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Connecting IOT

On Public and Private Cellular Networks

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Slide 1

CF(0 Do we not need to use the same title as in the agenda?
Christian Falckenberg (cfalcken, 2022-01-28T10:26:45.833

IoT and 5G macro trends

Use case diversity / complexity

- Higher bandwidth and lower latency enables many new use cases
- Different scenarios in public and private networks

Compute at the edge

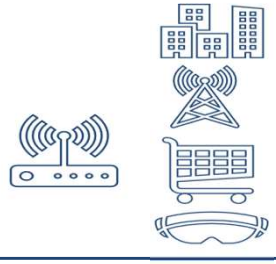
- Application processing closer to the end devices
- Distributed network elements require new level of automation

Cloud native

- Container and Microservices based architectures required for new 5G SA deployments
- Scaling, Slicing and feature velocity requires new network designs

Use case diversity / complexity

Different network architectures needed



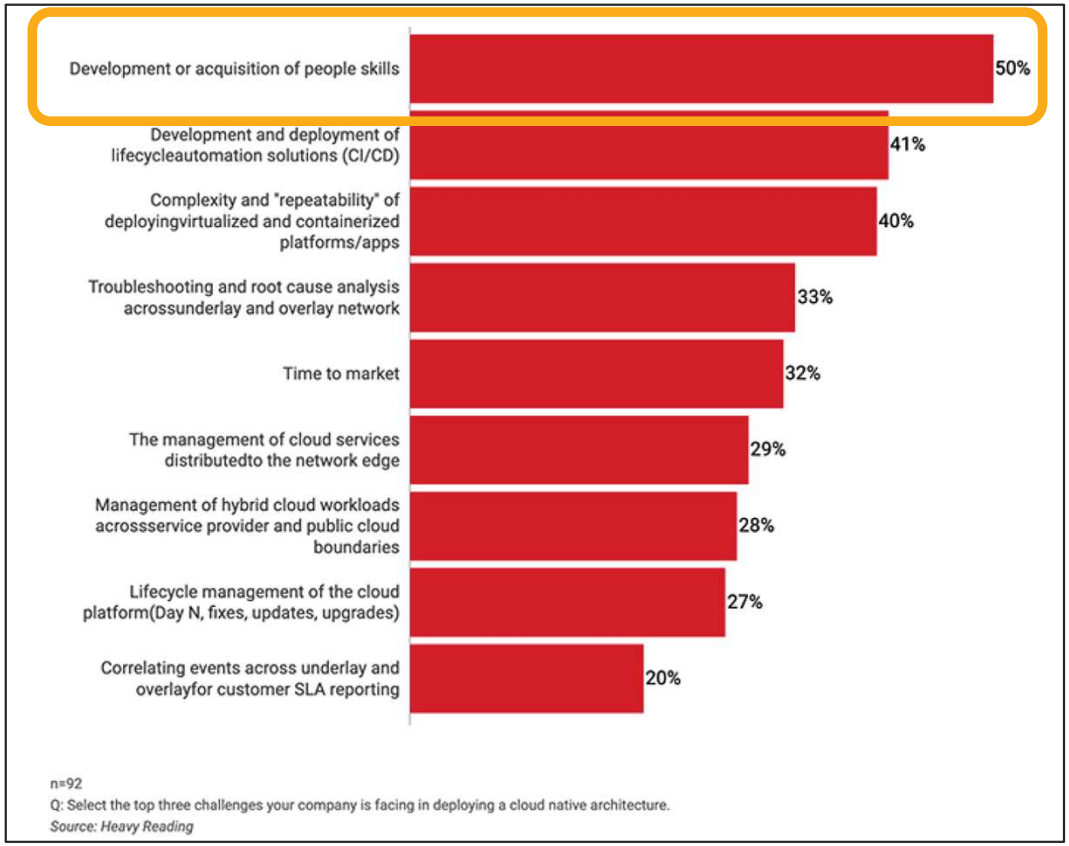



Industrial Routers	HD Cameras	Connected Car	Smart Banking	Gaming Venues	I4.0 / Tele Medicine
Utility, Retail, Travel and Infrastructure	Utility and Public Safety	Automotive	FinTech	Entertainment	Manufacturing and Health Care
Wireless hotspots for SmartOffice, SmartGrids, Retail and SmartTravel Service	Public Safety and SmartGrids	Diagnostics, WiFi, infotainment, navigation, FOTA/SOTA, search and telematics C-V2X for Autonomous driving	SmartPOS terminals, ATMs and iPads	AR/VR headsets and streaming	Remote surgery and smart manufacturing use cases (AGV, etc.)
Broadband Slice	Broadband Slice	Broadband, C-V2X and Latency Slices	Broadband Slice	Broadband and Latency Slices	Massive, Broadband and Latency Slices

Architectural and organizational challenges

- Cloud native 5G SA core required to deliver many of the benefits needed by advanced IOT use cases
- But the evolution to cloud native is see is challenging for today's organizations in Service Providers

Cisco's "as a Service" solution makes it easier for operators to support new IoT use cases for their customers



Key aspects of the Cisco IoT network solution

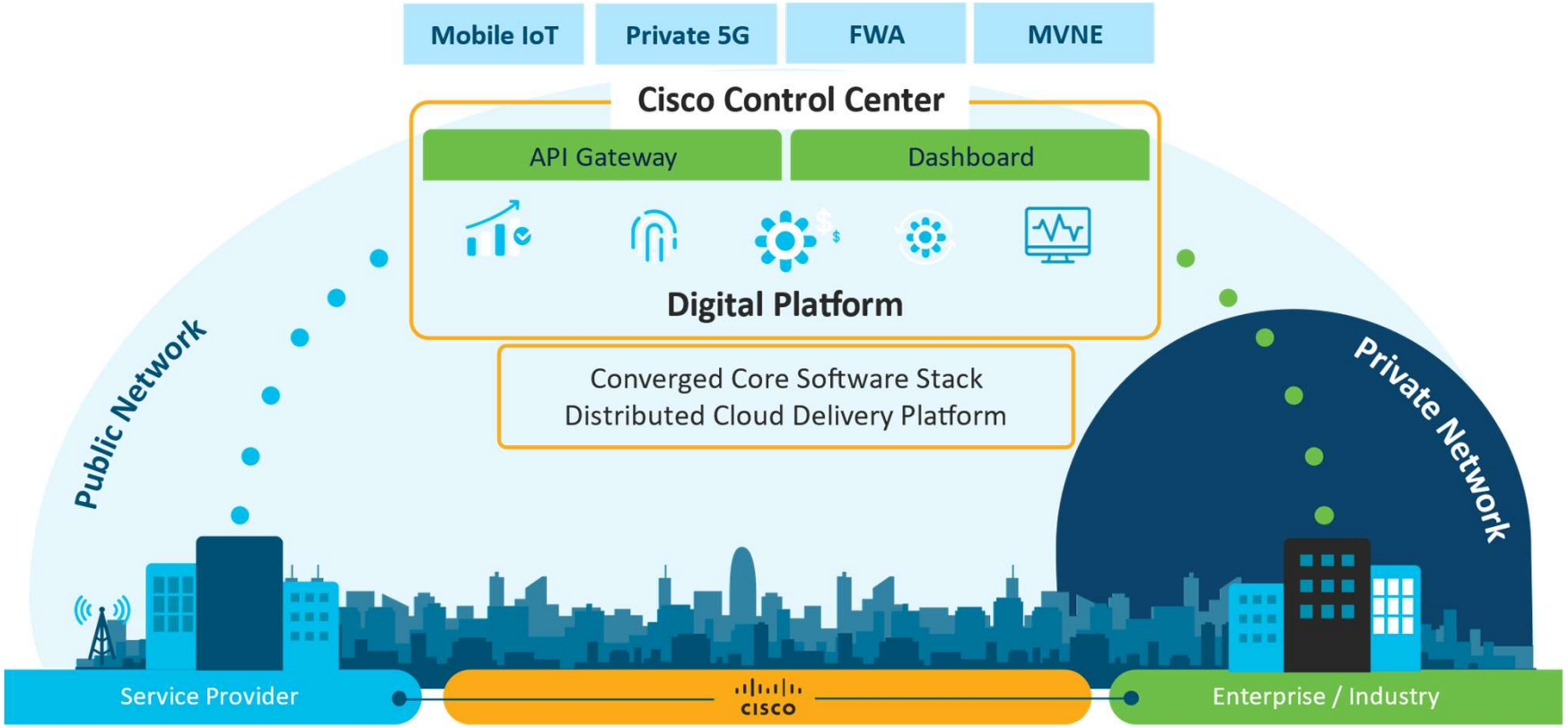
Cisco Control Center as the foundation
for both Public and Private IOT networks

“Core Network as a Service” for public networks

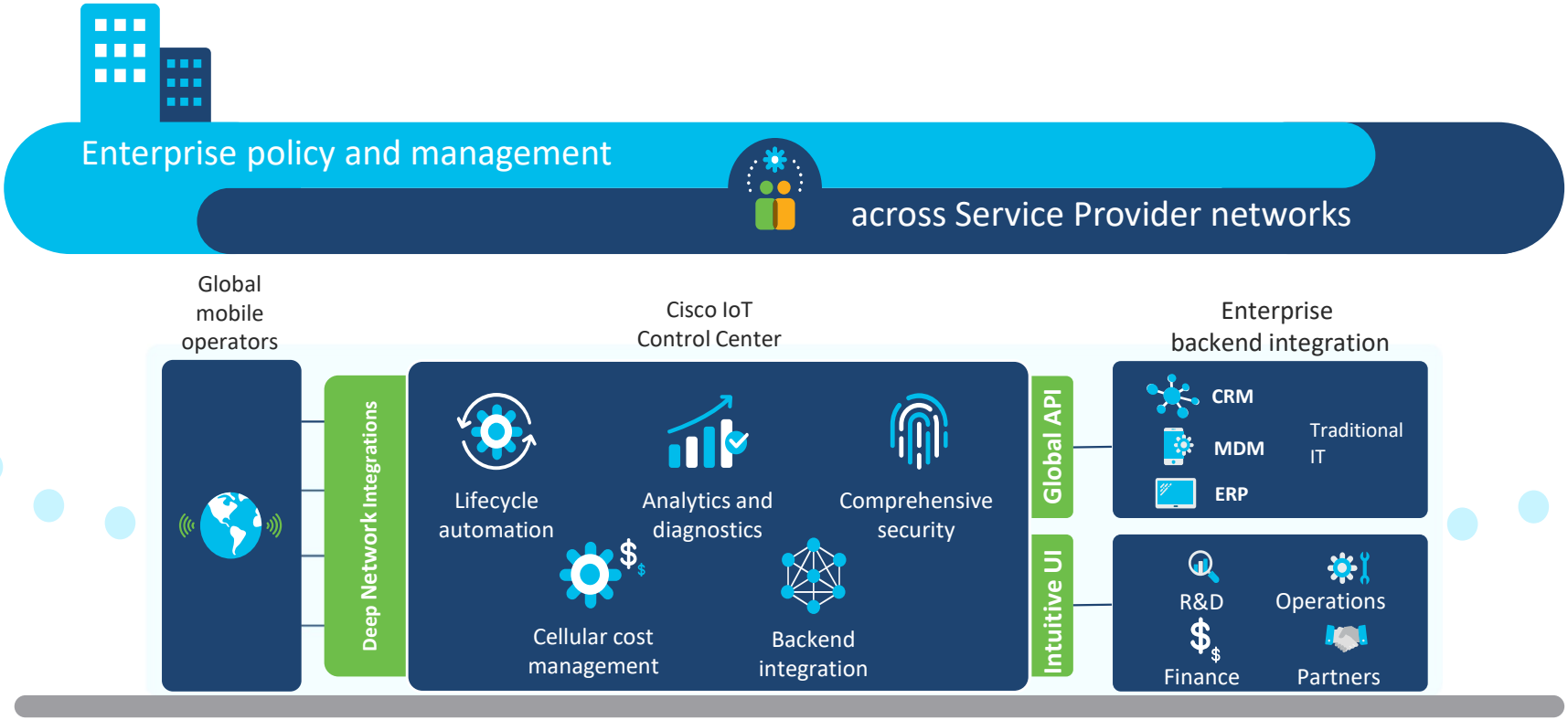
Cisco Private 5G

Cisco Control Center as the foundation for both Public and Private IOT networks

Cisco IoT solution for public and private networks



Building on a strong foundation of mobile SaaS Cisco IoT Control Center



Cisco IoT Control Center (CC)

190M+ Devices

30K+ Enterprises

50+ Service Providers

52B+ CDRs/month

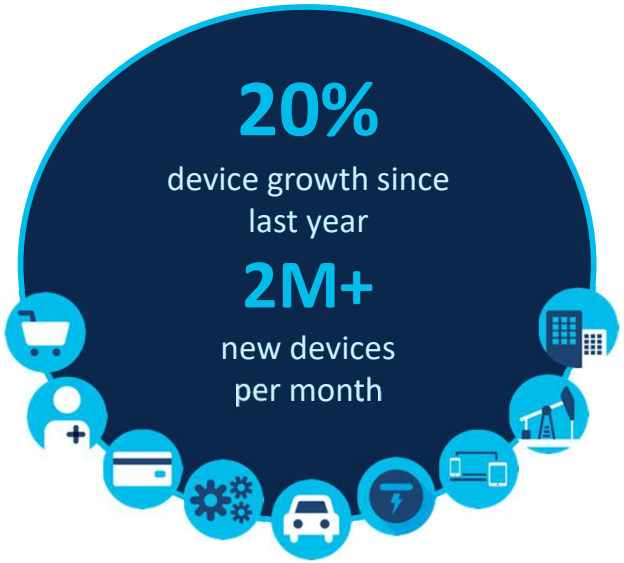
15+ Releases/yr

20+ Industries

120K+ Users

19 Data Centers

2B+ API calls/month



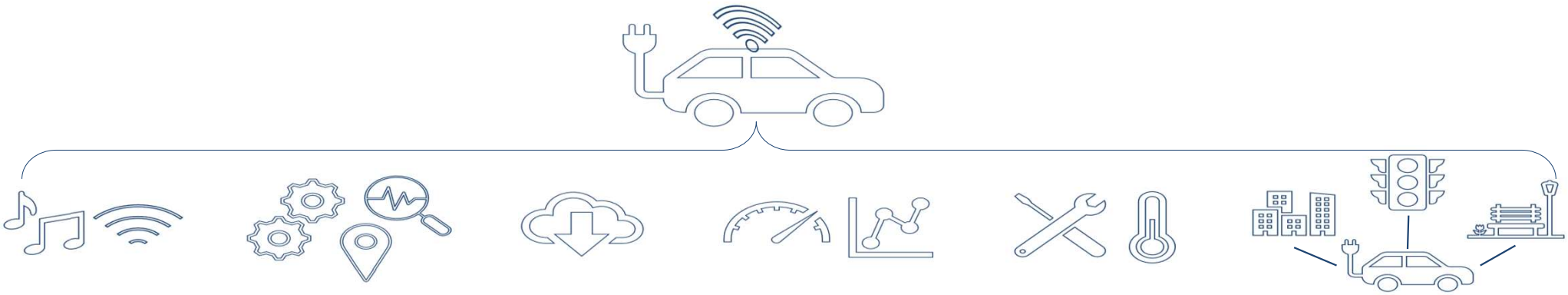
#1 Connected Car Platform
50+ Car Brands - 75M+ Connected Cars

Leveraging CC global leadership as the digital foundation for delivering business outcomes as a service

Connecting IOT with “Core Network as a Service” for public networks

Connected Car as key use case for public IOT

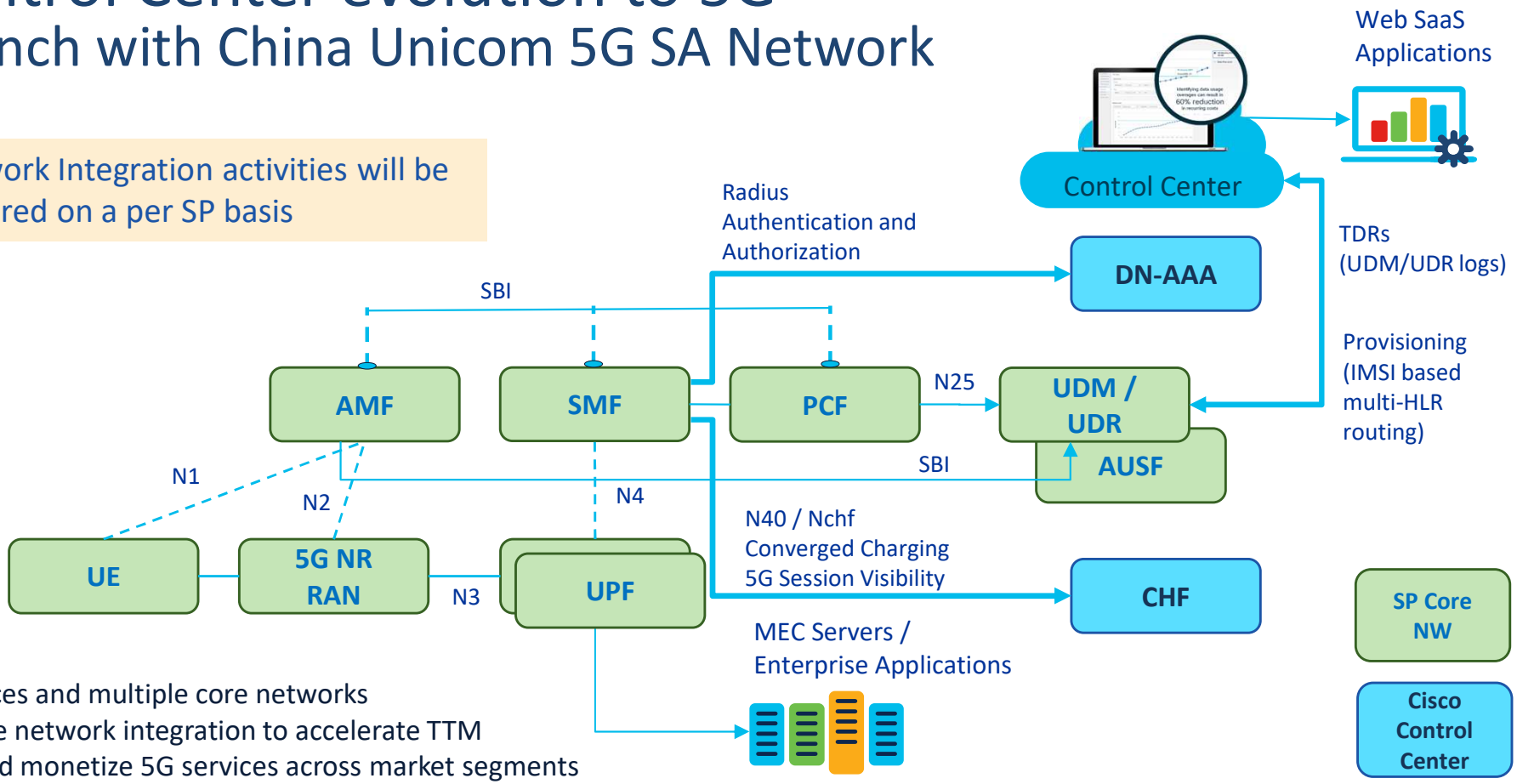
driving Enterprise demand for NW visibility and control



Infotainment and Wi-fi Hotspots	**Telematics**	**FOTA / SOTA**	**Usage based Insurance**	**Predictive Maintenance**	**C-V2X for Autonomous Driving**
OEMs can sell infotainment services using vehicle as a Channel	Fleet Management with Telematics.	Mission critical remote FW and SW updates.	Monetization opportunity to sell services based on driver behavior and usage.	Predictive Intel on repairs / maintenance. Eliminate cycle of downtime.	Real-time monitoring of connected components. C-V2X for Autonomous Driving.
Broadband Slice	**Broadband** Slice	**Broadband** Slice	Massive IoT Slice	**Broadband** Slice	Low Latency and C-V2X Slice

Control Center evolution to 5G
Launch with China Unicom 5G SA Network

Network Integration activities will be required on a per SP basis

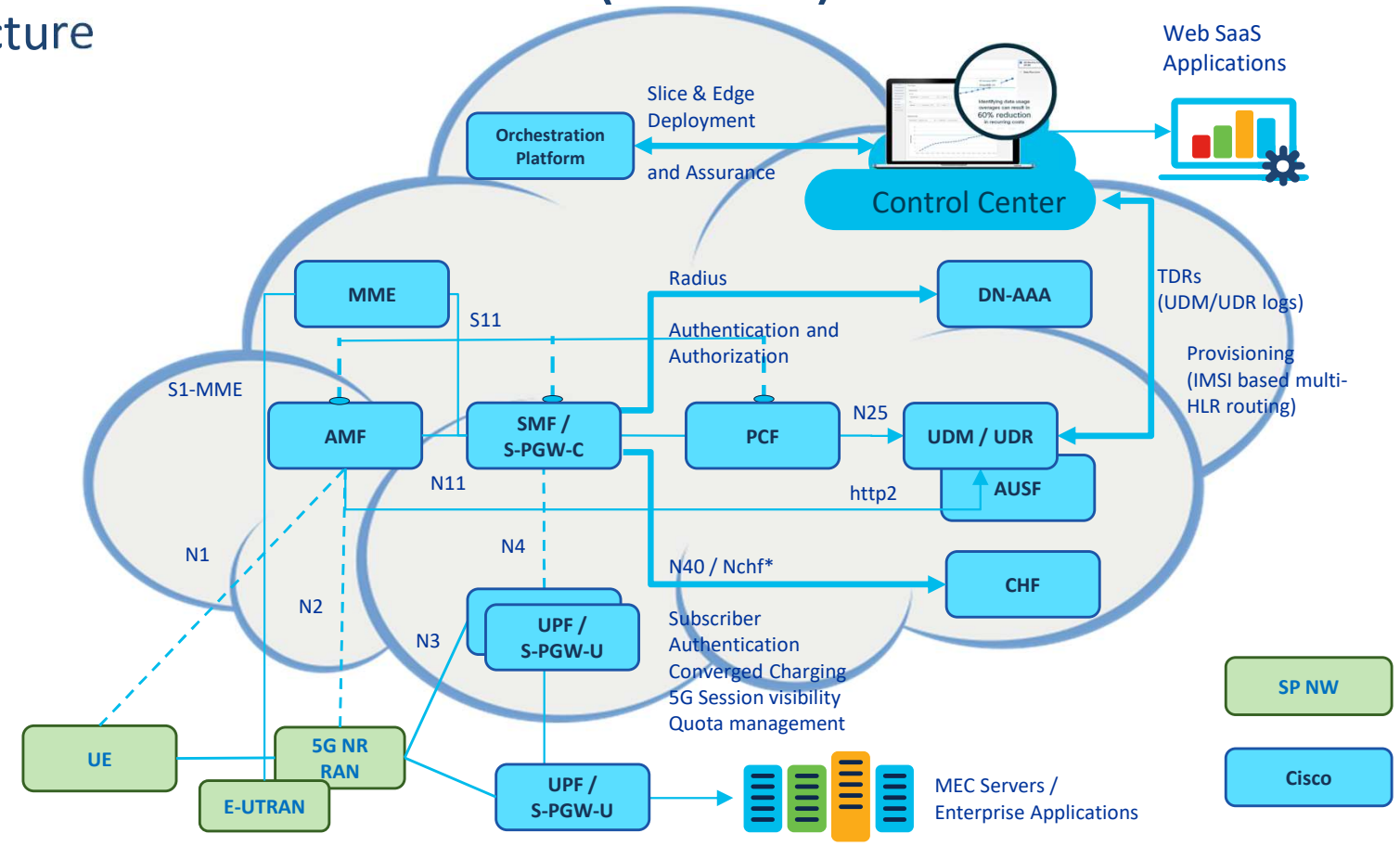


- ✓ 31 provinces and multiple core networks
- ✓ Direct core network integration to accelerate TTM
- ✓ Launch and monetize 5G services across market segments
- ✓ Cisco hosted CHF to enable rapid innovation with session visibility

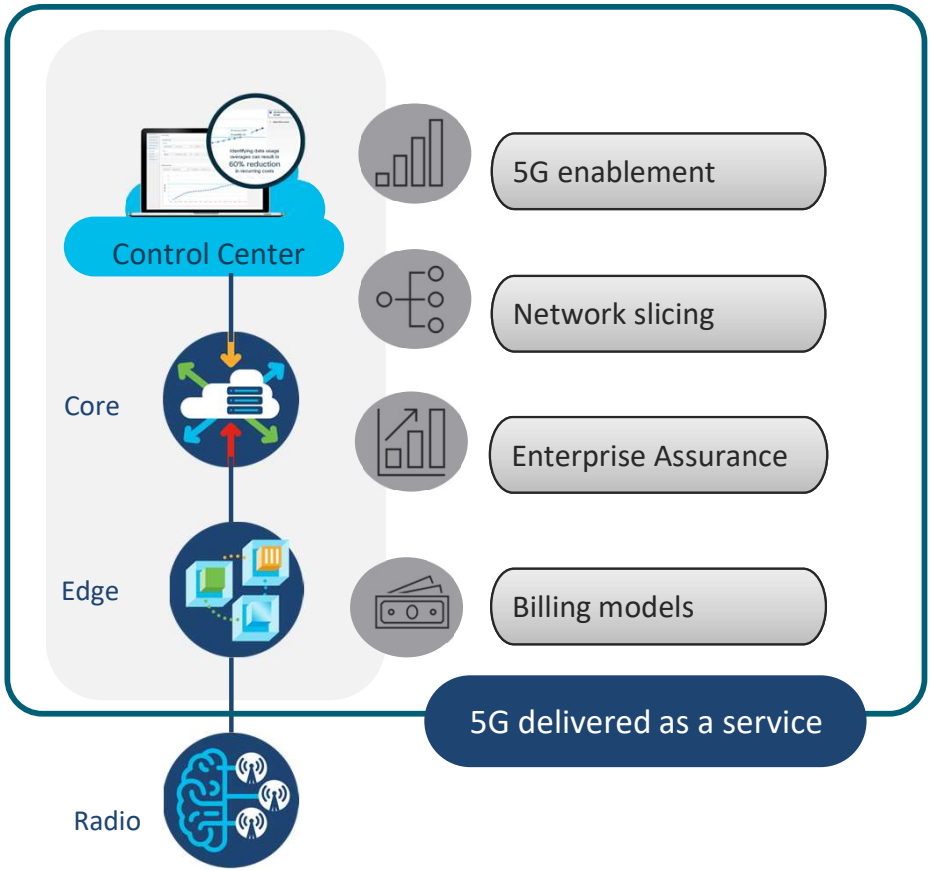
Cisco Core Network as a Service (CNaaS)

Reference architecture

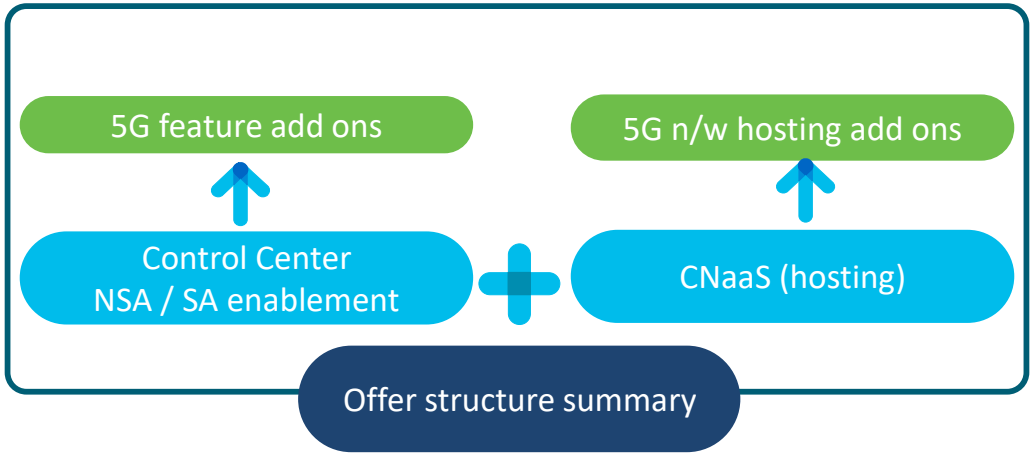
- Hosted and supported by Cisco
- Control Center plus dedicated core
- 4G and 5G



Public 5G aaS offer



- Complete solution offered by Cisco to Service Providers as a single package



Connecting IOT with Private 5G

What is Private 5G?

A private cellular network that is built using **3GPP 5G technology, dedicated** to carrying **traffic from a specific entity** (e.g., an enterprise) in **licensed radio spectrum**

5G Backhaul Options on Catalyst IR Series

Catalyst IR1101

Catalyst IR 1800

Catalyst IR8100

Catalyst IR8300

PIM, Sub-6GHz

Industrial Temp Range

EIO, Sub-6GHz

CG522-E, Commercial Temp Range

EIO, mmWave/Sub-6GHz

IP67, Industrial Temp Range

Private 5G Use Cases – Customer discussions

Use case examples

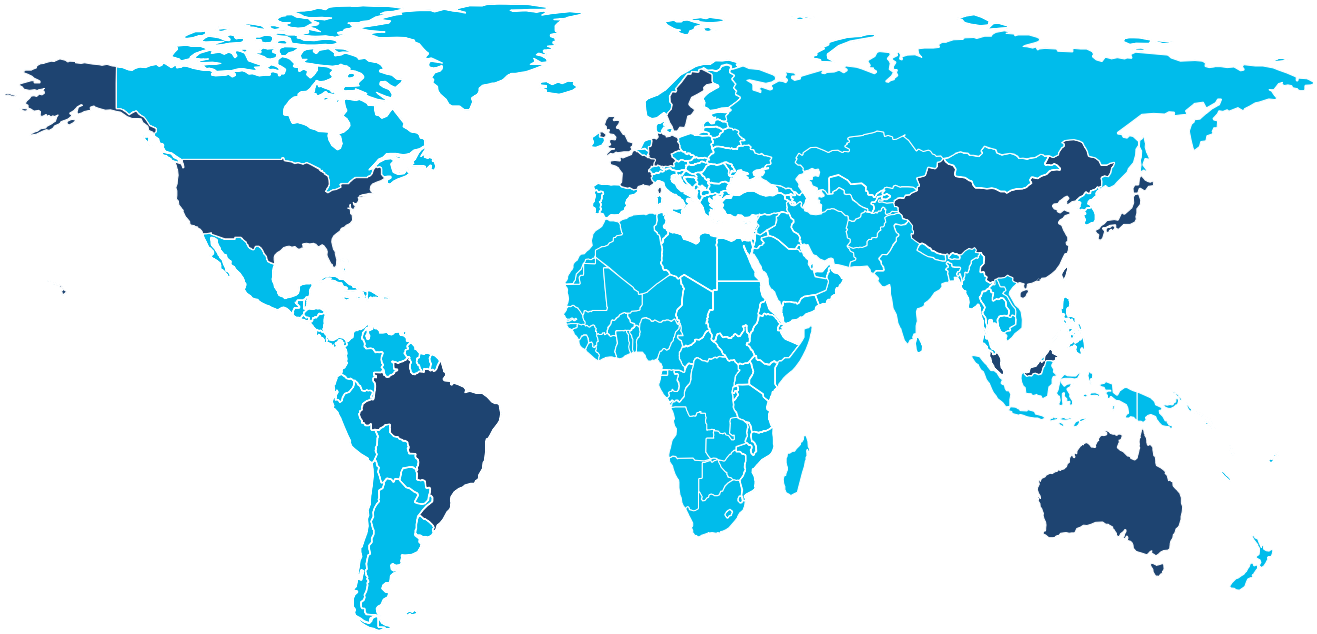
- Robotics Process Automation and Emergency Control
- AGVs and driverless vehicles
- High speed SW downloads
- Surveillance and measurement
  - AR/VR applications
  - Video
  - Sensor networks

- Autonomous forklifts, AGVs, AMRs for inventory logistics
- Distribution line/workflow automation
- Push to talk
- Location tracking

- Seamless coverage area
- Remote workers – for maintenance, repairs, data collection
- Video surveillance – remote safety
- Unmanned autonomous vehicles

Spectrum

Private Licenses



Private/Locally-licensed spectrum:		
U.S.: 3.55-3.7 GHz CBRS	Australia: 1.8, 2.1GHz, 26/28GHz	Brazil: 3.7-3.8 GHz
U.K: 1.8, 2.3 GHz, 3.8-4.2 GHz	Hong Kong: 28 GHz	Mexico: TBD
Germany: 3.7-3.8 GHz. 26GHz	Japan: 4.8, 28.2 GHz	Argentina: TBD
Sweden: 3.7GHz	Taiwan: 4.8 GHz	Chile: TBD
France: 2.6 GHz, 3.8-4.0 GHz	China: 4.4-4.5GHz, 5.9-7.1 GHz	Canada: TBD
	Malaysia: 26.5-28.1 GHz	

5G does not replace Wi-Fi

P5G and Wi-Fi 6 are complementary technologies – align choice to application and business needs

Private 5G	Judgement	WiFi 6 (802.11ax)
Mission-critical applications requiring ultra-low latency, or broad geographic coverage		Applications focused on capacity, client density, mobility, "guest" access, BYOD
Wide Area Coverage Large indoor and outdoor coverage (10K+ sqft per cell)	**Automated Guided Vehicle** Eliminate Interference Roaming delays of ≤ 50ms w/ 5G	**Digital Health** Advanced care Tele-medicine and mobile health
Process Automation HA & SLA Five-9's to Six-9's E2E latency ≤10ms	**Enhanced Mobile Broadband** 2Gbps+ download immersive experience	**Digital Campus** AR/VR/ MR-based Education E-learning

Performance | IOT Scale | Capacity | Security

Other considerations

Device ecosystem
5G IoT device availability expected to be limited until 2025

Spectrum
Added complexity and cost to acquire licensed spectrum for 5G

Operations
Currently higher operational complexity for 5G compared to Wi-Fi

Cost
Unlikely that 5G devices and infrastructure will be cheaper than Wi-Fi anytime soon

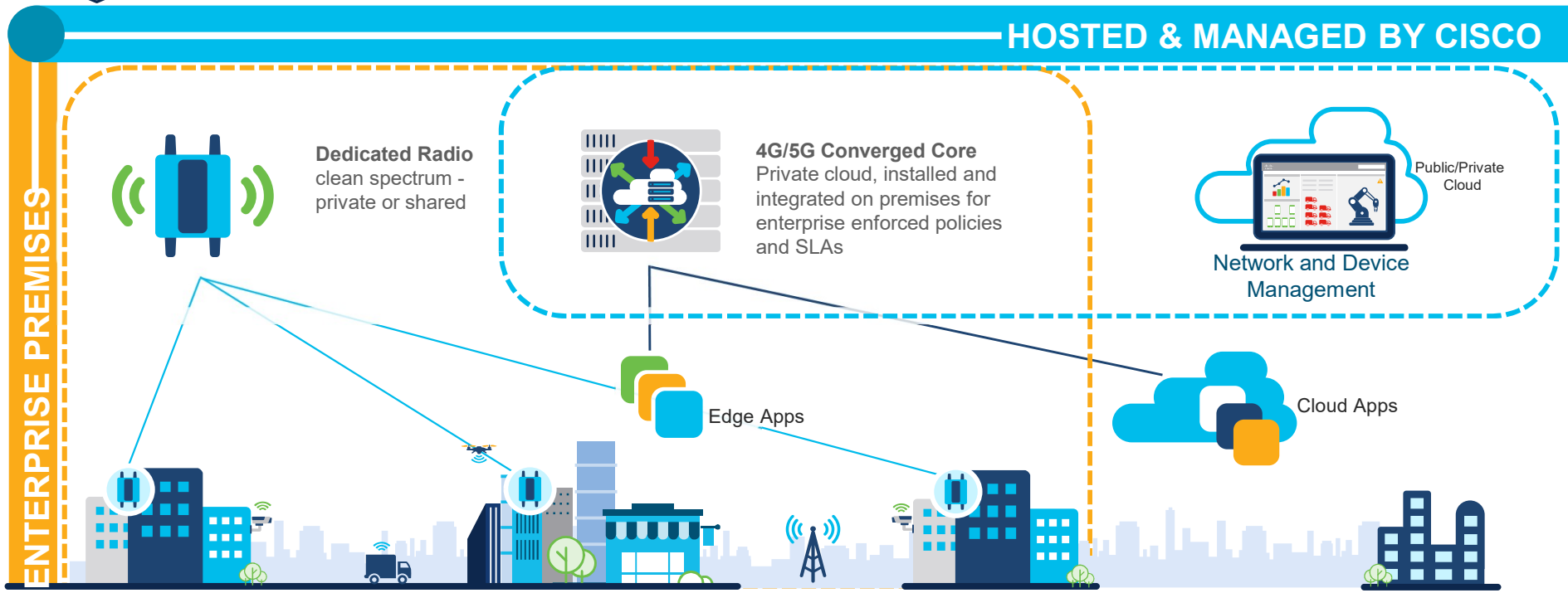
Application and business model needs drive choice

Cisco’s Private 5G Architecture

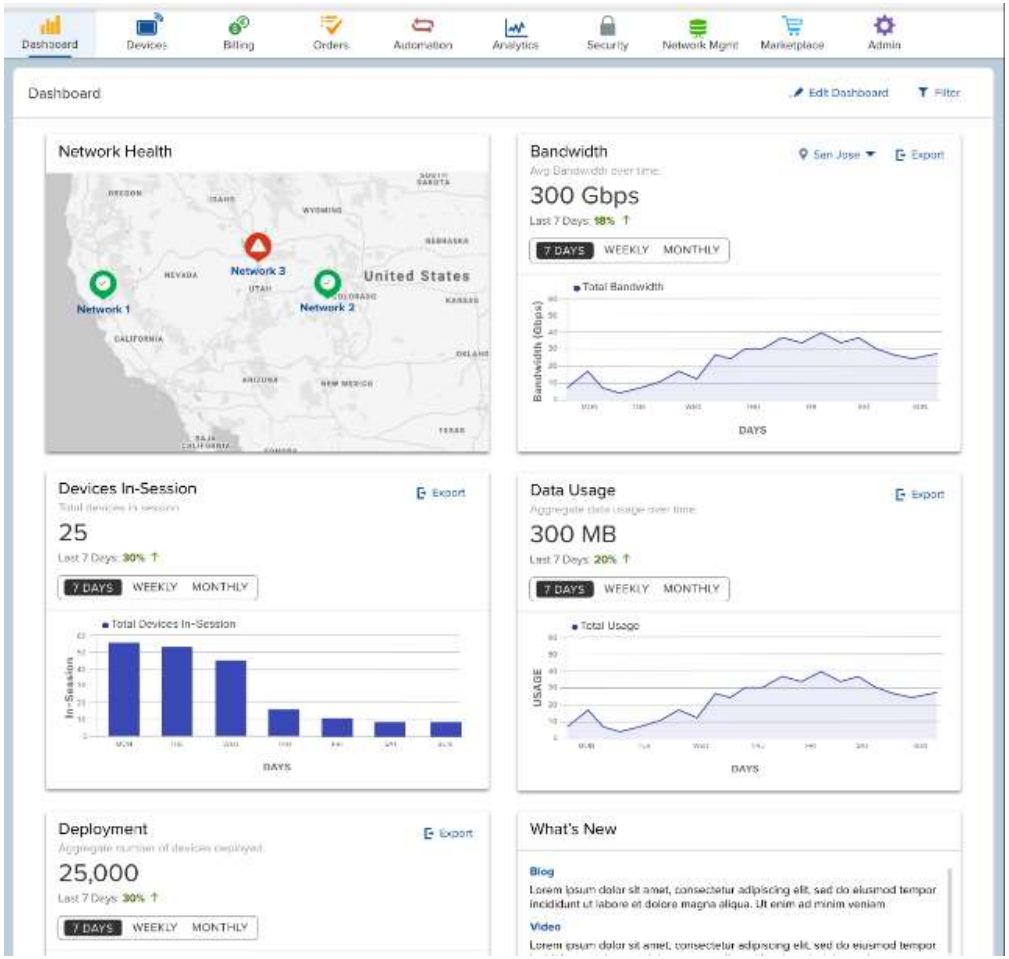
A dedicated mobile network connecting people, machines and applications.

Automatic upgrades & enhancements

Intuitively simple operations and management. Integrating with enterprise systems for common visibility and control



Compelling User Experience

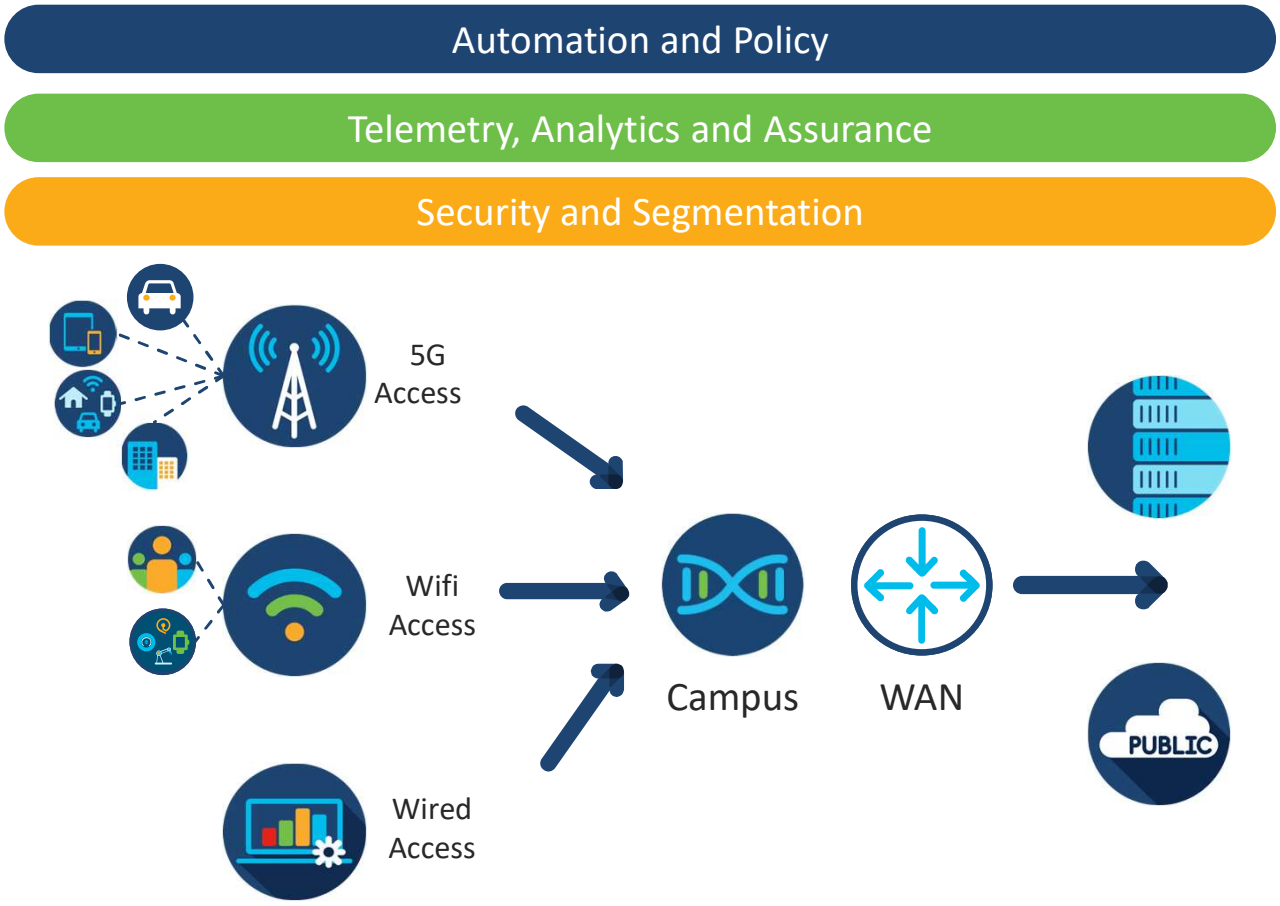


Vision of Private 5G Enterprise Network Integration

Private 5G as an extension of the Enterprise Network

Cisco Private 5G Vision

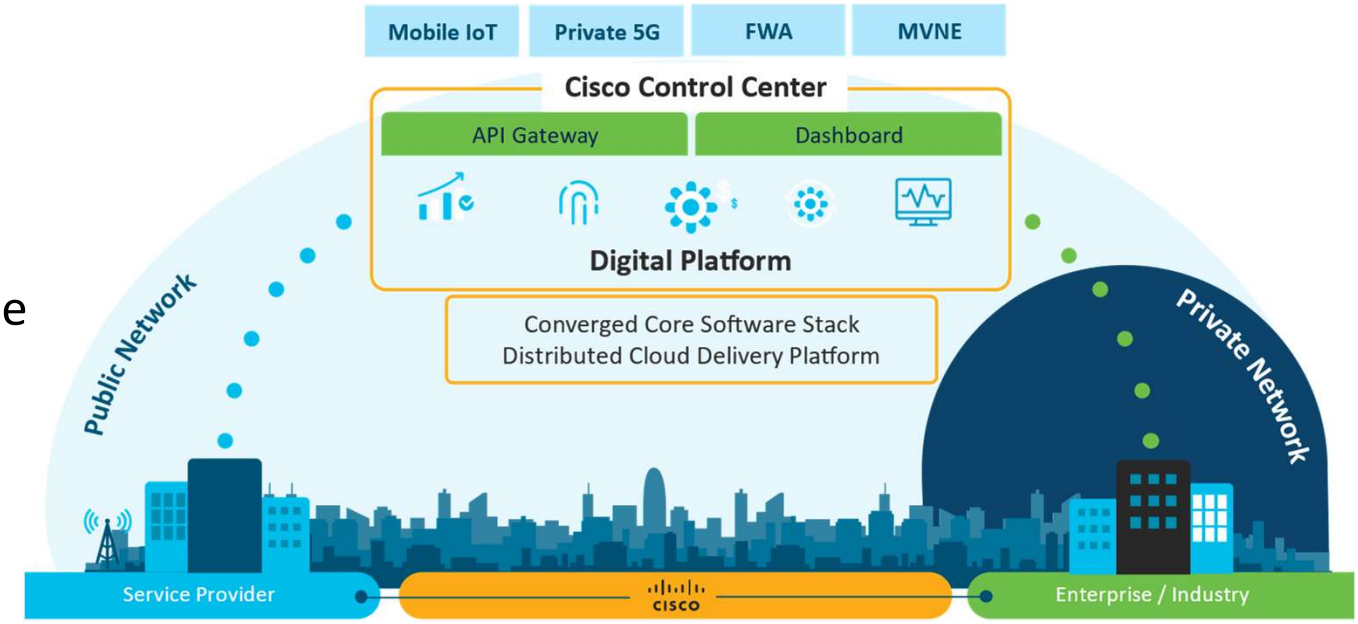
- Unified Identity Framework
- Common Enterprise Policy
- Private Mobility
- Enterprise Security Integration
- Leverage Existing Campus Transport
- Unified EN Operations
- Consolidated Insights & Analytics
- Cisco Endpoint/IoT GW Integration
- Public Mobility



Summary

Cisco IoT solution for public and private networks

- Solution built on a strong foundation
- Multi-Tenant Platform
- Visibility for the Enterprise Customer
- Faster to market

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