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Reinventing cloud-native 5G networks

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DISH Vision:

America's first cloud-native 5G network from Core to Edge

We're reimagining connectivity through new platforms, new business models and new ways of thinking to meet the convergence of wireless, data analytics, AI and the cloud to redefine the customer experience

Scalable through automation and AI to meet demand

Versatile spectrum and virtualization to save cost

Network slicing to support use cases

O-RAN Innovation

Open source & Open interface to speed deployment

Software based and programmable

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DISH Deployment Plan:

- **5G network to cover 20% of the U.S. population by June 2022**
  - Technical validation of O-RAN completed in 4Q2020
  - Construction and deployment underway across all initial markets
- **5G network to cover 70% of the U.S. population by June 2023**
  - Minimum of 15K cell sites
- **75% of the U.S. population in each license area by June 2025**
  - Continued build out to match competitors beyond 2025
- **Increasing Enterprise demand for private 5G networks**
  - Deployments planned for 2021

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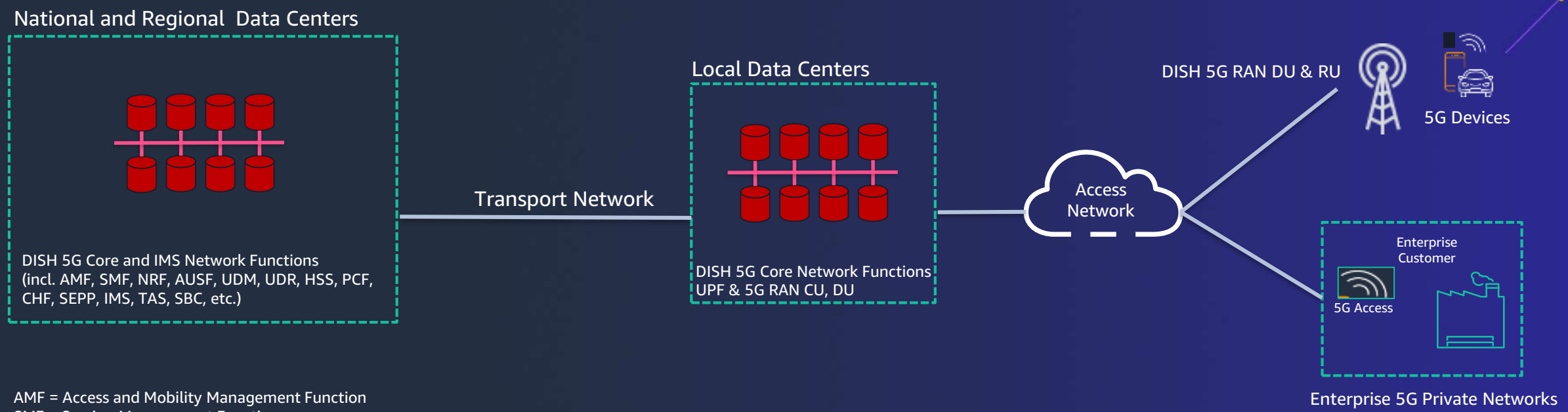
DISH Network Architecture



AMF = Access and Mobility Management Function
SMF = Session Management Function
NRF = Location Retrieval Function
AUSF = Authentication Server Function
UDM = Unified Data Management
UDR = Unified Data Repository
HSS = Home Subscriber Server
PCF = Policy Control Function
CHF = Charging Function
SEPP = Security Edge Protection Proxy

IMS = IP Multimedia Subsystem
TAS = Telephony Application Server
SBC = Session Border Controller
RAN = Radio Access Network
CU = Centralized Unit
DU = Distributed Unit
UPF = User Plane Function

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This is a Telco Industry First

Industry experience and Telco ISV partners

Telco solution lifecycle management approach with Tier1 ISVs delivering cloud native network applications

AWS Automation, CI/CD capabilities, 5G Promise of agility

AWS Professional Services to deliver network automation & CI/CD pipeline using AWS cloud services

AWS Outposts/Graviton2/Nitro

Exclusive purpose-built & modular building blocks for better performance, TCO, and security

Ecosystem of Development

5G APIs enable all of AWS developer ecosystem to create new 5G customer use cases like industry 4.0

Enterprise Ready Networks

Flexible 5G network to meet enterprise needs across many use cases

Common Security Model, Operating Model & Programming Model

Access better security, greater efficiency and increased agility and automation

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Cloud-native 5G benefits

Cost savings (TCO)

What is it?
Infrastructure build out and deployment savings leveraging existing AWS footprint

Significant reduction in TCO vs. traditional build

Staff productivity

What is it?
Efficiency improvement by function

Increased staff productivity through automation

Operational resilience

What is it?
Improved SLAs, reducing unplanned outages, leveraging a proven, secure infrastructure

Increased service availability/redundancy

Business agility

What is it?
Accelerate deployment of new features & applications, providing agile business models to customers on demand

Cloud vs. telco time to market

← **Cost impact**

Value impact →

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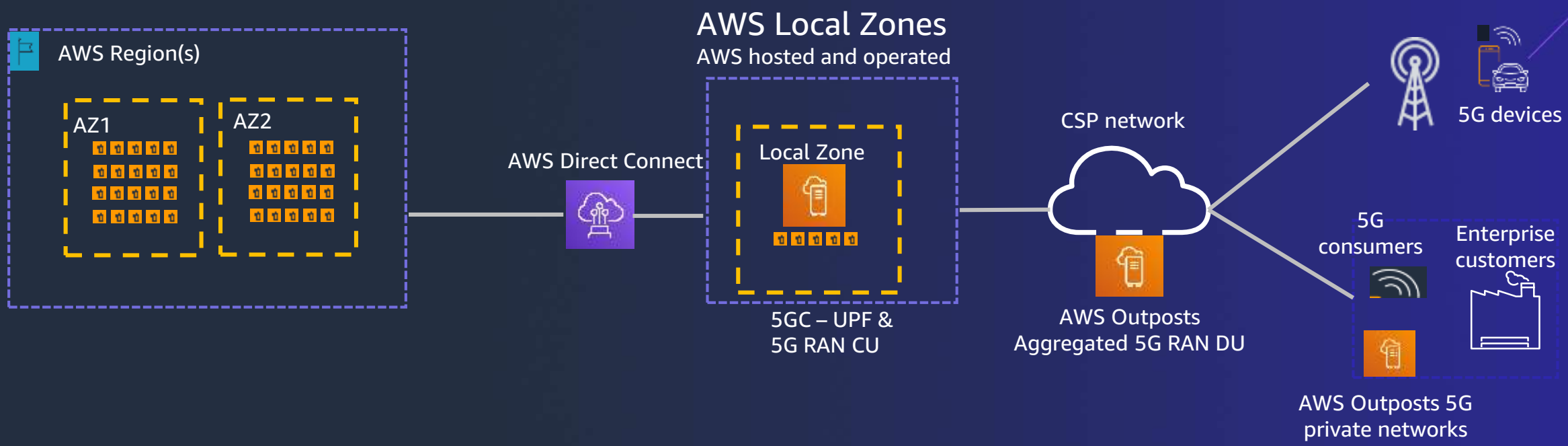
Utilizing AWS infrastructure to build 5G networks



5GC = 5G core
UPF = User plane function
RAN = Radio access unit
CU = Centralized unit

DU = Distributed unit
AZ = Availability Zone
CSP = Communications service provider
CGW = Carrier gateway

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Why think of cloudifying the network?

Capacity scaling is not flexible – proportional to CAPEX investments

Time to roll out new features and new services do not meet customer expectations

Pace of innovation is slow – need new avenues to expand markets and revenues

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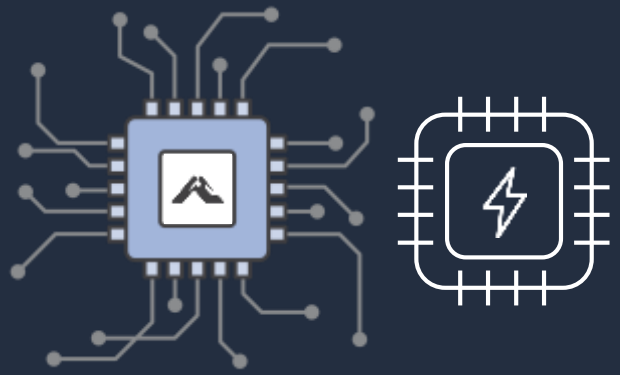
Powering cloud-native 5G networks



Graviton2/Nitro

Amazon EKS

AWS Outposts

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Simplifying network operations, and more

Automation, fast feature rollouts, and new opportunities to personalize the experience for customers





CI/CD

Observability

Closed-loop automation

Edge analytics

Predictive maintenance

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Thank you

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