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TLC301

Telefónica: Enabling industry 4.0 with Ericsson's 5G and edge cloud

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Agenda

5G challenges

Why Telefónica, Ericsson, and AWS?

What was implemented on AWS

Business and technical value

Conclusion / next step



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5G challenges



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5G challenges



Edge cloud required to break out exponential increase of data in radio and transport

Cloudification extending all the way to RAN in addition to core network needs

Complexity of **orchestration** multiplied as a result of diverse ecosystem and need for new applications

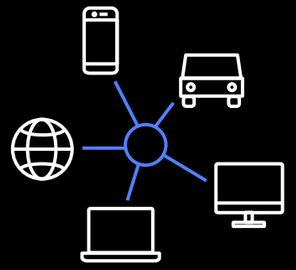
Need for **5G monetization** models beyond mobile consumers

Business and technical challenges faced



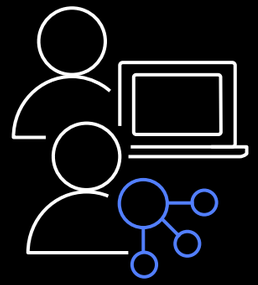
Time to market

- Automated deployment
- Infrastructure on demand



New business models beyond connectivity

- Fully automated service orchestration
- Edge capabilities
- Open for third-party integration
- Network slicing



Customer experience and quality of service

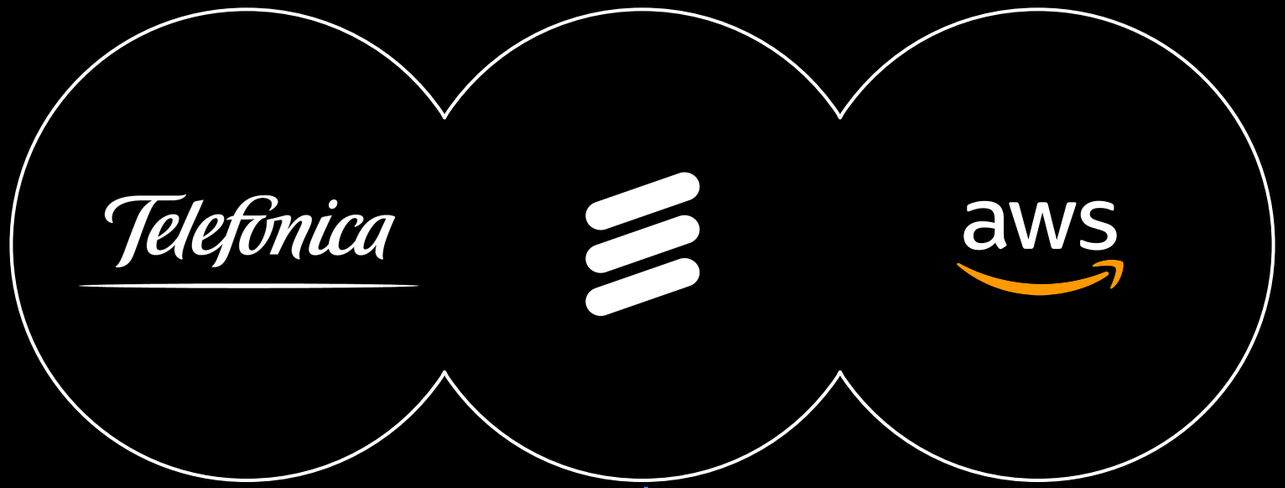
- AI/ML capabilities
- UX and QoS enhancement

Why Telefónica, Ericsson, and AWS?



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Why Telefónica, Ericsson, and AWS?



Cloud-native 5GC

Ericsson's cloud-native 5GC on Amazon EKS and services

Automation

Ericsson's Service Orchestrator and AWS DevOps tools

Edge cloud

Telefónica Germany's nationwide footprint and AWS Outposts

Monetization

Private Networks as a Service offered by Telefónica Germany and Industry 4.0 services

Joint value creation



Telefónica Germany

- Coverage / spectrum, 5G, extensive roaming and mobility services
- Mobile devices, IoT
- Programmable network (slicing / private / hybrid)
- Network planning and operations



Ericsson

- Enabling journey to 5G and beyond
- Delivering on high-value, low-latency use cases
- Full suite of migration and managed network services



AWS

- Public, on-premises, edge, and personal cloud
- Compute, Storage, DevOps, XaaS
- ISV, developer ecosystem

What was implemented on AWS

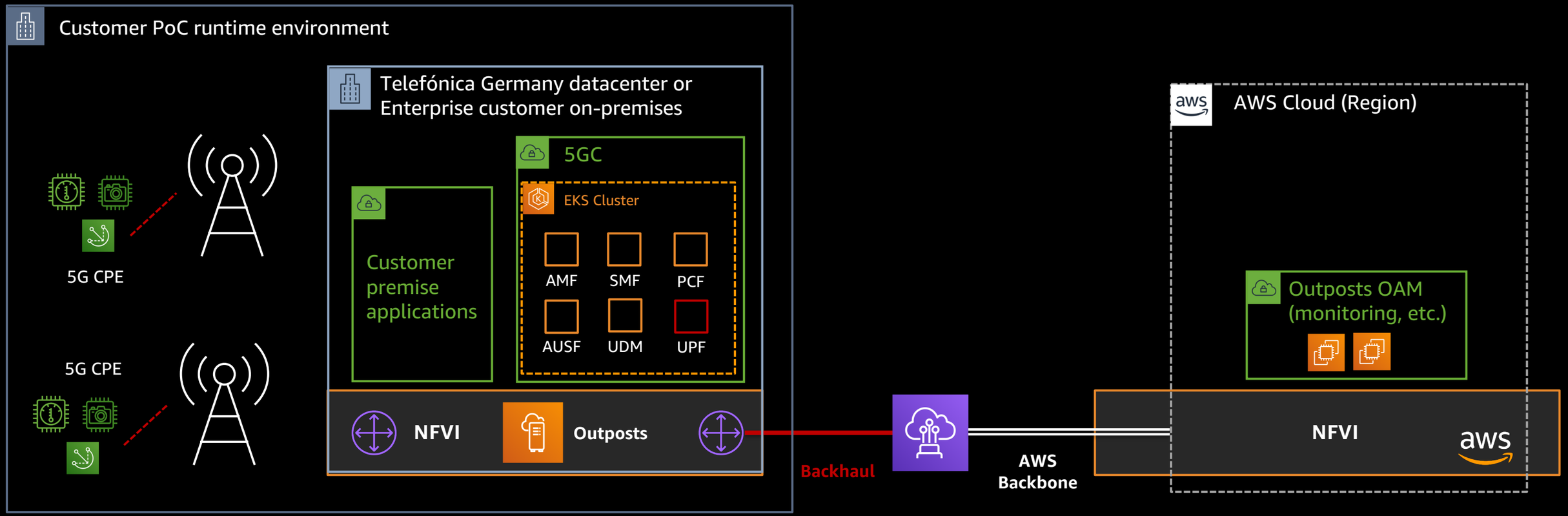


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5G SA for private networks on AWS

Telefónica Germany, Ericsson, and AWS joined forces to develop an Enterprise solution for an Industry 4.0 customer



Proof of concept with Telefónica Germany

E2E orchestration and exposure of the solution via Ericsson Orchestrator integrating with AWS APIs for resource management and workload placement based on network KPIs


Amazon EC2


Amazon EKS


AWS Outposts


Amazon EBS


Amazon VPC


AWS Direct Connect

Key feature A

Ericsson 5G Core standalone + Enterprise app(s) on AWS Outposts


AWS Tools and SDKs


AWS Lambda


AWS CloudFormation


Amazon CloudWatch


AWS CloudTrail

Key feature B

Integration of AWS APIs to Ericsson Orchestrator


AWS Tools and SDKs


AWS Command Line Interface


Amazon EKS

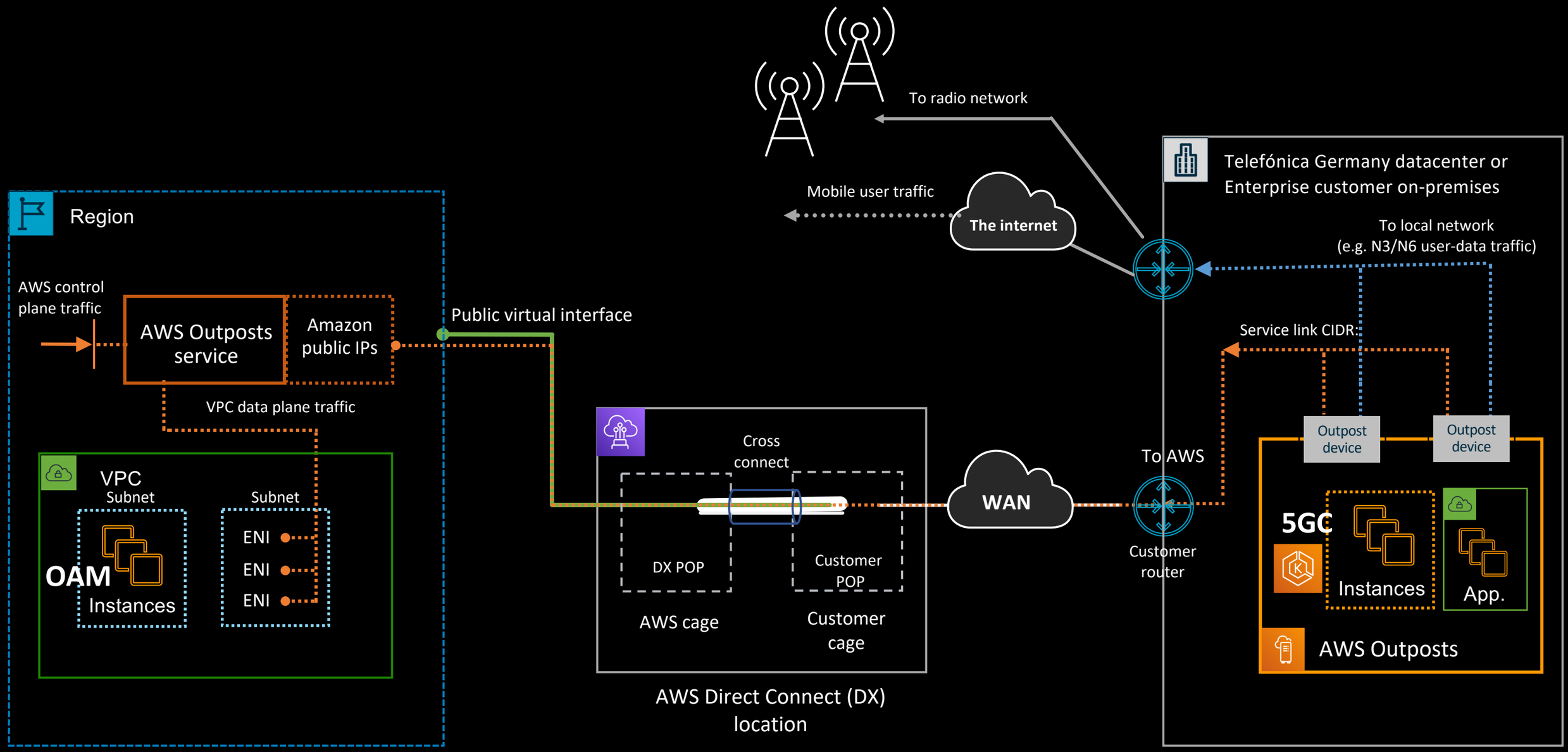

Amazon ECR


AWS CloudFormation

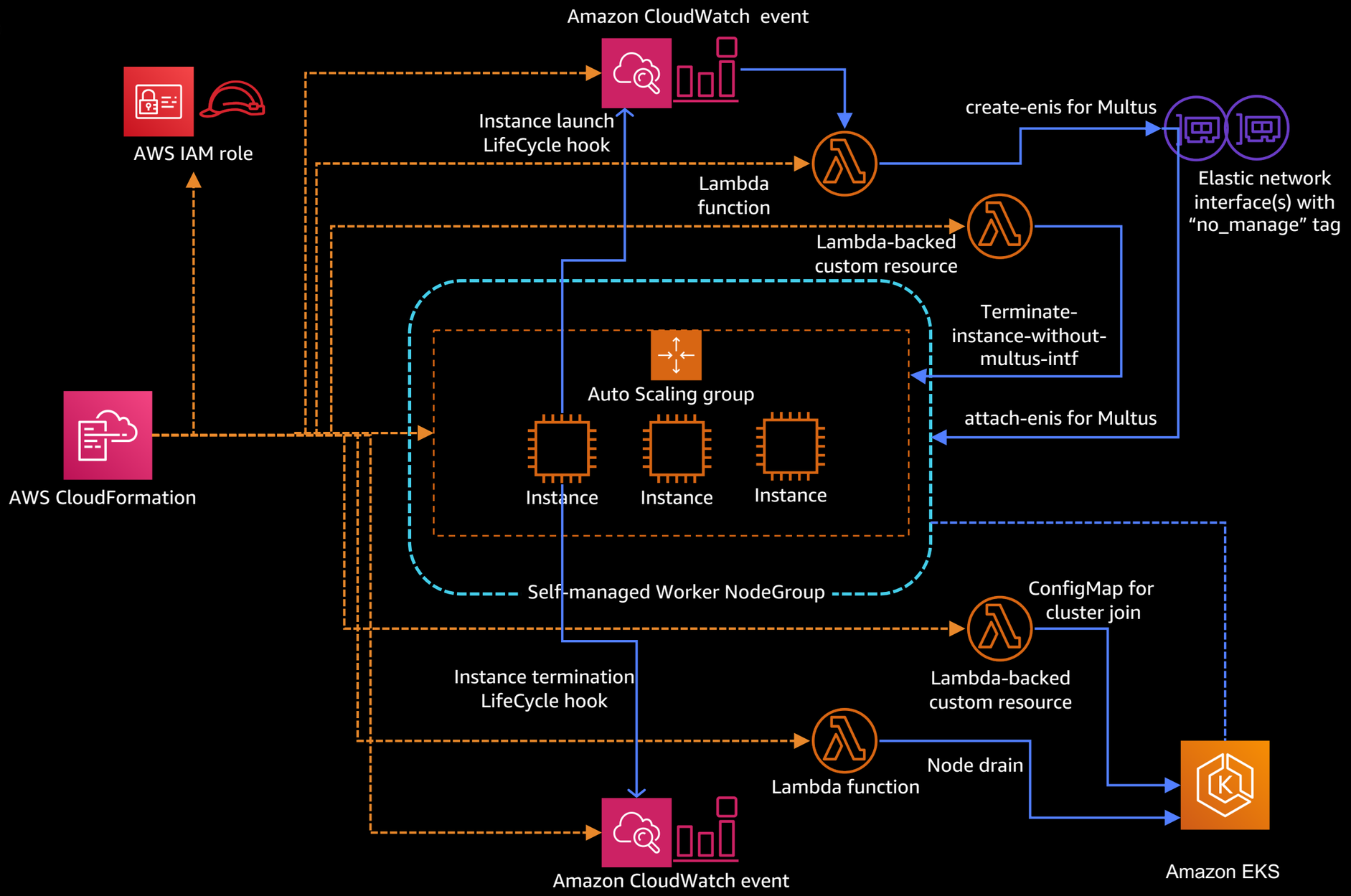
Key feature C

1. Ericsson Orchestrator for the end-to-end service orchestration
2. Exposure of network and service APIs to Enterprise app(s)

Ericsson 5GC standalone on AWS Outposts



AWS APIs


Amazon CloudWatch event
AWS IAM role
Instance launch
LifeCycle hook
Lambda
function
create-enis for Multus
Elastic network
interface(s) with
“no_manage” tag
Lambda-backed
custom resource
Terminate-
instance-without-
multus-intf
Auto Scaling group
attach-enis for Multus
AWS CloudFormation
Instance
Instance
Instance
Self-managed Worker NodeGroup
ConfigMap for
cluster join
Lambda-backed
custom resource
Instance termination
LifeCycle hook
Lambda function
Node drain
Amazon CloudWatch event
Amazon EKS

5GC deployment on AWS

VPC creation

- Public / private subnets
- Route tables
- IGW/NAT GW
- Security



AWS CloudFormation



AWS Management Console

EKS cluster creation

- Cluster creation (EKS master)
- WorkerNode creation



Amazon Elastic Kubernetes Service

Helm deployment

- Namespace
- CNF deployment
- Virtual service / NLB creation



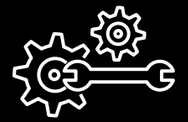
Amazon Elastic Container Registry



Ericsson-specific helm chart

CNF configuration

- CNF-specific configuration



CNF application setting



AWS Tools and SDKs



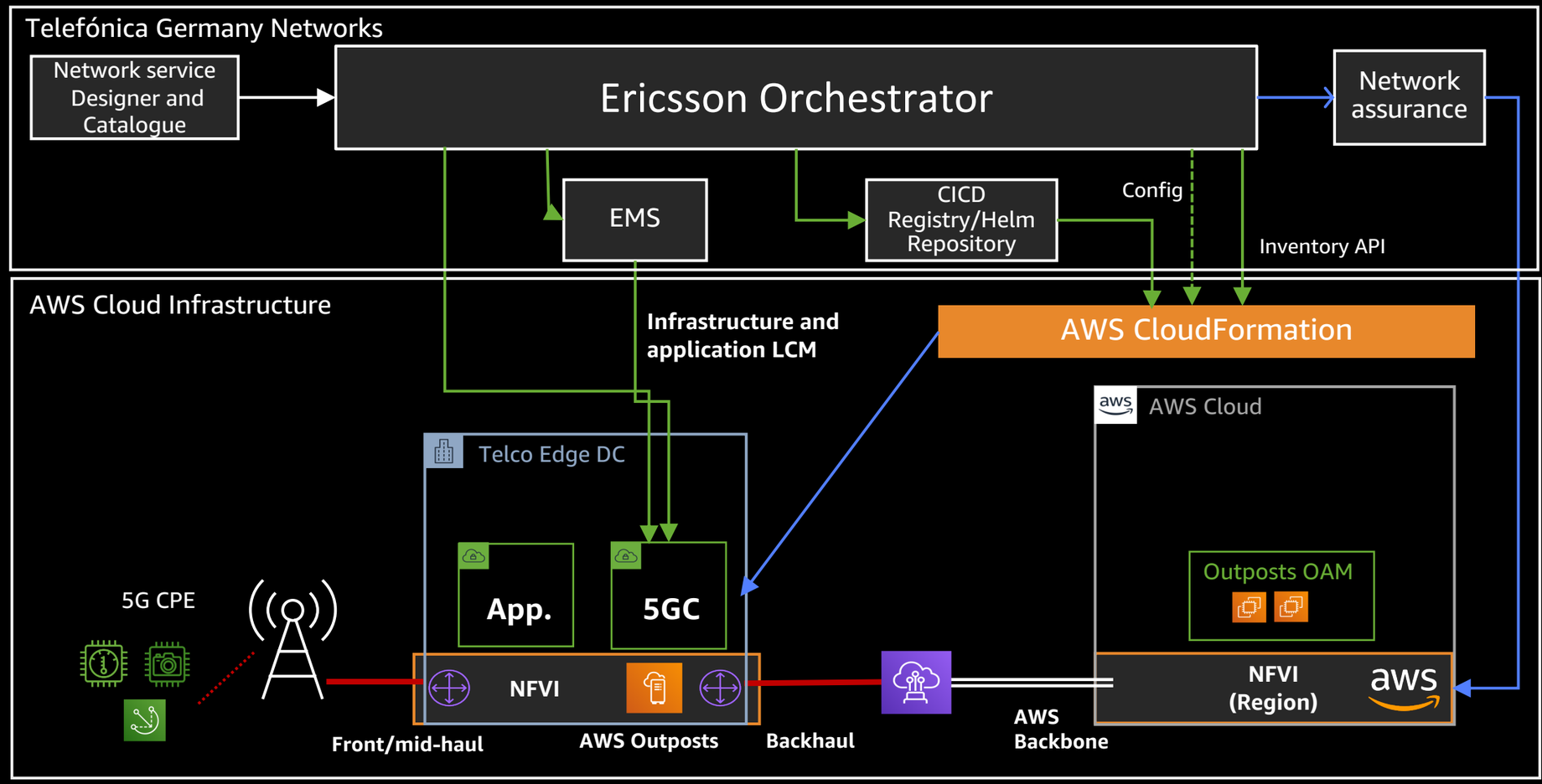
AWS Command Line Interface



Ericsson Orchestrator

Ericsson Orchestrator integration

1. **Automation**—API-based programmable orchestration
2. **Infrastructure as code**—Managed services by AWS + security and compliance
3. **Flexible / hybrid integration**—AWS DevOps, CI/CD tools + Ericsson Orchestrator



Business and technical value



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The value of 5G for consumers and industry

Consumers



In the near term, consumers expect 5G will offer benefits



Consumers see value in 5G use cases and are willing to pay

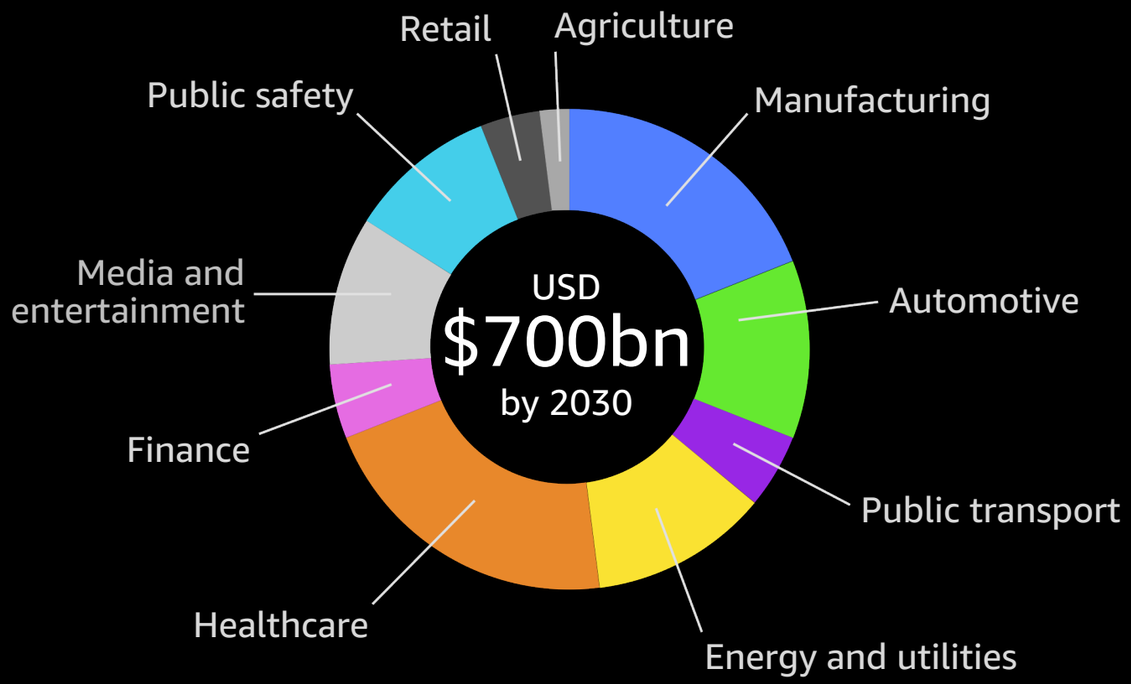


Consumers predict 10x data usage increase on 5G by 2025

Source: Ericsson ConsumerLab report, 5G consumer potential, May 2019

Industry

Industry digitalization potential 5G investment by 2030



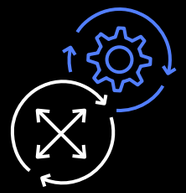
Source: Ericsson and Arthur D. Little, 5G for business a 2030 market compass, 2019

Business and technical value

Segment entire technology chain to maximize business value to our business



Transform
Software-based telco operator



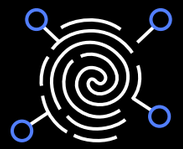
Build
Automation



Deploy
Network slice, Edge/MEC



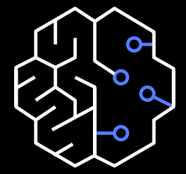
Provide
Standardized, open APIs



Boost
Security, privacy



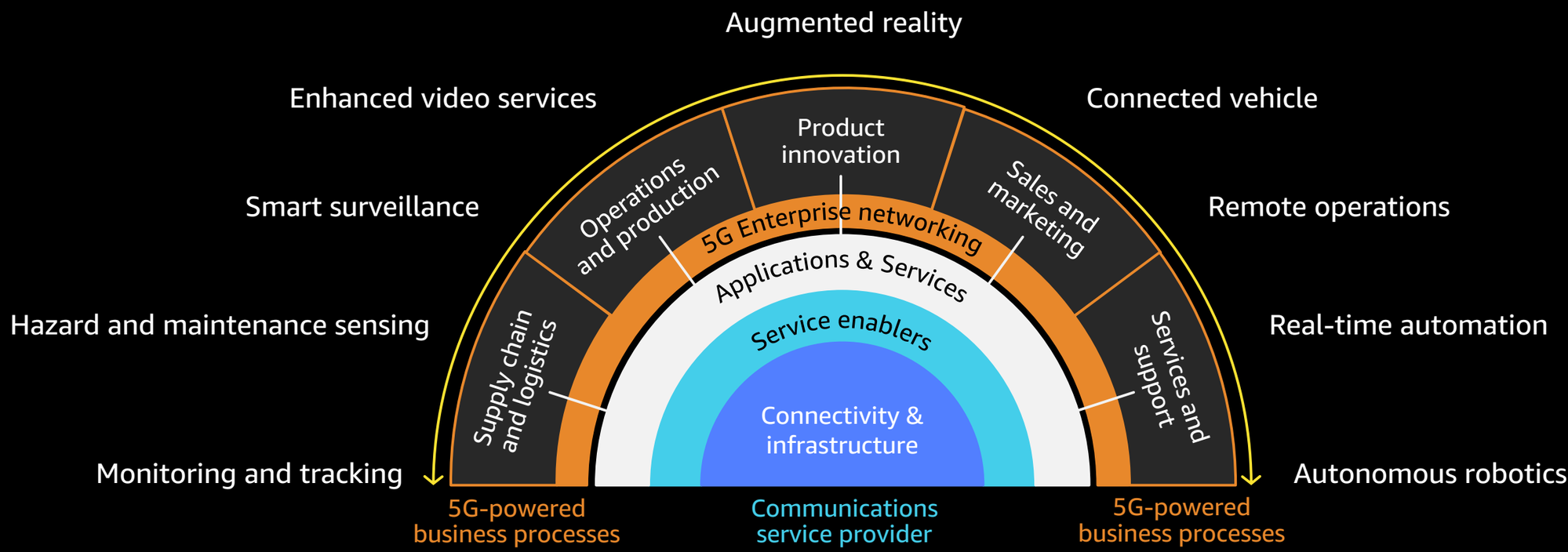
Create
New business, ecosystem



Leverage
AI/ML

Cellular enables industries to reinvent processes

5G-powered industrial use case clusters address needs across industries



Mining | Automotive | Manufacturing | Ports, airports | Public safety | Oil and gas | Energy and utilities | Media and entertainment | Rail transport

Source: Enabling intelligent operations with mission critical networks, Ericsson 2020

Business value

The ambition is to become your digital enabler

Edge computing
Image recognition
3D printing
Cognitive systems
Deep learning
Robotics
Virtualization
Smart things
Big Data
Drones
Internet of Things
Machine learning
Automation
Augmented human
Virtual reality
Augmented reality
Voice recognition
Artificial intelligence





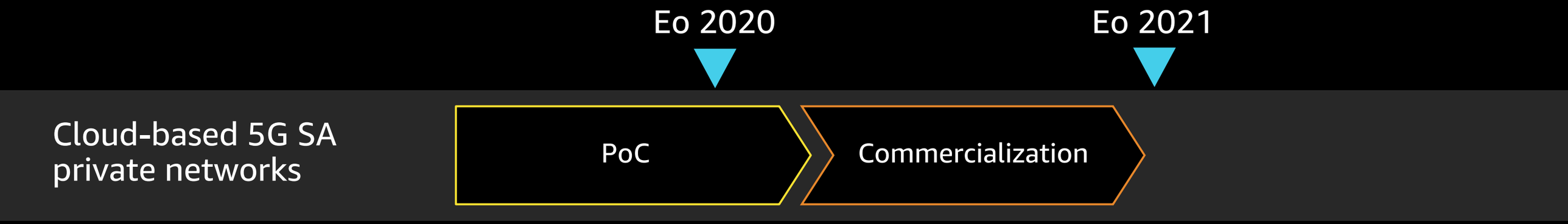

Conclusion / next step



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Conclusion / next step

1. Fully managed private 5G SA networks
2. Value-added MEC/IoT services on top of connectivity



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