



# 5G TECH TALK

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JUNIPER  
NETWORKS

Engineering  
Simplicity

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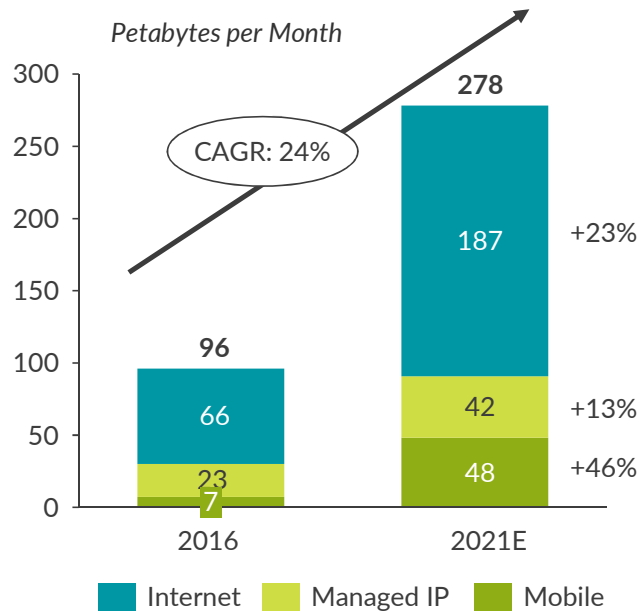
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# WHAT IS DRIVING THE EVOLUTION TO 5G?

## 1. Global IP Traffic Growth



## 2. Increased Competition

- 1 Traditional Network Operators and MSOs
- 2 MVNOs
- 3 Cloud service providers

## 3. 5G Use Cases/Revenue Streams

Enhanced Mobile Broadband

Massive IoT

Critical IoT

Fixed Wireless

**\$250B** Worldwide revenues from 5G services by 2025

Source: ABI

# MAKING THE 5G NETWORK WORK WILL RELY ON SIGNIFICANT DENSIFICATION OF ACCESS...

## 5G Requirements

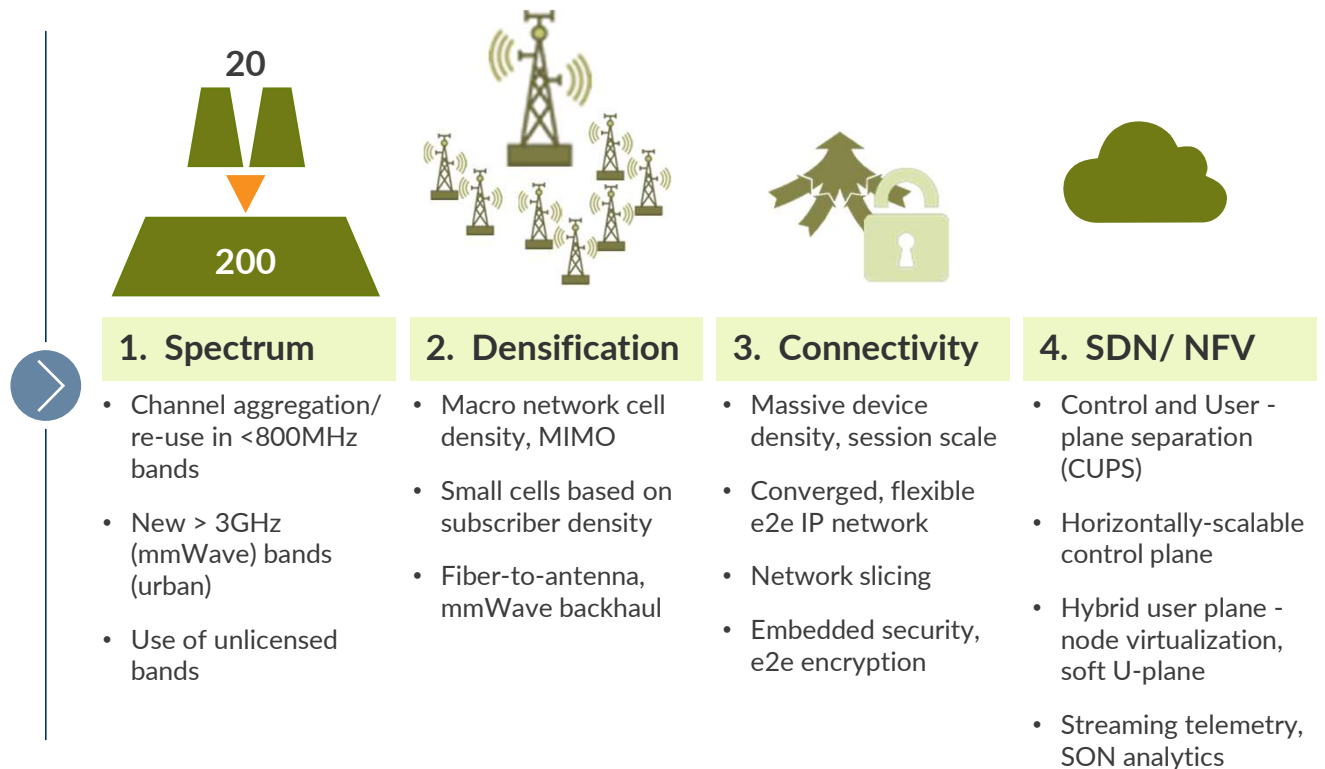
**10-100x** Data rates

**100-1000x** Capacity

**10-100x** Connected devices

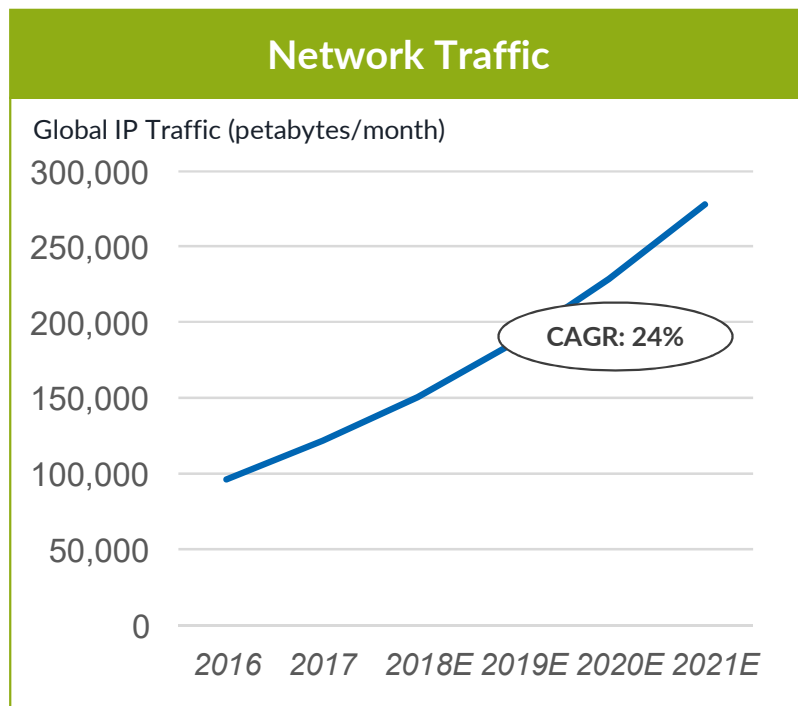
**10-50x** Lower latency

## 5G Design Criteria



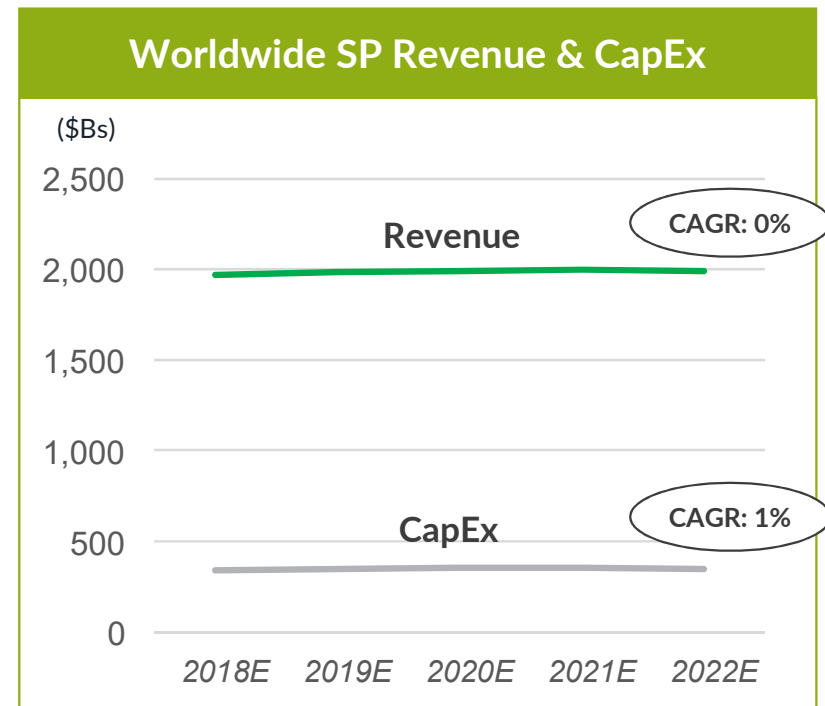
# HOWEVER, MAKING THE 5G BUSINESS CASE WORK COULD BE CHALLENGING WITHOUT TRANSFORMATION ...

*Huge traffic growth rates continue. . .*



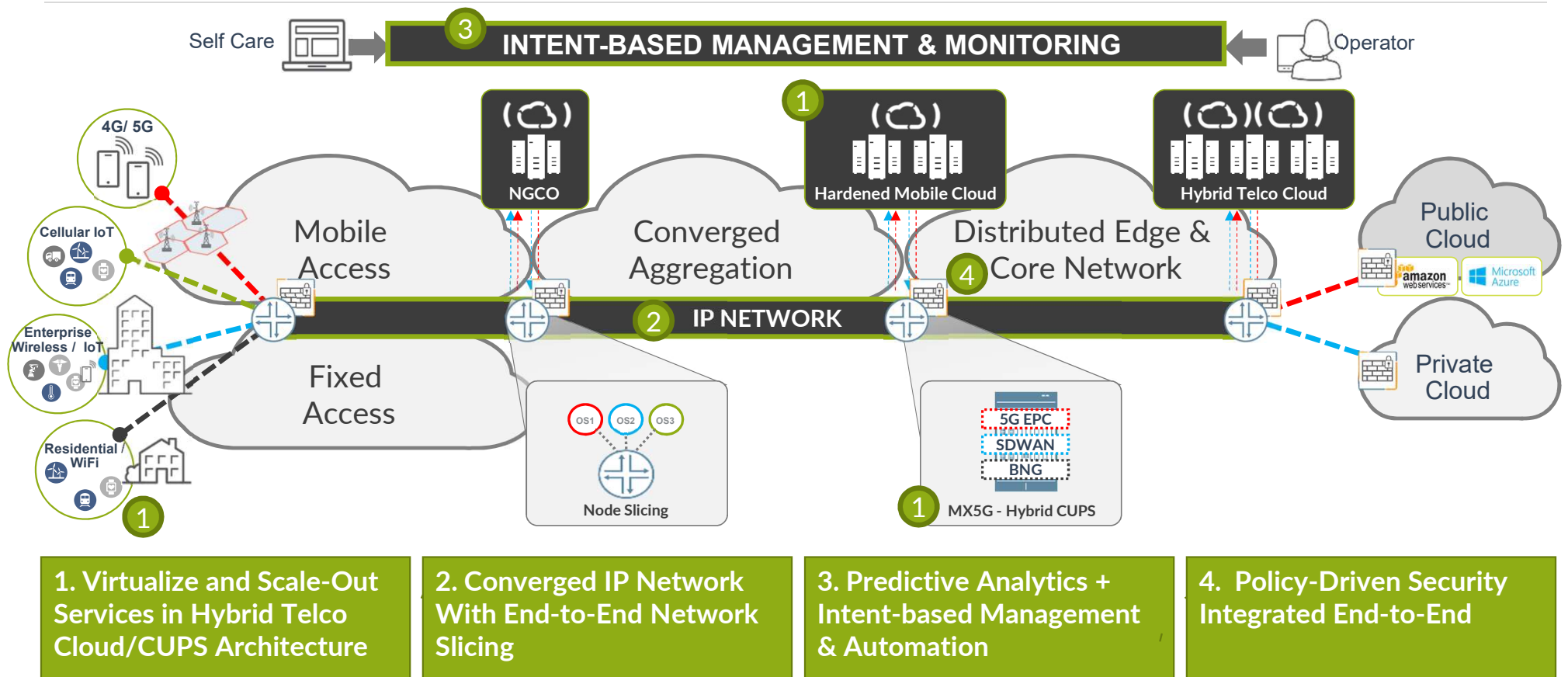
Source: Cisco VNI

*. . . But network operator revenues and spending remain under pressure.*



Source: IHS

# OUR VIEW IS THAT 5G SERVICE AND ROI WILL BE ENABLED BY KEY TRANSFORMATIONS OF THE NETWORK ARCHITECTURE



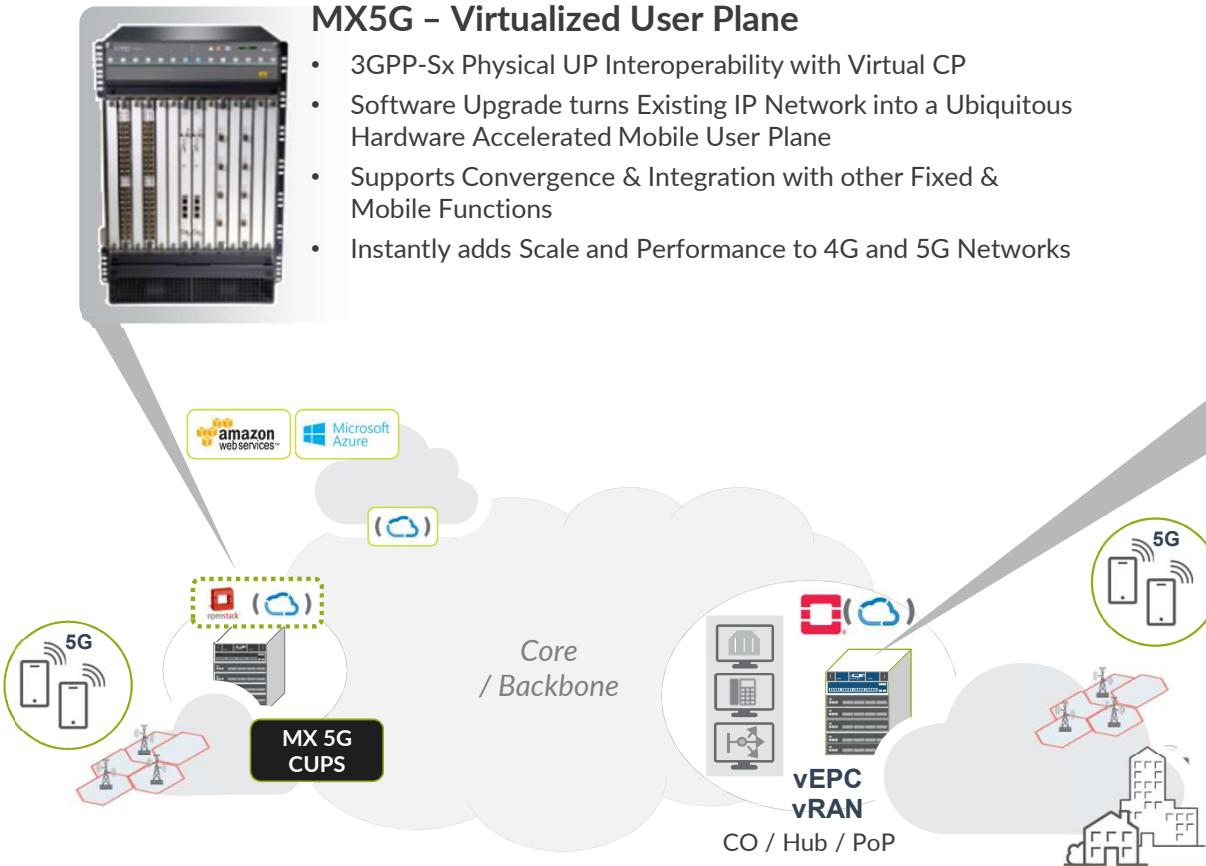


# 1. VIRTUALIZE AND SCALE-OUT SERVICES

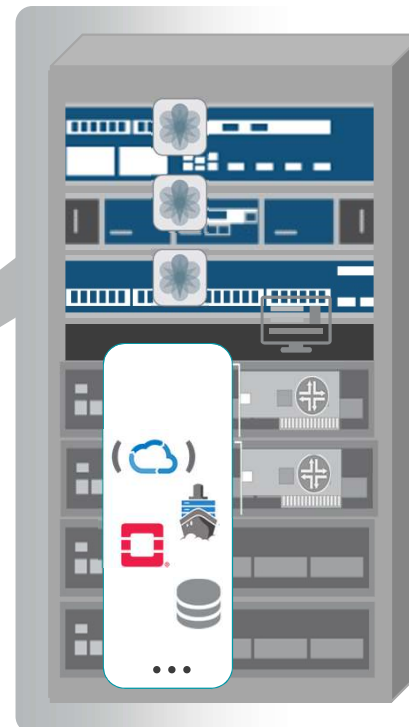
## HARDENED DISTRIBUTED CONTRAIL CLOUD STACK FOR HYBRID TELCO CLOUD/CUPS

### MX5G – Virtualized User Plane

- 3GPP-Sx Physical UP Interoperability with Virtual CP
- Software Upgrade turns Existing IP Network into a Ubiquitous Hardware Accelerated Mobile User Plane
- Supports Convergence & Integration with other Fixed & Mobile Functions
- Instantly adds Scale and Performance to 4G and 5G Networks



### Contrail is #1 Solution for Cloud/ Mobile Automation\*



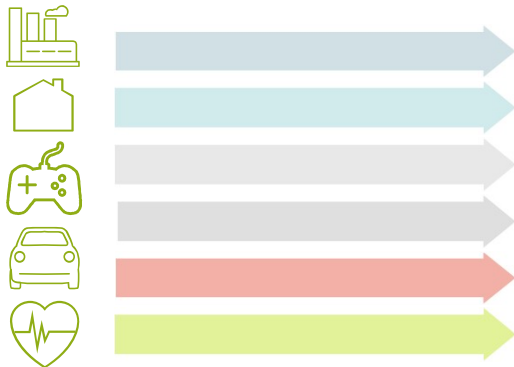
- Complete, mobile-hardened software and hardware stack for Hybrid Telco Cloud
- ~35 Tier1/2 Service Providers wins
- Secure, automated multi- and hybrid deployments
- Full multi-tenancy and segmentation per use case
- Dynamic policy-based chaining
- Leading virtualized functions for mobile service complex

\* OpenStack Foundation 2017 User Survey

## 2. VIRTUALIZATION ENABLES CONVERGED IP NETWORKS

Juniper network slicing efficiently delivers mass customization to users

- Minimize CapEx and OpEx
- Migration path, Operational consistency



### Contrail

*Visibility, Management, & Orchestration with APIs for the 5G ecosystem*

### Node Slicing

*Junos node slicing*

### One Junos OS

*Open, programmable, 5G-ready network operating system*

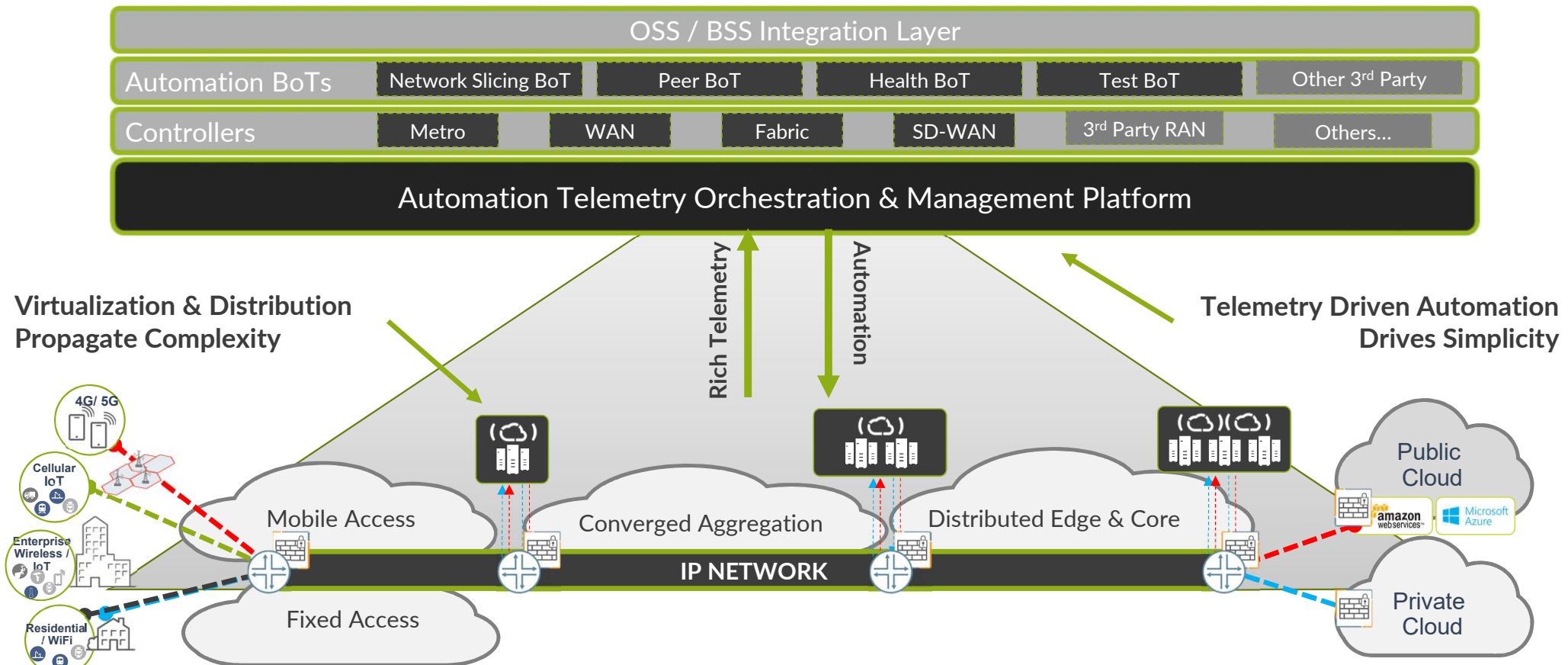
### Juniper E2E Physical/Virtual Platforms

*Best-in-class routing, timing/synch, built-in security*

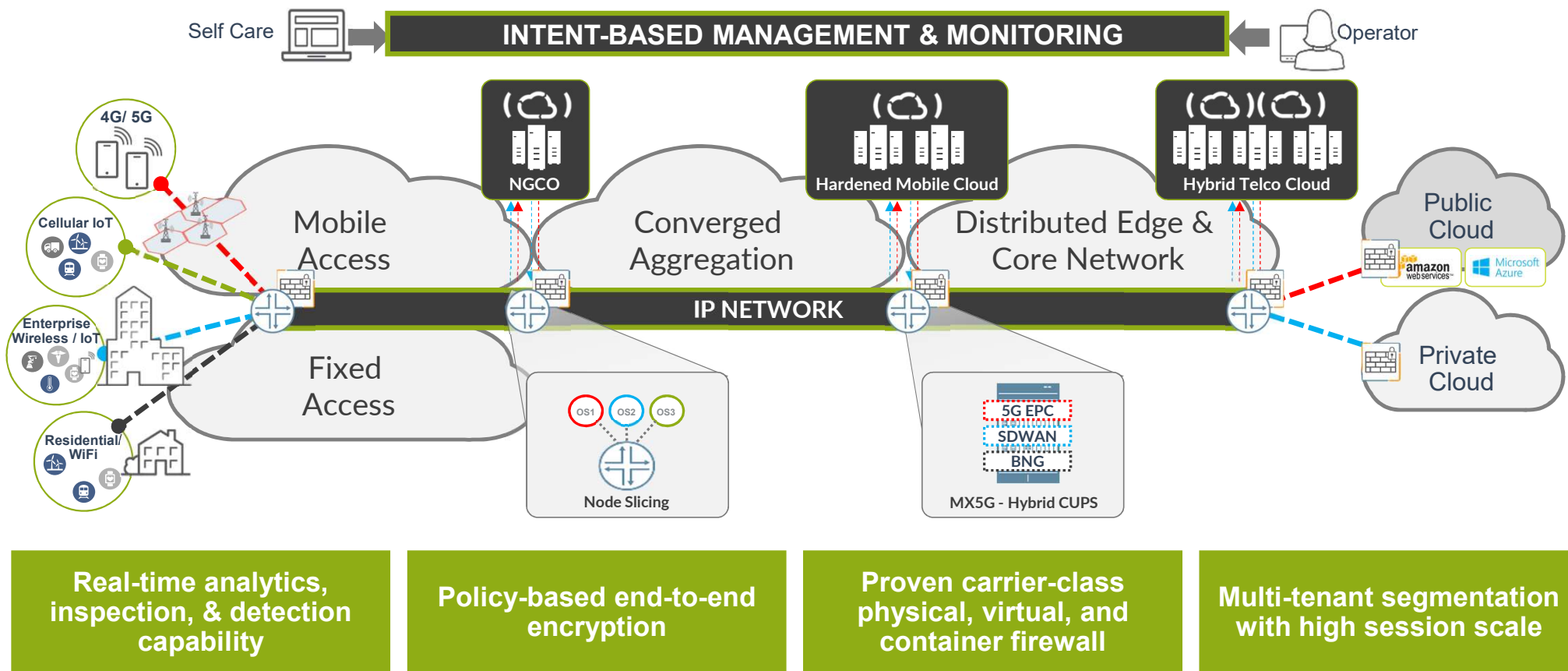


### 3. JUNIPER'S ADAPTIVE SOFTWARE EVOLUTION

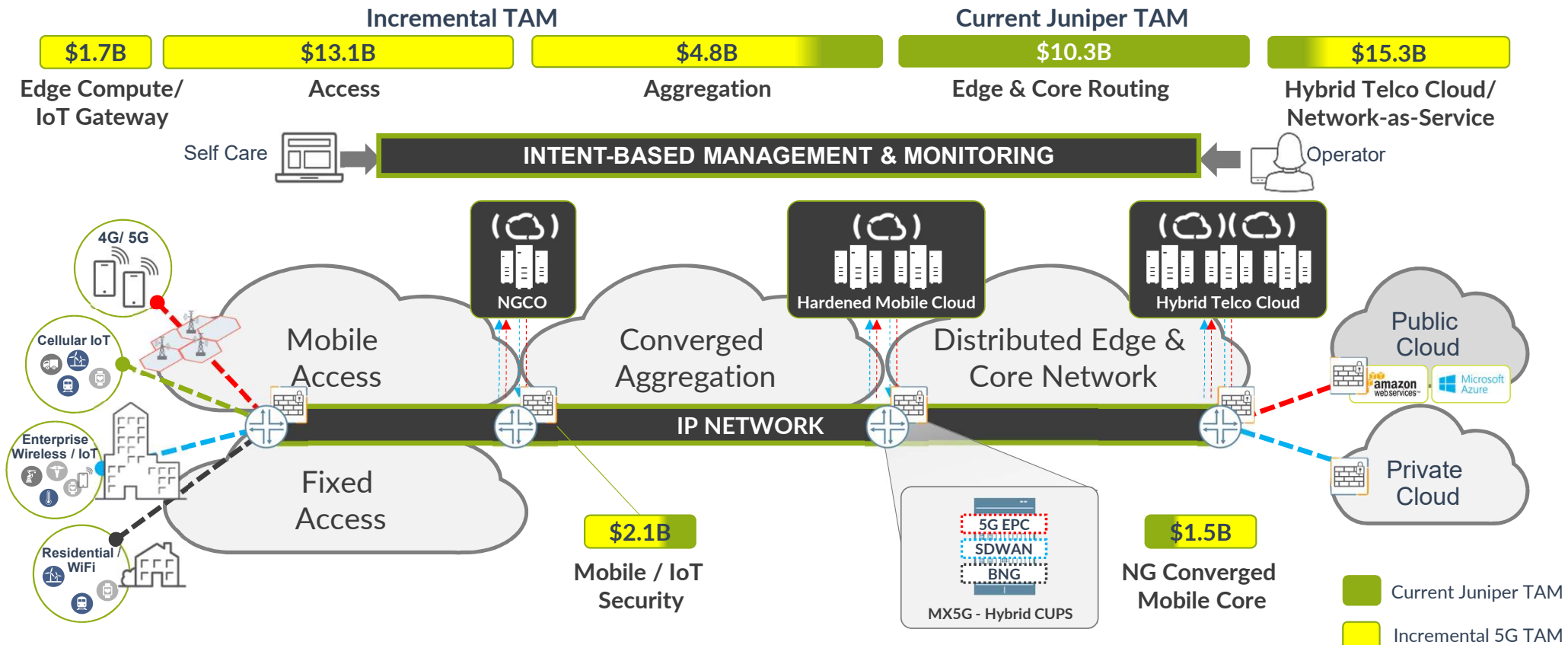
API-BASED PLATFORM BASED ON CONTRAIL AND APPFORMIX TO ENABLE SELF-DRIVING NETWORK™



## 4. POLICY-DRIVEN SECURITY INTEGRATED END-TO-END

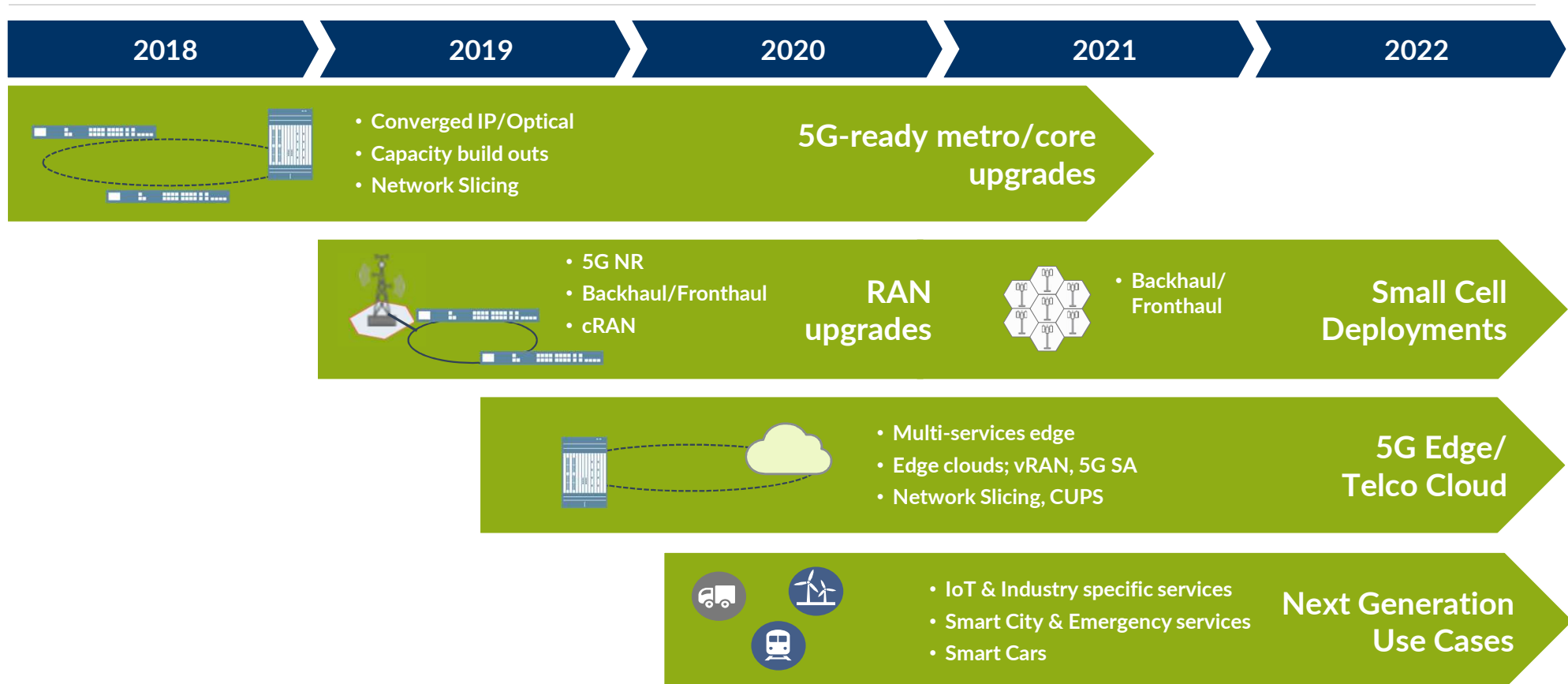


# TRANSFORMATION TO 5G EXPANDS JUNIPER'S TAM IN SERVICE PROVIDERS TO ~\$50B IN 2020



Source:: 2020 TAM based on IHS, Dell'Oro, SNS Research, ABI Research, Juniper analysis

# TIMING AND PHASES OF SP TRANSFORMATION TO 5G



THANK YOU

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