
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

HYB203

Pushing the boundary of the cloud to the edge

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Amazon Web Services

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Axiom Space Inc.

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EVP and CTO, Member of the Executive Board
KONE Corporation

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Agenda

Continuum of AWS services from cloud to edge

AWS hybrid cloud and edge services and customer examples

AWS Local Zones, AWS Outposts, AWS Snow Family, AWS IoT solutions

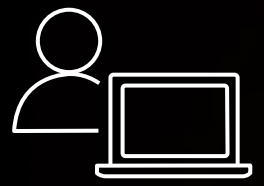
Guest speakers

- Extending the cloud to low Earth orbit (and beyond)
- Co-innovating urban journeys

Q&A

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Learning from our customers



Extend the cloud

Bring infrastructure, services, tools, and experiences wherever customers need it – in the cloud, on premises, and at the edge



Use cases

Low-latency applications, migrate and modernize, local data processing, data residency



Challenges with solutions today

Complexity, cost, and maintenance of on-premises solutions and solutions at the edge

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Applications that need to remain on premises

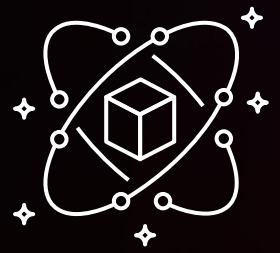


Latency-sensitive

Equipment and processes sensitive to compute latency

Interactive workloads such as AR/VR, design, and visualization

Complex workloads that span a variety of host and storage systems



Local data processing

In hybrid workflows, transcoding, filtering, caching, and alerting applied at the edge

Bringing AWS compute to large datasets that can’t be easily moved



Residency

Where regulations dictate that data and infrastructure reside in specific countries

Where contracts specify where applications are deployed

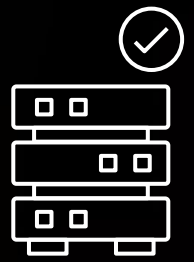
Where enterprises are not ready to move to AWS Regions for Infosec or other reasons

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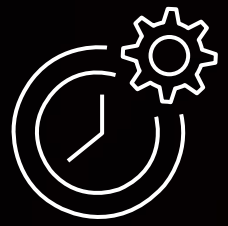
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Customers want the same experience

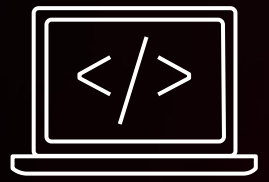
ACROSS ON PREMISES, THE EDGE, AND THE CLOUD



Same reliable, secure, and high-performance infrastructure



Same ownership model and operational consistency



Same APIs for supported services



Same tools for automation, deployments, and security controls



Same pace of innovation as in the cloud

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Pushing the boundary of the cloud to the edge

SAME INFRASTRUCTURE, SERVICES, APIS, AND TOOLS FOR A CONSISTENT EXPERIENCE

Global infrastructure



AWS Regions

Metro centers



AWS Local Zones

5G networks



AWS Wavelength

On premises



AWS Outposts

Far edge



AWS Snow Family

Smart devices



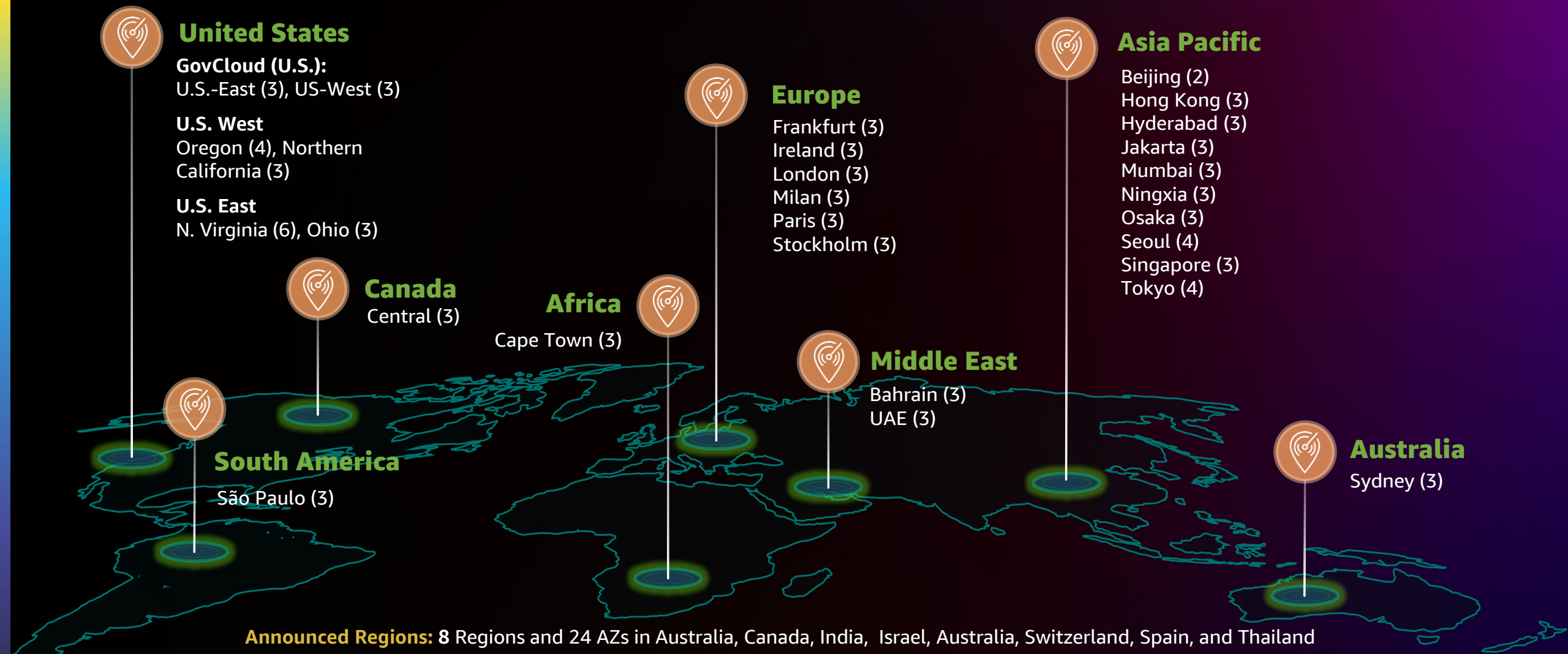
AWS IoT

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AWS hybrid cloud and edge services

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Availability Zones (AZs)



Announced Regions: **8** Regions and 24 AZs in Australia, Canada, India, Israel, Australia, Switzerland, Spain, and Thailand

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34 new AWS Local Zones



North America

Atlanta
Boston
Chicago
Dallas
Denver
Houston
Kansas City
Las Vegas
Los Angeles
Miami
Minneapolis
New York City
Philadelphia
Phoenix
Portland
Seattle
Querétaro
Toronto
Vancouver

Europe and Africa

Hamburg
Warsaw
Amsterdam
Athens
Berlin
Brussels
Copenhagen
Helsinki
Johannesburg
Lisbon
Munich
Nairobi
Oslo
Prague
Vienna

Asia Pacific

Delhi
Taipei
Bangkok
Bengaluru
Chennai
Hanoi
Kolkata
Manila

Available
Announced

South America

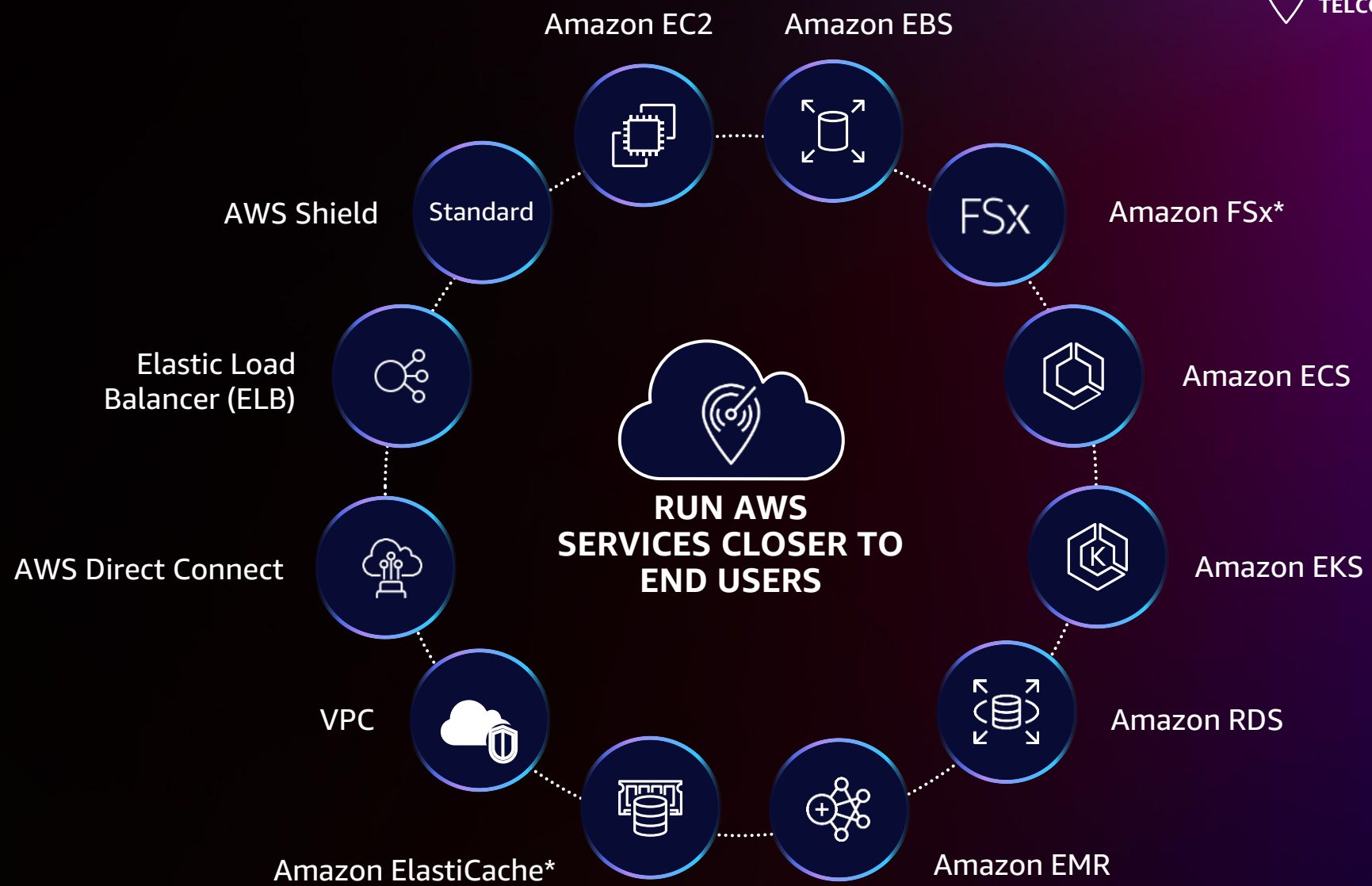
Bogotá
Buenos Aires
Lima
Rio de Janeiro
Santiago

Australia and New Zealand

Auckland
Brisbane
Perth

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AWS Local Zones



METRO AREAS & TELCO NETWORKS

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* Some services only available in select Local Zones

Netflix: Content creation

NETFLIX

The challenge

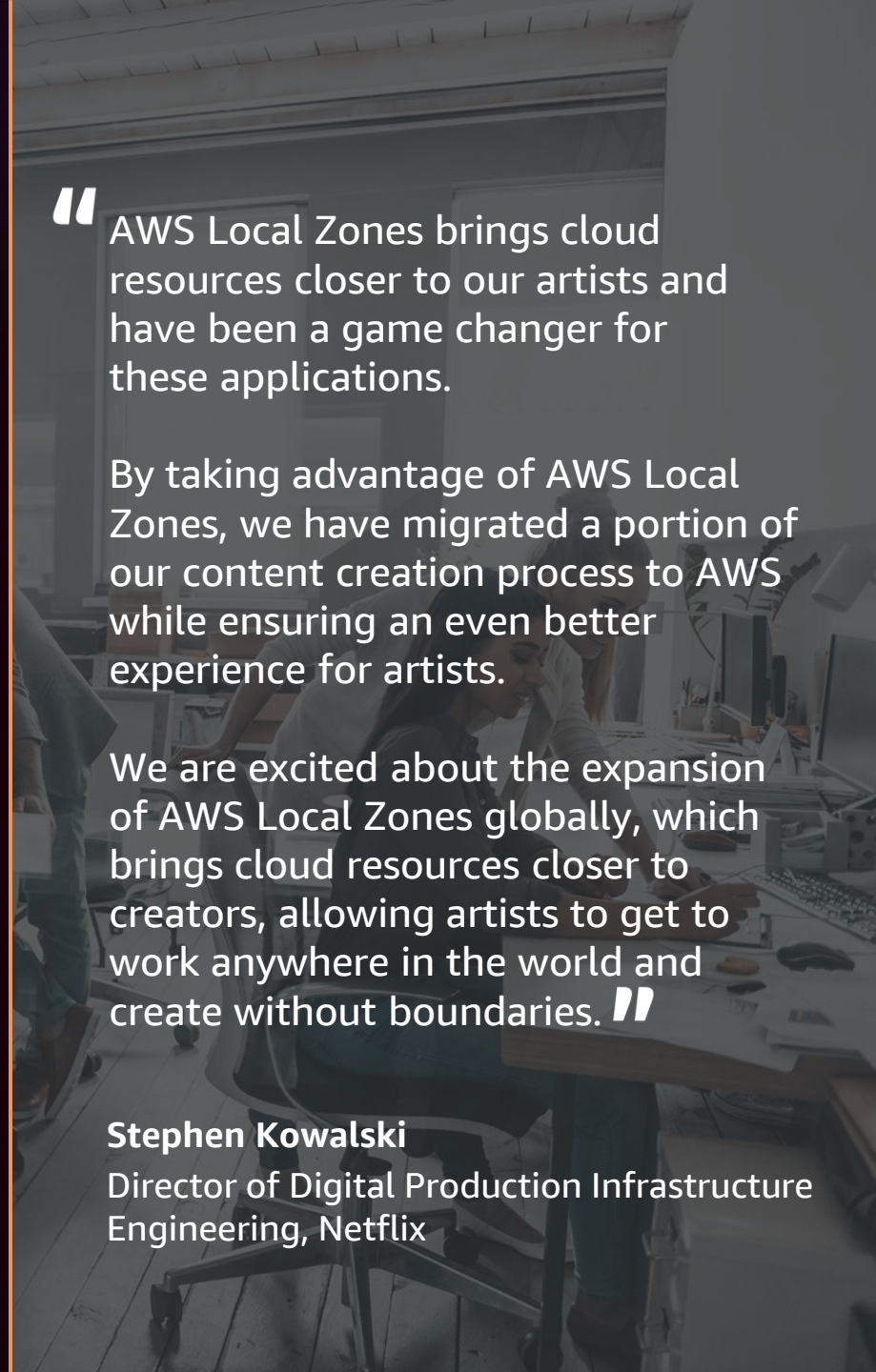
Artist's workstations require less than five millisecond latency from their offices or animation hubs to their workstations to have a smooth, jitter-free content creation experience. Historically artist workstations have stayed on premises to meet the latency required to power their tools.

Solution

Netflix uses the LA Local Zone with Direct Connect to achieve 1-2 millisecond latency from their animation hub to the Local Zones and run latency-sensitive workloads such as live production video editing closer to artists.

Business outcome

Netflix is able to provide their artists with a smooth experience with remote workstations across cities in the USA because of their proximity to Local Zones.



"AWS Local Zones brings cloud resources closer to our artists and have been a game changer for these applications.

By taking advantage of AWS Local Zones, we have migrated a portion of our content creation process to AWS while ensuring an even better experience for artists.

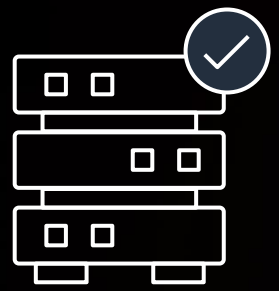
We are excited about the expansion of AWS Local Zones globally, which brings cloud resources closer to creators, allowing artists to get to work anywhere in the world and create without boundaries."

Stephen Kowalski
Director of Digital Production Infrastructure Engineering, Netflix

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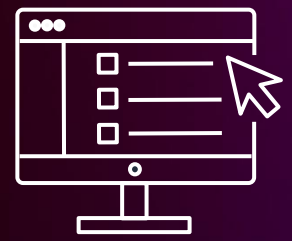
AWS Outposts: Bringing AWS on premises



Same AWS-designed infrastructure as in AWS data centers (built on AWS Nitro System)



Fully managed, monitored, and operated by AWS as if in AWS Regions



Single pane of management in the cloud providing the **same APIs and tools** as in AWS Regions

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AWS Outposts family

ON PREMISES

RUN AWS INFRASTRUCTURE AND SERVICES ON PREMISES



Outposts rack

Bring the same AWS APIs, services, and features to virtually any datacenter or co-location space



Outposts servers

Run Outposts in locations with limited space or smaller capacity requirements

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AWS Outposts



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Transform and accelerate delivery of healthcare services

The challenge

- Critical care lacks predictive analytics for preventative treatment
- High cost of managing on-premises solutions for data residency
- Different infrastructure, APIs, and tools for on premises and cloud

The solution

- Outposts is a fully managed service that provides a consistent experience across on-premises and cloud environments
- AWS compute and storage on premises seamlessly integrated with AI/ML services in the cloud
- Consistent management, automation, and devOps for Philips

Business outcome

- Proactive healthcare service delivery leveraging AI/ML
- Fully managed on-premises infrastructure and consistent platform across environments simplifies management and operations
- Consistent infrastructure, development platform, and tools accelerate adoption and deployment of Philips solutions globally



"With Outposts, I can develop applications, deploy them on the same infrastructure on-premises, and managed with the same tools, providing the same view end-to-end to both our care providers and IT administrators, with over 70,000 servers and distributed across 1,200 locations."

Rich Ridolfo, Sr. Director, Operations

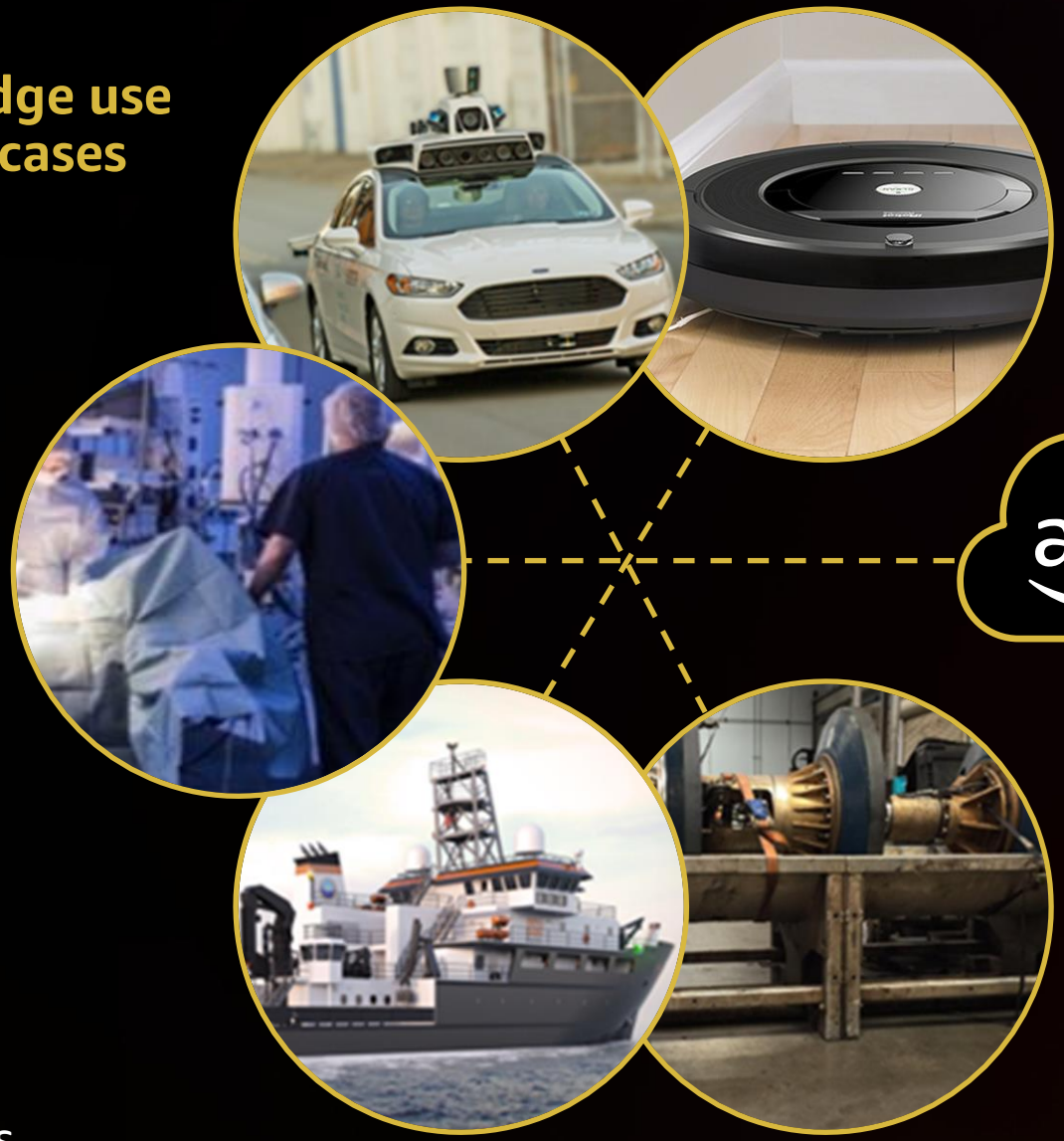
Phillips customer testimonial video

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What is the rugged mobile edge?

FAR EDGE

Edge use cases



Why is it important for customers?

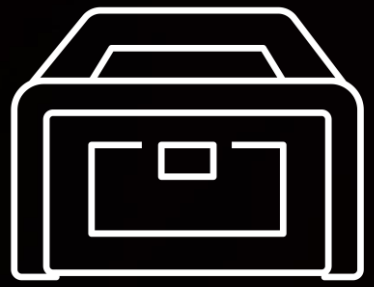


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AWS Snow Family

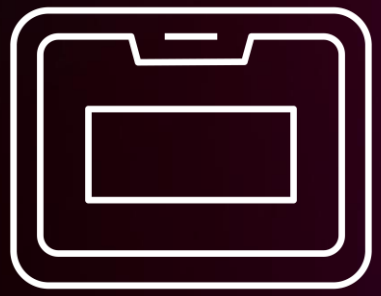
FAR EDGE

PHYSICAL DEVICES TO AGGREGATE AND PROCESS DATA IN RUGGED EDGE LOCATIONS, THEN TRANSFER TO AWS



AWS Snowcone

Compact and portable device, purpose-built for use outside of a traditional data center



AWS Snowball

Compute-optimized or storage-optimized device for extreme conditions

Available for clustering, scaling, and connectivity

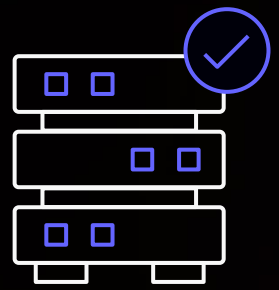
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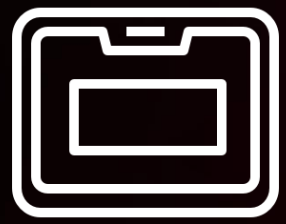
AWS Snowball Edge for rugged and tactical edge

FAR EDGE

BRINGS AWS TO THE RUGGED EDGE AND LOCATIONS WITH NO OR LIMITED NETWORK CONNECTIVITY



Delivers powerful compute for high-performance workloads at the rugged edge



Now with double the compute and memory

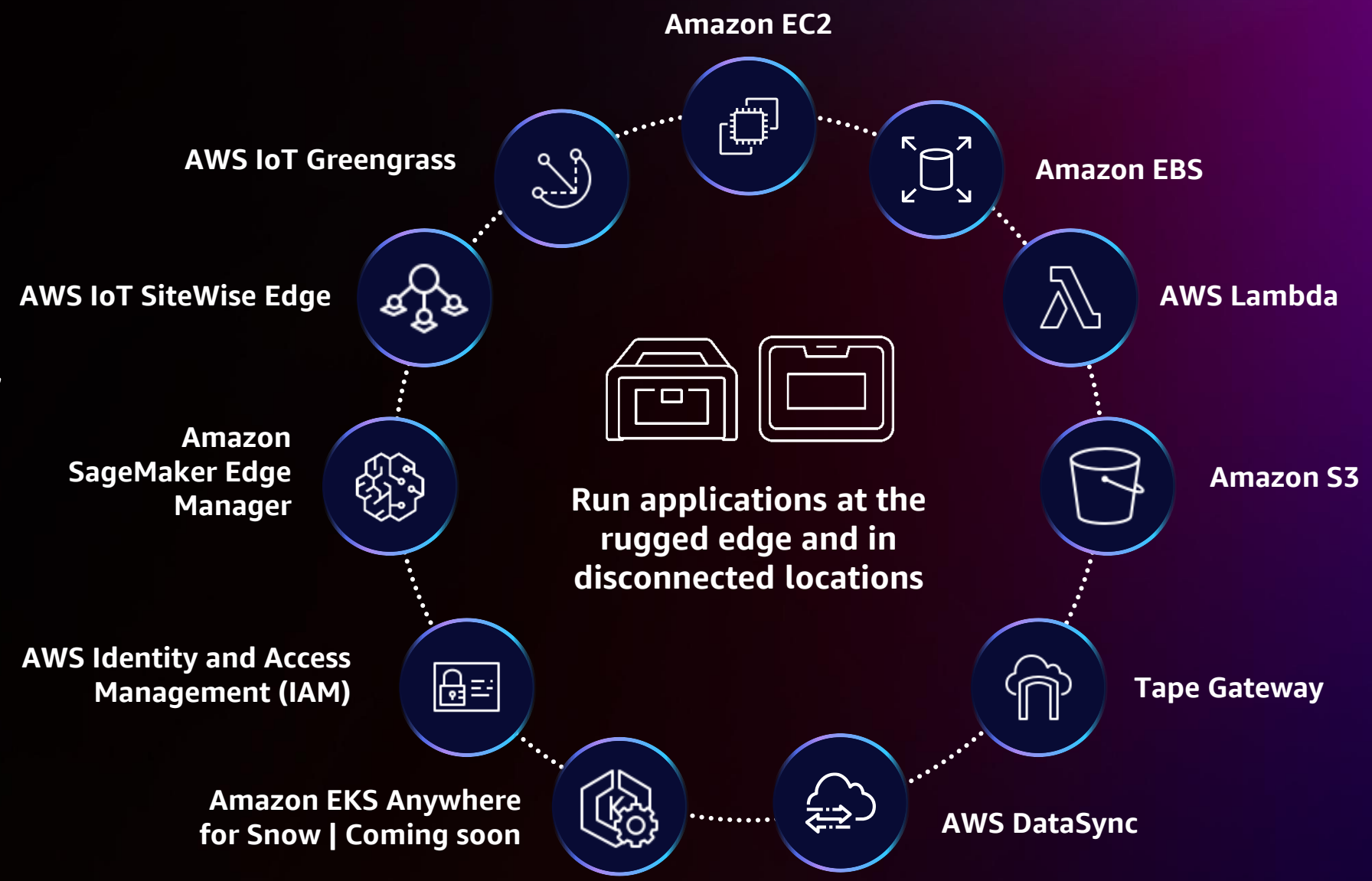


Extended use cases for private 5G wireless at the mobile edge; mobile platforms such as trucks, ships, and aircraft; and complex analytics at remote sites

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AWS Snow Family



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Using AWS services at the edge to identify health and safety risks

Challenge:

- Mavenir is a 5G ISV that offers a fully containerized packet 5G core portfolio to modernize existing mobile networks. Its customers Spark and Qrious wanted to build a hazard-detection system for EnviroNZ to help detect if people are too close to excavators

Solution:

- Spark leverages a combination of AI-powered computer vision solution built by Qrious and containerized 5G core solution by Mavenir for EnviroNZ, delivering a hazard detection system running on Amazon EKS Anywhere on Snowball Edge devices.

Result:

- Mavenir developed a cutting-edge AI solution that could make EnviroNZ sites safer by anticipating and reacting immediately if someone bypasses their safety controls. The pilot of the computer vision system, running Mavenir's 5G core on Amazon EKS Anywhere on Snowball Edge, helps solve a key business issue for EnviroNZ.

"We are looking for ways to bring the potential of 5G to life – demonstrating how faster throughput, lower latency and high levels of reliability can create tangible business outcomes. We are looking forward to working with the business community in the coming years to identify and test further use cases."

Mark Beder, Technology Director for Spark



MAVENIR

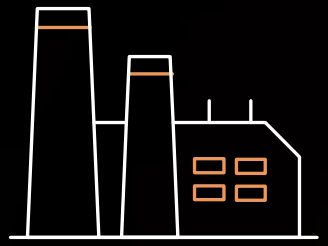
Spark nz

Qrious

AWS Snowball Edge compute

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What customers are doing with AWS IoT



Improve the performance and productivity of industrial processes



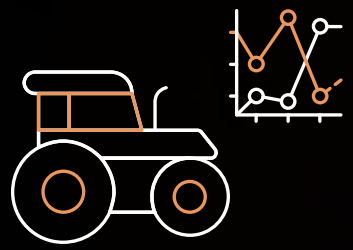
Remotely monitor patient health and wellness applications



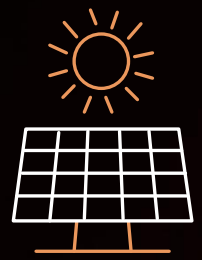
Track inventory levels and manage warehouse operations



Increase the efficiency of homes, buildings, and cities with smart products



Grow healthier crops with greater efficiencies



Manage sustainable and energy resources more efficiently



Transform transportation with connected and autonomous vehicles



Enhance safety in the office and on the factory floor

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AWS IoT solutions family

SMART DEVICES

SECURELY BUILD, DEPLOY, SCALE, AND MANAGE YOUR IOT APPLICATIONS AT THE EDGE



Building blocks

The broadest and deepest set of cloud services and partners to help customers create custom IoT applications



Purpose-built services

Services that simplify the time to build IoT applications for specific industries



Solutions

Consulting services from AWS Partners and AWS ProServe and pre-packaged software solutions from AWS Marketplace

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AUTOMOTIVE

LG

Challenge

To develop mobility services and upgraded solutions, LGE needed to develop **edge-to-cloud solutions that could rapidly collect vehicle data**, including a vehicle big data platform that provides data analysis and mobility services

Solution

By adopting **AWS IoT FleetWise**, LGE is able to **intelligently collect OBD/CAN data in near real time** and **simulate vehicle data** for virtual fleet status

Using AWS Data Pipeline, LGE has also developed a **vehicle data platform** using real and simulated data

Impact

- **Collect data quickly** regardless of car type, based on the industry standard VSS data structure
- Rapid prototyping and cost-effective validation of mobility services that can **increase insights and understanding of vehicle behaviors**



"Utilizing AWS IoT FleetWise, our vehicle and mobility service platform collects and processes the raw vehicle data into monetizable data services. Our customers can gain accurate and real-time insights into their vehicles and fleet. We look forward to delivering improved decision-making."

Gene Cho, Vice President, LG Electronics

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Extending the cloud to low Earth orbit (and beyond)

Pushing the boundary of the cloud to the edge

Jason Aspiotis

Director, In-Space Solutions
Axiom Space Inc.

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AXIOM SPACE

Our vision

A thriving home in space that benefits every human, everywhere.

Our mission

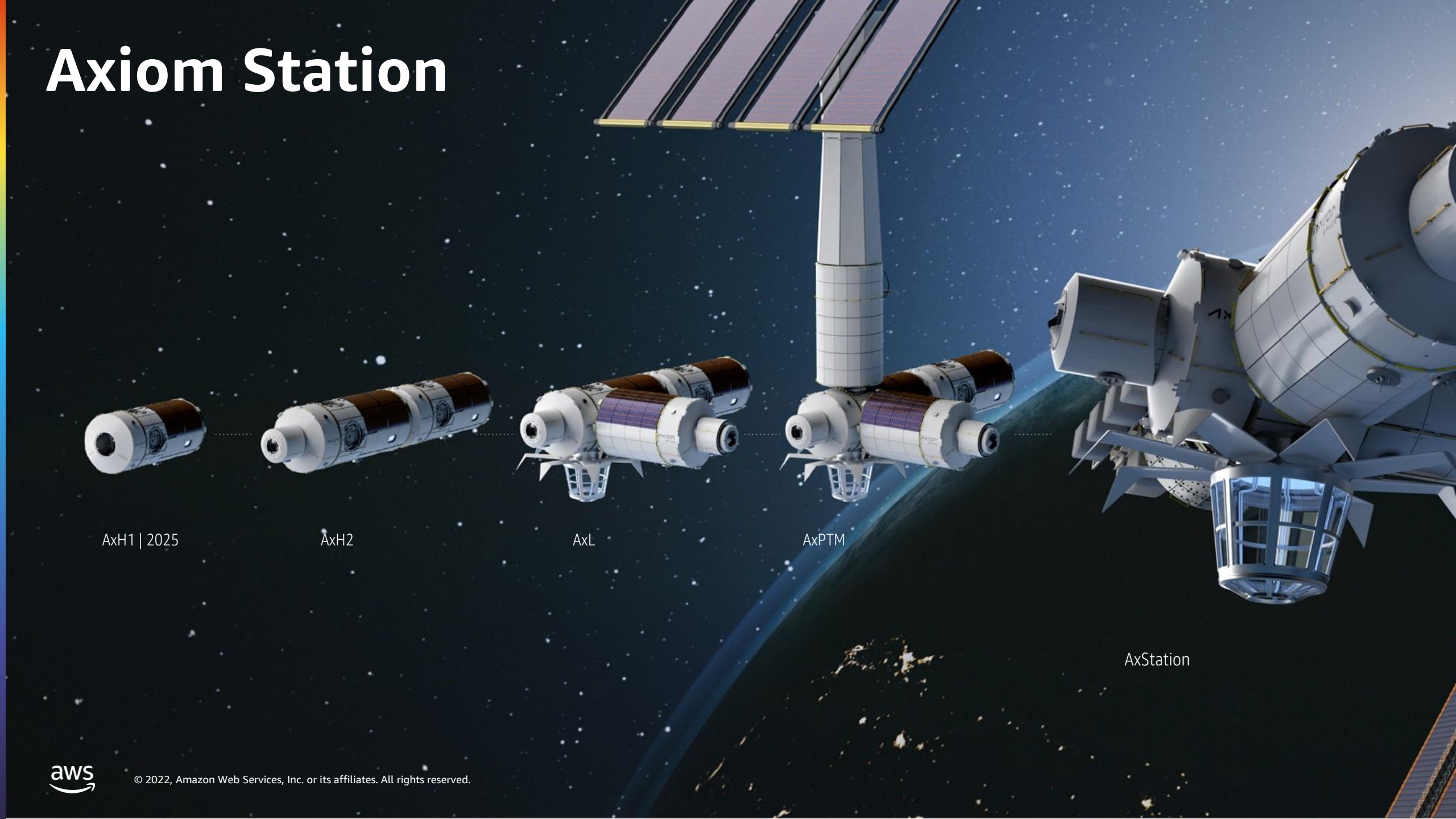
Improve life on Earth and foster possibilities beyond it by building and operating the world's first commercial space station.



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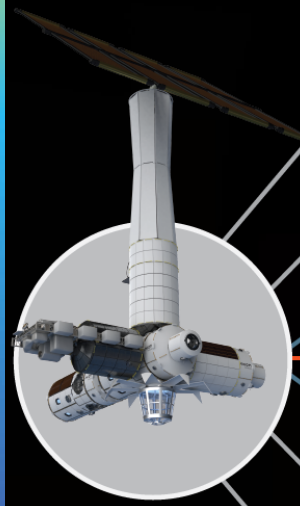
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Axiom Station



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Supporting new markets in LEO



- Government Agencies
- Private Astronauts
- Researchers & Manufacturers
- Space Exploration Organizations
- Media, Filmmakers & STEM Educators
- Commercial Enterprise, Defense and Intelligence Industry
- Satellite Builders & Operators

→ Training Facility for Professional Astronauts

→ Life-Defining Experiences

→ Laboratory & High-Tech Manufacturing Facility

→ Technology, Systems & Operations Testbed

→ In-Space Location, Content & Sponsorship Opportunities

→ On-Orbit Data Storage, Edge Computing & Cybersecurity

→ Manufacturing, Deployment & Service Depot

→ Pharmaceuticals, Life Sciences & Bioprinting

→ 3D Printing & Other Advanced Manufacturing

→ Materials: Alloys, Fiber Optics, Nanotubes

→ Rad-Hard Microchips

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Axiom and AWS on the ISS

Snowcone launched and integrated into ISS April 2022

Successful demonstration of ML workloads

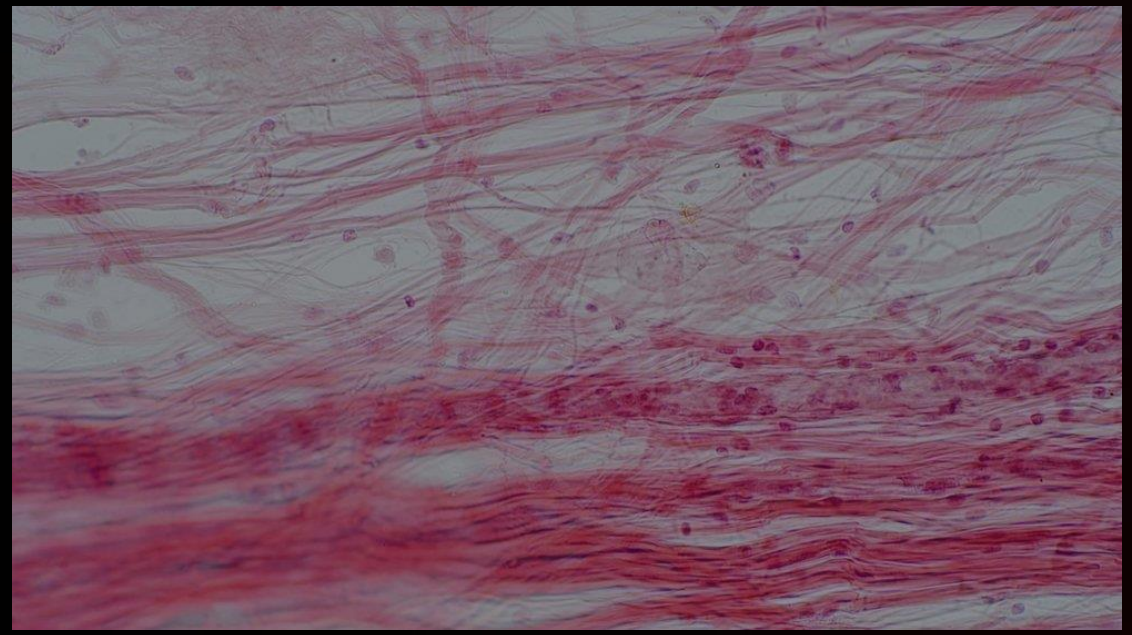
Available for demonstrations!



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Cloud in LEO use case: Research & manufacturing

Supporting the development and advancement of new capabilities and products in biotech and materials



Enhancing human performance as we expand our presence in LEO and beyond



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“Fundamentally, I would like to use edge-based devices to do most of our AI compute.”

Lisa Costa

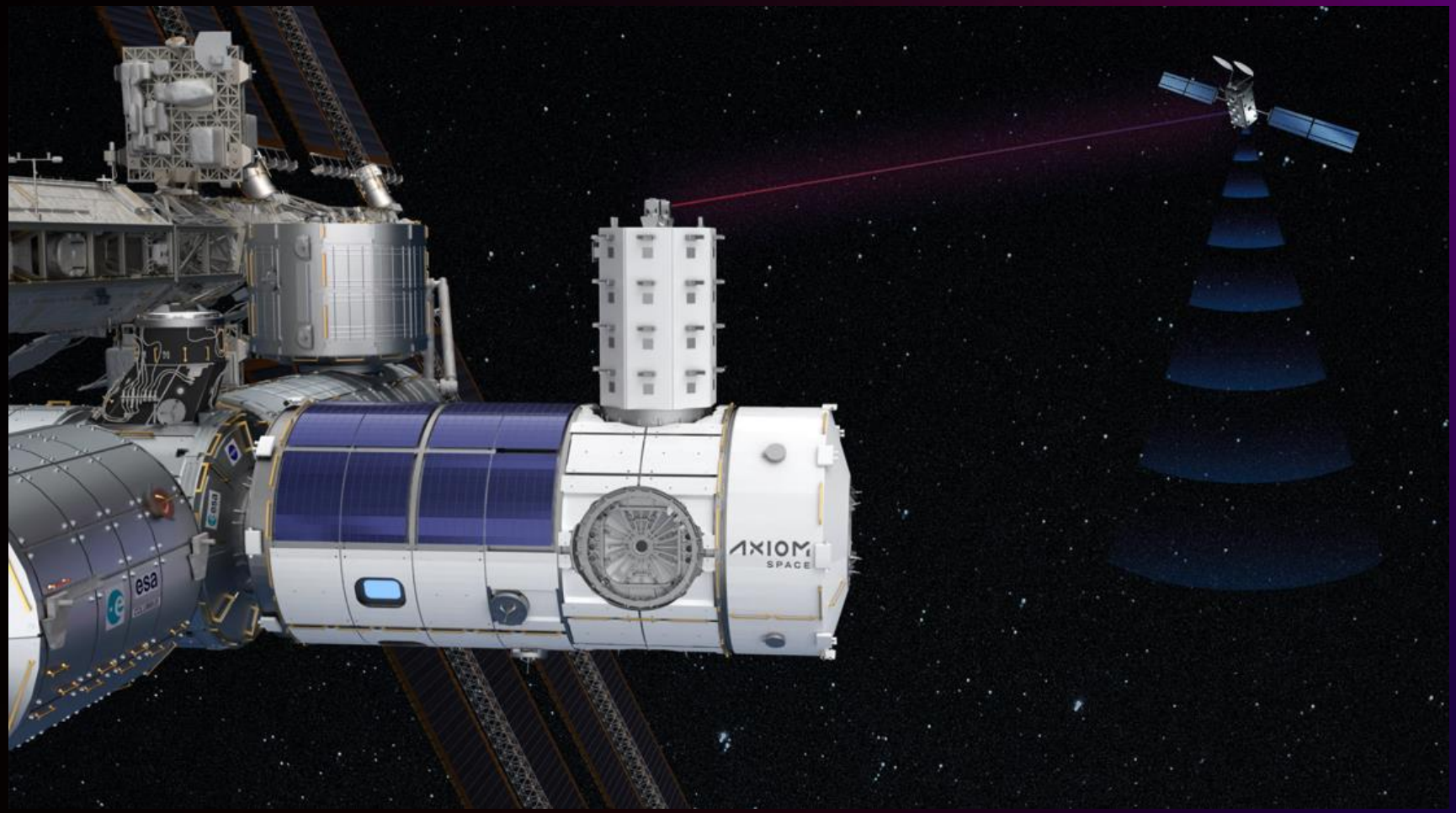
Chief Technology and Innovation Officer
U.S. Space Force

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Cloud in LEO use case: Mesh-network & security

Demonstration of 10 Gbps optical link between space station and MEO

World's first quantum encrypted comms link between the ISS and Earth



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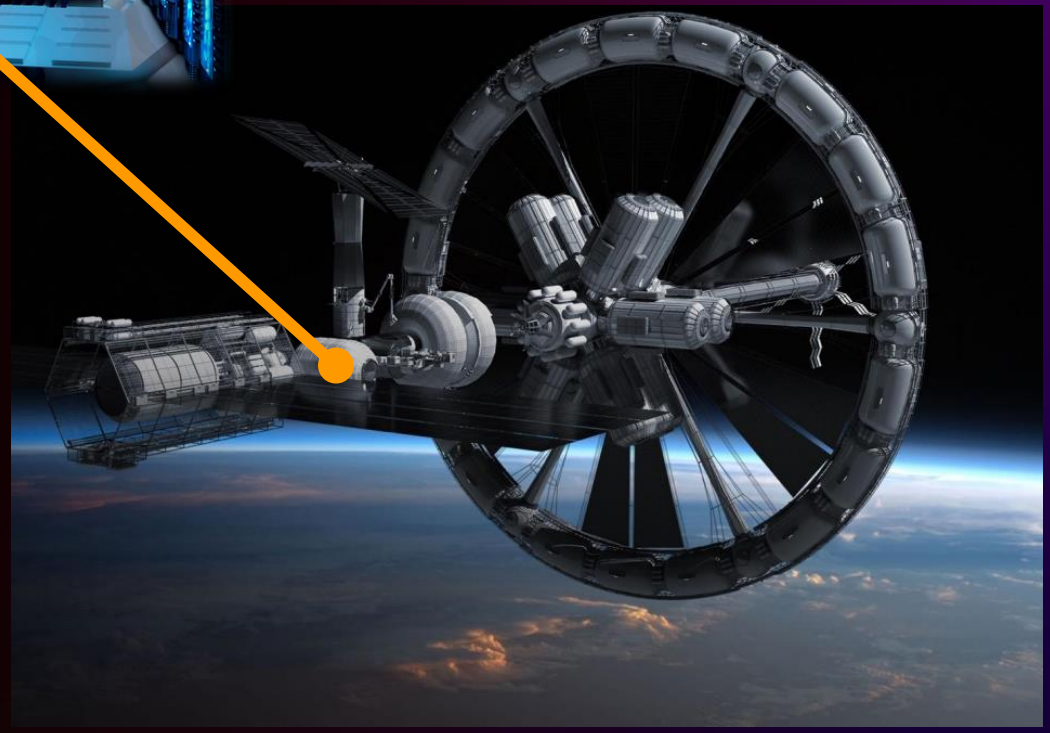
Cloud in space: Vision 2040

Supporting exploration and advancement of our civilization into the solar system





Enabling economic development and cities in space



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Co-innovating urban journeys

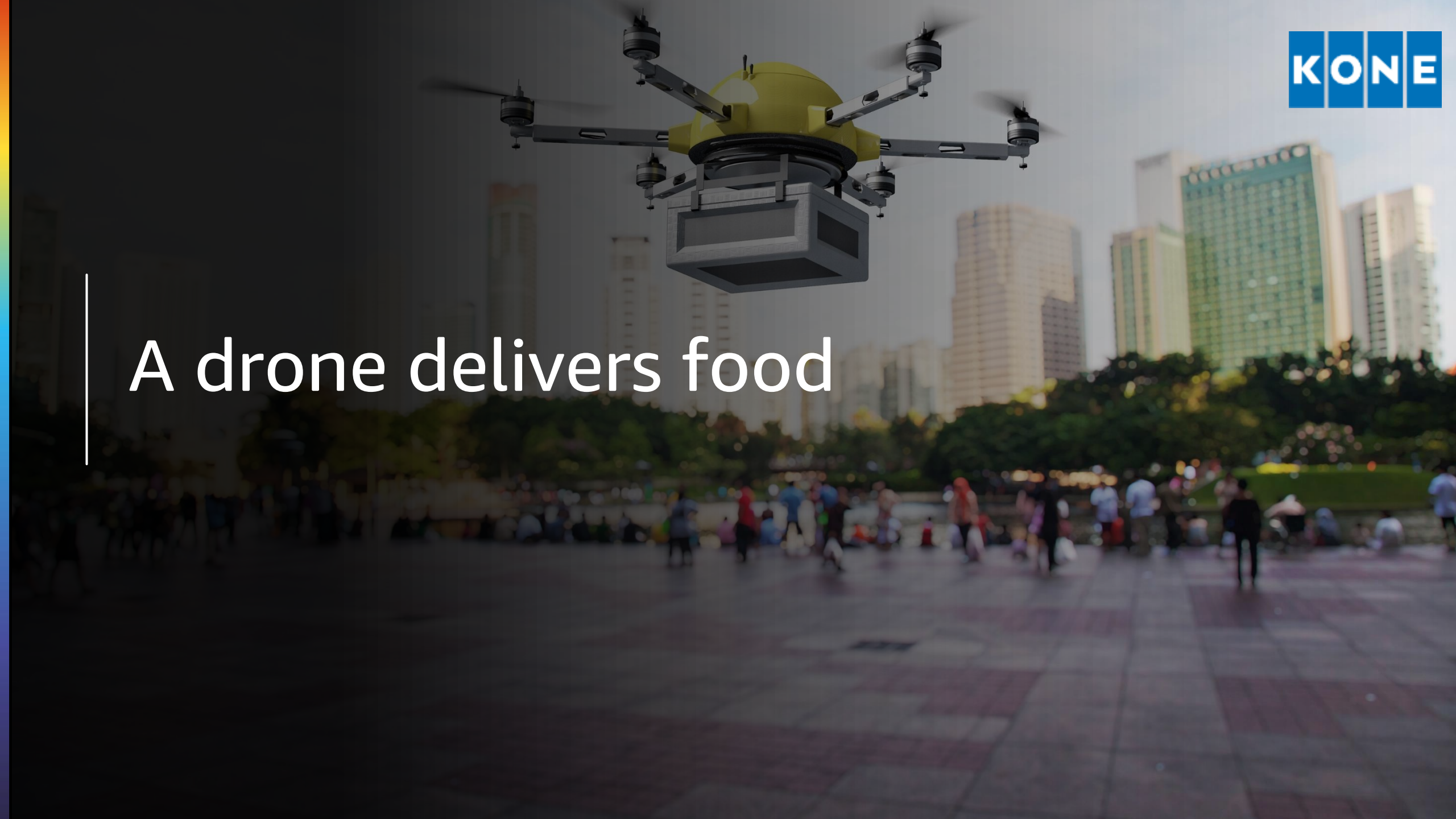
Maciej Kranz
EVP and CTO
KONE Corporation

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KONE
Good Morning



A robot delivers medicine



A drone delivers food



Predictive maintenance


KONE
We prioritize journeys with AI


Welcome back Maciej!
Elevator C will take you to your meeting on the 12th floor.



KONE’s mission

Improving the flow of urban life, together with customers and partners


KONE
Moving 1 billion
people everyday

The solution









FROM







TO

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The technology making the experiences possible

On site

KONE Connected Elevators, Escalators & Auto walks

Real time communication

AWS Cloud

Data Ingestion - Command & Control

Amazon API Gateway
AWS Lambda
Amazon S3
AWS IoT Core
AWS IoT Device Management
AWS IoT Device Defender

IoT action
IoT certificate
IoT shadow
IoT policy
IoT rule
IoT topic

Analytics

Amazon MSK
Amazon EMR
AWS Glue
Amazon S3
Amazon Athena

Security & Identity Management

Amazon Cognito
AWS Certificate Manager (ACM)
IAM
AWS KMS
AWS Secrets Manager

APIs & applications

Amazon API Gateway
AWS Lambda
AWS Fargate
Amazon DynamoDB
Amazon RDS
Amazon S3

Operational Metrics & Audit

Amazon CloudWatch
AWS CloudTrail

Consumers

KONE technicians

KONE customers

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Physical + digital journeys are increasingly personal

How AWS helps customers speed innovation at the edge



Accelerate innovation with the broadest and deepest set of capabilities



Create a truly consistent and secure experience across all environments



Optimize applications with experienced partners and the best support

aws

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Join us for more

STAR THESE SESSION IDS IN YOUR ATTENDEE PORTAL

Leadership session!

AWS wherever you need it
Thursday 11am



Snow Family

STG211 – Breakout Session
Hybrid cloud storage and edge compute: AWS, where you need it

STG210 – Breakout Session
Best practices for moving data to AWS, online and offline

HYB205 – Breakout
AWS Snow Family: Bringing AWS to the rugged, mobile, and disconnected edge



Outposts

STG332 – Chalk Talk
AWS where you need it: Object storage at the edge

HYB312 – Breakout
AWS Outposts: Bringing the AWS experience on premises



Local Zones

HYB202- Breakout
AWS Local Zones: Building applications for a distributed edge

HYB206- Breakout
AWS: A great way to run 5G networks



IoT

TLC305-Breakout
Reimagining the home experience with cloud-native 5G powered by AWS

TLC303- Breakout
Verizon Connect transformation through their journey to the cloud

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Thank you!

Siddhartha Roy

Jason Aspiotis

Snowcone-Inquiry@axiomspace.com

Maciej Kranz



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