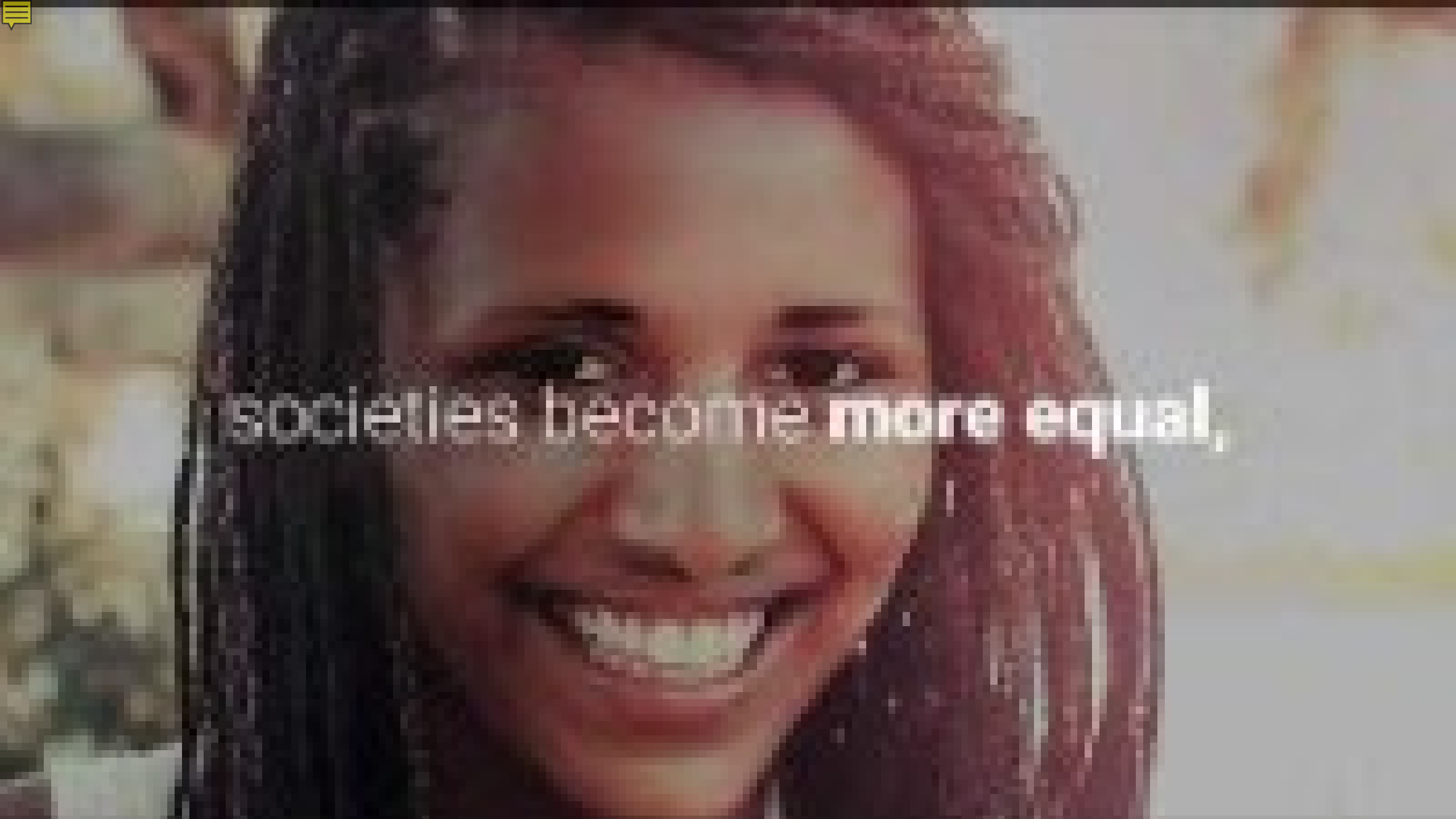
Data Center BeLux Forum

What happens when IoT and P5G meets (in) the edge?


societies become more equal,

Did you know?

65% of the **Fortune Global 500** and 80% of the **Fortune Global 100** companies are our clients

If you did a google search, you likely used our network

#1 in Network Service Provider according to Gartner and IDC

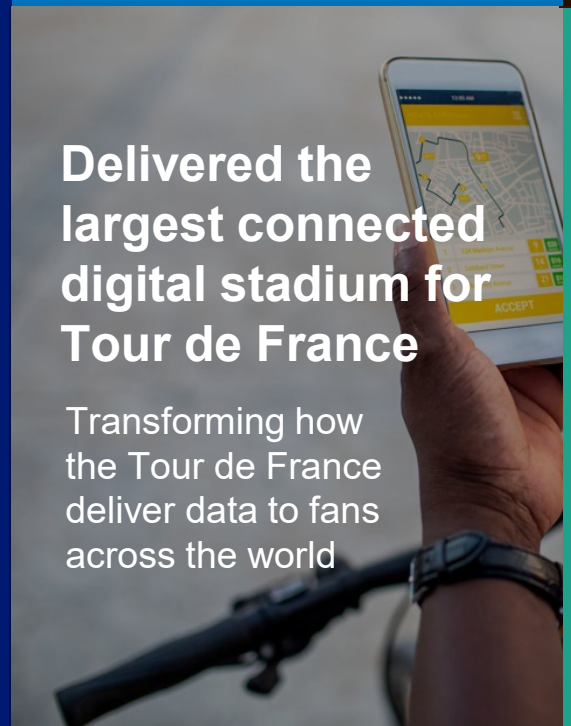
Hyperscalers & social media platforms run here for global reach

One of **the top 3 in Global Data Centers** according to IDC and TBR

NTT

Innovating Smart solutions for our clients

The **first enterprise multi-country** private 5G offering.

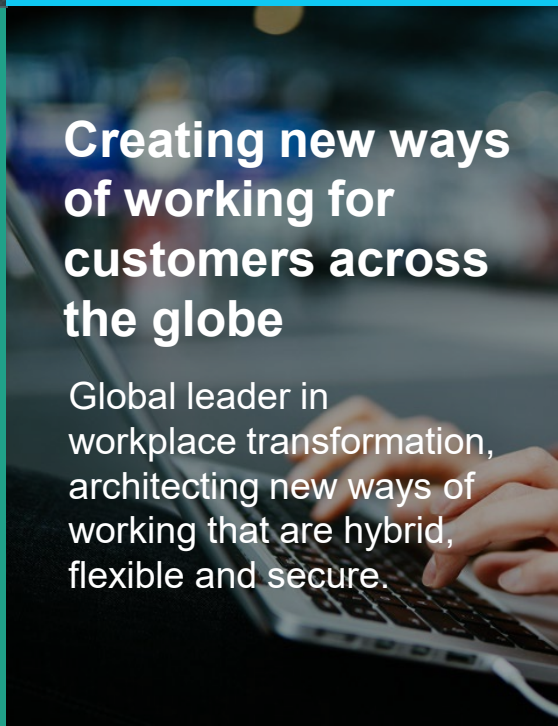


Delivered the largest connected digital stadium for Tour de France

Transforming how the Tour de France deliver data to fans across the world

150 year heritage of using technology for good

Helping our clients and the world to reach net-zero by 2030



Creating new ways of working for customers across the globe

Global leader in workplace transformation, architecting new ways of working that are hybrid, flexible and secure.

Agenda:

What happens when IoT and P5G meets (in) the edge?

1. The iNTTerconnected world
   Sensor to Cloud communication
2. Private 5G
   The building blocks & Differentiators
3. The Intelligent Edge
   Edge to multiCloud communication
4. Questions?
   And answers!

Internet of Things

Industry 4.0 – Smart Industry – The Digital Factory

Industry 4.0 refers to a new phase in the Industrial Revolution that focuses heavily on interconnectivity, automation, machine learning, and real-time data

18th Century

Industry 1.0
Mechanical production powered by steam

19th Century

Industry 2.0
Mass production lines and electricity

20th Centu

Industry 3
Automate production electronics a computers

The connected car – car IoT

A *connected car* is one that has its own **connection to the internet**, that allows the car to share internet access and data with other devices inside and outside the car.

18th Century

Chair on wheels

18th Century

Car on wheels

18th Century

iPad on wheels

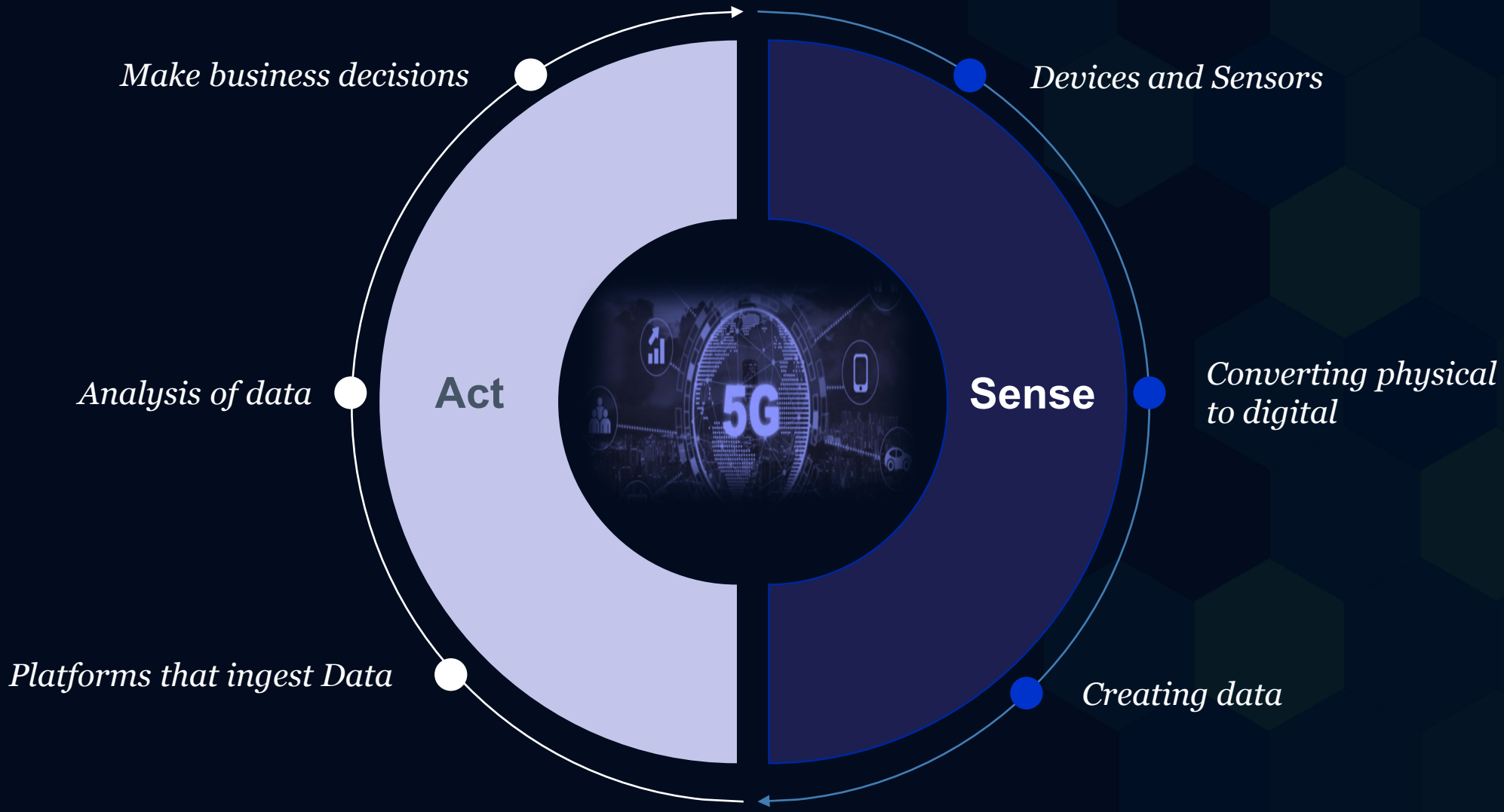
18th Century

Edge on wheels

iNTTerconnected?

Internet of Things

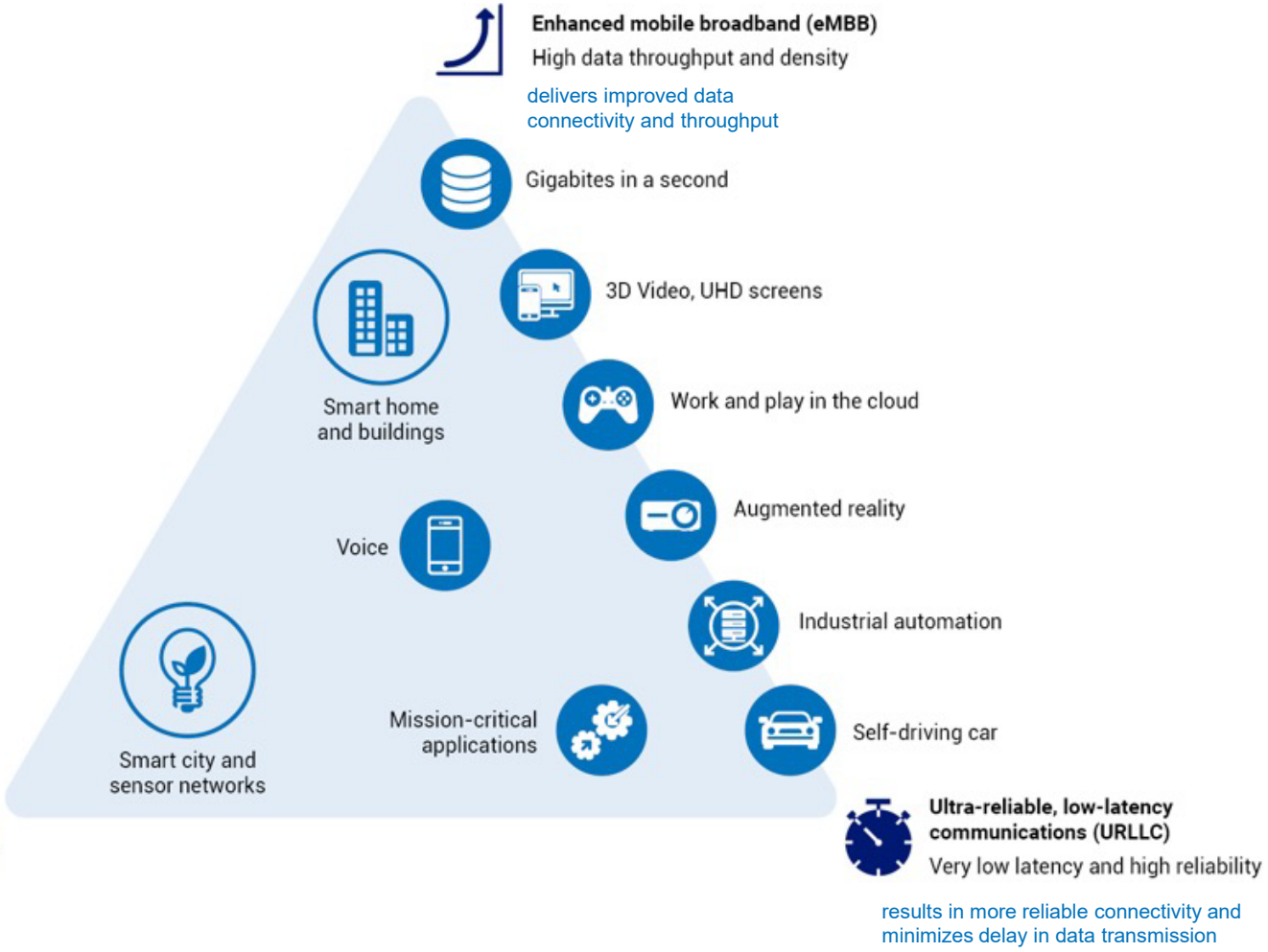
Simplistic model



What is 5G? An enabler for growth

The ability to handle a large density of devices transmitting large volumes of data enables enterprises to drive digitalization and decisively improve data-based business models.

- **New standard** for mobile communications
- Shift to **service-based architecture**
- Complete **software-defined** approach
- Designed to address **multiple use cases** in one network
- Improved **speed**, **density**, **reliability** and **latency**



What is 5G? An enabler for growth

One regulated umbrella protocol that can deal with others, that are using open frequencies

LoRaWAN

WiFi

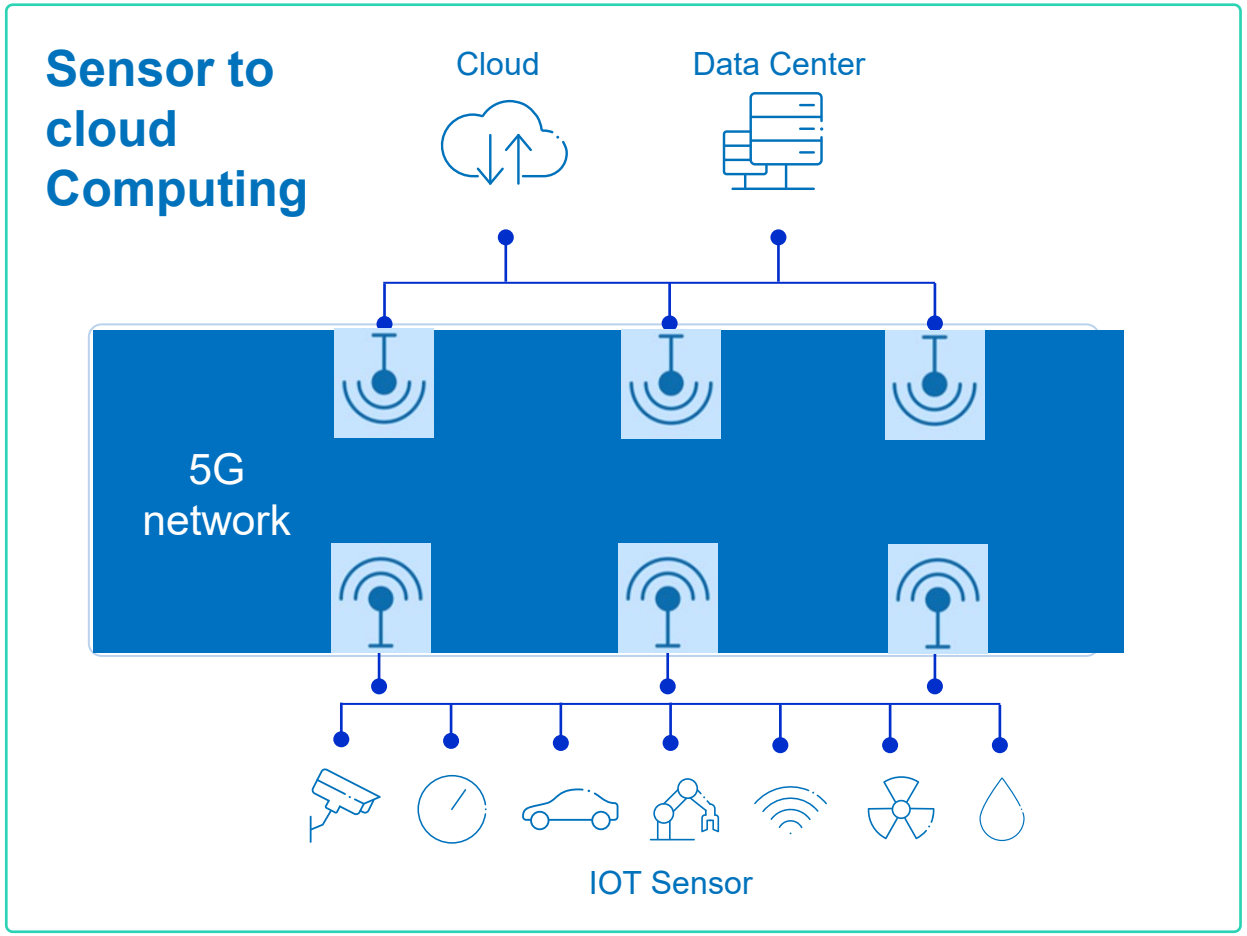
NB - IoT

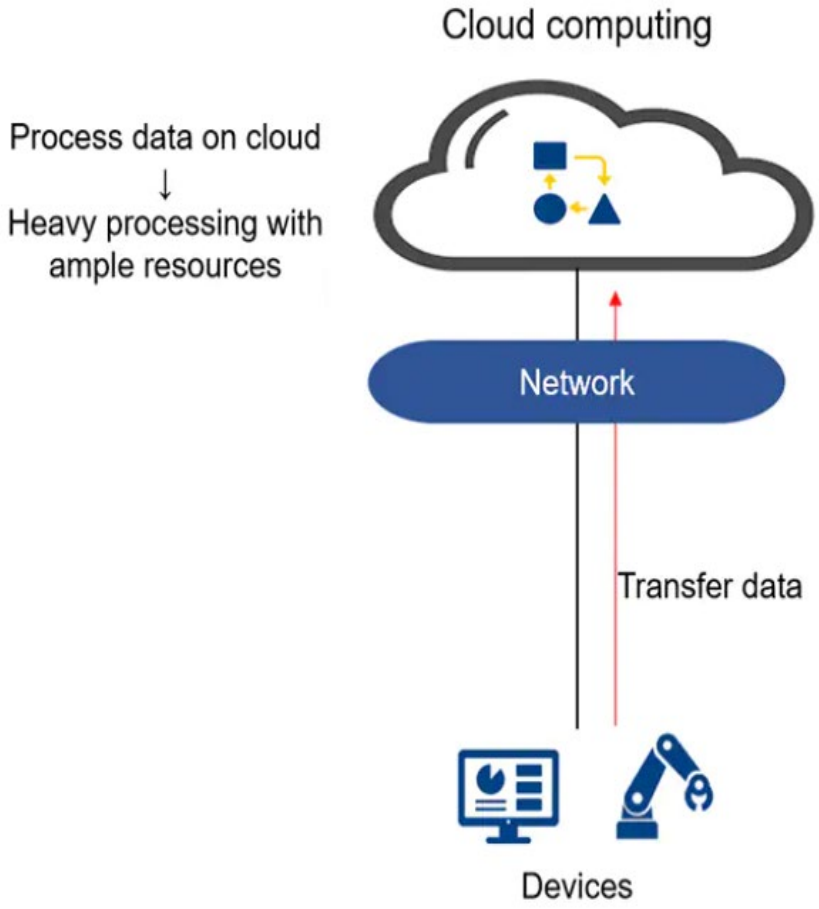
BLE

Cellular

M2M

the “iNTTerconnected” world





Unlock new and innovative services for enterprises

The power of 5G, IoT and real-time AI will unlock new and innovative services for enterprises across the world to accelerate their transformation toward Industry 4.0.

USD 110bn

Private 5G networks spend will reach USD 25bn in 2026 and **USD 110bn in 2036.**

2036

By 2036, what is spent on enterprise cellular will be more than public cellular.

13x

5G speeds will be 13 times higher than the average mobile connection by 2023. The average 5G connection speed will reach 575 Mbps by 2023.

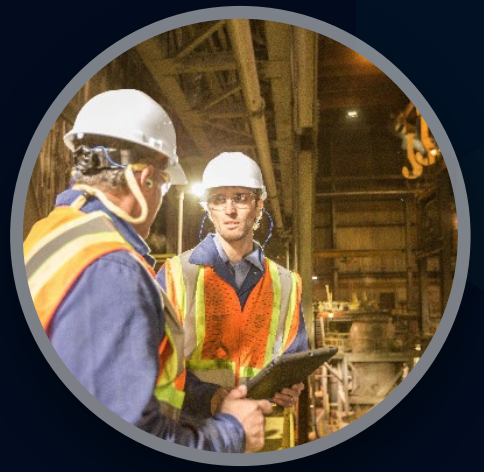
Sources:
Azure Private MEC solution blog
ABI research
Cisco Annual Internet Report

Potential use cases to solve the business challenges

Preventative Maintenance

Forecasting and harvest predictions

OEE (Overall Equipment Efficiency)

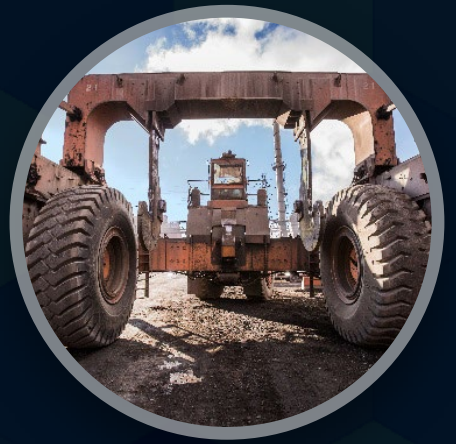


Personnel Safety

Real-time Quality Detection

Remote Monitoring

Condition-Based Maintenance



Asset Tracking & Management

NTT IoT Experience Examples*

Real Time Equipment Monitoring

Fleet Predictive Maintenance

Connected Car/ Telematics

Operator Behavior

Worksite Asset Management

Connected Factory/ Digital Twin

People Movement

Asset Tracking/Movement

Smart Cities Smart Campuses

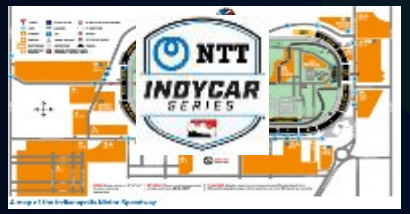
Smart Building/Smart Spaces

IoT Connectivity in 180+ Destinations

Connected Conservation

Digitizing Tour de France

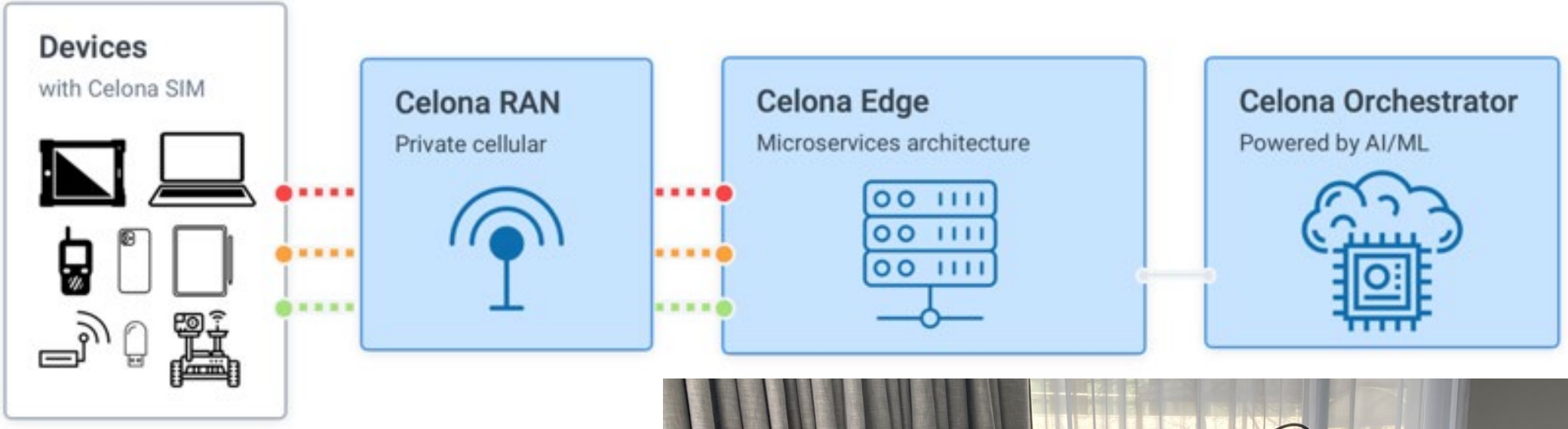
Digitizing Indy Car



AR/VR

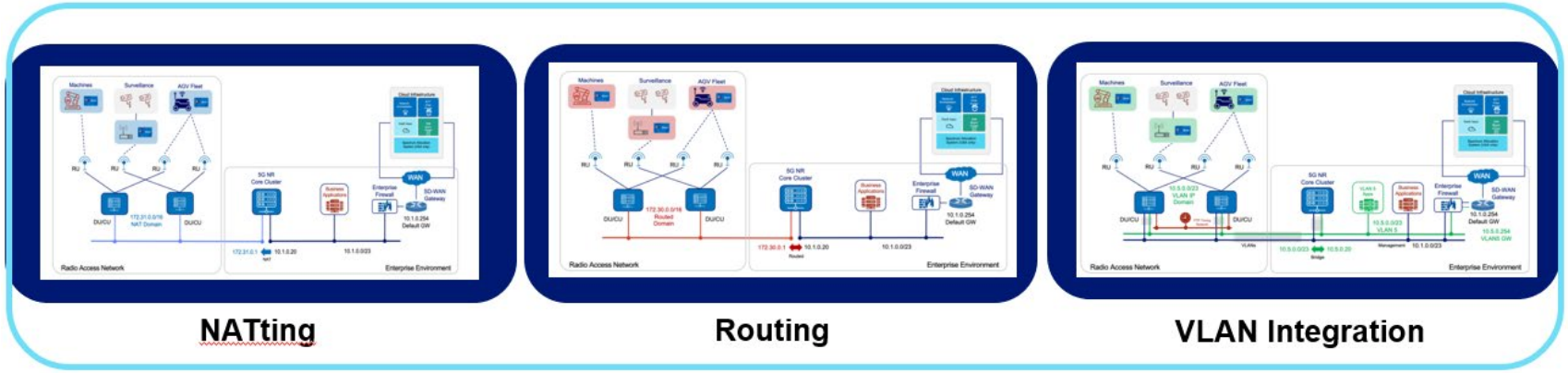
*not exhaustive

The Private 5G concept

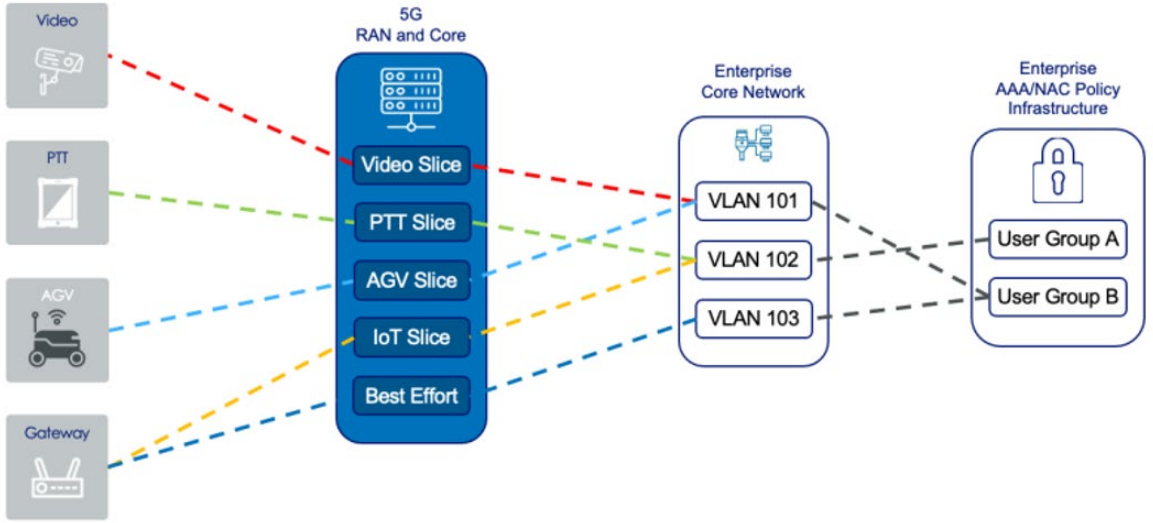


Our P5G Differentiators

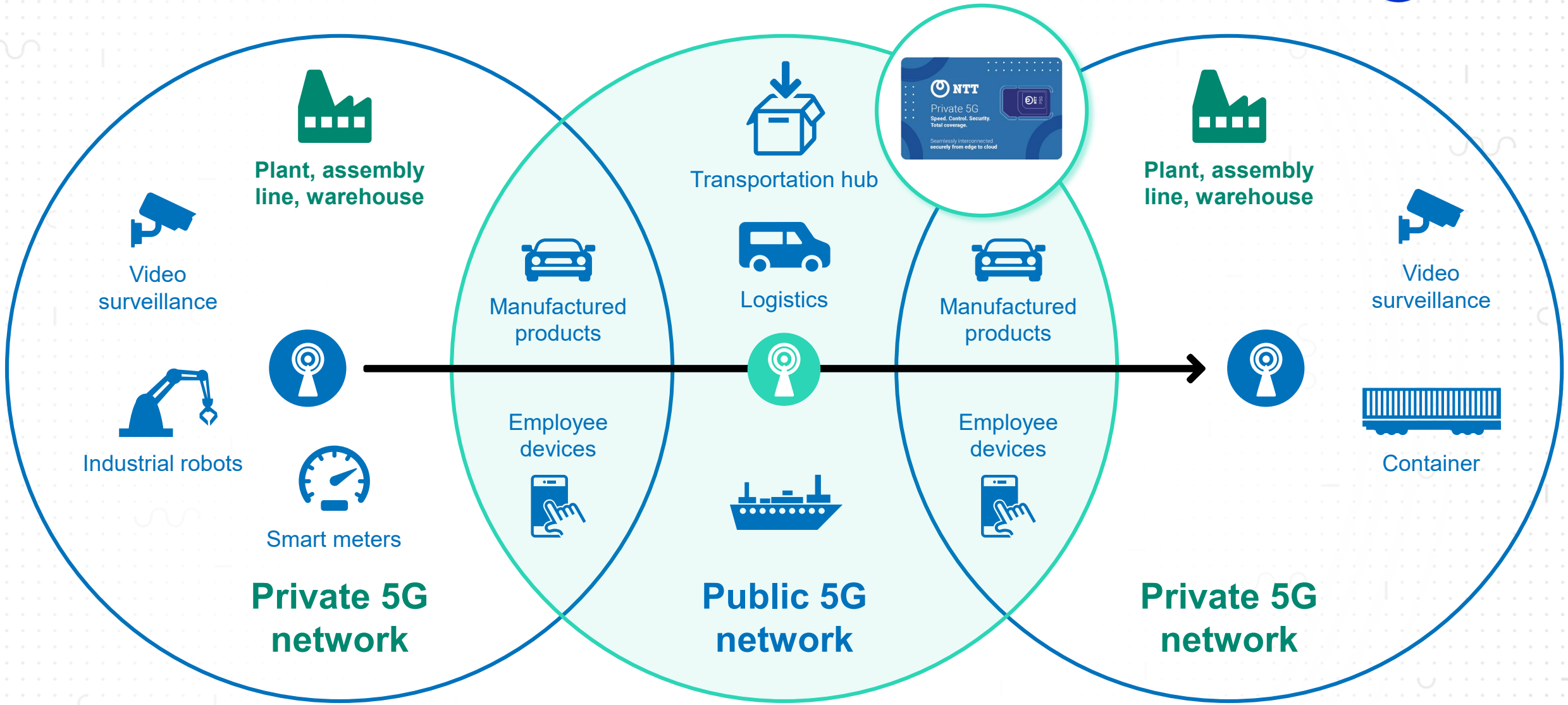
- **Networking integration possibilities**



- **VLAN & QoS mappings**



Our complete enterprise 5G solution



Quality of service, network slicing, virtualized network and application infrastructure

Our Private 5G platform architecture

We provide the first commercially available, private LTE/5G network-as-a-service full stack solution delivered on-premises, at the edge, or as a cloud service, with flexible deployment options.

Private 5G/LTE network and edge devices
Cloud native | CIO centric | micro slicing | behind the firewall

Open and licensed spectrum
Licensed spectrum | 20+ countries | CBRS in US

NTT Global Operations Centers
24x7x365 remote monitoring | CIO self-service portal

Managed Network Services
Fully managed offer | Network as a Service | Device as a Service

Global connectivity
NTT eSIM / SIM | 190+ country coverage | public private roaming

Secure by design
Global SOC | SASE services | ZTNA capability

Application Dev & Systems Integration
40+ countries | full portfolio of services | vertical knowledge

Private 5G

An **end-to-end private 5G** solution for speed, control, security and coverage

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Businesses are shifting their focus to Operational Technologies (OT) from IT

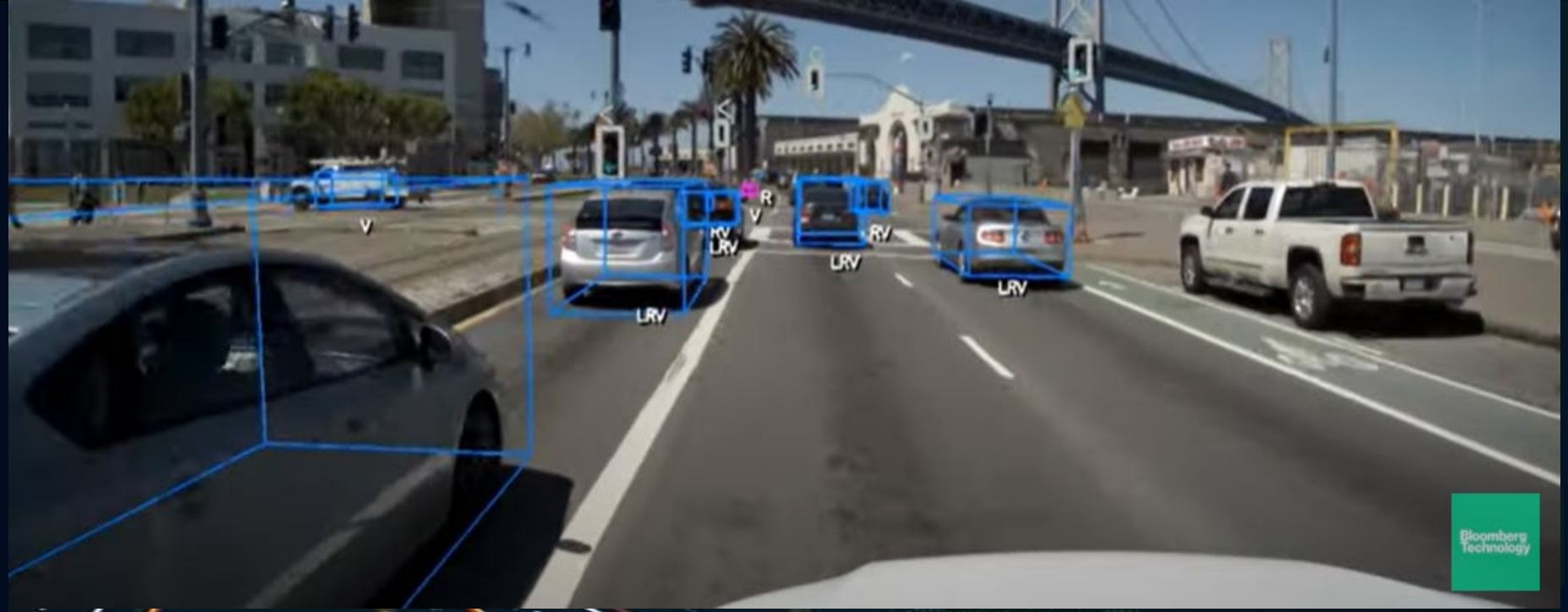
Challenges for today's businesses

Reliable Connections and Low Latency requirements hampers near real-time automation

Large data **Bandwidth** use cases are expensive to store on the cloud

High availability is dependent on **third party end-user solutions**

Security and privacy can be compromised by data leaving organisation's perimeter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Technology

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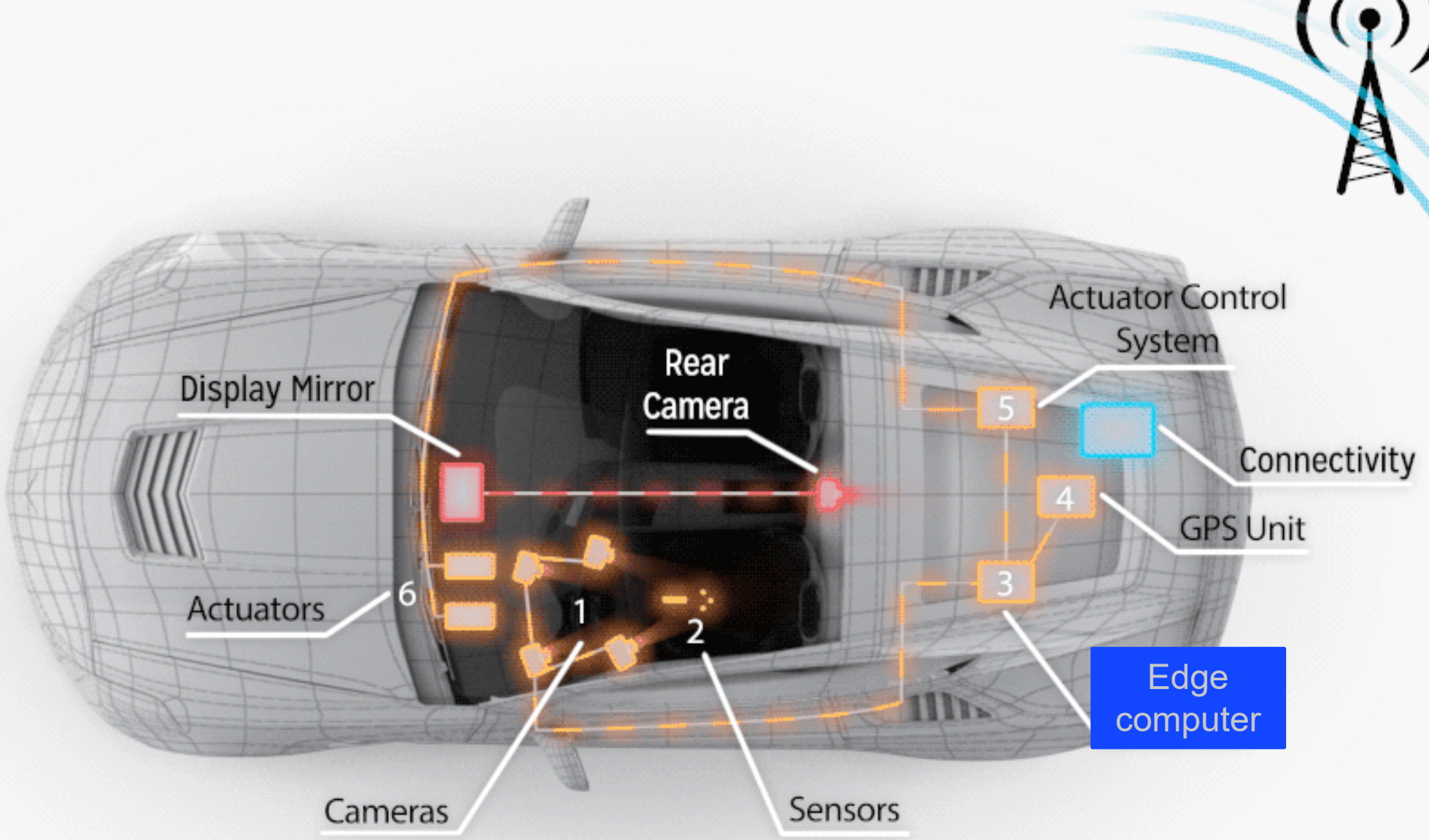
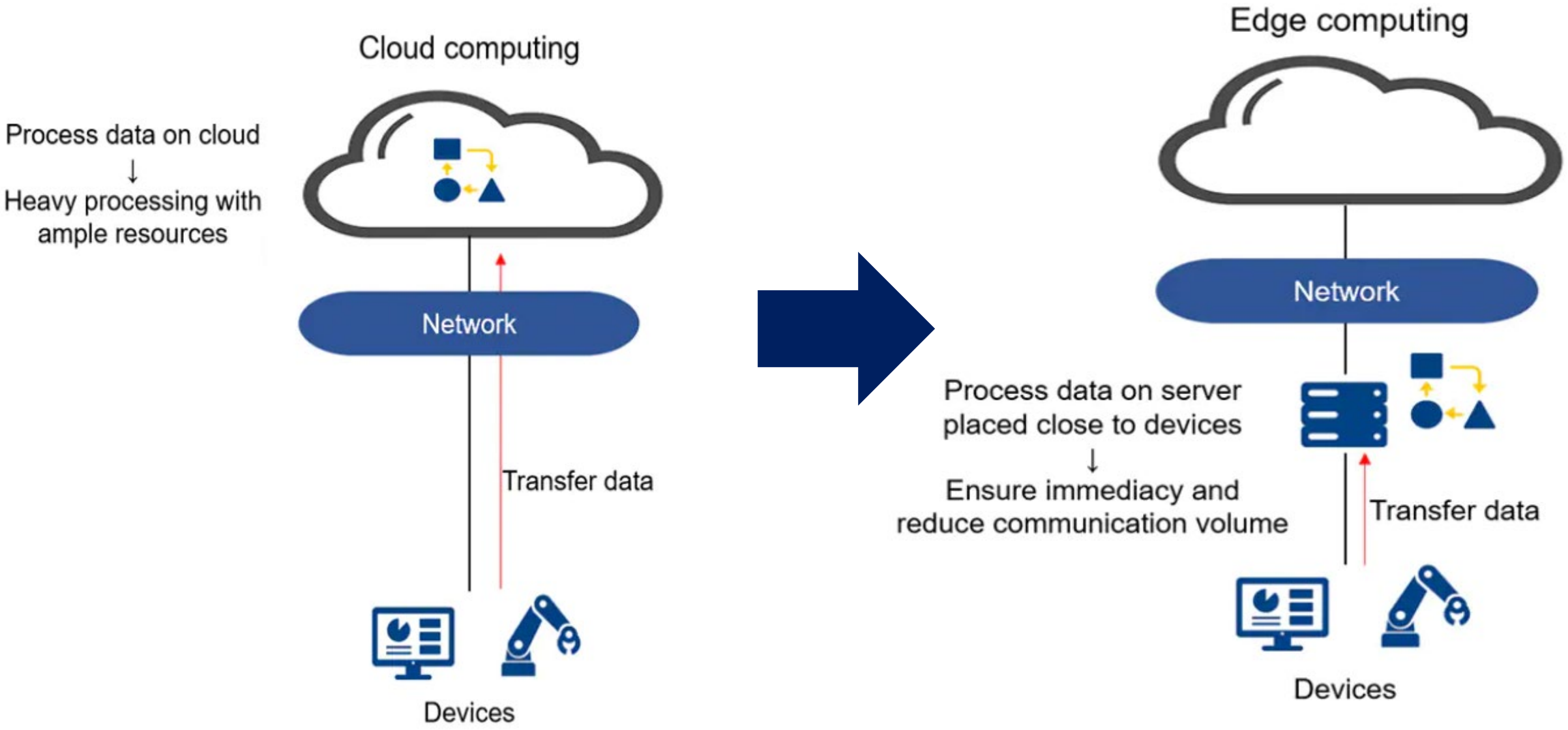

Display Mirror
Rear Camera
Actuator Control System
Connectivity
GPS Unit
Actuators
6
1
2
5
4
3
Edge computer
Cameras
Sensors

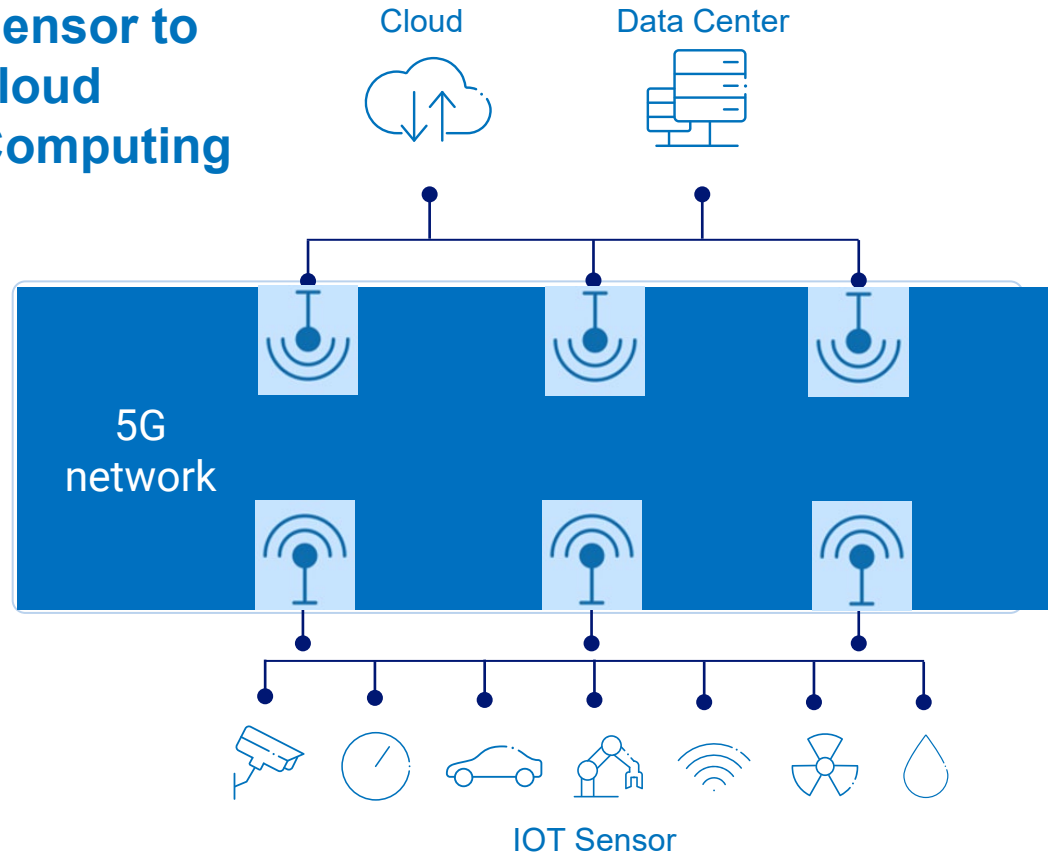
Model shift in IoT:



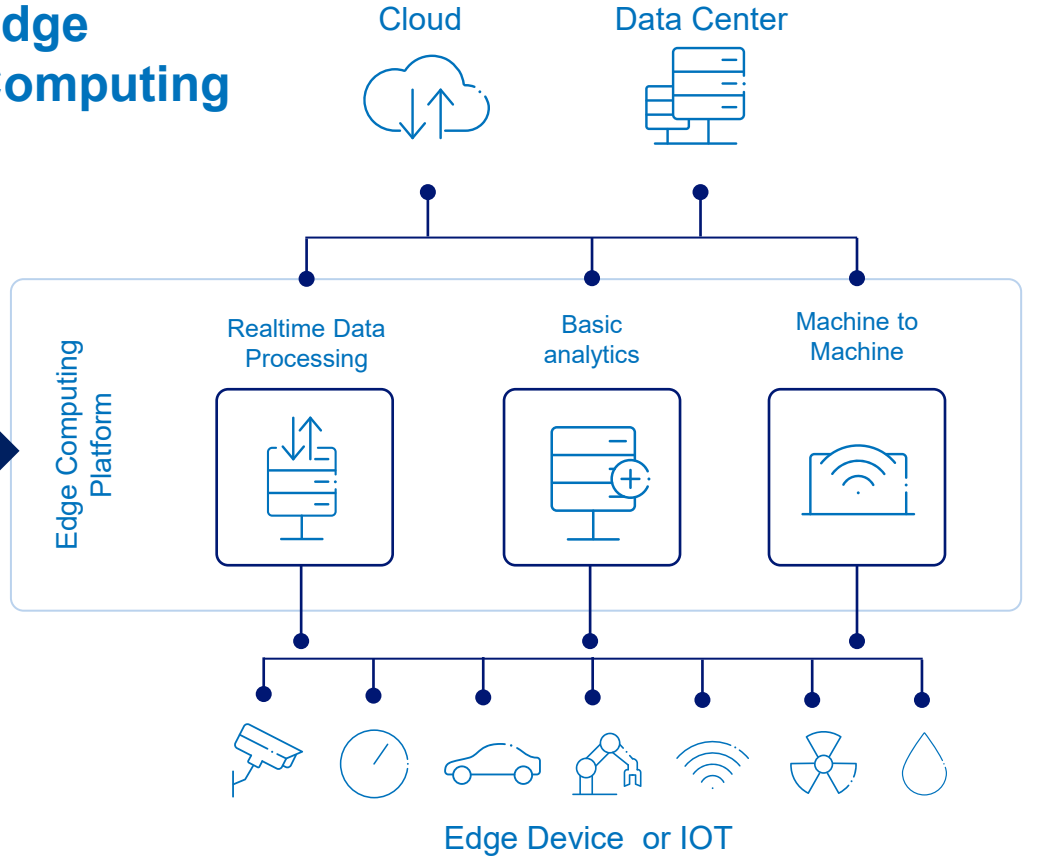
The “iNTTerconnected” world

Data processed and decisions are made on-premise locally to drive security, efficiency and performance gains

Sensor to cloud Computing



Edge Computing



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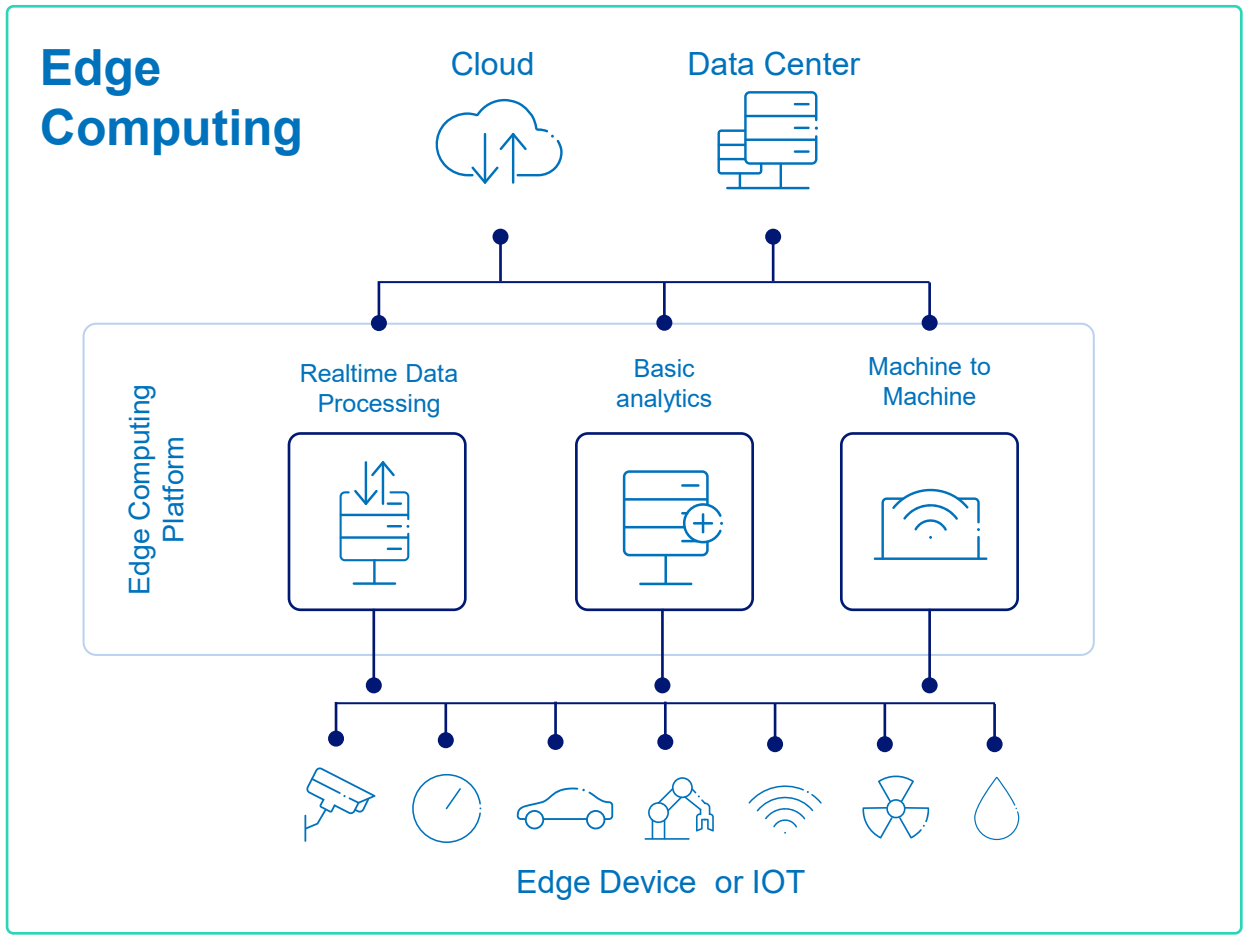
What is “Edge”

Data processed and decisions are made on-premise locally to drive security, efficiency and performance gains



By year-end 2023, 50% of large enterprises will have a documented edge computing strategy, compared to less than 5% in 2020.

Source: Gartner Leading the Edge: Gartner’s Initial Edge Hardware Infrastructure Forecast, June 2020

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Edge isn't new!

Intelligent Things

Smartphone/watch

How to managed communications?

How to manage remote applications?

How to manage remote devices?

WiFi – (P) 5G convertor

Intelligent Gateways

Remote servers

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NTT – Edge aaS Offering Portfolio

NTT

aws Azure

NTT Multicloud

HCI Edge Compute

1 Edge Compute (EaaS)

On-Prem or near Prem

NTT P5G

2 Edge connectivity (P5G NaaS)

P5G for security, low latency and high bandwidth

Factories Robotics Workplaces IoT / IIoT Fleet Industrial Vision Care

3 Connected Devices (IoT)

IOT Sensors + Actuators + Applications

Edge on water:

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Why NTT for Edge aaS

We bring differentiated capabilities to win in edge to cloud offering with SLA(s)….

Completeness : NTT is able to **land any client application into any location** – public cloud, private cloud, on-prem

Simplicity : NTT can **connect any edge location to any cloud location** using our intelligent and secure network fabric

Efficiency and Innovation : We can provide better **flexibility and fungibility in edge computing and analytics** given we deliver as-a-service

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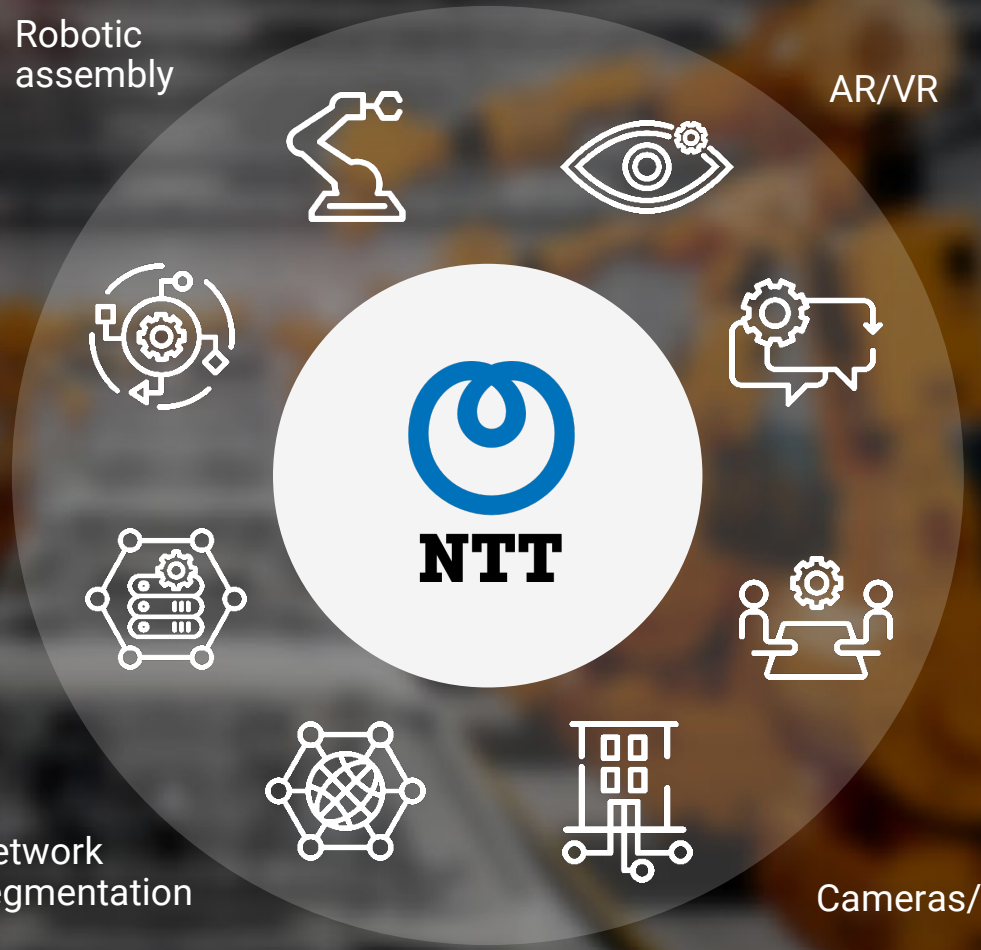
A turnkey Edge as a Service for:

manufacturing

automotive

healthcare

...



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Data Center BeLux Forum

Questions and answers?

NTT

Thank You!