

Google Cloud Norway



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**Googles planer i Norge
med nytt datasenter og
strategi for 5G og
Telekom.**

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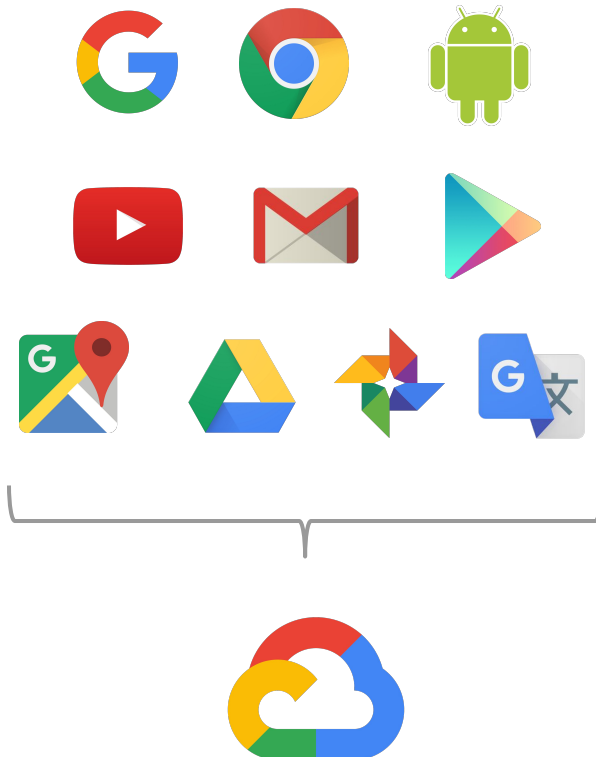
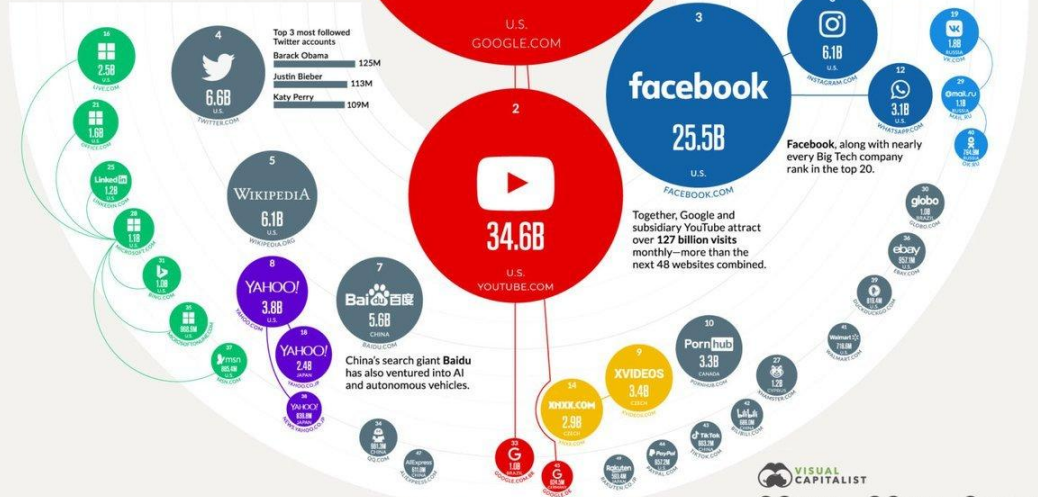
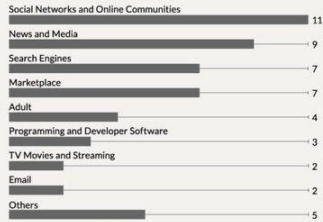
New cloud regions coming to a country near you



THE WORLD'S Top 50 Websites

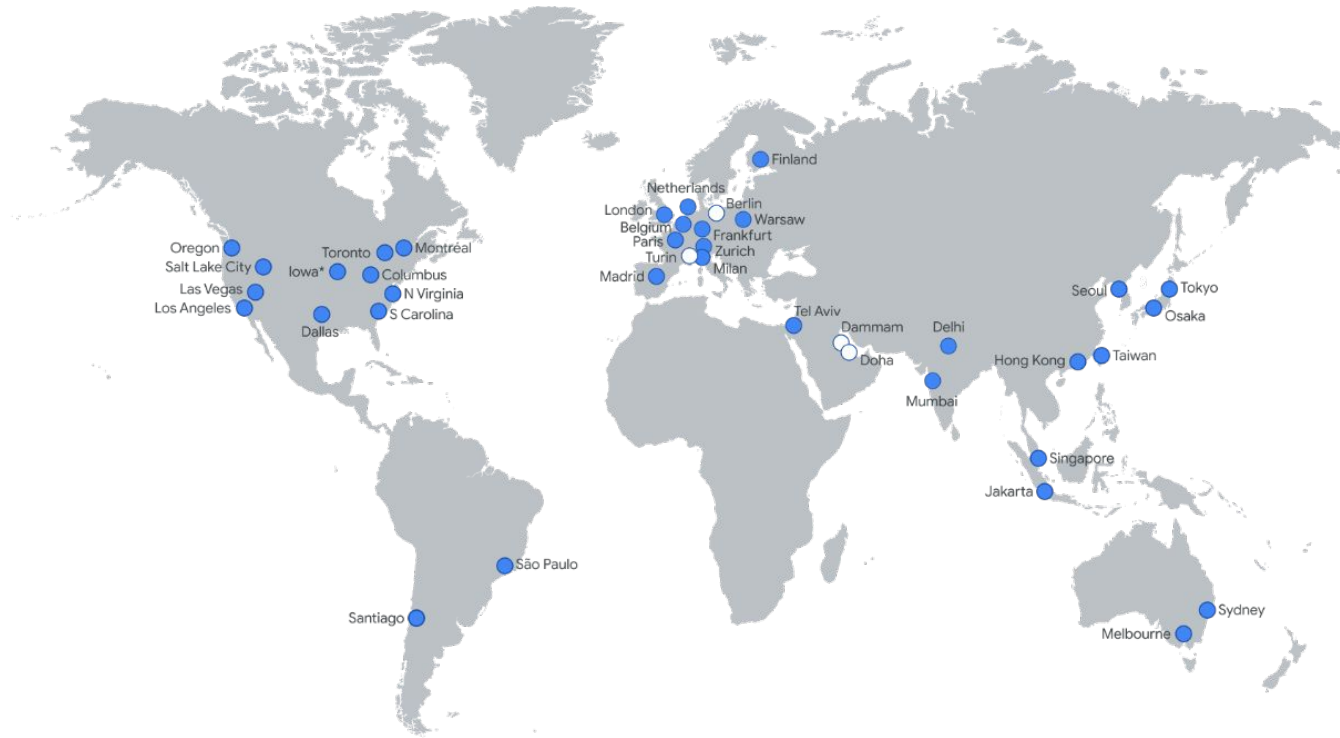
Below, we show the key players—from Google to Twitter—that currently dominate the Internet.

BREAKDOWN BY CATEGORIES (GLOBAL, NOV 2020)



Google Cloud Platform regions and zones

Google Cloud is coming to Norway



COMING SOON! Google Cloud will continue expanding into the following regions: Doha (Qatar), Turin (Italy), Berlin (Germany), Dammam (Kingdom of Saudi Arabia), Mexico, Malaysia, Thailand, New Zealand, Greece, Norway, South Africa, Austria and Sweden.

Google Cloud region with comprehensive services with **Low carbon** footprint

AMERICAS

EUROPE

ASIA PACIFIC

MIDDLE EAST

MULTI-REGION

Products	Zurich (europe-west6)  Low carbon	Frankfurt (europe-west3)	Finland (europe-north1)  Low carbon	Warsaw (europe-central2)
STORAGE & DATABASES				
Cloud Storage ^{2,5}	●	●	●	●
Cloud Storage for Firebase	●	●	●	●
Cloud Bigtable ⁵	●	●	●	●
Cloud Spanner ^{2,5}	●	●	●	●
Cloud SQL ⁵	●	●	●	●

Source: <https://cloud.google.com/about/locations#europe>

Customer requirements driving need for local Cloud regions



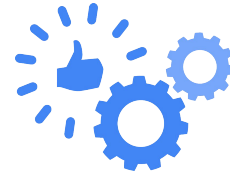
Performance

Locate services close to users with low Latency



Highly Available

Globally distributed services



Data Sovereignty

Store and Manage data onshore - retain data sovereignty



Security

Security by design and Security by default



Regulatory Compliance

Deliver services based on Local legislation and Industry specific regulations

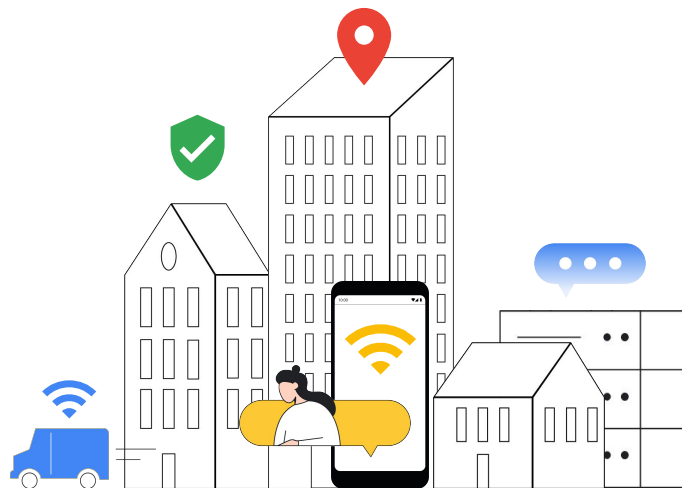


Sustainability

Choose resource location based on Sustainability requirements

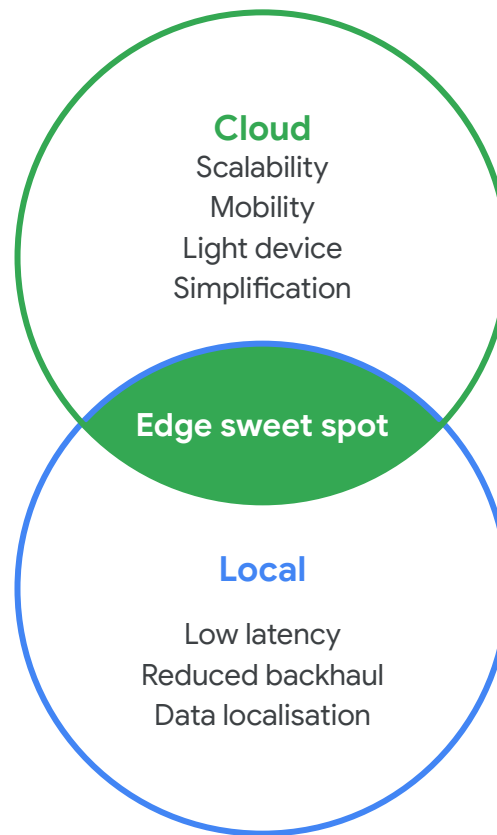
Monetizing the Edge with Google Cloud

Juan Ramirez
Principal Architect

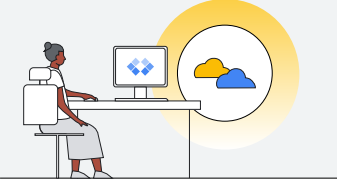


Edge Computing


/ɛdʒ / kəm'pjʊ:tɪŋ/



Google can run in **your** environment, any way you **choose**



Google Cloud
Empowers faster solution development, smarter business decisions, and connects people anywhere



Google Distributed Cloud
Extends Google Cloud's infrastructure and services to the edge and into your data centers

common control plane | container orchestration and management



policy and security automation | operations and services management

Powered by Anthos

Google Distributed Cloud

Open & Flexible

Leveraging Open Source and Commercial Off-the-Shelf Hardware tapping into industry innovation and open ISV ecosystem

Intelligent (AI inside)

Based on Google AI portfolio, enabling real time decisioning and automation in the platform and as a service

Consistent

Provides a consistent application and IaaS experience across Google Cloud, Google Edges, Operator Edges and Customer Edges and Data Center



Modern

Cloud Native approach based on Google leadership in Kubernetes and Anthos leading hybrid-cloud solution

Carrier-Grade

Leveraging proven best practices at scale and technologies used for Google Core Services optimized for the Edge

Secure

Security spanning Core Google Cloud, Google Global Network, Google Edge Infrastructure, and end-user devices

Anthos is at the heart of Google Distributed Cloud enabling Edge and Telecom Network Transformation



Network Functions and Edge Applications

Edge Applications Ecosystem
Network Functions (CNFs/VNFs)



03

Open platform based on Kubernetes

Anthos tuned for Telecom and Edge workloads



02

Distributed Cloud Infrastructure

Google Cloud, Google Edge, CSP Edge,
Enterprise Edge



01

Google Cloud is helping to monetize the Edge and accelerate new paths to growth with a three-pillar strategy:



01

Edge use cases portfolio

A rich portfolio of use cases for enterprise/ industry verticals and Telcos



02

Open platform

An integrated, fully managed hardware and software platform



03

Distributed Edge infrastructure

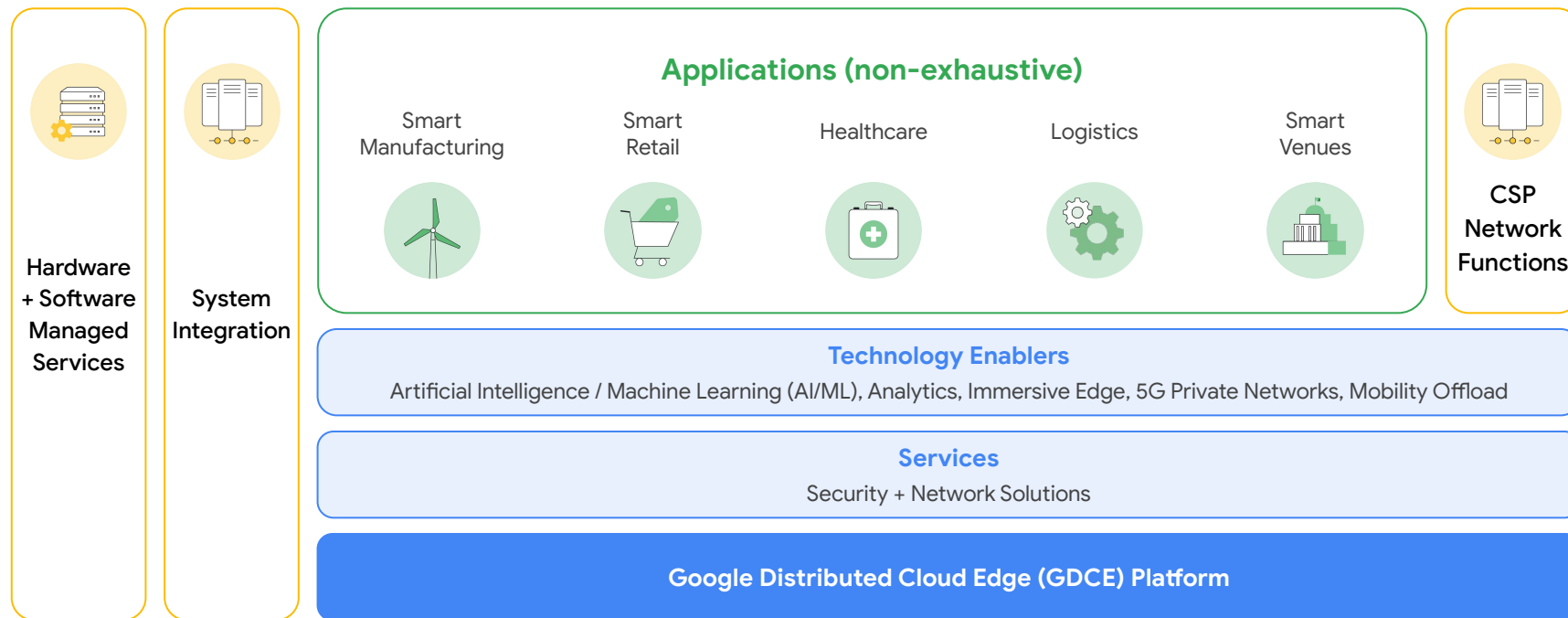
Google Edge, Operator Edge, Customer Edge, other third party Edge

1

2

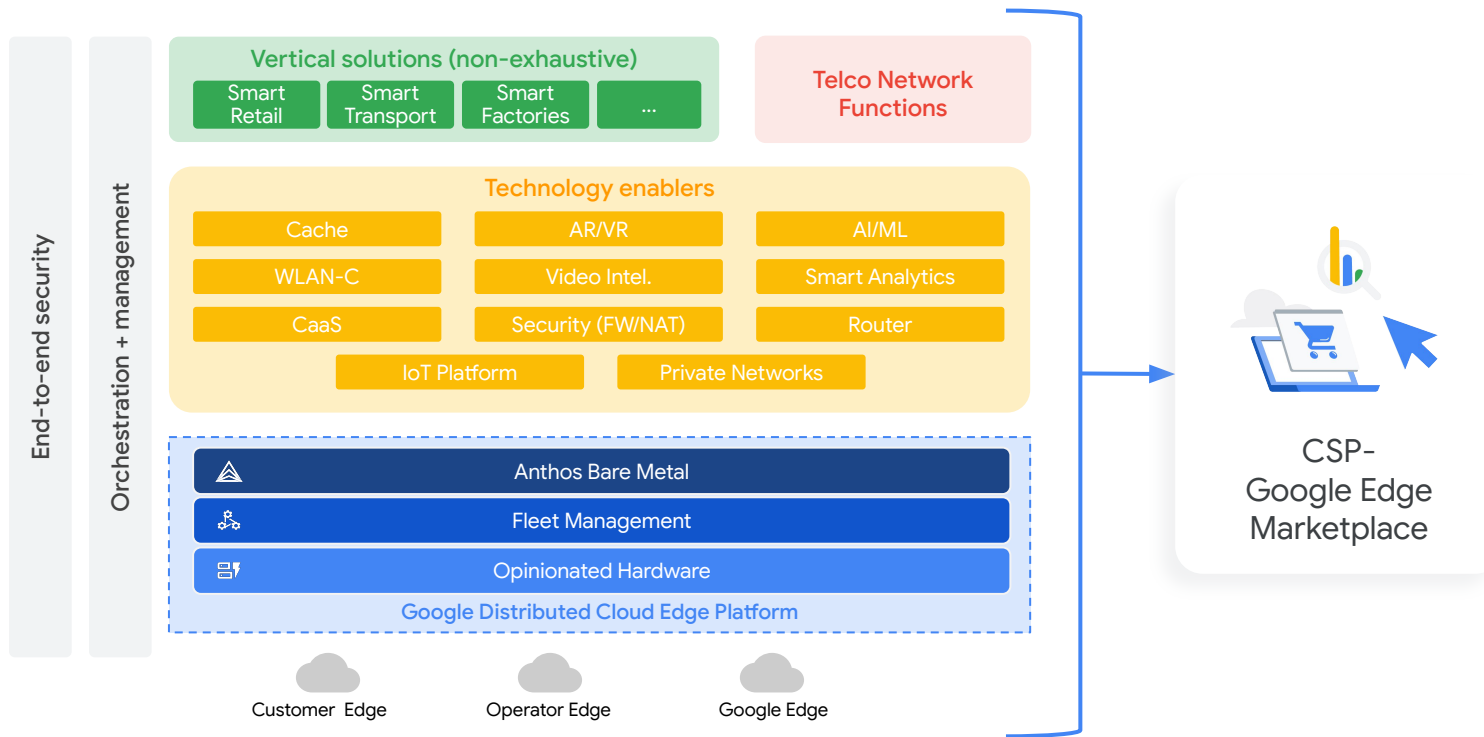
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Google Edge Solutions - Core elements

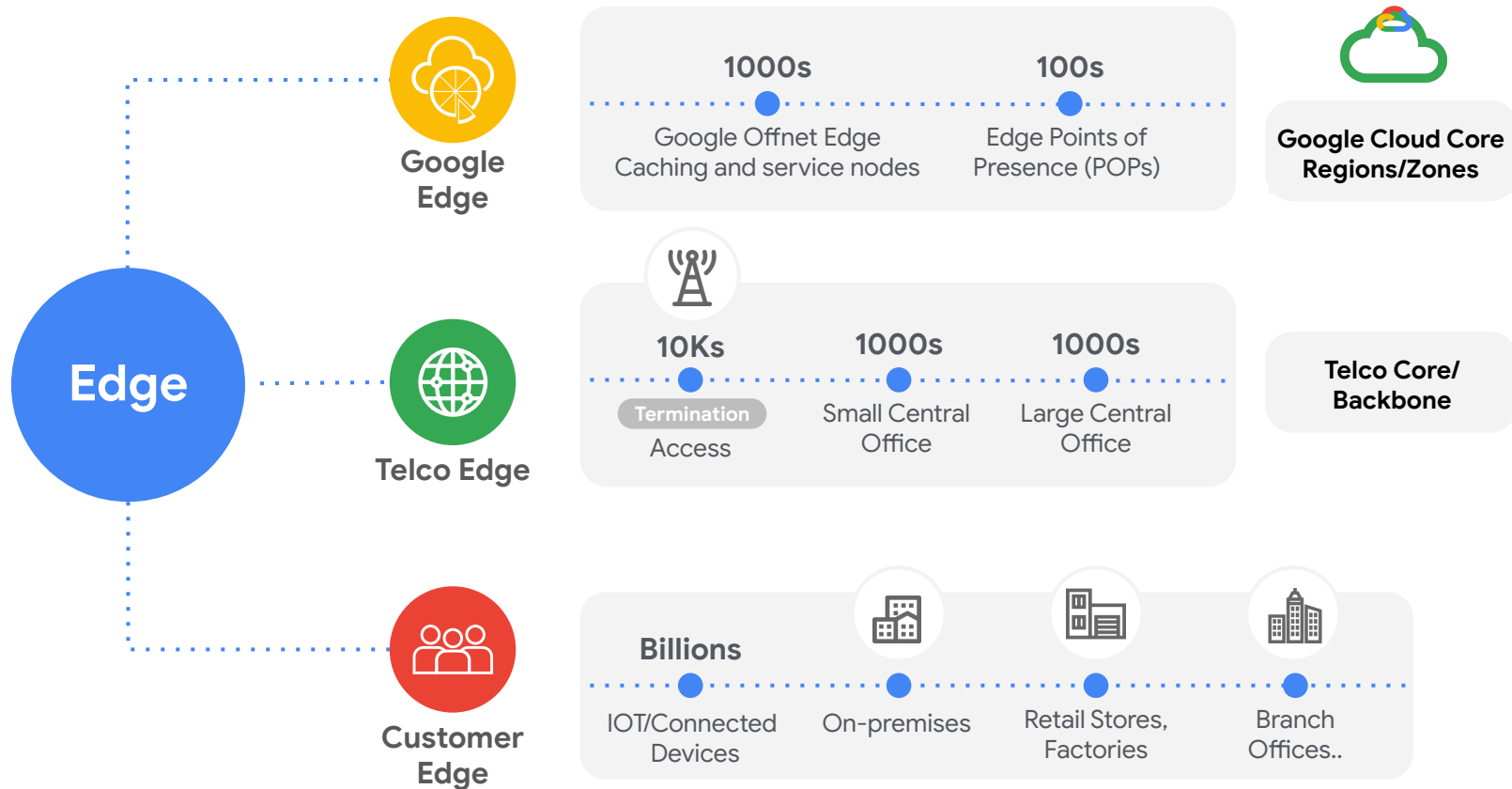


- 1
- 2
- 3

Google Distributed Cloud Edge - A single platform for a diversity of workloads



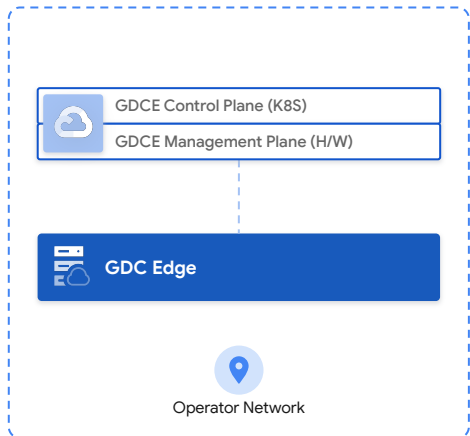
Pillar 3: Distributed Edge infrastructure



Telco Network Transformation - Journey and Direction

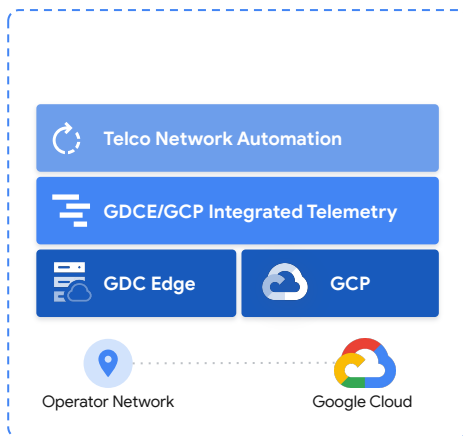
Proprietary + Confidential

Optimized Network Function Platform



- Managed Edge Platform
- Managed K8S PaaS / Clusters
- Telecom Networking Optimization
- Single Rack Operations, Multiple Racks Supported
- Network Core Validation

Automated Hybrid Network Platform



- GDCE Scale, Security, Privacy
- RAN Platform Introduction
- Network Optimized NF on GCP/GKE
- Infra and NF Integrated Telemetry
- Cloud Native Automation (Nephio)

Autonomous Distributed Telecom Platform



- GDC Edge at Google Network Edge
- RAN Optimized HW & Automation
- AI Driven Automation & Optimization
- Telco Data Fabric
- Control-Loop Operation

Google Cloud brings a rich ecosystem of partners

Industry ISVs



Technology Partners



Edge ISV Partners



System Integrators



Illustrative Edge use cases that may leverage the ecosystem*

Manufacturing

- Automated guided vehicles (AGV) and autonomous mobile robots (AMR)
- Augmented reality (AR)
- Remote control
- Vision-based control
- Real-time process control
- 3D bin picking
- Environmental monitoring
- Industrial controls (e.g. PLC)
- Predictive maintenance
- Drones
- Telematics
- Safety monitoring and improvement
- Security monitoring

Warehousing

- Automated guided vehicles (AGV) and autonomous mobile robots (AMR)
- Augmented reality (AR)
- Autonomous security and safety
- Barcode scanners
- End-to-end supply chain visibility

Mining

- Real-time fleet management
- Remote control of machines
- Automated driverless trucks
- End-to-end process automation
- Real-time throughput yield analytics

Retail

- Automated replenishment by AGV/AMR
- Real-time environment control
- AR-driven operations (incl. training)
- Predictive inventory planning
- Recommendation engines
- Store navigation
- Shelf analytics
- Products tracking and tracing

Consumer

- Gaming (cloud, AR, multi-player)
- eSports enablement
- Enhancement of events (e.g. concerts, sport events)
- Consumer AR/virtual reality (VR)
- Education applications
- Improved video streaming
- Smart wearables
- Smart home applications

Automotive

- Connected vehicles and remote vehicle management
- Dynamic fleet optimization
- Theft protection
- Predictive maintenance
- Self-driving cars
- Car-sharing demand/supply management
- Driverless public transport

Healthcare + Life Sciences

- Alerts/diagnostics from real-time patient data
- Remote procedures
- Patients condition/reconvert monitoring with smart wearables
- Remote and analytics-based drugs dosing
- Disease identification and risk stratification
- Patient triage optimization
- Proactive health management
- AR-based training
- AI-driven and remote imaging diagnostics

Energy, Feedstock + Utilities

- Power usage analytics
- Drones
- Outage identification and automatic restoration
- Smart grid management
- Energy consumption forecasting

Oil + Gas

- Drones
- AGV and AMR
- Real-time process control
- Augmented reality (AR)
- Industrial controls (e.g. PLC)
- Smart surveillance

Road Traffic

- Automatic deployment of emergency vehicles
- Traffic control in public spaces
- Smart dispatch of public services
- Dynamic tolls for roads
- Video-based collision avoidance systems

Agriculture + Aquaculture

- AGV and AMR
- Produce monitoring and analytics
- Condition based remote feeding in aquaculture and meat production
- Image analytics for yield increase
- Production analytics in aquaculture

Airports

- Traffic patterns and congestion management
- AGV and AMR
- Air-side ground movement navigation
- Security monitoring and hazards identification
- Facial recognition and boarding-pass-free check-in

Ports

- AGV and AMR
- Augmented reality (AR)
- Real-time video monitoring
- Autonomous security and safety
- Harbor surveillance
- 3D bin picking (applied to containers)
- Self-driving ferries

Public Safety

- Monitoring and sensing
- Smart surveillance
- Securing connectivity during mass-events (e.g. stadiums)
- Autonomous robots for disinfecting public spaces

*The use cases on this slide are indicative only, illustrating possible use cases which may be enabled when CSP/Enterprise customers combine Google Distributed Cloud Edge (GDCE) with third-party ISV Edge solutions and/or Google IP solutions.



Questions

Google Cloud

Google Distributed Cloud - Deployment offers

Offers designed for greater choice and customization based on your unique needs

Edge

Google-managed hardware and software solution designed for low latency, data residency, and hybrid workloads

Manufacturing needs visual-inspection anomaly detection with private MEC

Hosted

Air-gapped hardware and software solution, managed by Google or a trusted partner, for the most sensitive workloads

Government agency must meet data and operational sovereignty requirements

Connected

Air-gapped

Choice in hardware form factor



That's a wrap.

Google Cloud