5G: Bridging the Gap between Telecom and Vertical Industries

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IEEE 5G
SUMMIT

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OUTLINE

I.   5G OVERVIEW

- Challenges and Use Cases
- Key Technologies

II. INNOVATION AT ALTRAN

- R&D "Triangle"
- Advanced Networks
- R&D Solutions

III. 5G: A WIDER ECOSYSTEM

- Per-Industry Use Cases
- Cross-Industry collaboration

I – 5G OVERVIEW

5G: THE NEXT GENERATION, OR A TOTALLY NEW DIMENSION?

- Diversity of service requirements

Entertainment	E/M-Health	Industry 4.0	Transportation	Energy

- Disruptive business models

Anything as a Service	IoT	Network Slicing

- Wide array of connected devices

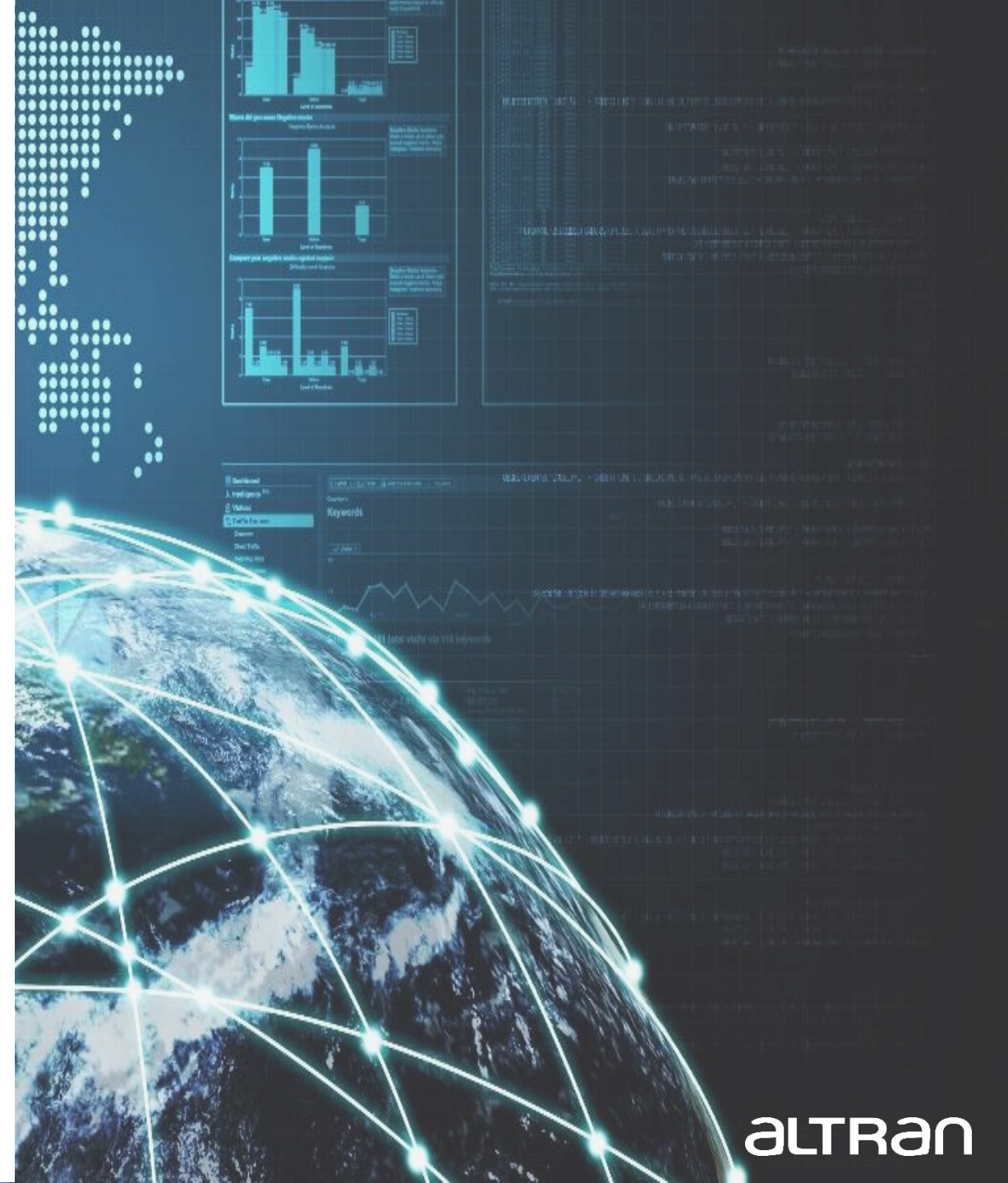|				
Smartphones	Drones	Vehicles	Robots	Sensors

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CHALLENGES TO BE ADDRESSED ON THE PATH TO 5G

Work Processes & Culture

- Transition to Cloud-native operation (networking + IT)
- Adoption of DevOps Agile methodologies
- Shift in Operator – Industry relation

The Business Model Chaos

- Unclear player positioning
- Decentralized value chains
- Cloud & virtualization lead to new XaaS models
- IoT & privately owned (non-telco) infrastructures

Shift to SDN & NFV

- NFV comprehension and performance
- Coordination and orchestration in brownfield
- Multi-vendor integration

References:
SDXCentral's "NFV and SDN Roundtable Insights" | Small Cell Forum Document 166.08.01 "5G, virtualization and DevOps"
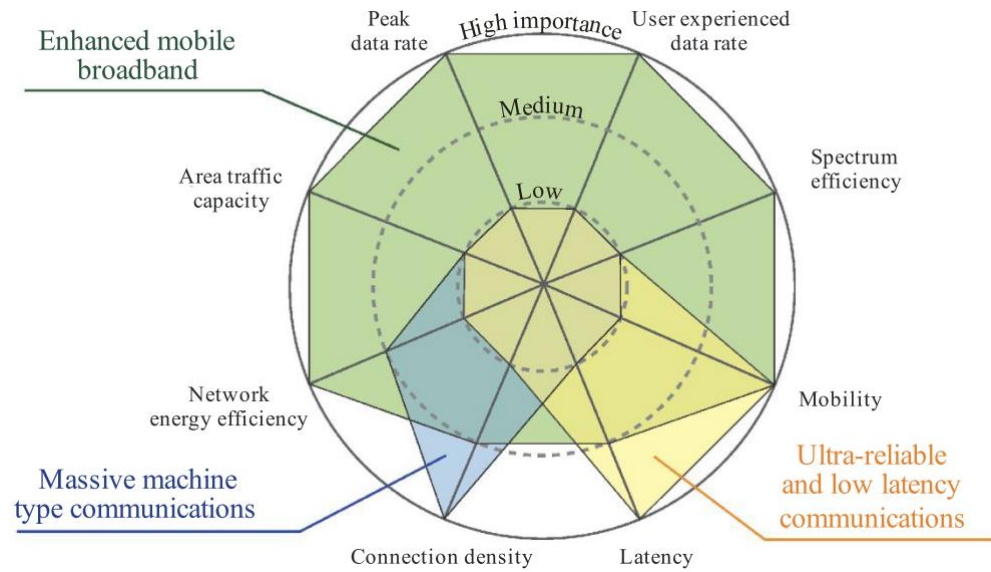
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5G USE CASE CLASSES

25 Gbps   < 10 ms

10-year battery   99.9 % available   100 dv,/m²

Enhanced mobile broadband

Peak data rate   High importance   User experienced data rate

Medium

Area traffic capacity   Low   Spectrum efficiency

Network energy efficiency   Mobility

Massive machine type communications   Ultra-reliable and low latency communications

Connection density   Latency

IMT2020 service type – requirements mapping

200km/h   < 10 ms

KEY NETWORK TECHNOLOGIES UNLOCKING 5G SERVICES

Access Network

NR, mmW, licensed / unlicensed
LPWAN, LTE, WLAN

Cloud-RAN + X-Haul fibre (lots of)

MU-MIMO, Filtered OFDM, SCMA

Transport + Cloud

SDN, NFV, MEC

Network Slicing

SON

Computing

Analytics (Machine Deep Learning, Big Data)

Orchestration

Security

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II – INNOVATION AT ALTRAN

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R&D "TRIANGLE"

European Projects

- Definition, integration & demonstration of vertical 5G-aligned use cases

National Projects

- E2E Service orchestration (NFV, MANO)
- MEC-based video transport enhancement

Academia

- Advanced video support
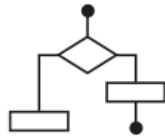- SDN/ NFV, Cloud

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ADVANCED NETWORKS

- Focus on new ways of providing **enhanced control** over the network.

- Aiming to deliver **better quality of experience** along more richness of content.

Infrastructure & transport optimization

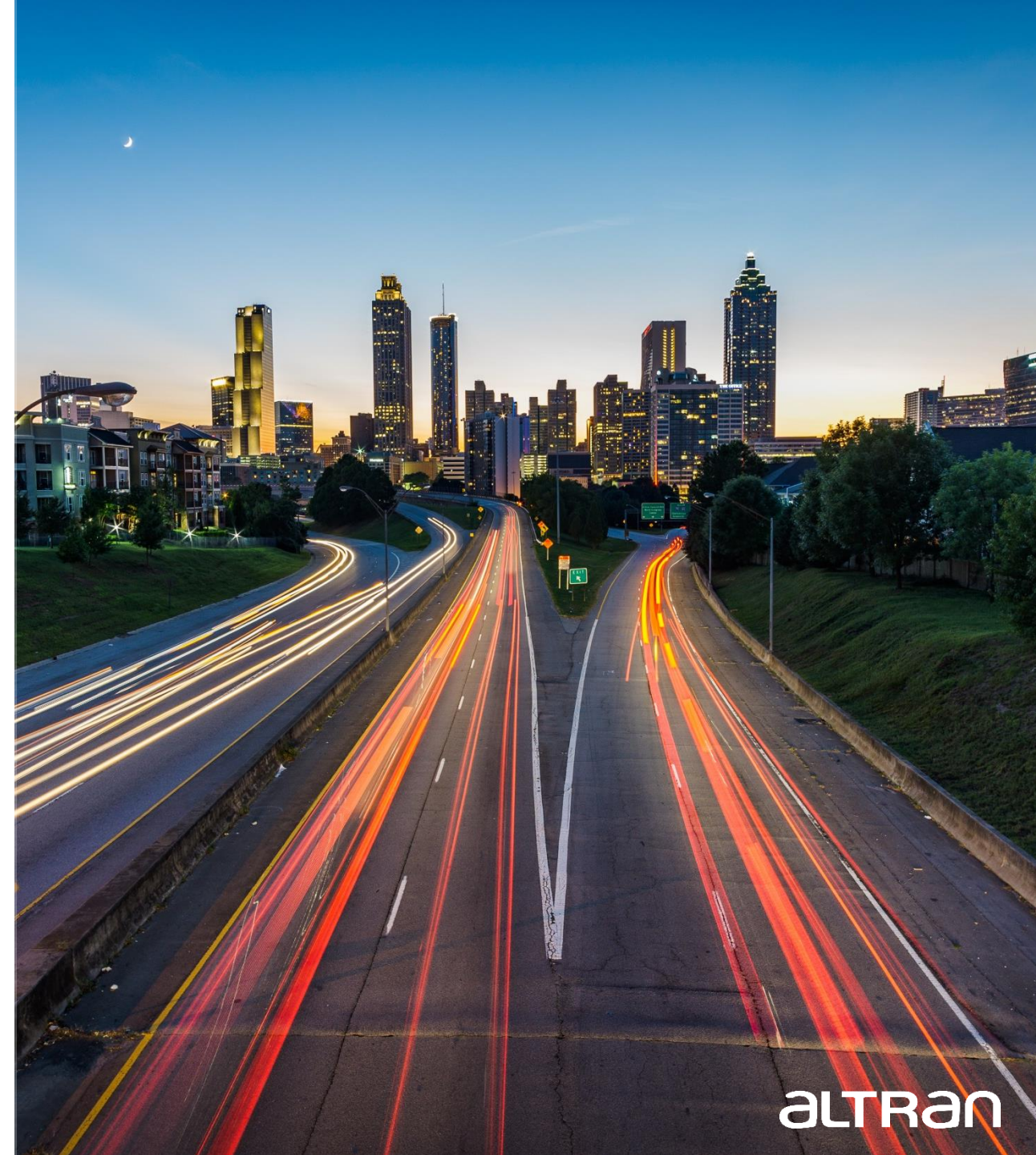SDN – NFV - MEC

Management & Orchestration

MANO

Network adaptability

SON

Altran ranked as leading worldwide service provider on Telecom and overall Engineering R&D services

Zinnov, December 2016
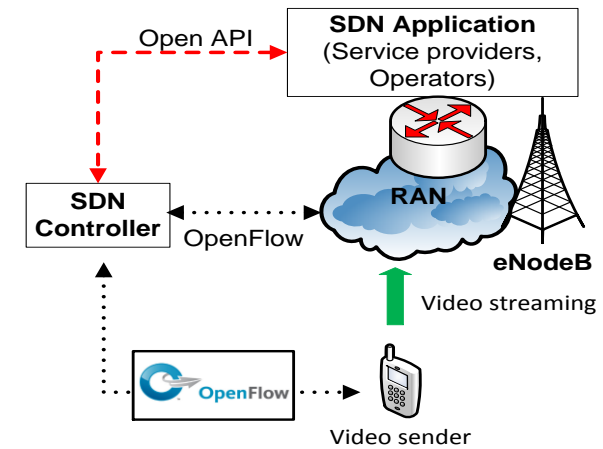
zinnov™
ZONES
PRODUCT ENGINEERING SERVICES

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CASE 1 - VDSNET

ENHANCED CONTROL OVER MOBILE UPLINK VIDEO

- Address the (now mainstream) live streaming services
- Leverage SDN to improve control over video uplink transmissions from mobile devices

Partners: universidade de aveiro | instituto de telecomunicações

CASE 2 - **PLUTO**

DEVELOPMENT OF MOBILE AUTOMATION ROBOT

- Human-Machine Interface User Acceptance Testing (HMI-UAT) over touch interfaces with computer vision validation.
- Enable remote human-emulating robotics control
- Potential applications
  - massive IoT (e.g. parallel testing)
  - mission-critical IoT (e.g. precise robotics control)

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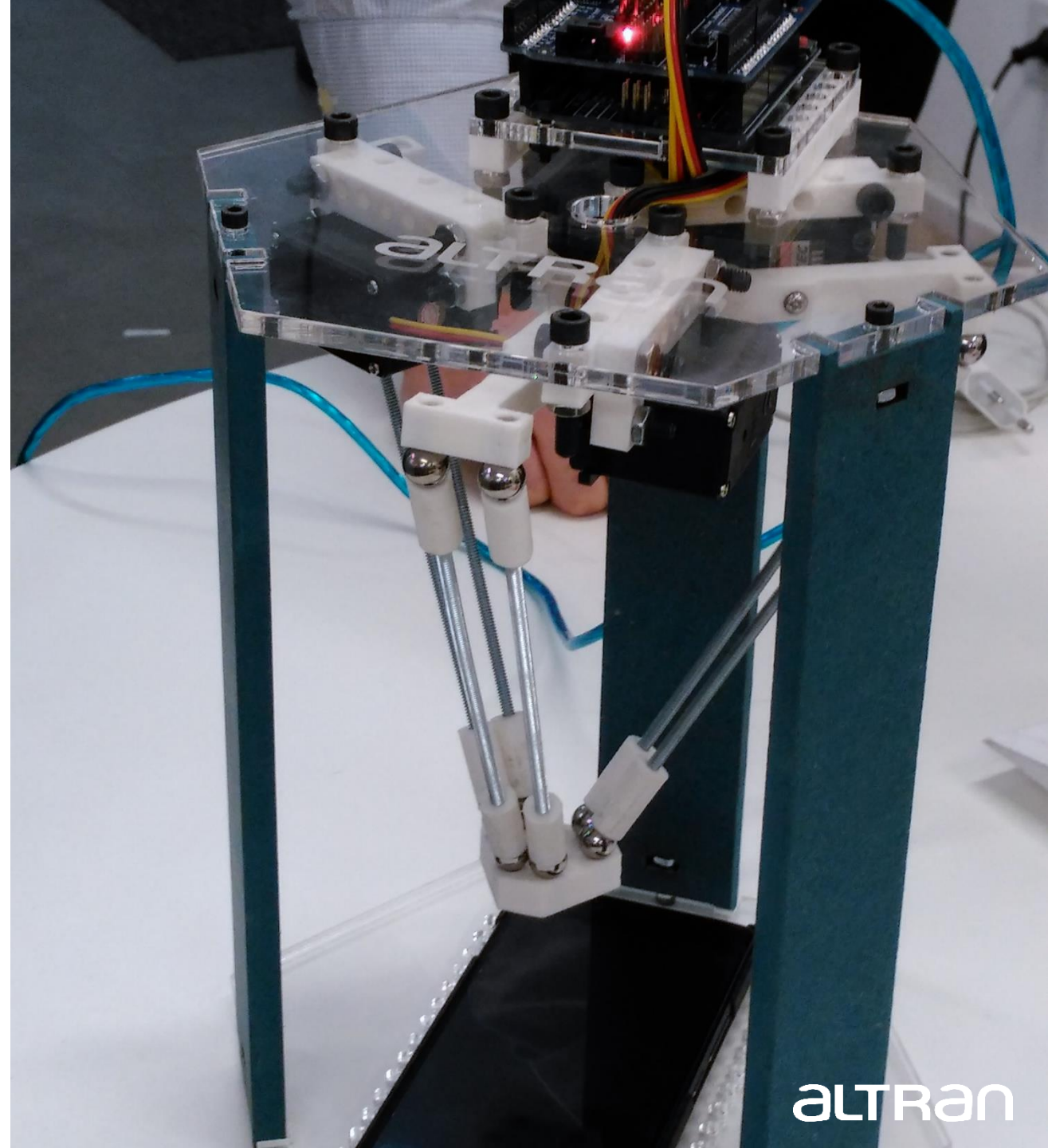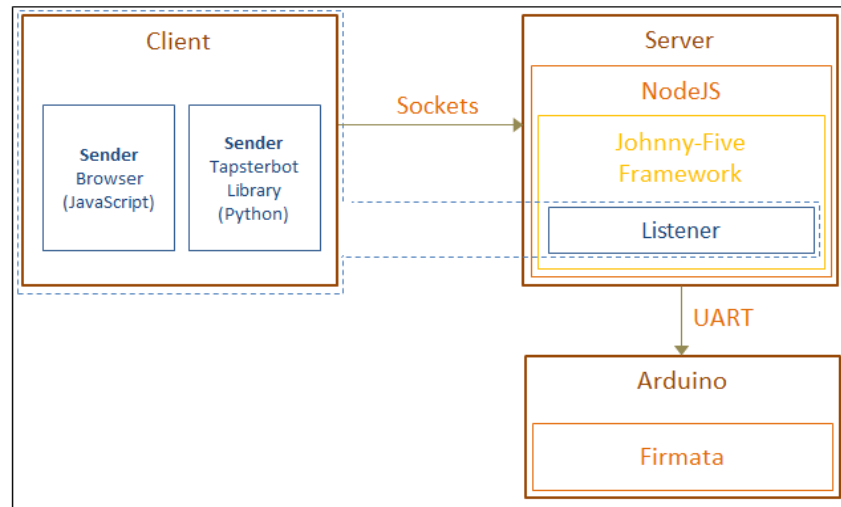
INDUSTRIAL ANALYTICS

- **Machine driven big-data** (e.g. complex analytics), transversal to all markets, will play a key role in the upcoming years

- Focus on **new algorithms** for industrial predictive maintenance, operational intelligence, etc.

Descriptive	Diagnostic	Predictive	Prescriptive
What?	**Why?**	**Most likely**	**Optimization**
What's happening?	Why is it happening?	What will happen next?	How to improve?

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VueForge™ – CREATING VALUE FROM MACHINE-DRIVEN BIG DATA

① HARVESTING THE DATA

② TRANSPORTING THE DATA

CLOUD

③ EXTRACTING THE INFORMATION

④ TRANSFORMING INFORMATION INTO DESIRABLE SERVICES

⑤ TURNING SERVICES INTO BUSINESS

VueForge™
Creating Value from
Machine-driven Big Data
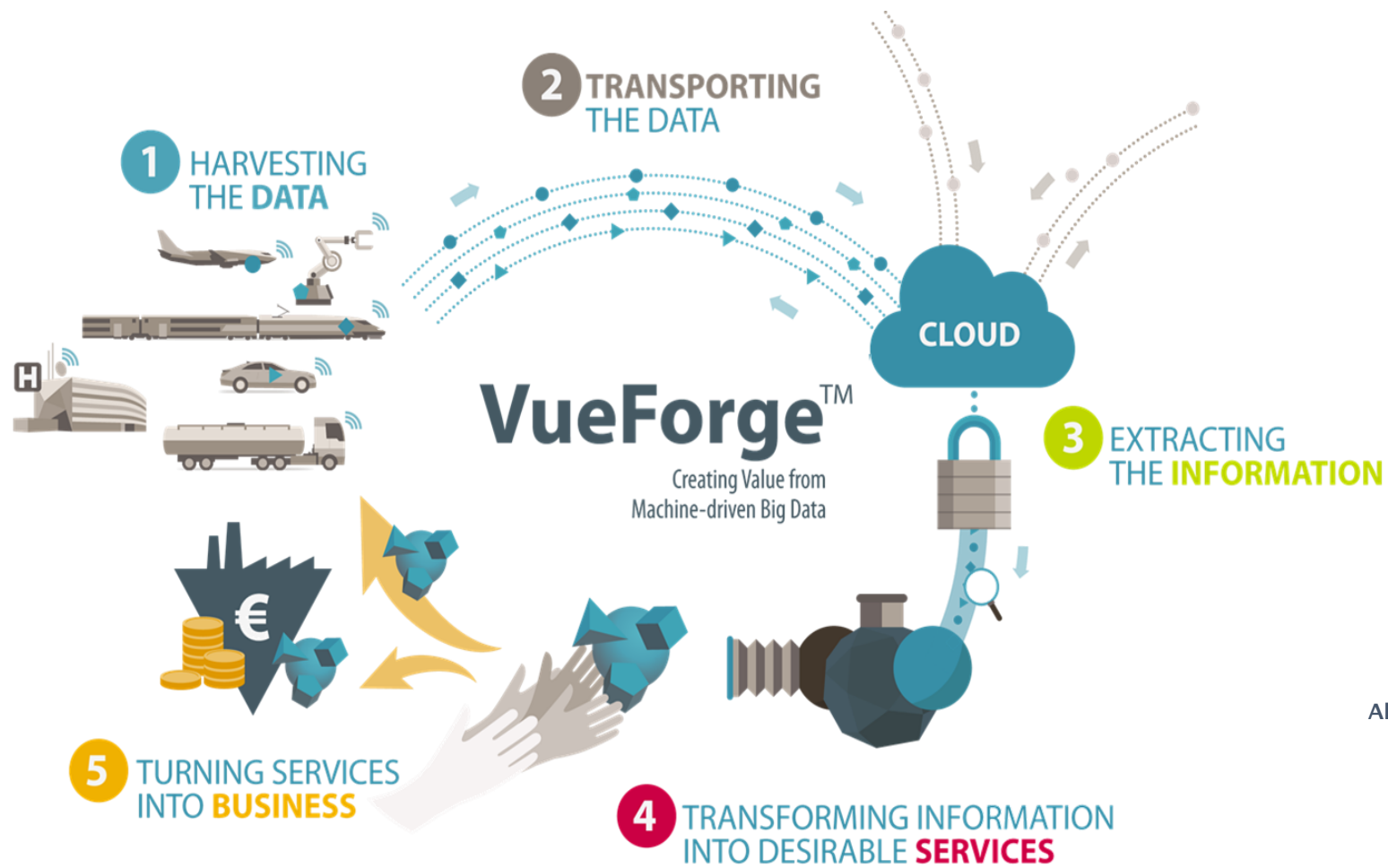
Altran ranked as leading worldwide service provider on IoT technology services

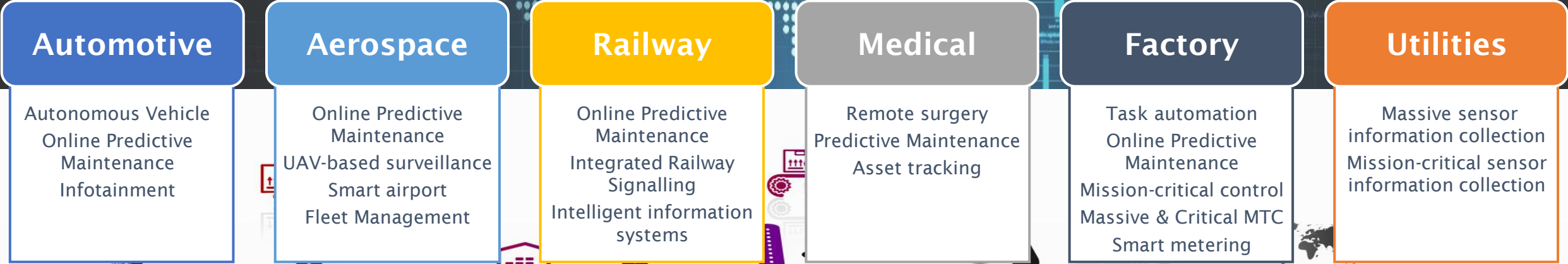Zinnov, August 2016

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III – 5G: A WIDER ECOSYSTEM

PER-INDUSTRY 5G USE CASES

Automotive
Autonomous Vehicle

Online Predictive Maintenance

Infotainment

Aerospace
Online Predictive Maintenance

UAV-based surveillance

Smart airport

Fleet Management

Railway
Online Predictive Maintenance

Integrated Railway Signalling

Intelligent information systems

Medical
Remote surgery

Predictive Maintenance

Asset tracking

Factory
Task automation

Online Predictive Maintenance

Mission-critical control

Massive & Critical MTC

Smart metering

Utilities
Massive sensor information collection

Mission-critical sensor information collection

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5G AND CROSS-INDUSTRY COLLABORATION

- Combine **"Telecom" + "Industry-specific"** know-how

- Adaptation to **new** diverse & complex **business models**

- Cooperation through the **complete technological Life Cycle**, from Use Case definition to system validation

- **New layers/ APIs** translating Vertical connectivity requirements into Network Service configuration

Network Operator Service

ABSTRACTION LAYER

Multi-tenancy through Network Slicing

Vertical business & Network

Vertical End-to-End Service

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INNOVATION MAKERS

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