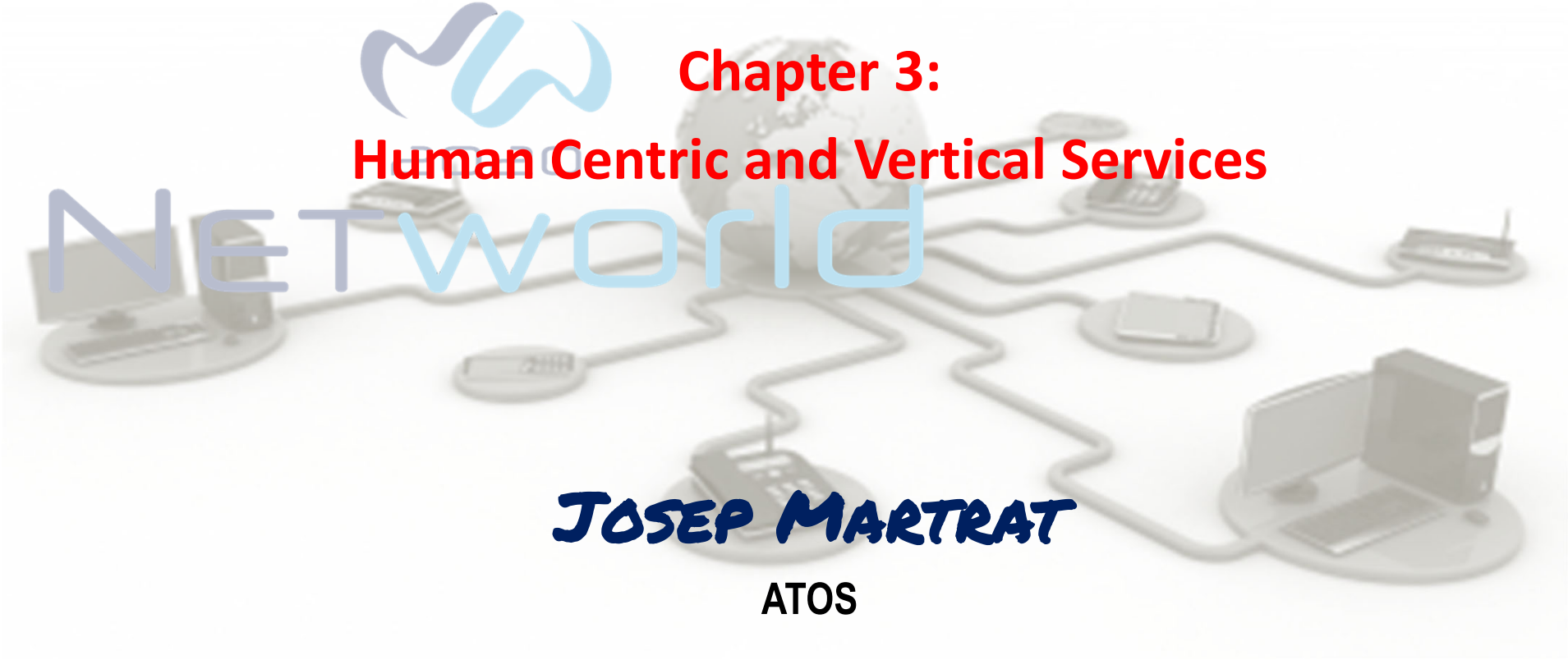
Networld2020 SRIA webinar



Chapter 3:
Human Centric and Vertical Services

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ATOS

Based on Networld2020 SRIAv3.0

Outline Chapter 3:
Human Centric and Vertical Services

- Emerging applications and use cases
- Digital Service Transformation
- From Software-Centric to Human-Centric Internet Services
- Extreme Automation and Real-Time Zero-Touch Service Orchestration

Chapter 3: Human Centric and Vertical Services

- ***Digitalisation with EU values***
  - Digital transformation of businesses and Internet evolution must incorporate the EU values that represent our Society and respect the rights of EU citizens

- Any technical solution must attain the necessary levels
  - trustworthiness,
  - resilience,
  - openness,
  - transparency
  - dependability

  while inclusive and respectful with diversity and assuring societal privacy
- These concepts and values must be translated to technical requirements of future networks and services

Chapter 3: Human Centric and Vertical Services

	2018		2025
Connected devices*	23 billion	x3	75 billion
Created Data**	33 Zetabytes	x5	175 Zetabytes
Enterprise Data created & processed outside DCs & Cloud***	~10%	x8	>80%

"Digital transformation is not about the evolution of devices, it is about the integration of intelligent data into everything that we do " (IDC)

"Radical results require radical transformation" * (ATOS)

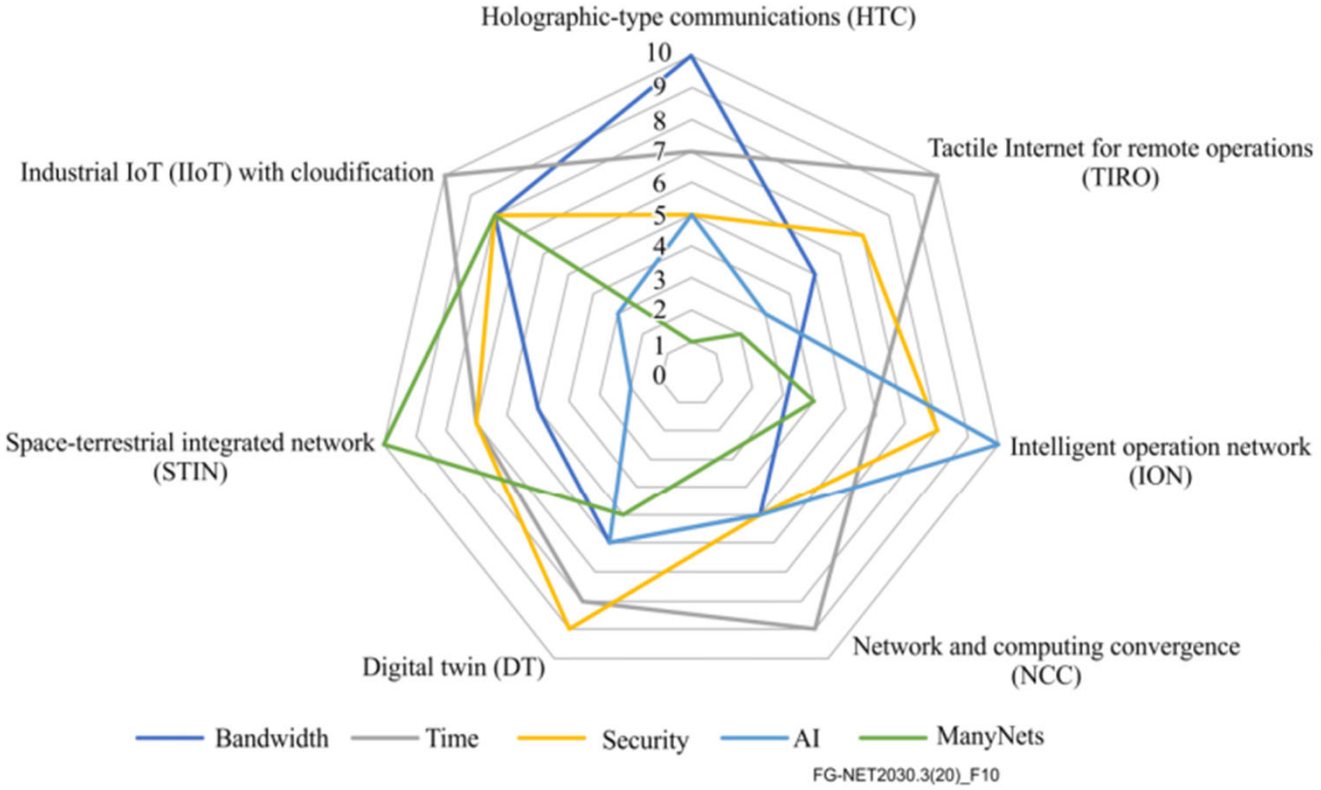
Chapter 3: Emerging applications and use cases

In the **short/medium term** *[and for illustration purposes]*

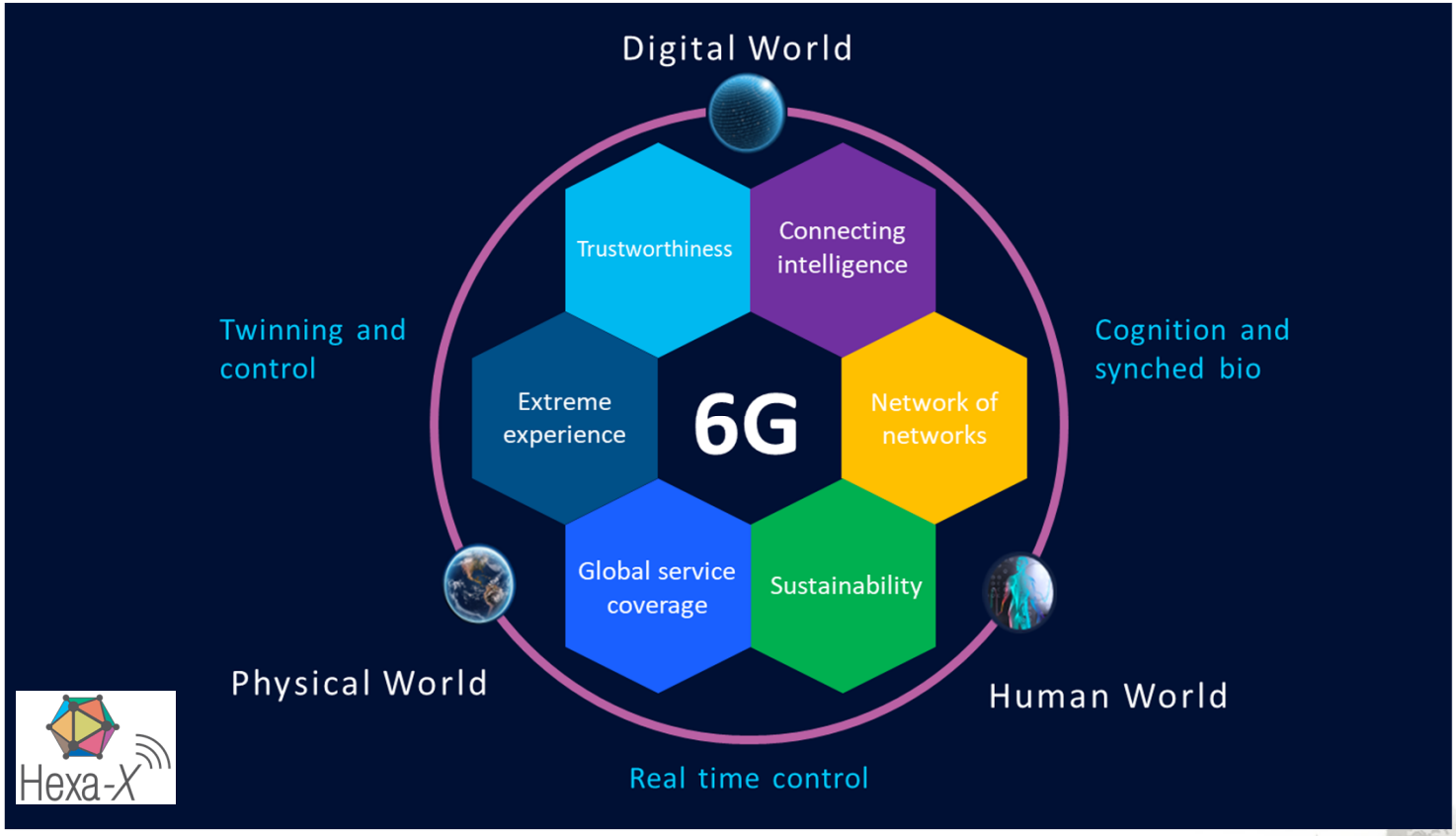
- **Robotic automation**: advances in robotics and artificial intelligence are accelerating the adoption of interconnected and autonomous machines in numerous sectors (farming, manufacturing, health etc)
- **Massive monitoring and remote management**: fine-grained, continuous monitoring of processes, such as Industrial IoT (IIoT), CyberPhysical Systems (CPS) and remote Media-aided Systems, etc is becoming the basis for productivity cost optimization, predictive maintenance, and higher efficiency in smart grids, healthcare monitoring, etc
- **Digital twin (DT):** The massive, continuous monitoring opens the door to create virtual models capturing all the details of physical goods and processes, enabling real-time digital representations, multimedia mixed-reality cases that allow data-centric management and enrich interactivity
- **Extreme pervasiveness of the smart mobile devices in Cities** together with the ubiquitous coverage of the mobile telecommunication systems may be employed to monitor large metropolitan areas.
- **Autonomous and Hyper-connected On-demand Urban Transportation** Millions of people move every day in cities, traffic congestion, security management, connected vehicle (critical V2X) scenarios, etc

Chapter 3: Emerging applications and use cases

In the **longer term;** Holographic media applications, Tactile Internet for remote operations, Multi-Sense Networks, Network and computing convergence, Critical Infrastructure support applications, etc [*ref: ITU-T Network 2030 – 7 UCs*]



Chapter 3: Emerging applications and use cases



Source: HEXA-X project: vision

Chp3 - Abstract dimensions with relevant network requirements

Abstracted dimensions	Relevant network requirements
Bandwidth	Bandwidth; capacity; QoE; QoS; flexibility; and adaptable transport
Time	Latency; synchronisation; jitter; accuracy; scheduling; coordination; and geolocation accuracy
Security	Security; privacy; reliability; trustworthiness; resilience; traceability; and lawful intercept
AI	Computation at edge; storage; modelling; collection and analytics for network programmability and management
ManyNets	Addressing; mobility; network interface; multiple RATs and heterogeneous network and computing convergence.

And we need to add others such as decarbonisation, levels of energy consumption, achieved network cognitive level, etc

Chapter 3: Human Centric and Vertical Services

- **Digital Service Transformation**

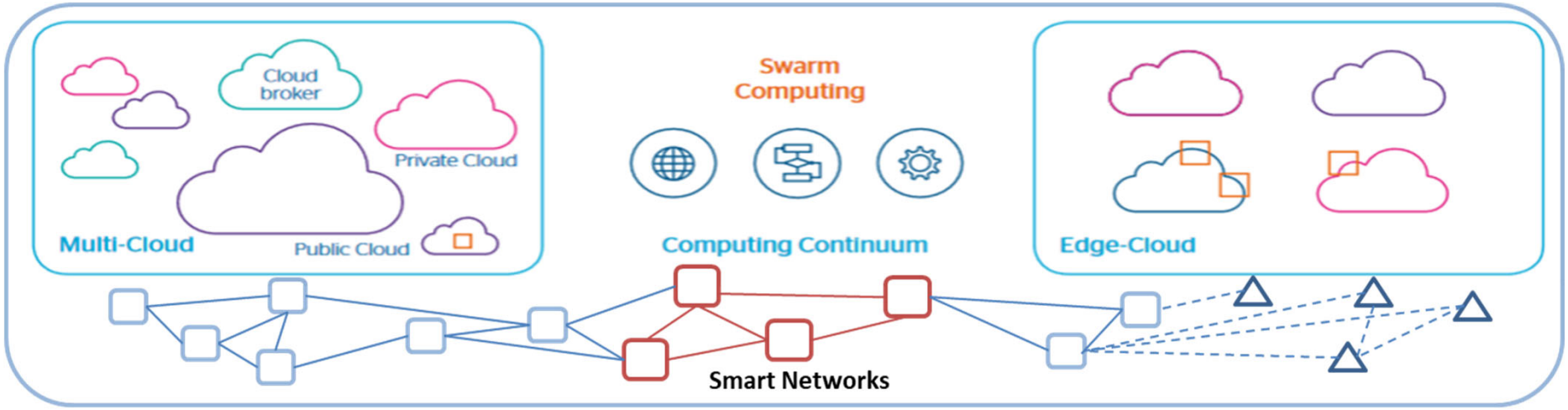
The envisaged trend is the convergence of digital foundations (such as *future networks, evolution of edge/cloud computing, any connected object and use of data and new ones like quantum comp*) and their complete fusion in an ***ICT continuum*** platform.

- Public clouds have become mainstream today and cloud computing evolves towards hybrid models, combining private clouds and being extended towards the edge clouds with lighter virtualization techniques.
- Network softwarisation also reinforces this convergence of networks and IT systems (virtualization reached not only at core & edge network but also at optical elements and radio access functions)
- Number of connected devices, tablets, wearables and IoT elements is growing 'N' billions by 2025
- Data Era, generation, processing, federation and consumption of data

This compute capability in the cloud&edge becomes increasingly connected though flexible networks, leads to the emergence of an *ICT continuum* that needs to be managed to offer a unique "service" capability.

This impacts on all economic sectors, specially on Communication Service Providers (CSPs), over-the-top (OTT) players, hyperscalers, etc and also vertical stakeholders to build and offer B2B2X (Business-to-Business-to-X)

Computing Continuum; network, multi-cloud, edge and swarm



Swarm computing refers to **massively distributed**, **self-organizing systems** of agents that **work collaboratively towards** a **defined outcome**.
This swarm (intelligent) computing combines *network and cloud* capabilities to create on-demand, autonomic and decentralized computing (edge/cloud), thus taking the functionality and flexibility delivered by connected devices, CBS and IoT ecosystems to a new level.

Chapter 3: Human Centric and Vertical Services

From Software-Centric to Human-Centric Internet Services

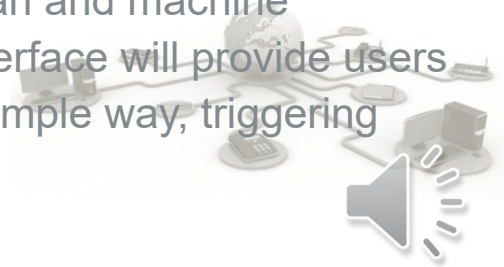
Human Centric innovation supports customers and communities in creating a prosperous and sustainable future where people are always connected. Human centric means empowering individuals and facilitate its interactions in digital services → **digital inclusion**

These concepts must be translated to technical requirements of future networks, a task increasingly hard because of the increasing trend of cyber-physical social systems, an area where we consider the impact of individual human beings that are an integral part of the systems – both as a user as well as a source of disruption.

For instance,

- My Connected Private Data Cloud as a personal cloud and follow me with services in network, with the ultimate vision of the (twin) human-being as an integral part of the system.
- Future network services will be human-interfaced in the sense that people will interact with them as they currently do with other humans.

This user centricity will be felt as well on the interfaces between human and machine (perceived as the interface to the intelligent network system). This interface will provide users (service designers) the ability to create new services (features) in a simple way, triggering changes on the whole network substrate.



Chapter 3: Human Centric and Vertical Services

Extreme Automation and Real-Time Zero-Touch Service Orchestration

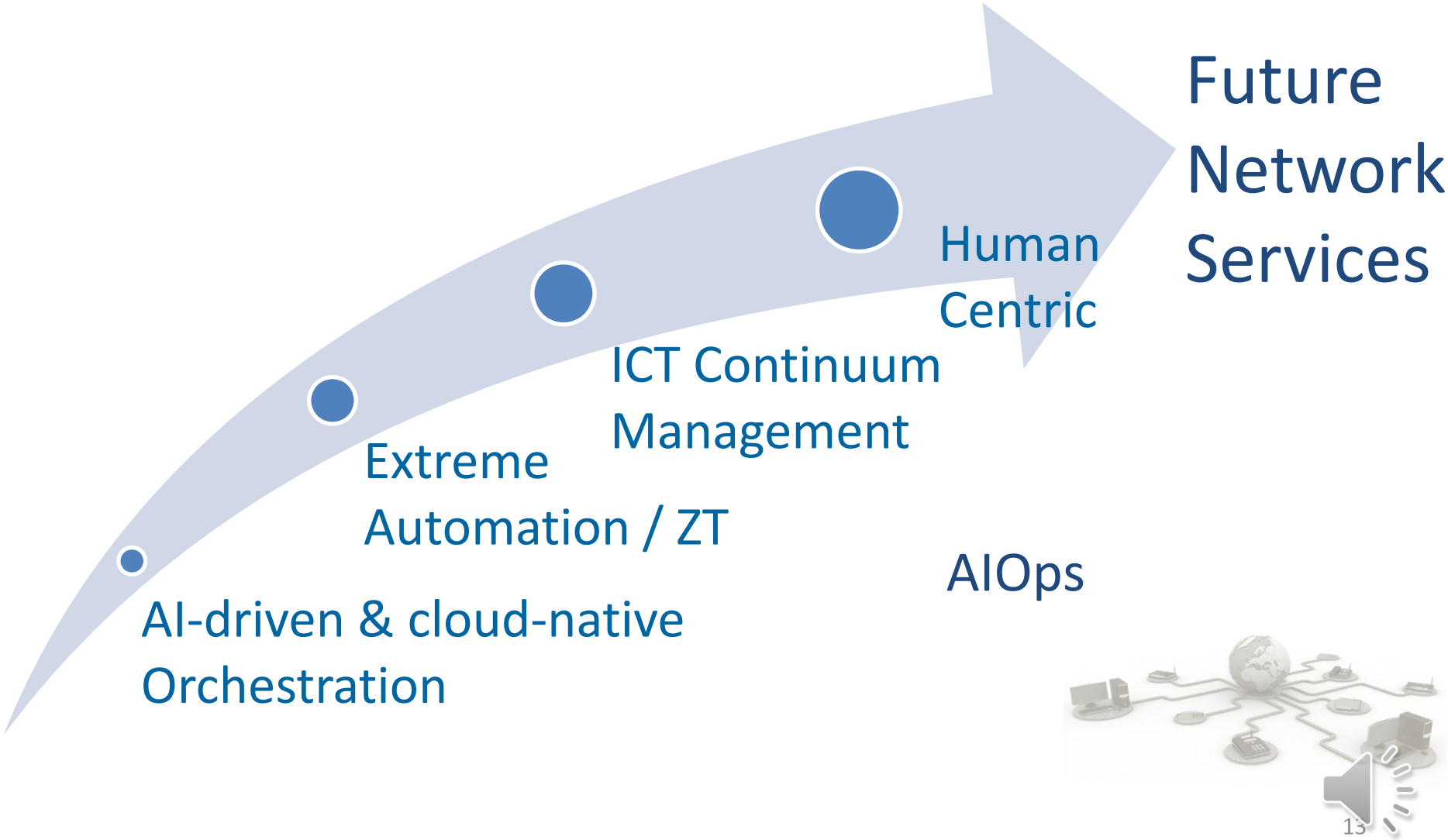
- ”hyper-connected world” where more challenging performance requirements, B5G/6G cases an always-on and ultra-fast connectivity
- complete digital transformation in industry and society in which the sustainability, trust and automation are presented as main pillars

Trend for maximisation of automation in all processes and interactions for QoE

AIOps trend that offers huge opportunities for CSPs deliver better services and reduce operation costs

- Enhanced policy management including huge data analytics
- Artificial Intelligent driven orchestration and network management
- Cloud-native management and serverless approach applied to Orchestration

Networks are expected to achieve auto-provisioning, self-redundancy, self-healing


Future
Network
Services
Human
Centric
ICT Continuum
Management
Extreme
Automation / ZT
AIOps
AI-driven & cloud-native
Orchestration

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THANK YOU!