

ITU KALEIDOSCOPE

ONLINE **2021**

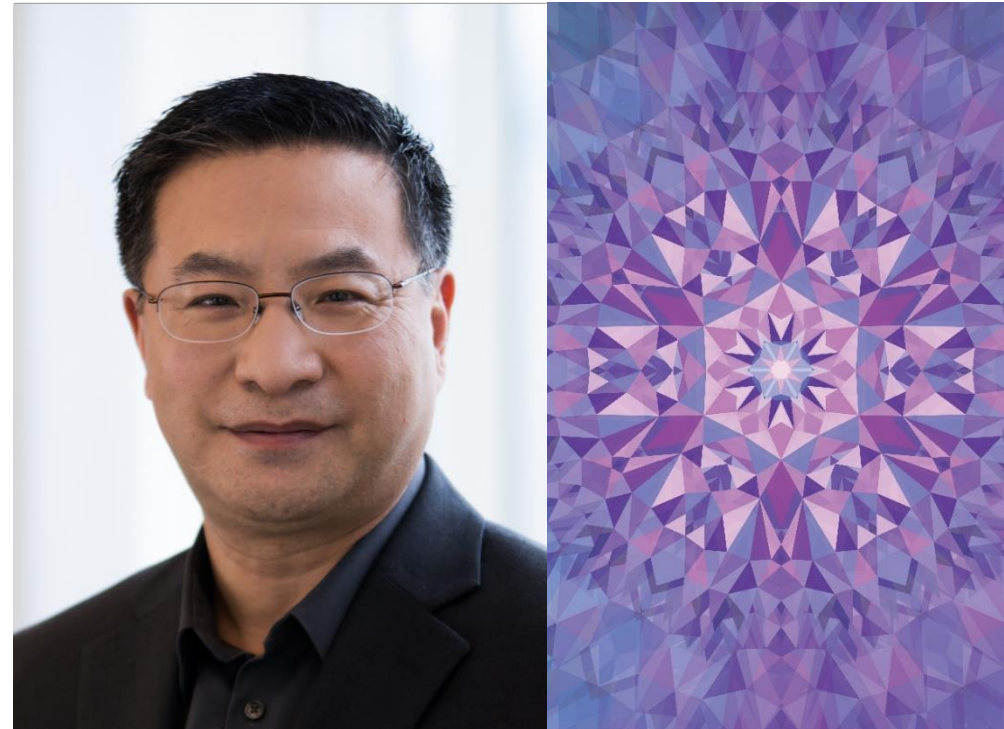
6-10 December 2021

**6G Technologies for Mobile
Connected Intelligence**



Dr. Geng Wu, Intel Fellow
Intel Corporation

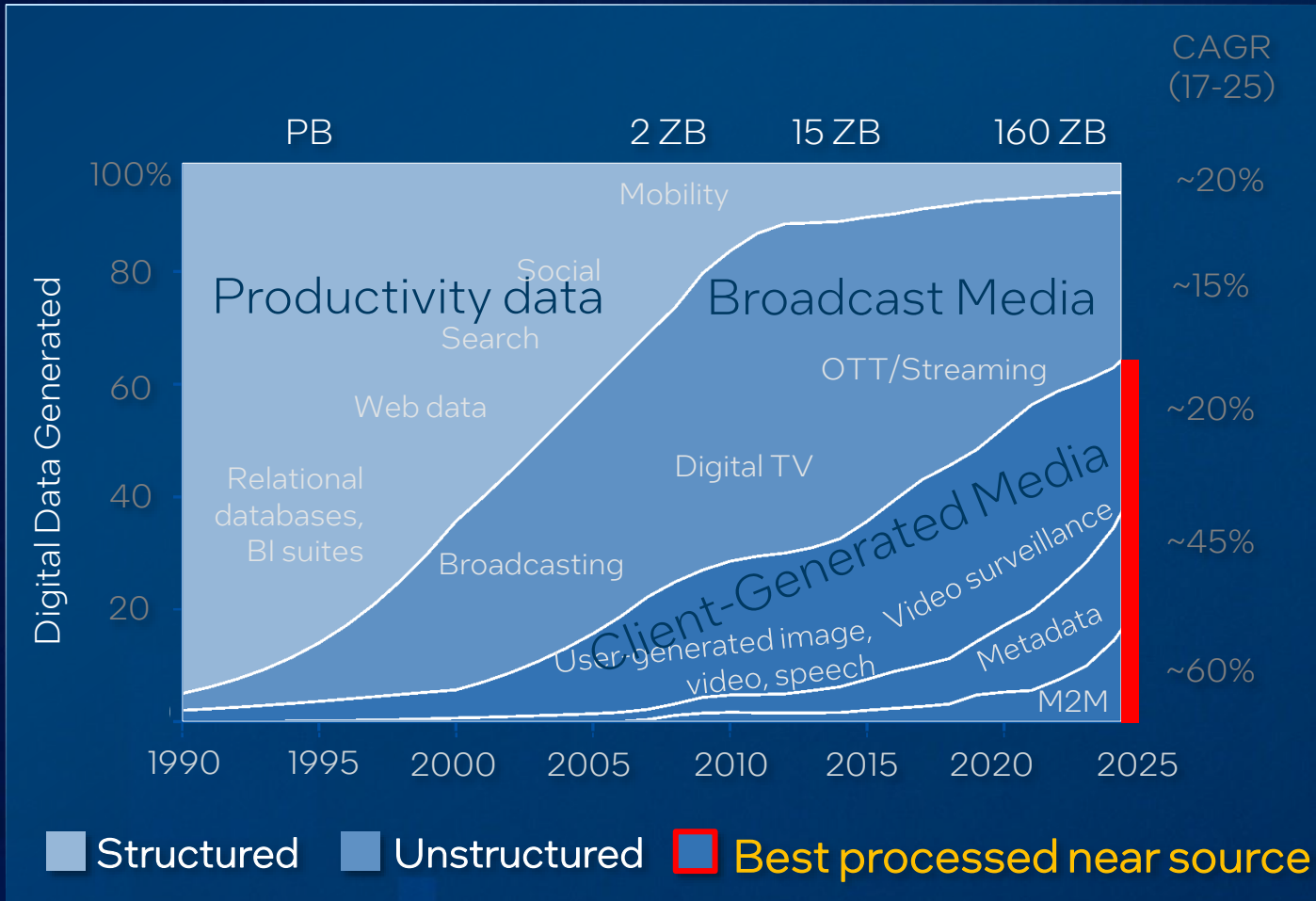
Keynote session



6G technology objectives



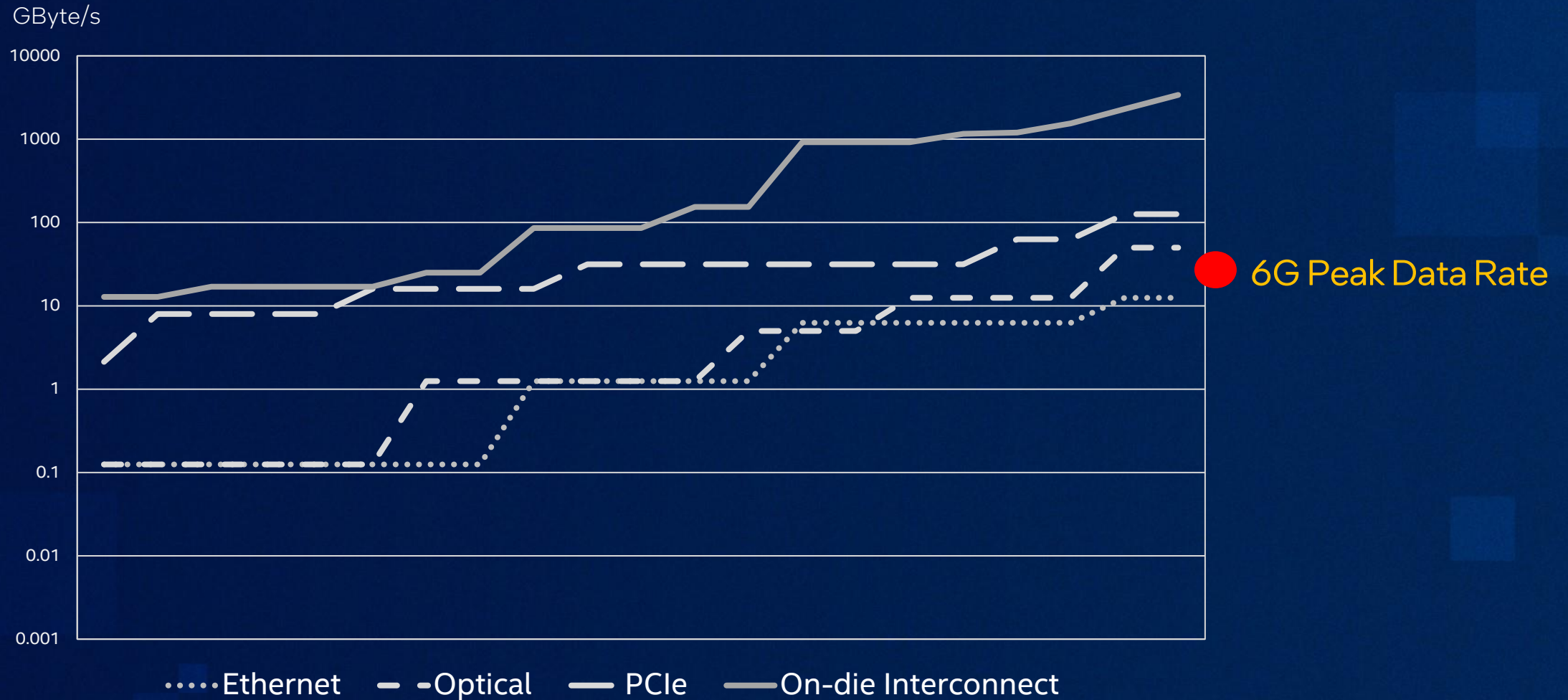
The shifting nature of data...



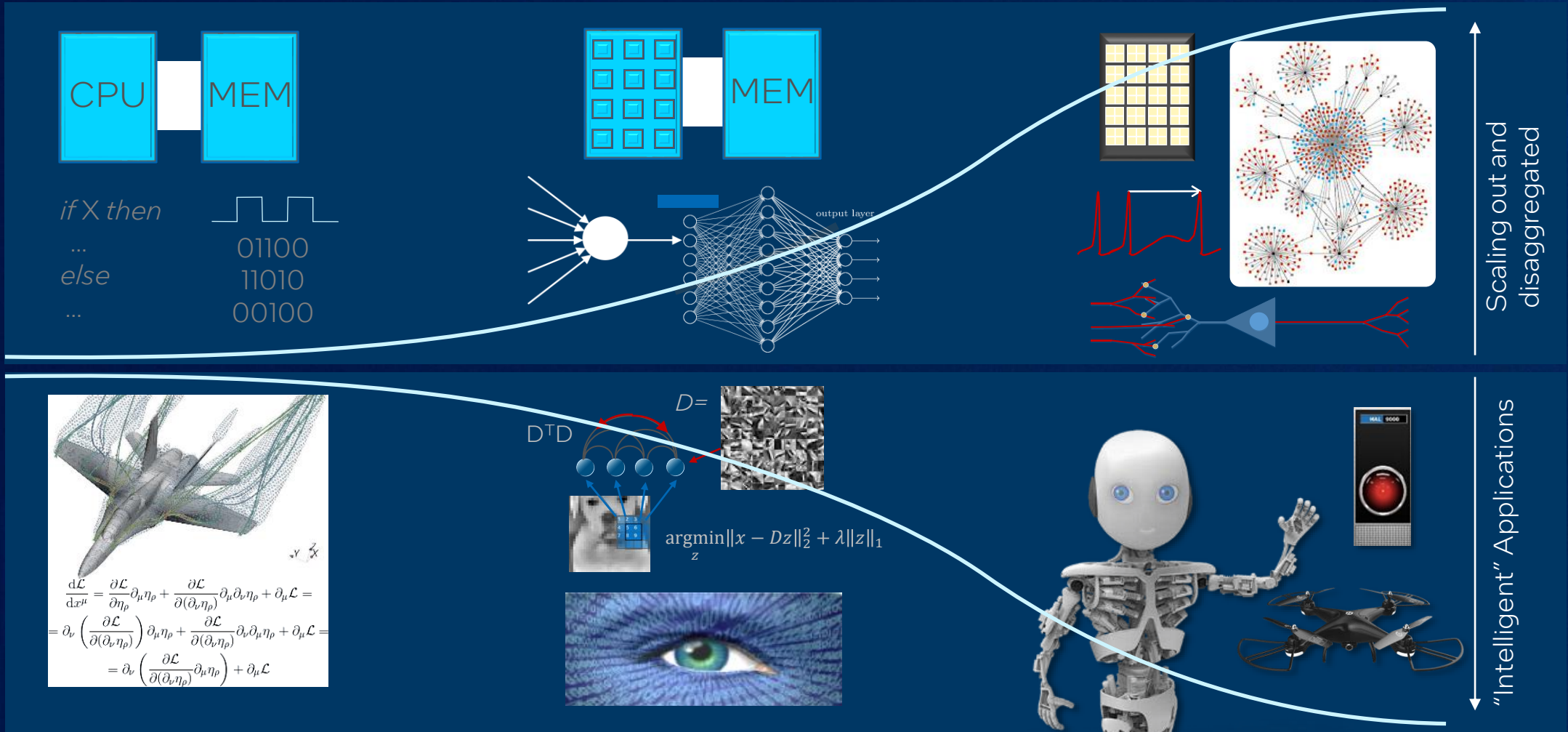
Source: Analyst and Intel Data - Oct 2018

- Evolve from traditional communication payload to data for ML/AI
- Distributed and mobile
- New numeric formats, precisions and quality
- Best processed near the source
- New requirements for privacy and security

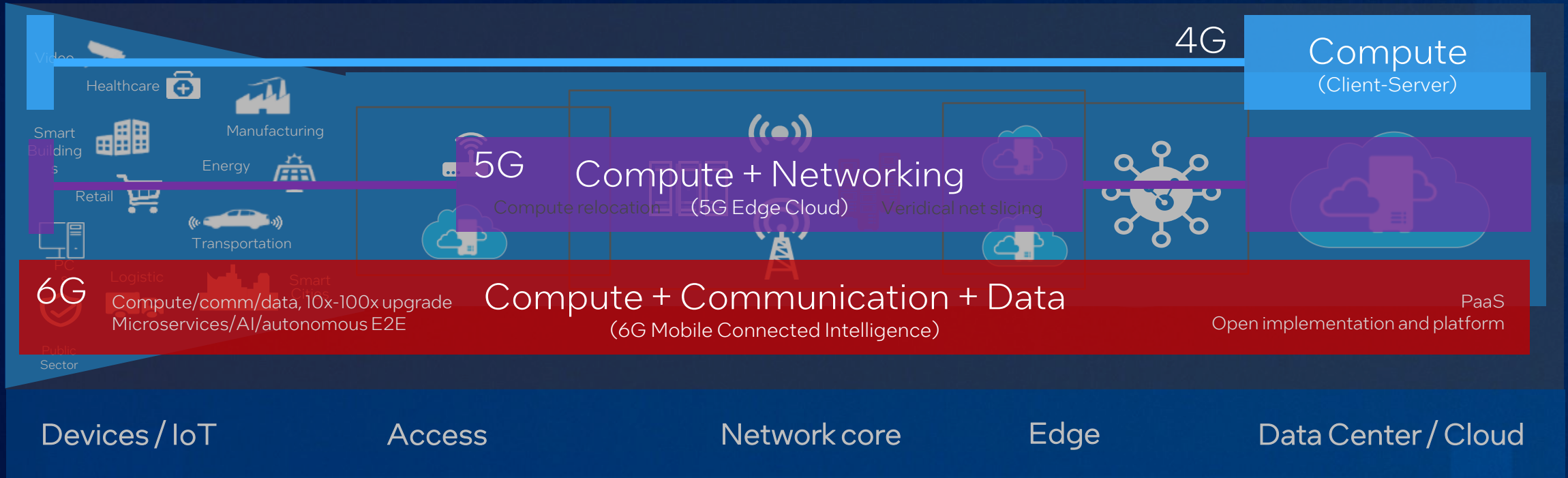
The growing throughput of wireless links...



The evolving of computing...

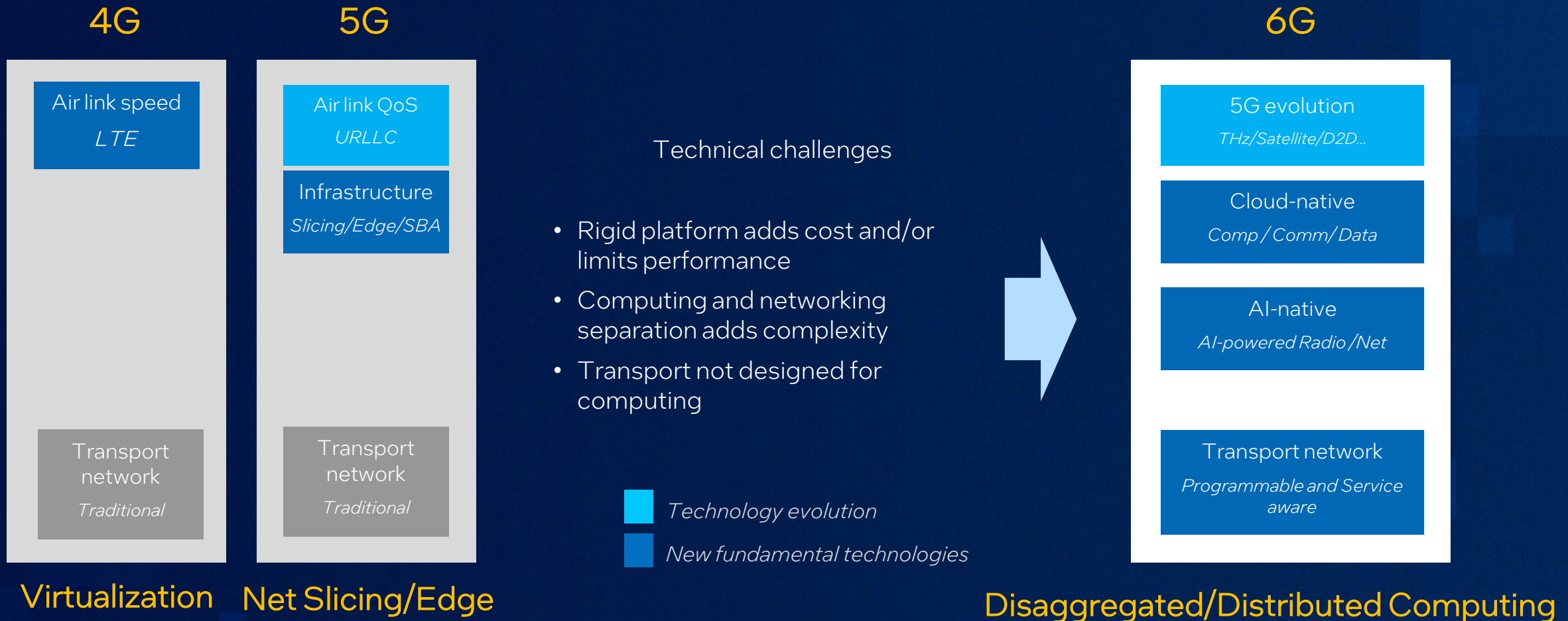


The evolution of computing and communication...



New architecture and protocol stack; 10x to 100x KPI; 6G systems to support computing

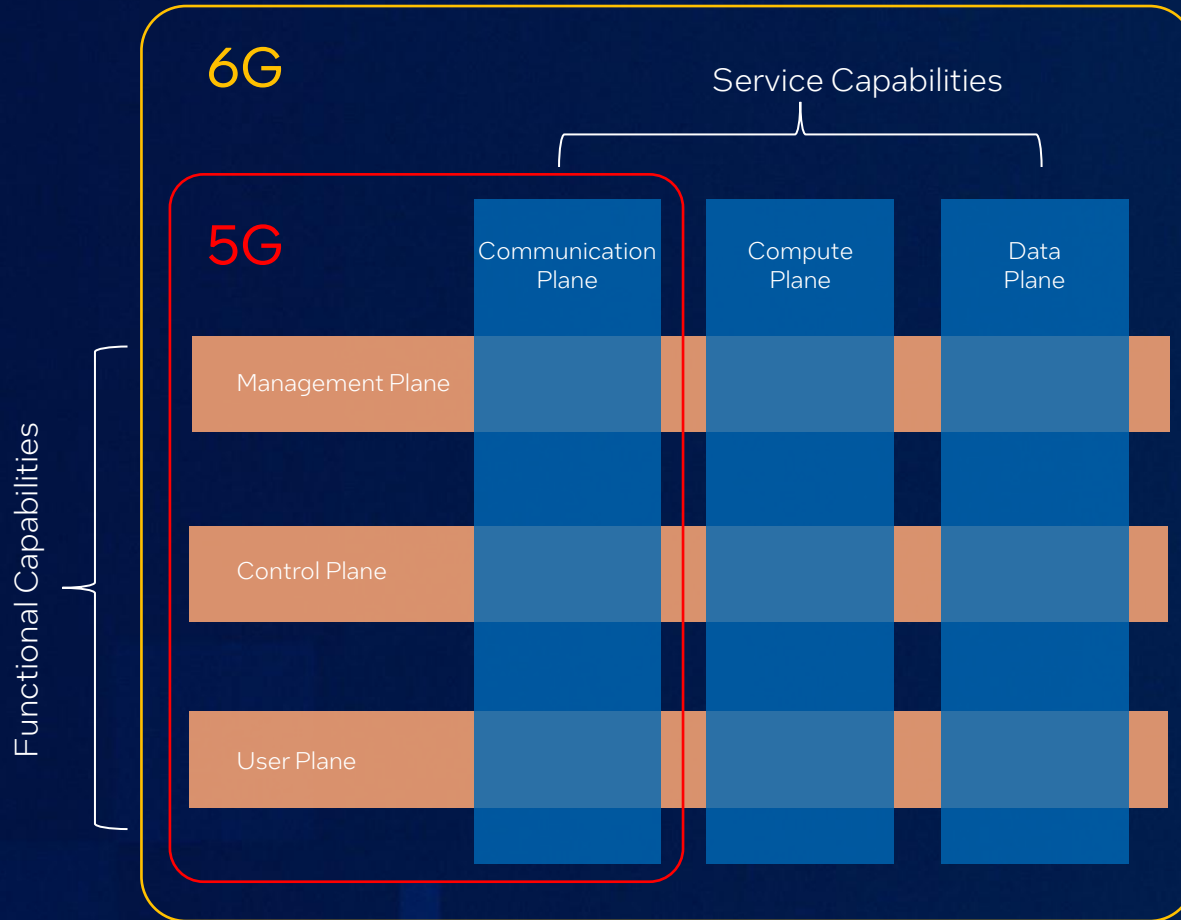
Technology transformation in 6G



Cloud-native and AI-native 6G system

| | Cloud-native | AI-native |
|---------------------------------|---|--|
| Air interface | Air interface features to enable dynamic computing scaling-out between device and network. | AI native air interface, e.g., AI-based channel estimation, AI assisted beam management. |
| System and Network | Compute Plane and Data Plane in NW. Couple compute and communication service/session establishment | Data Plane services and functions optimized for fueling AI/ML. |
| Service Management | Full life-cycle dynamic services management for in-network computing and data services | AI assisted network operation and management |
| Software/Hardware Platform | Micro-services, service mesh, and orchestration for wide-area cloud; Distributed/disaggregated computing. | Accelerators for AI training/inference acceleration |
| Reliability and Trustworthiness | Across-domain security in wide-area distributed multi-clouds. | Data sharing across domains. Data privacy issue. |

6G technology framework

















Important focuses and technology decisions:

- How to enable distributed computing at scale and across domains?
- How to dynamically scale out device compute?
- The exact level of coupling and/or integration between communication and computing?

Industry 6G standards development

Traditional and Open Standards

| | | |
|--|--|---|
|  | Disaggregated RAN <ul style="list-style-type: none"> • Open Arch / Open Source • RIC / AI • White box |   |
|  | Device, RAN and CN <ul style="list-style-type: none"> • Air interface • Network architecture • Cloud / AI-native |     |
|  | Functional building blocks <ul style="list-style-type: none"> • NFV • Orchestration • MEC |   |
|  | Components/Platform <ul style="list-style-type: none"> • xPU / memory / packaging • Photonic / RF / Mixed-Sig • Ref. design/software |   |

Markets



Technologies



Hexa-X NSF RINGS



Business and Regulation

Open Source / IPR

Information Security
Regulation

Radio Equipment
Regulatory Conformance

Interoperability /
System Integration

Traditional core specs development by 3GPP, IPR management, market scaling
Open implementation, open architecture, open supply chain, "long-tail" markets

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Thank you!

