

Start simple: TWT Bandwidth on Demand Use Case



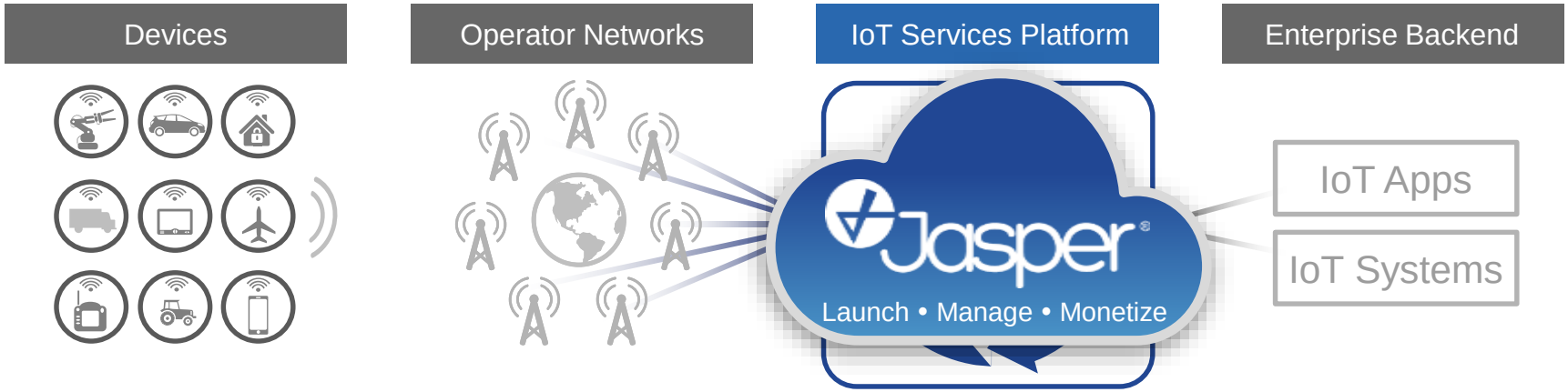
Dial up bandwidth where you need it, when you need it—

- Data Back-up / Replication / BCDR
- Seasonal traffic increases / limited time projects or campaigns
- Bandwidth hungry applications like Video Conferencing / Telepresence/ Streaming Video
- New software deployments / updates
- Variable cloud computing resource consumption
- Unforeseen events

Business Benefits to TWT Customers:

- **Time Savings:** Immediate access to more bandwidth
- **Flexibility**: Increase bandwidth on-demand, or as scheduled
  Predictability: Tools that let customers know exact costs
  Control: Customers decide when, where and how much bandwidth is needed. SP decide who in your business is authorized to make changes.
- **Visibility:** Comprehensive visibility of all transactions
- **Simplicity**: Complete self-service via interactive portal

Consider massive scale: IoT Connectivity Management Platform



Broad Range of Vertical Markets

IoT Platform Requirements	Only with Control Center
Must be completely automated	Set-and-forget automation
Must monitor in real-time to restore performance	Real-time network intelligence
Must be able to expand globally	Deep integration into 20+ operators

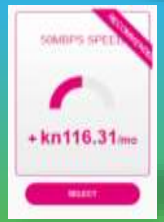
Serve Enterprise, SMB and Things with SDN

Before:

- Expensive truck rolls, CPE management
- Siloed, un-orchestrated systems
- Slow, manual service delivery

Cloud Business Services

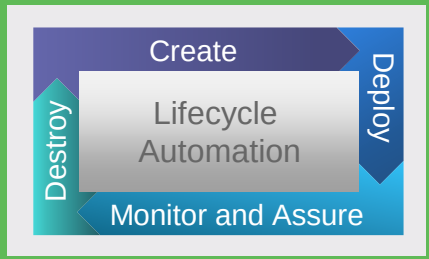
Suite of pre-packaged, cloud-delivered WAN, VPN, security services, more



SD-WAN
Secure & Fast

After:

- **Up to 76% reduced OpEx**
- Automated service lifecycle management
- Customer self-service; zero-touch CPE



*ACG Research

Cisco Virtual Managed Services (VMS)

Behind the scenes: convergence of many DC

Proposed Convergence – Phase 1

IT Data Center

Enterprise IT applications
Big Data Analytics
New Service & App Dev
Legacy Migration
Web 2.0

Network Data Center

(v)OSS/BSS
Billing
(v)CRM/CEM/IMS
VAS
(v)Contact Center

Telco Data Center

NFVI for 3G/4G/5g
NFVI for Enterprise/BB
NFVI for Media
NFVI for IoE/IoT

Bare Metal, Multi HyperV, Compute, Storage
10/25G → 40/100G
Enterprise IT Apps
Hadoop, Analytics, Software Storage, Data Virtualization,

Bare Metal, Multi HyperV Compute, Storage
10/25G → 40/100G
OSS/BSS
CRM/CEM/IMS
Contact Center

Bare Metal, Multi HyperV Compute, Storage
10/25G → 40/100G
STP, GGSN, SGSN, Gi-LAN, VoLTE, IN, IMS
CPE, Enterprise Services
Content, DVR, Encoders

DISTRIBUTED NETWORK FABRIC with ACI / Nexus
SOFTWARE DEFINED CONTROLLERS WITH POLICY
DC MANAGEMENT AND AUTOMATION

Convergence - Future

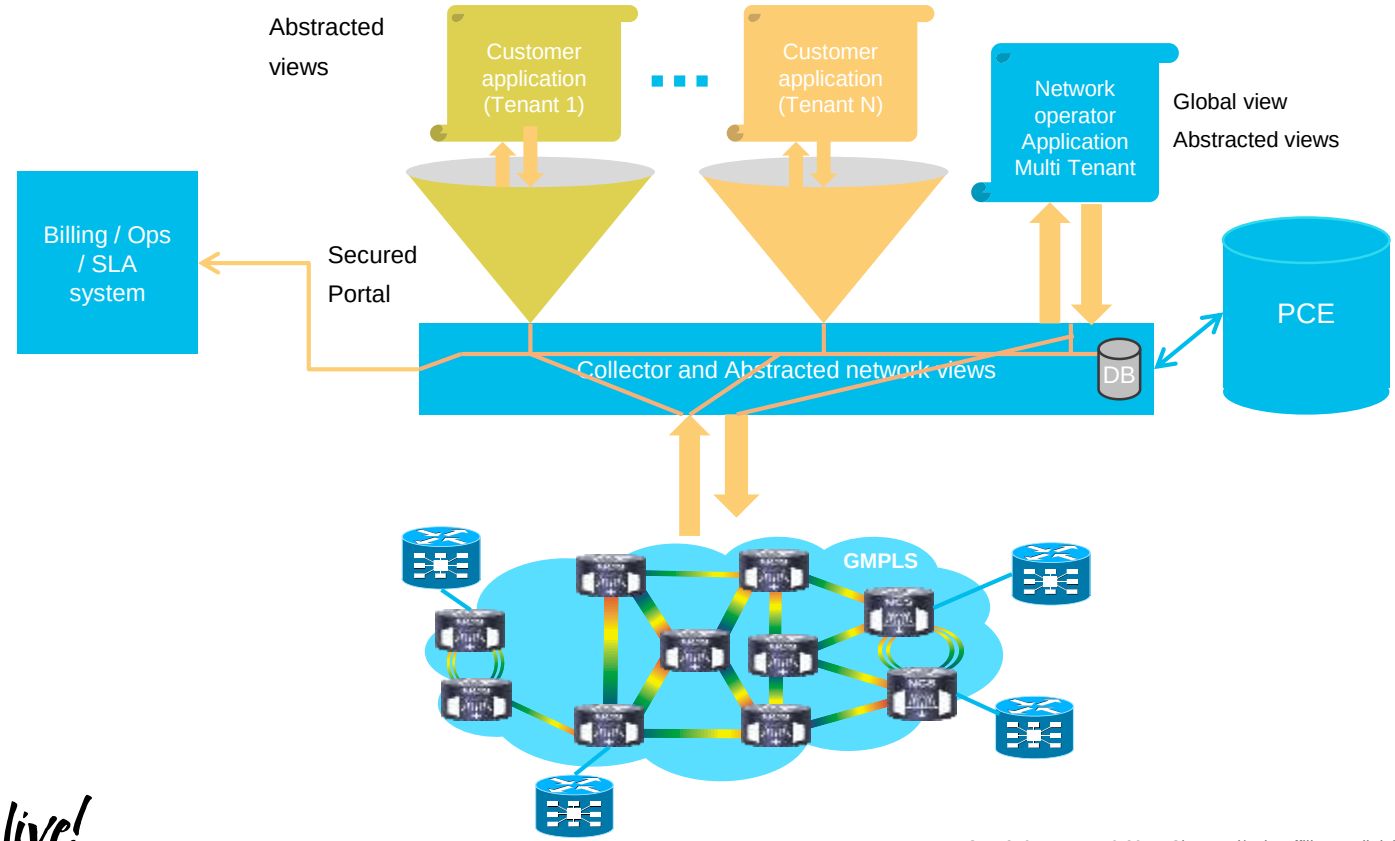
VNFs & IaaS/PaaS/ISVs on Common Virtual Infrastructure

OSS/BSS
VNFs | IaaS | PaaS | SaaS
Converged Infra for Virtualization and Cloud
MANO

Converged Network & IT Business Domains

Centralised and Distributed
Common Architecture & Management

SDN Controller approach for 5G Network slicing



High-level System Architecture

Service #1

Service #N

Tenant 1 control plane (e.g. GMPLS, SDN)

Tenant 1 OVPN

Service #1

Service #N

Point-to-point request (to be computed) or ERO

Tenant 2 OVPN

Network Virtualization Platform

Network Abstraction

Virtual Network Embedding & Provisioning

Tenant Service Computation & Provisioning

Resilience (restoration)

Graphical User Interface

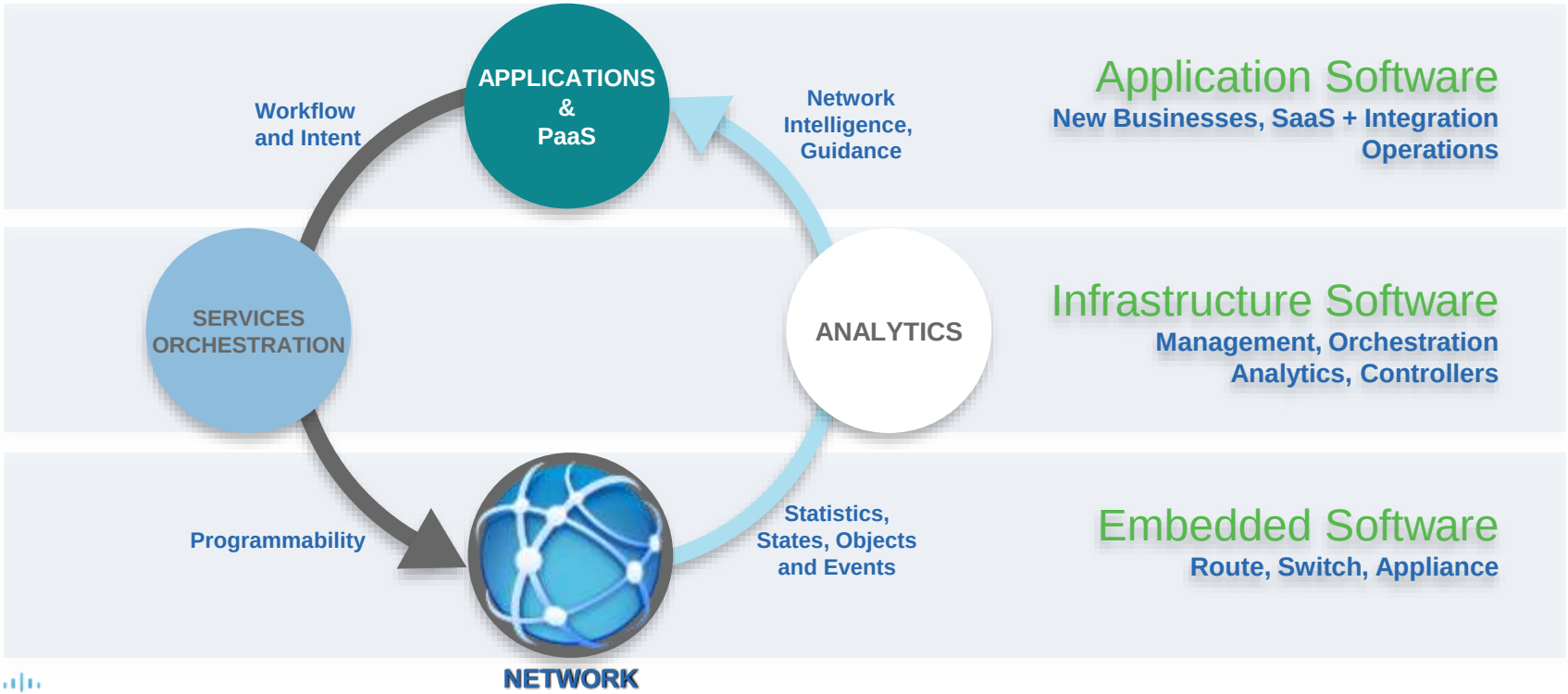
Optical control plane (e.g. GMPLS, SDN)

Optical Layer

The vision

Reactive Networking ➔ Intelligence drives change

Turning data into information to drive intent




CISCO