Understanding the impact of new generation of business services

Jesus Luzardo

amdocs

CSP's enterprise vision

From:

- Traditional networks
- Connectivity based revenues
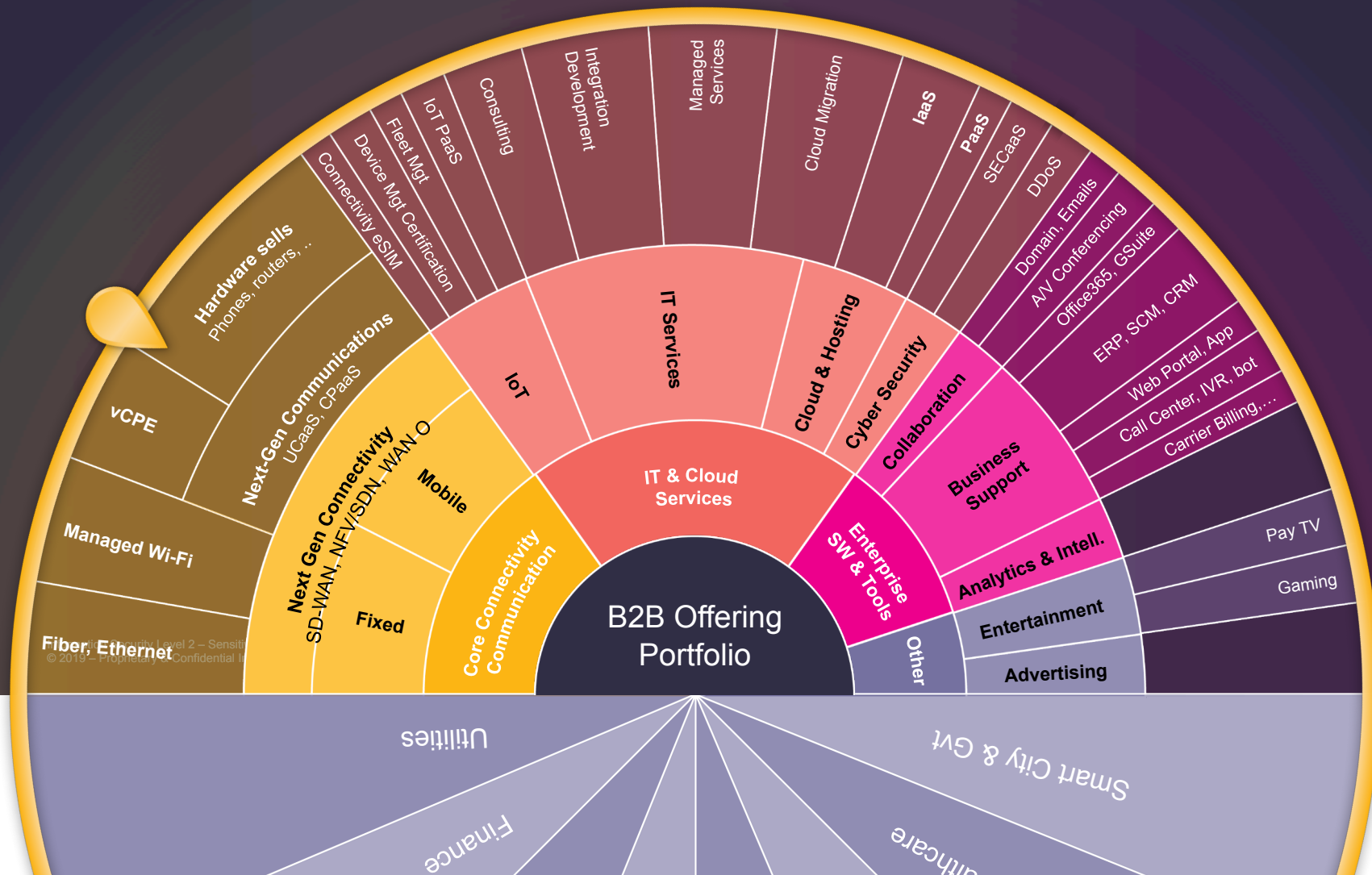- Manual intensive, cumbersome operations

To:

- Virtualized connectivity and communications
- ICT on-top of Connectivity
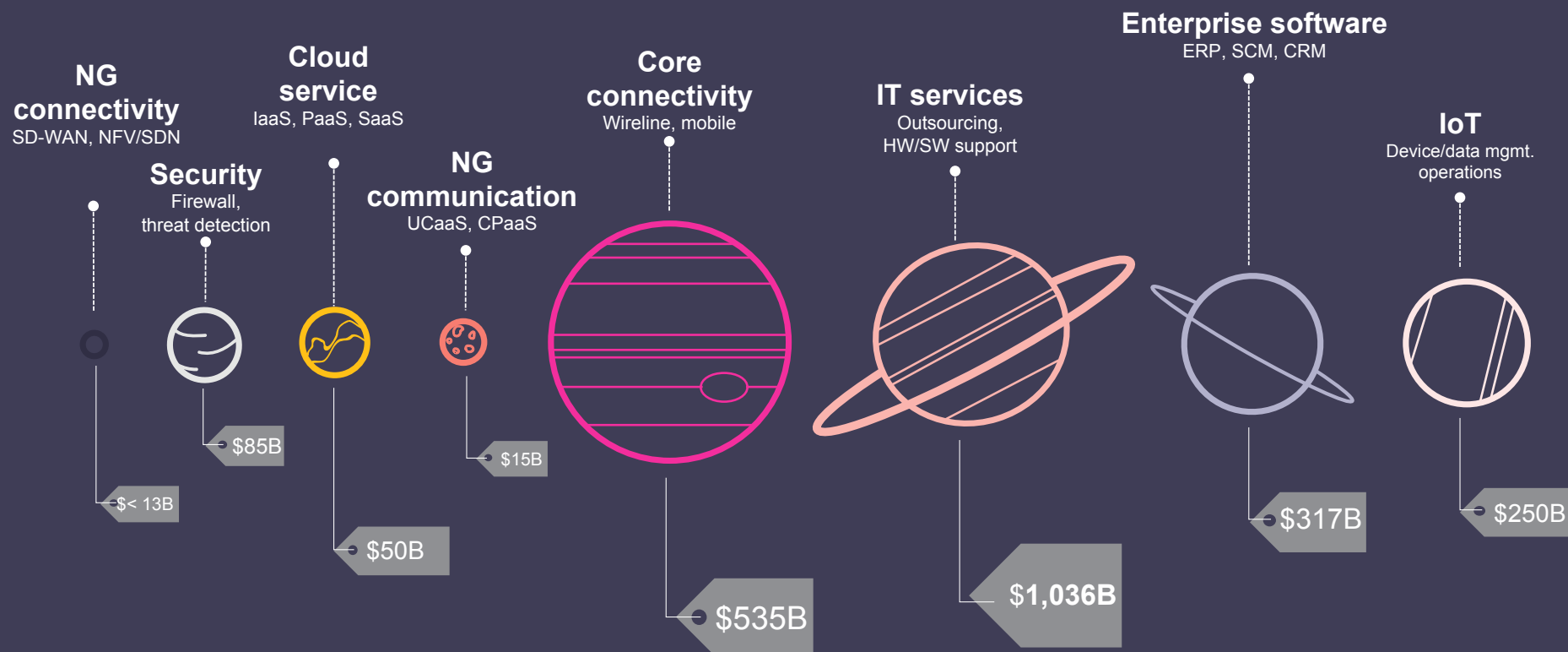- Digitized experience & automated operations

Sell Smarter , Deliver Faster, Grow Beyond

A diverse portfolio of connectivity & beyond

But what to sell should not be "a wheel of the fortune"

enterprise ICT universe

NG connectivity
SD-WAN, NFV/SDN

$< 13B

Security
Firewall, threat detection

$85B

Cloud service
IaaS, PaaS, SaaS

$50B

NG communication
UCaaS, CPaaS

$15B

Core connectivity
Wireline, mobile

$535B

IT services
Outsourcing, HW/SW support

$1,036B

Enterprise software
ERP, SCM, CRM

$317B

IoT
Device/data mgmt. operations

$250B

with CSPs controlling one domain: connectivity

NG connectivity
SD-WAN, NFV/SDN

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Core connectivity
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IT services
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Enterprise software
ERP, SCM, CRM

IoT
Device/data Mgmt. operations

40%

9%

7%

30%

99%

5%

1%

5%

$< 13B

$85B

$50B

$15B

$535B

$1,036B

$317B

$250B
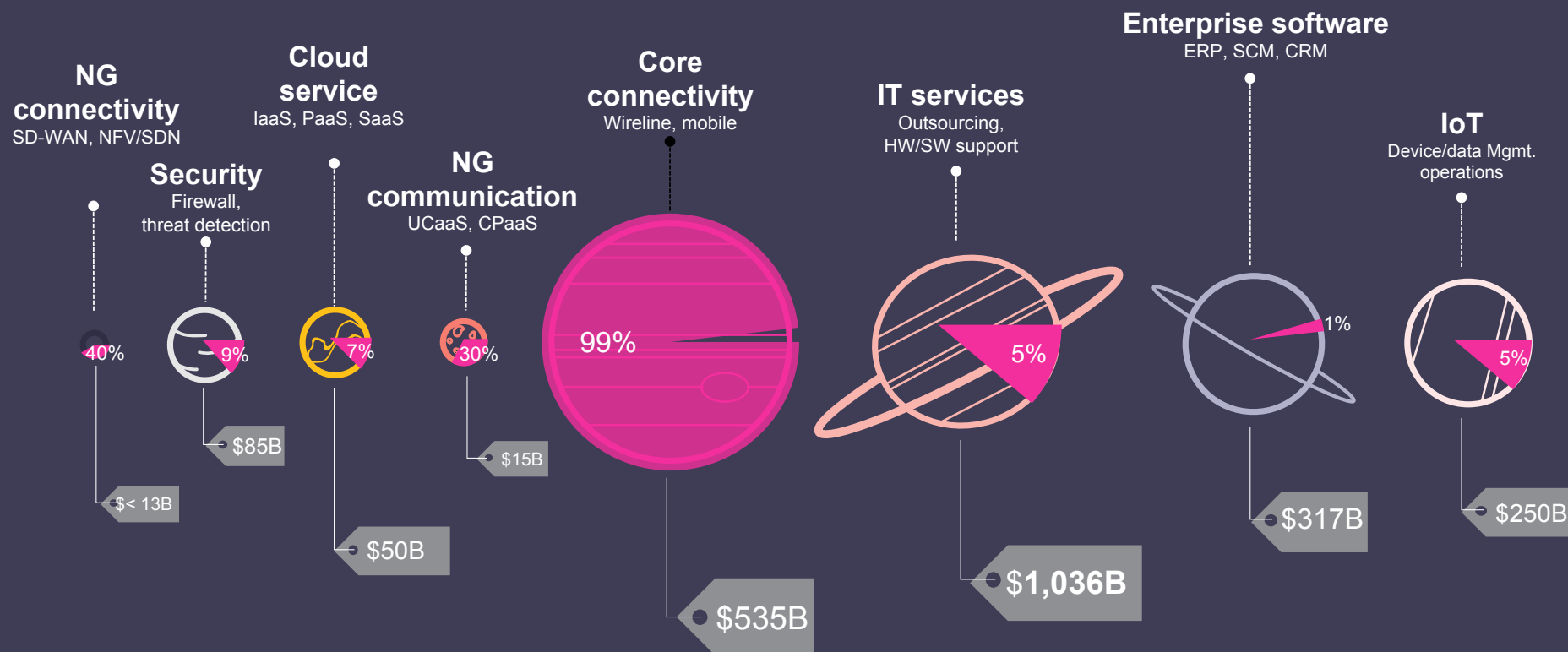
CSP market share

...and many growth opportunities to explore

Turning Threat to Opportunity
- NG Comms
- NG Connectivity

Domains Driving Growth
- IoT
- Security
- Cloud

Opportunistic
- IT Services
- Enterprise SW

CSP Growth Rate ('15-'17 CAGR)

- $< 15B — NG Connectivity
- IoT — $250B
- Cloud — $50B
- NG Comms — $13B
- Security — $85B
- IT Services — $1,036B
- Enterprise Software — $317B
- Core Connectivity — $535B

90%
30%
15%
13%
9%
5%
1%

Overall Growth Rate ('17-'21 CAGR)
1% 5% 8% 13% 19% 25%

Source: TBR, Gartner, Analysys Mason, Ovum, news articles, SP press releases, annual reports, websites, Team Analysis

Enterprise Virtualized Connectivity can unlock the enterprise revenue from the beyond connectivity

Security
$85B

Cloud
$50B

IOT
$250B

IT Services
$1,036B

NFV/SDN
5G

SD-WAN ++, 5G Network Slice, etc.

Guaranteed
SLA
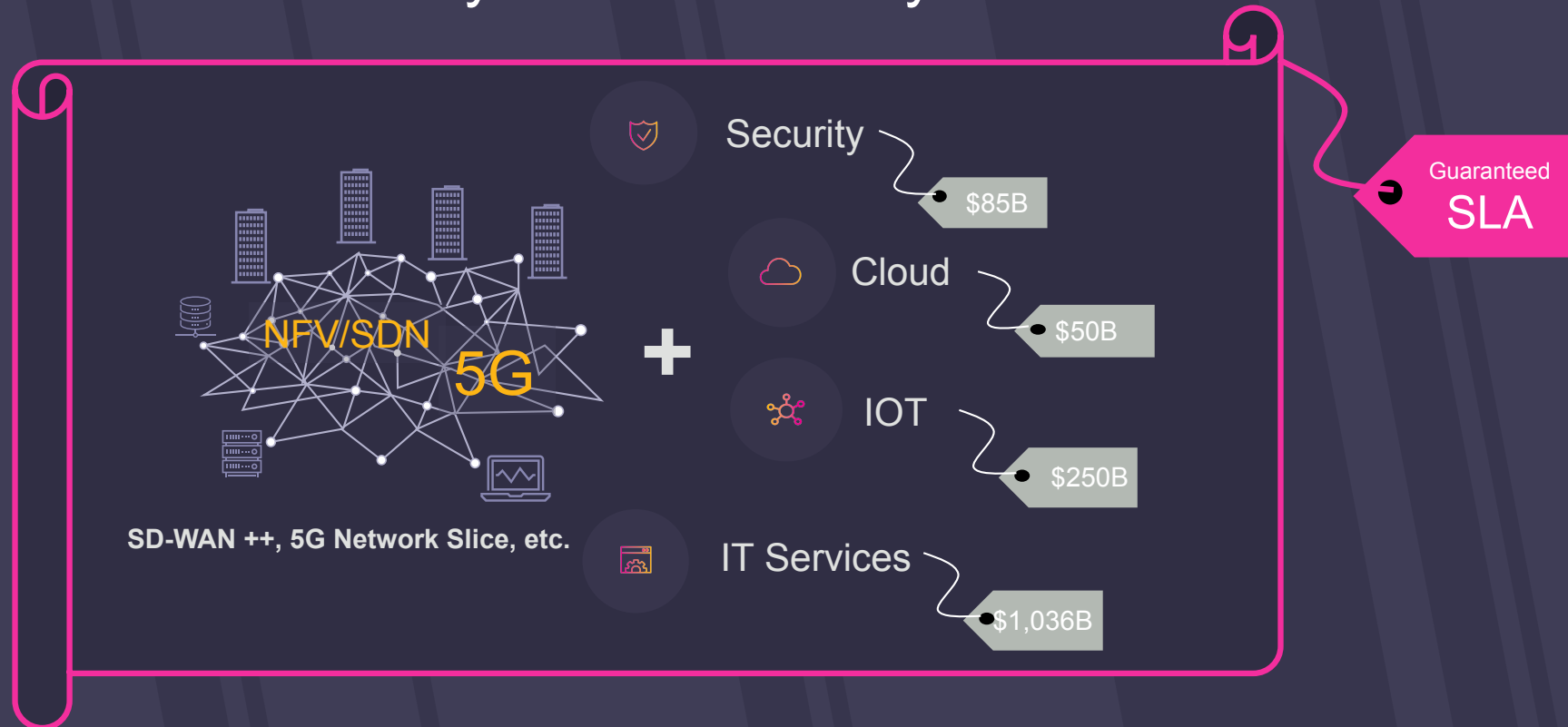
SD-WAN: Paradigm shift in enterprise connectivity services

SD-WAN deployment models

Managed service	OTT SD-WAN	DIY

VERSA NETWORKS · viptela · JUNIPER NETWORKS · nuagenetworks · velocloud · silver peak · HUAWEI

Enterprises spending on edge routers vs. SD-WAN

75% of WAN infrastructure will use SD-WAN by 2022

US$ Millions

	2018	2019	2020	2021	2022
SD-WAN Equipment	926	1300	1535	1,655	1,779
Branch Office Router	3,592	2,946	2,278	1,724	1,128

■ SD-WAN Equipment   ■ Branch Office Router
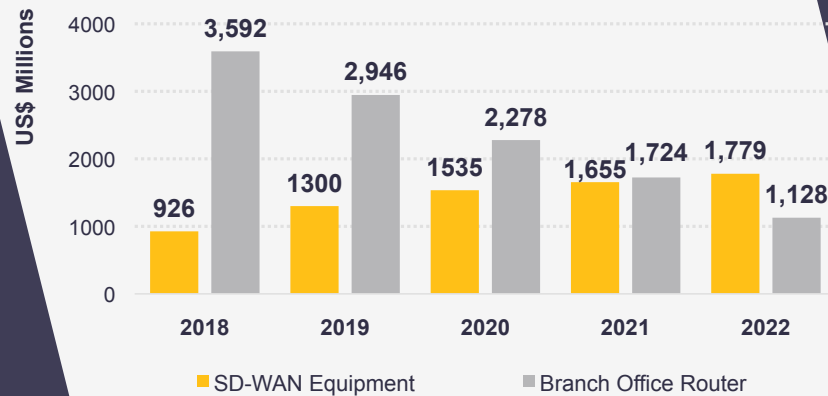
Favourable SD-WAN delivery model

DIY 24%

40% Managed SD-WAN by CSP (with WAN transport)

36% Managed SD-WAN by vendor , OTT or SI
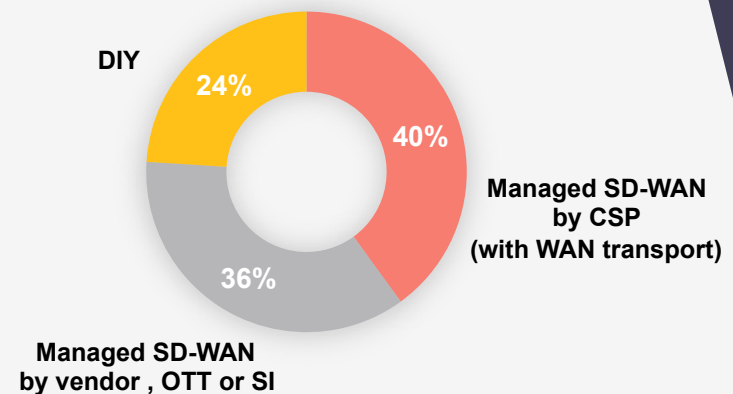
Gartner

SD-WAN & VAS

Can communications service providers turn the SD-WAN threat into an opportunity?

DYI / WAN Vendors

Service Providers' Differentiators

Price

Flexibility

Time to Deliver

Guaranteed SLA and Mng Service

Hybrid – SD-WAN with MPLS

Bundled services

at&t · verizon✓ · Sprint · orange · BT

Telefónica · vodafone · colt · TATA · Singtel
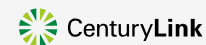
COMCAST · CenturyLink · EarthLink · Level(3)

Service Provides need to offer **differentiated SD-WAN solution** bundled with complementary services
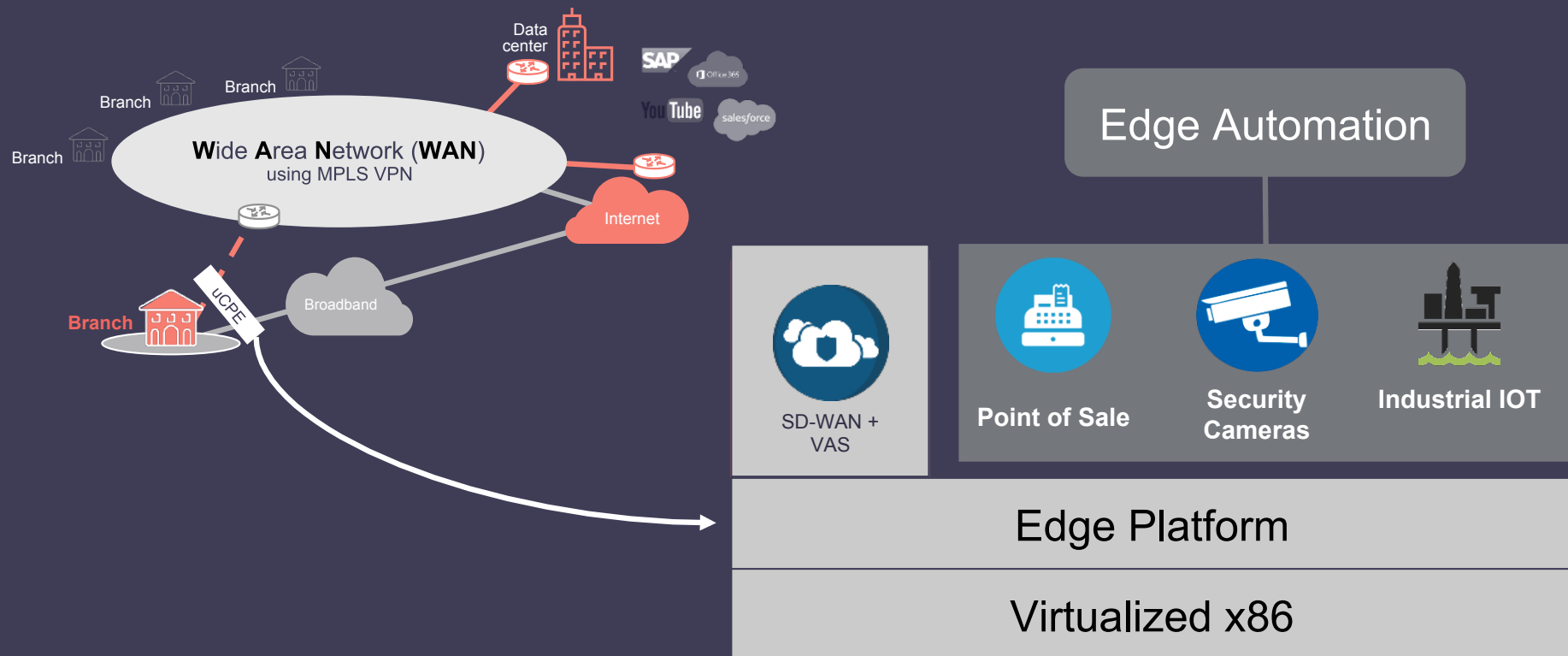
SD-WAN & VAS

Enterprise SD-WAN Purchase Options

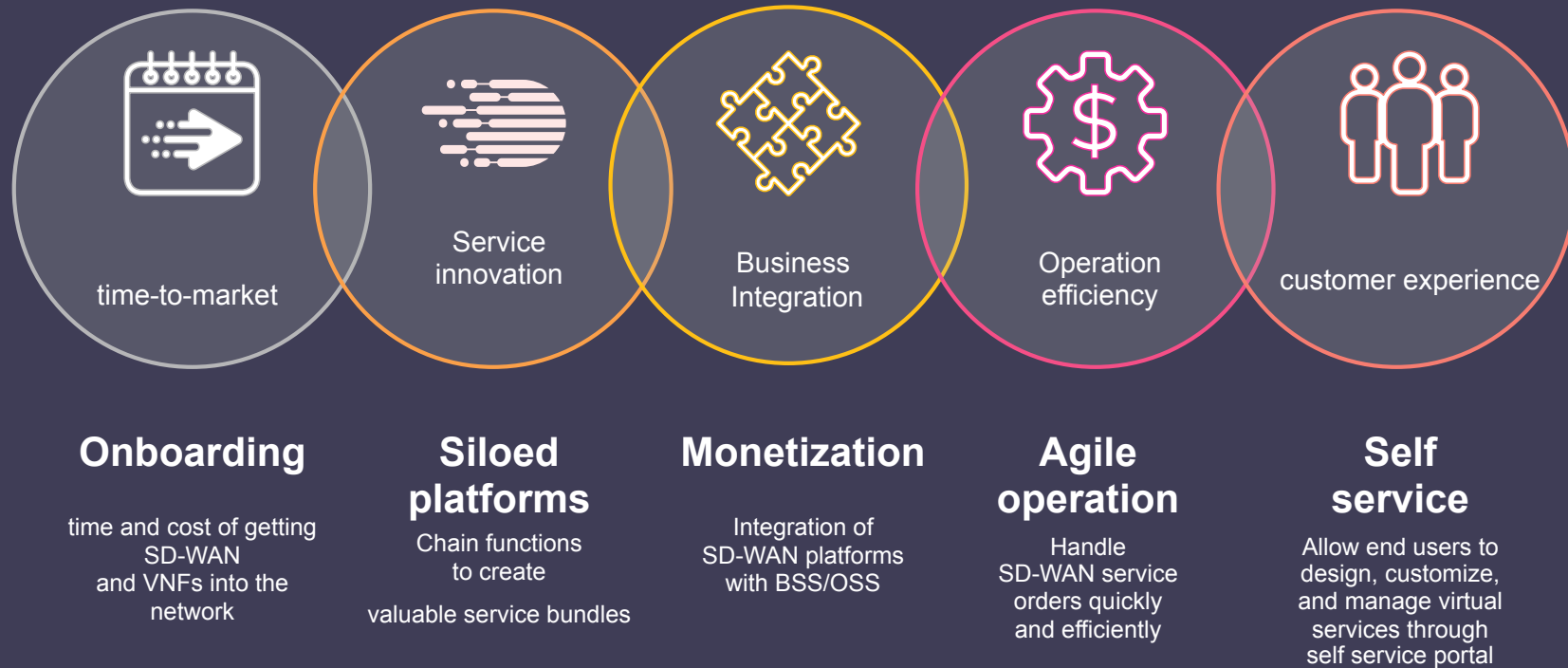| Sample Options	CPE-end (buy and install)	Connectivity (procure)	Cloud-end (build and install)	Ongoing Management
A	Enterprise	Enterprise	Enterprise	Enterprise
B	Enterprise	Enterprise	Enterprise	SP
C	Enterprise	Enterprise/SP	SP	SP
D	SP A	SP B	SP A	SP C

Devil is in the details – management of infrastructure versus management of services, maybe not the same SP builds and manages (role of MSPs), and
the SP providing connectivity might not be same as SP providing SD-WAN

SD-WAN & VAS

Taking it a step further
Mini-cloud for the branch

Branch

Branch

Branch

Branch

Data center

SAP

Office 365

YouTube

salesforce

Wide Area Network (WAN)
using MPLS VPN

Internet

uCPE

Broadband

Edge Automation

SD-WAN + VAS

Point of Sale

Security Cameras

Industrial IOT

Edge Platform

Virtualized x86

SD-WAN & VAS

Offering SD-WAN introduces operational complexities

Onboarding

time and cost of getting SD-WAN and VNFs into the network

Siloed platforms

Chain functions to create

valuable service bundles

Monetization

Integration of SD-WAN platforms with BSS/OSS

Agile operation

Handle SD-WAN service orders quickly and efficiently

Self service

Allow end users to design, customize, and manage virtual services through self service portal

time-to-market

Service innovation

Business Integration

Operation efficiency

customer experience

SD-WAN & VAS

Generational moment for enterprise experience

5**G** is not just another G

5G NR   +   Edge Computing   +   Network Slicing

Experience = Speed + Latency + Reliability

5G for Enterprise

What makes 5G special for Enterprise market?

Bandwidth Frequency

mmWave

Localized, **high-capacity and low-latency** communications services

Mid Band

Enhanced Mobile Broadband (eMBB) consistent capacity, speed

Low Band

Nationwide coverage and reliability, **massive IoT**

Coverage

Source: 5G Americas

Different services need different types of bandwidth

Nothing like this has happened before!!
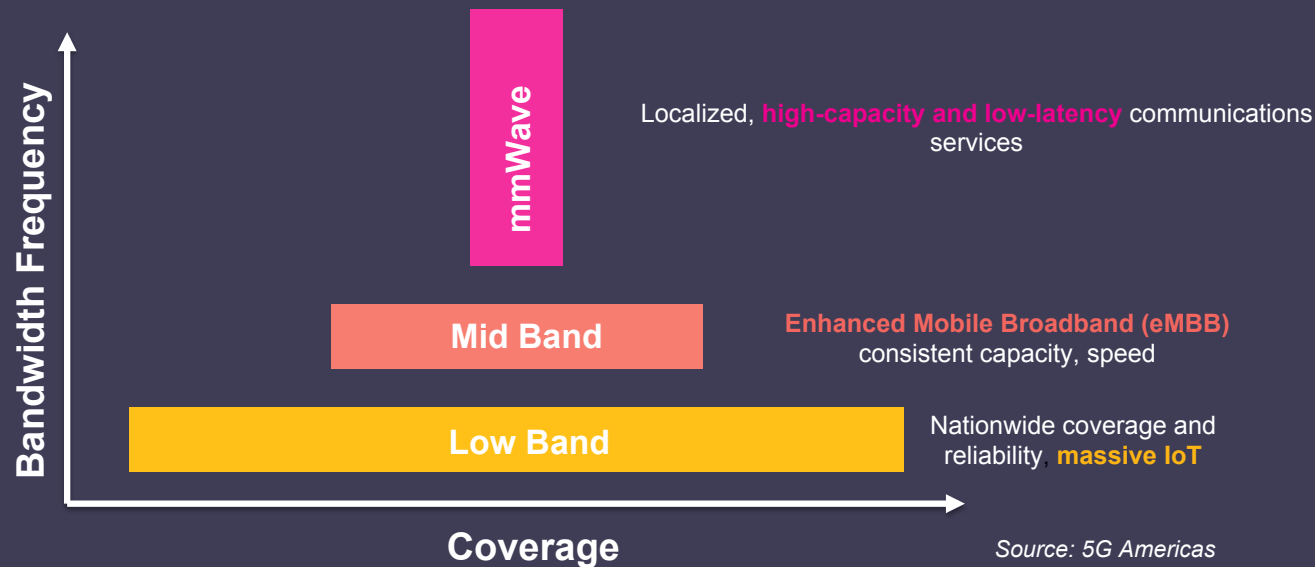
*Mobile operators can now sell more than "price plan" to their **enterprise customers.***

*Network Slicing allows them to sell **SLA based services** for the first time*

5G for Enterprise

Optimism about new 5G enterprise revenues

How strongly do you expect 5G to drive business opportunities with enterprise and SMB customers?
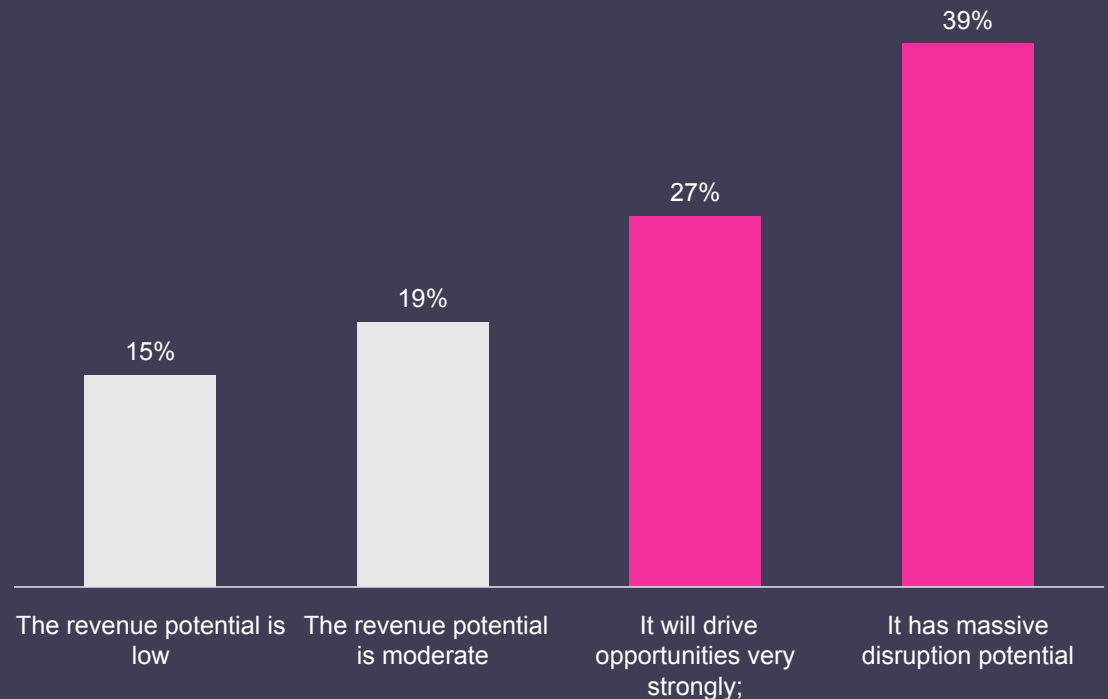
2/3 say
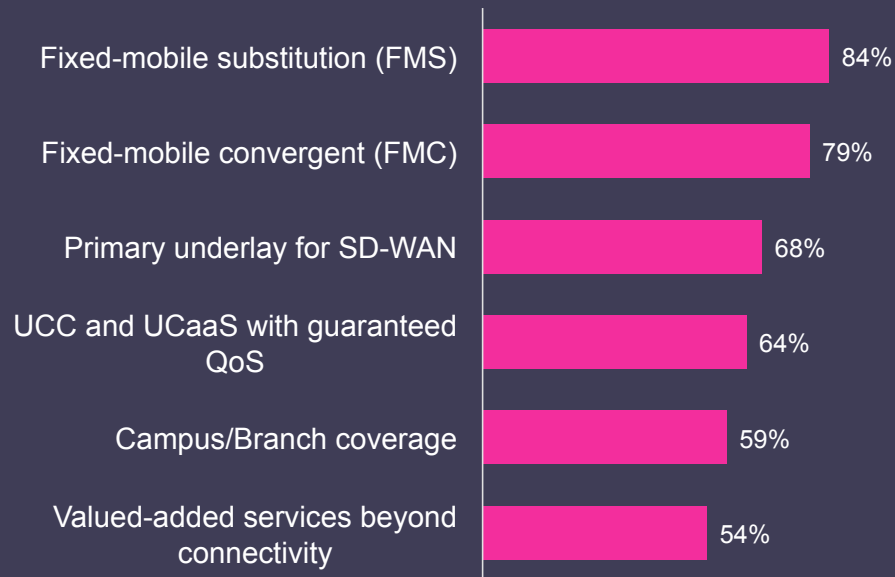5G will drive new business opportunities and generate new revenue

"…the revenue case for 5G will need to be founded on the business market —in particular, with global companies and in select verticals."
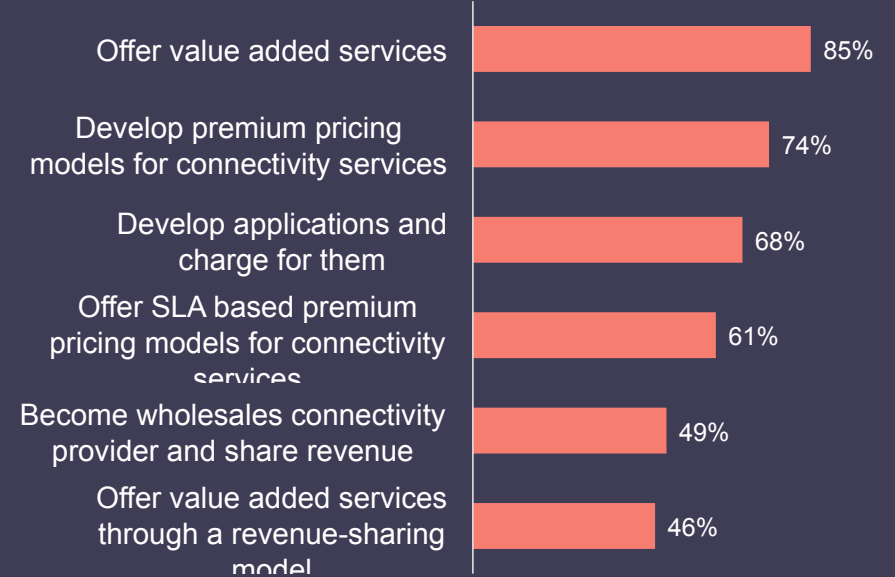
-- *Survey Respondent*

15%
The revenue potential is low

19%
The revenue potential is moderate

27%
It will drive opportunities very strongly;

39%
It has massive disruption potential

5G for Enterprise

Early enterprise monetization strategies for 5G

Which areas of your existing enterprise portfolio do you expect to enhance using 5G?

Area	%
Fixed-mobile substitution (FMS)	84%
Fixed-mobile convergent (FMC)	79%
Primary underlay for SD-WAN	68%
UCC and UCaaS with guaranteed QoS	64%
Campus/Branch coverage	59%
Valued-added services beyond connectivity	54%

In the first year or two, post launch, what is your plan to monetize 5G enterprise services?

Plan	%
Offer value added services	85%
Develop premium pricing models for connectivity services	74%
Develop applications and charge for them	68%
Offer SLA based premium pricing models for connectivity services	61%
Become wholesales connectivity provider and share revenue	49%
Offer value added services through a revenue-sharing model	46%

Although optimism about 5G remains high, delivering 5G-based customer value strongly depends on the effectiveness of a CSP's operations and monetization capabilities.

5G for Enterprise

Importance of 5G Network Slicing

Enabling new kind of SLA based Business Services going beyond traditional QoS

| Slice 1 |
| Slice 2 |
| Slice 3 |
| Slice 4 … |

5G Network Slicing

Horizontal Attributes
- Latency
- Throughput
- Connection Density of IoT
- Reliability
- Mobility
- Security
- Analytics
- Battery Life for IoT
- Geography

Industry Verticals
- Media
- Health
- Voice
- Logistics
- Consumer
- Others

What does network slicing really bring to CSPs and their enterprise customers? The capability to provide new partner-enabled (B2B and B2B2X) service offerings.

5G for Enterprise a

Industry 4.0

5G Enablers

- Narrow Band IoT
- Software Radios
- eSIM
- Network Slicing

Mobile Sensors

Real-time reports and alerts

Automation Tools

Business Model

- B2B

Key Benefits

- High Value Customers
- Growth Markets
- Connectivity and Automation are Differentiators

B2B

Industry 4.0

Consumer Flow

FarmX

Is a mid-size, eco-sensitive farm

- Located in upstate NY
- Supplies fresh produce to many farm to table restaurants
- Business depends on dedication to sustainable farming
- Business model requires lean, cost sensitive operations for profitability

Consumer Engagement

- Telco has E2E solution for industry that includes connectivity and partner services
- Sales rep easily creates proposal for humidity sensors, water management, breed management, health sensors
- After negotiation and agreement, FarmX is mapped to NB-IOT network slice
- Sensors start generating data and customer gets actionable alerts/ automation kicks in

Connected Event

5G Enablers

- Dedicated Network Slice
- 1Gbps bandwidth
- Ultra-low latency
- Intensive edge computing

4K Video Streaming

HD Advertising Services

VR Views

Business Model

- B2B2C

Key Benefits

- Expand market for NaaS
- Potential for other aaS monetization
- High Value/Low Touch

B2B2C

Formula1
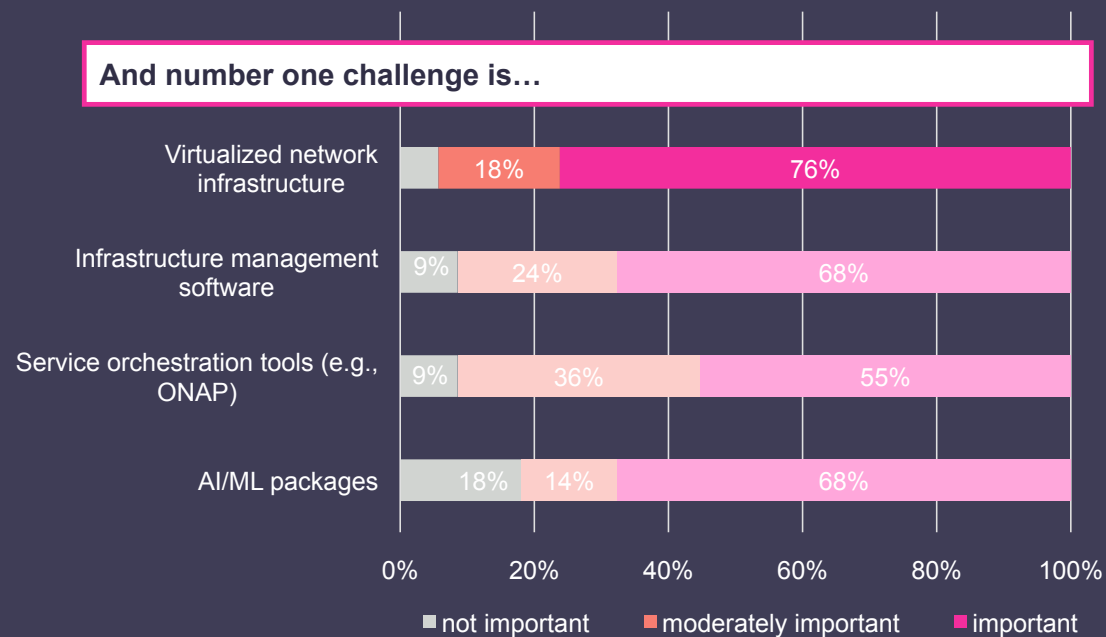# 4K Video Streaming

Consumer Flow

Formula One Group

- Group of companies responsible for the promotion of the Formula One World Championship and exercising the sport's commercial rights
- Operates the Formula 1 app with a free and premium version.
- Would like to enhance the service with ultra HD, ultra reliability and low latency mobility.

Consumer Engagement

- Telco can offer a dedicated network slice with the application at the edge of the network for high reliability and low latency.
- With the network capabilities, F1 can offer enhanced VR experiences
- Telco can also offer secure payment gateway and billing aaS.
- Formula 1 owns the relationship with the customer and pays for the wholesale connectivity

And they know the challenge ahead

Please rate the importance of each of the following internal software enhancements in delivering 5G-enabled services.

And number one challenge is…

Category	not important	moderately important	important
Virtualized network infrastructure		18%	76%
Infrastructure management software	9%	24%	68%
Service orchestration tools (e.g., ONAP)	9%	36%	55%
AI/ML packages	18%	14%	68%

■ not important ■ moderately important ■ important

*"I know 5G technology will get implemented in the network, my concern lies with **OSS/BSS readiness** to address business opportunities enabled by this network."*

-- European Network Operator

5G for Enterprise ᵃ

Enterprise Virtualized Connectivity ++
Key characteristics

Customer Experience

Partner Ecosystem

On-Demand

ICT Innovation

Dynamic, Real-time

VAS

Zero-touch

Programmable

Automation

Agile

Self-healing

Flexible

Sell Smarter, Deliver Faster, Grow Beyond

Next-Gen Connectivity ++

Key Takeaways

Know your vertical Advantage

Create premium Enterprise Services complementing to existing business services for the vertical market you are already in

Remember you already have an Edge

Look for the business use case that the best leveraging your existing infrastructure

Prepare for on-demand enterprise expectation

Bridging the gap to "consumer-like" experiences

Differentiate using NFV innovation

Monetize and manage multi-vendors Virtual Network Functions (VNFs) ecosystems

LET'S HAVE
ENTERPRISE CONVERSATIONS