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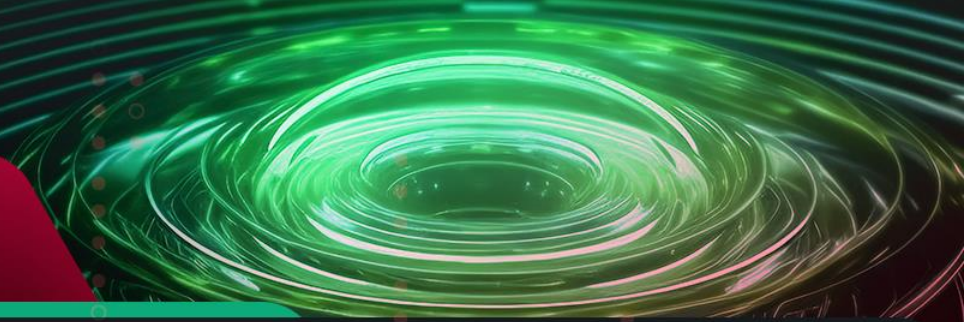
ICT SUMMIT MEXICO 2024

El futuro de ICT - Inteligencia Artificial, Convergencia y Sustentabilidad



24 DE ABRIL

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Data Center evolution in an AI and sustainable world

Jacques Fluet, Global Director, Data Center Program, TIA

Joseba Calvo, TIA-942 Engineering Committee member

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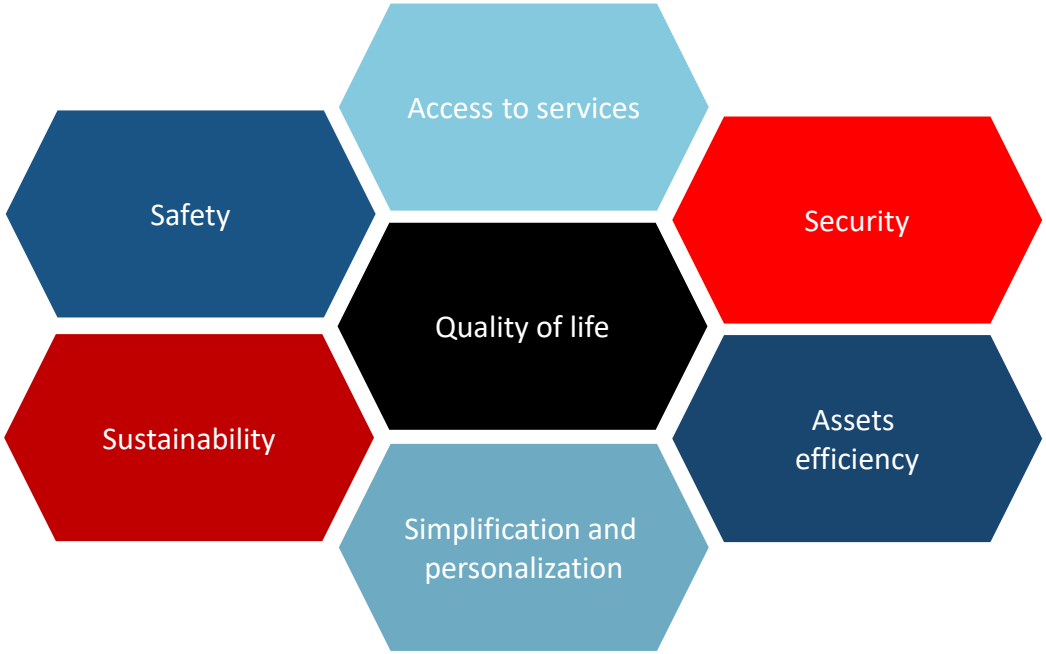
Digital World

Connected Intelligence (AI/ML)



From
Information gathering and reporting

To
Autonomous data analysis, pro-active actions, and continuous improvements

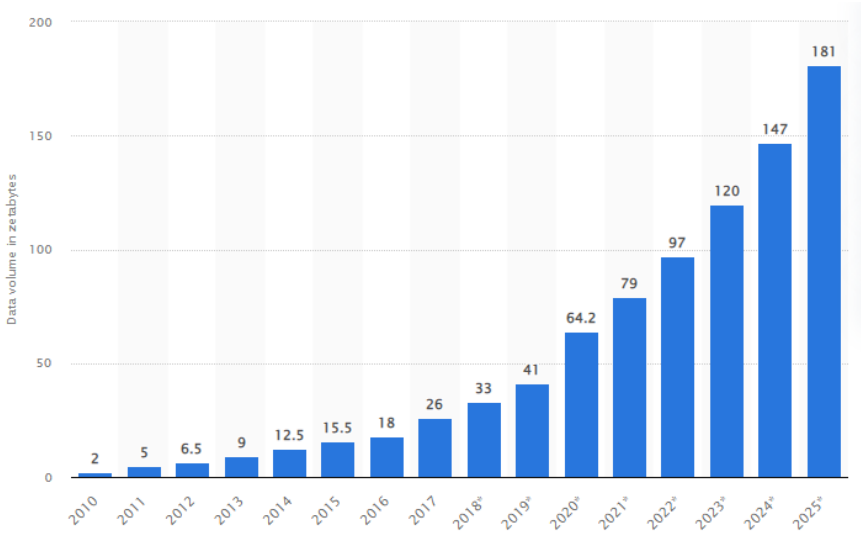
Jacques Fluet (Microsoft Image Creator)

Digital World Expansion

- By 2025, 181 zettabytes (or 181 trillion gigabytes) of data will be generated around the globe

  > 90 zettabytes created by edge devices

- Gartner predicts that by 2025, 75% of enterprise-generated data will be created and processed at the edge
- Nokia predicts that the traffic on global telecom networks will grow at a compounded annual growth rate (CAGR) of 22% to 25% from 2022 to 2030



IDC' Data Age report, sponsored by Seagate

ICT Evolution Trends

Jacques Fluet (Microsoft Image Creator)

INCREASED TRAFFIC

- Billions of people and things connected
- More connected services
- Mission-critical performance

RELIABILITY

- Software-defined networks and data centers
- Workload orchestration
- Performance degradation avoidance

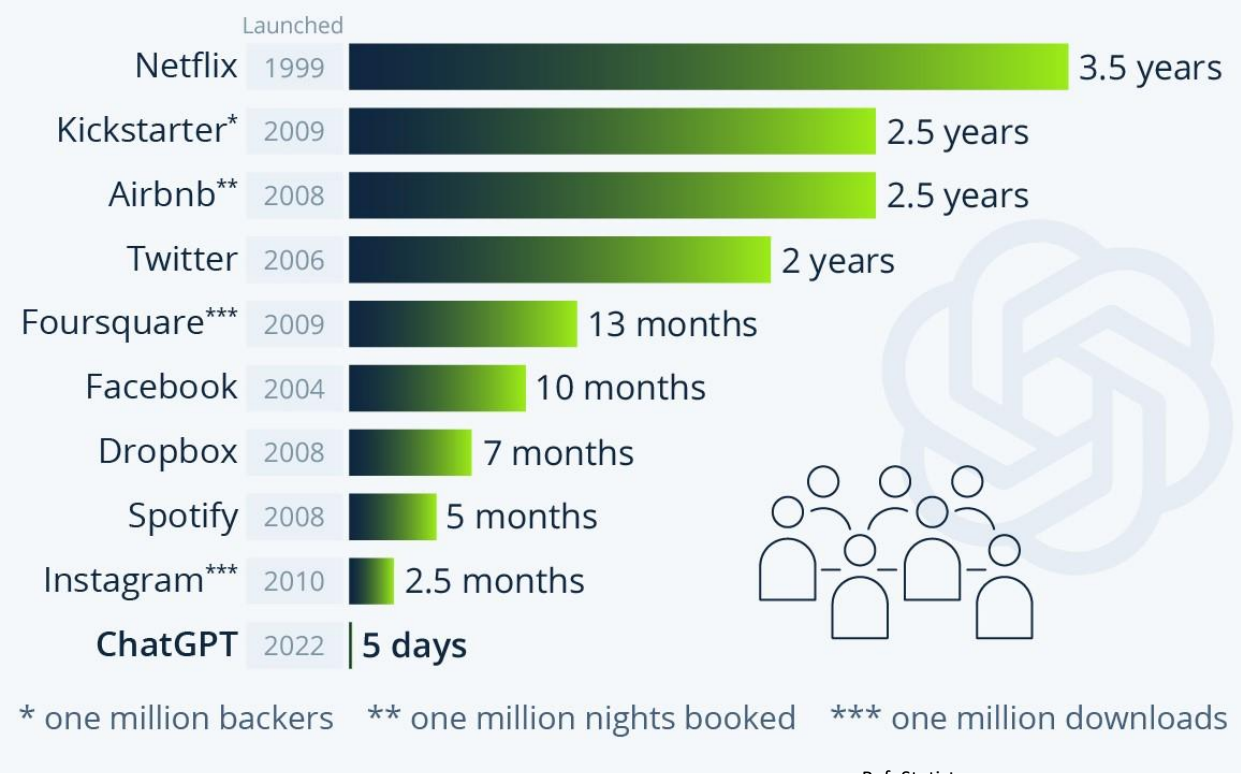
SUSTAINABILITY

- Renewable/clean energy
- Efficient energy usage
- Water usage reduction
- Lifecycle

NEW TECHNOLOGIES

- AI/ML
- Liquid cooling
- Emergency power (HVO, BSS, H2)

Time to one million users



Ref: Statista

AI numbers

- DigitalBridge CEO Marc Ganzi believes the market potential of generative AI could reach **hundreds of billions of dollars for data center, fiber, and tower providers.**
- Cloudflare to deploy **Nvidia GPUs at the Edge for generative AI inference - in up to 300 data centers**
- IDC expects enterprise spending on generative **AI software, infrastructure hardware and IT services to grow from nearly $16 billion this year to $143 billion in 2027.** That's 13 times greater than the annual growth rate for global IT spending.
- AI Supercloud services will be delivered by European data centres and will eventually consist of more than **20,000 NVIDIA H100 Tensor Core GPUs by June 2024.**
- Nvidia's Data Center business is **up more than 400% since last year** to $18.4 billion in fourth-quarter sales
- CyrusOne offers **300kW-per-rack AI data center design**
- Aligned Data Centers offers turnkey solution for up to **300 kW per rack**

Advanced AI applications

- Real-time security
- Real-time safety
- Predictive maintenance
- Pro-active performance reliability
- Resources utilization efficiency
- Sustainability
- Troubleshooting
- Healthcare diagnostics
- And many more …

AI impacts on the environment

- High power requirements
  - GPT-3 training: 1,287 MWH (est.)
  - GPT-4 uses 30,000 GPUs (~9 MW)
- CO2e emissions
  - GPT-3 more than 500 times CO2e emissions than one person travelling from New York to San Francisco
- More water requirements for cooling
  - Microsoft announced in its environmental report that water use increased by 34% from 2021 to 2022 (More than 6 billion liters of water) – Google reported more than a 20% increase in water use.
  - A GPT Chat search between 5 and 50 questions consumes almost half a liter of water

Sustainability

- Carbon emission reduction
- Water usage reduction
- Efficient energy usage
- Equipment lifecycle
- Efficient asset utilization
- Noise

Sustainability in the news

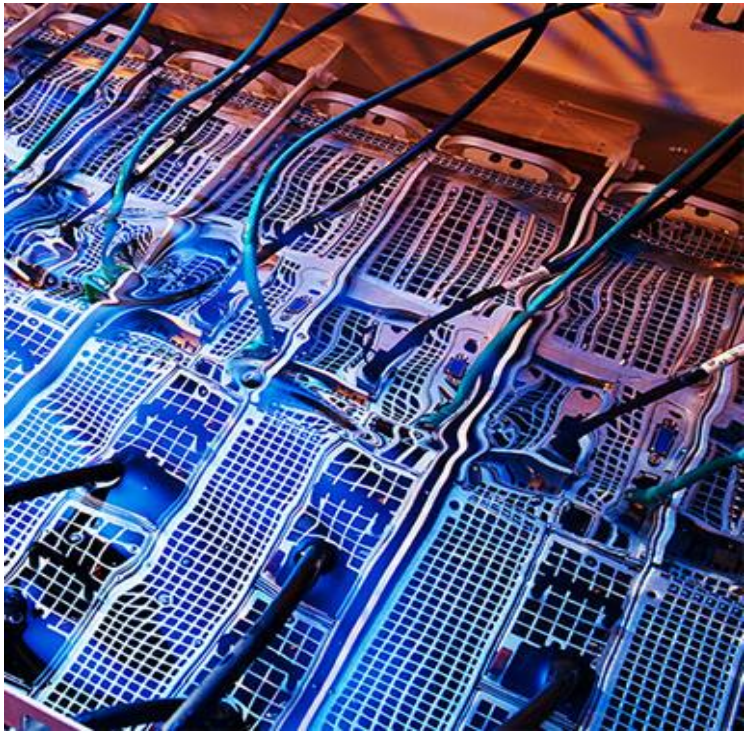
- Microsoft committed to becoming carbon negative, water positive and zero waste by 2030
- Google’s goal is to achieve net-zero emissions across all operations and value chain by 2030
- Equinix set a goal to be climate neutral by 2030
- Telmex carbon emission net zero by 2050
- European Energy Directive is expected to set a maximum PUE and a minimum energy re-use for data centers

Environmental conditions

Enhanced cooling to keep the high computing servers running

Direct to Chip cooling
Gigabyte

Computer room air conditioner
Trane



Immersion cooling
GRC

Standby Power Systems

Reduction of carbon emission for the standby power systems

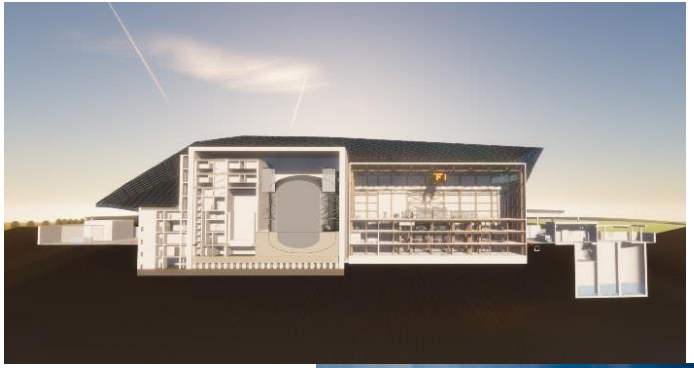
Natural gas generator
Caterpillar

Diesel generator
Caterpillar

Hydrogen fuel cell power station
Honda

BESS: Battery Energy Storage System
Zenobe Energy.

Cleaner energy generation



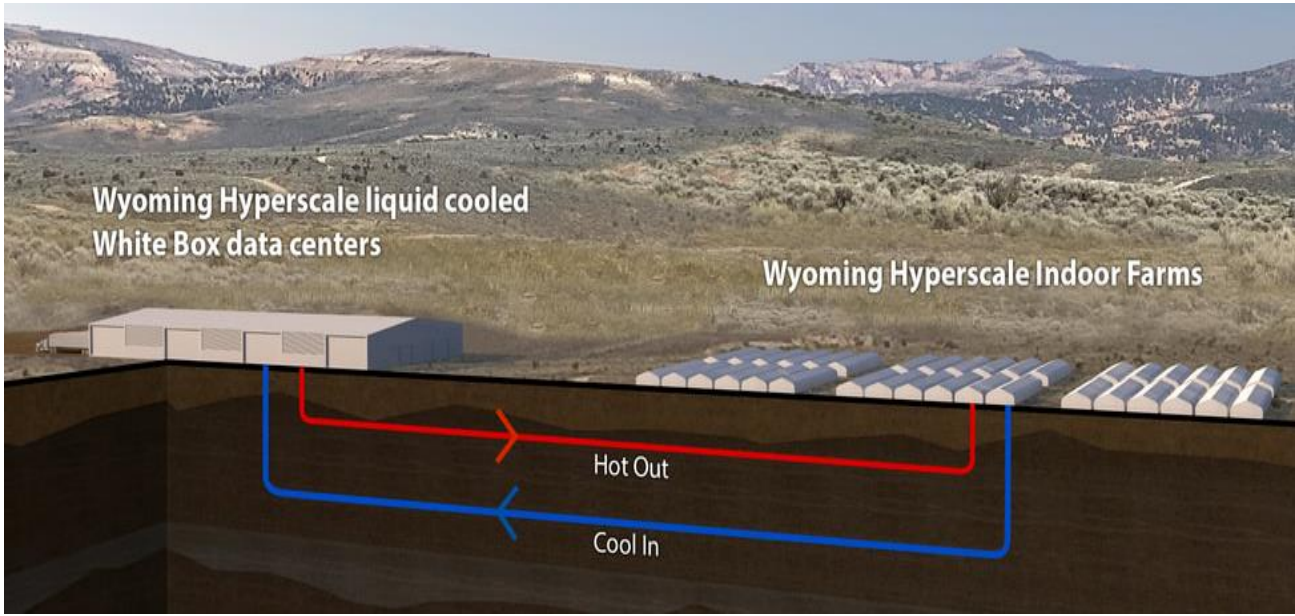
SMR (Small Modular nuclear Reactor)
Rolls Royce

Wind farm
Duke Energy

Solar power
Duke Energy

Sustainability considerations

- Carbon-free energy
- Energy efficiency
- Energy re-use

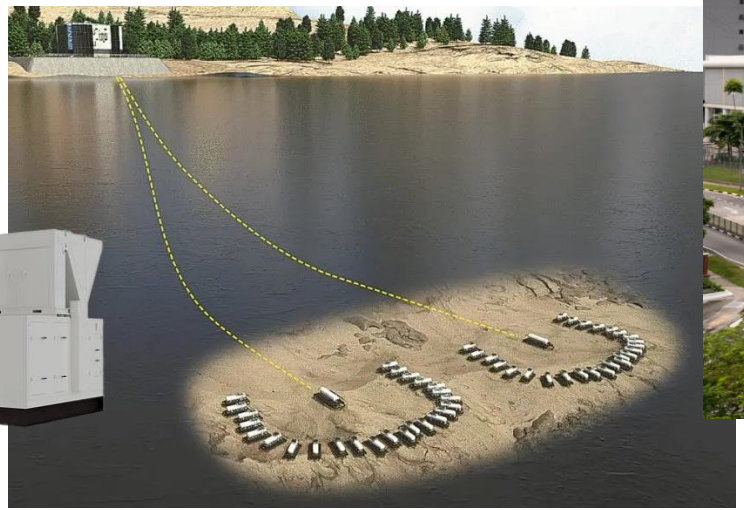


ICT Evolution - Distributed Computing

Most efficient compute location

Stulz

Compass Quantum



Underwater Data Centers in Sanya
Beijing Highlander Digital Technology

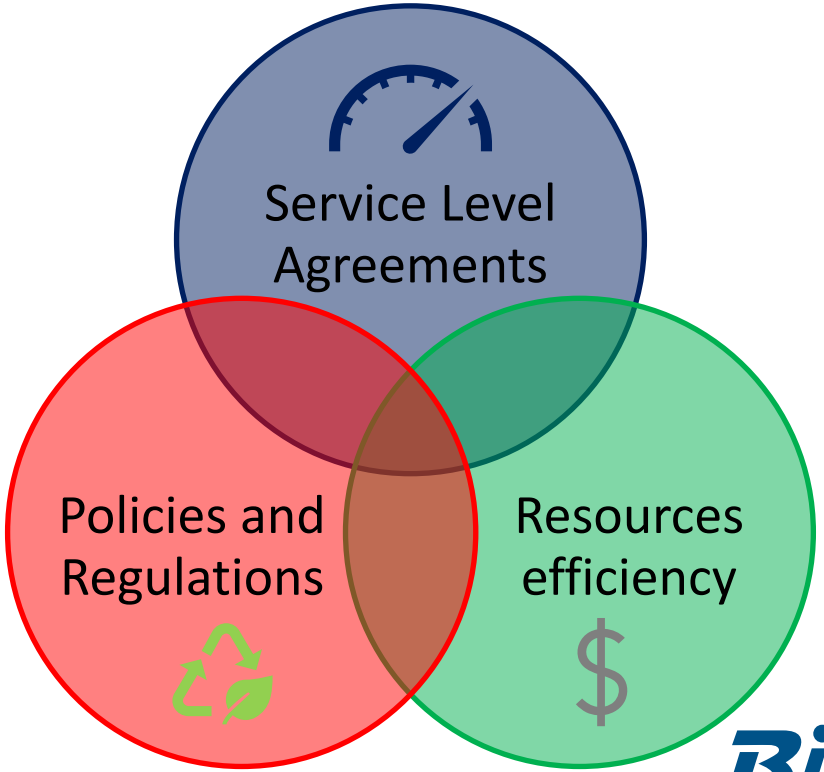
Google

Data Center Orchestration

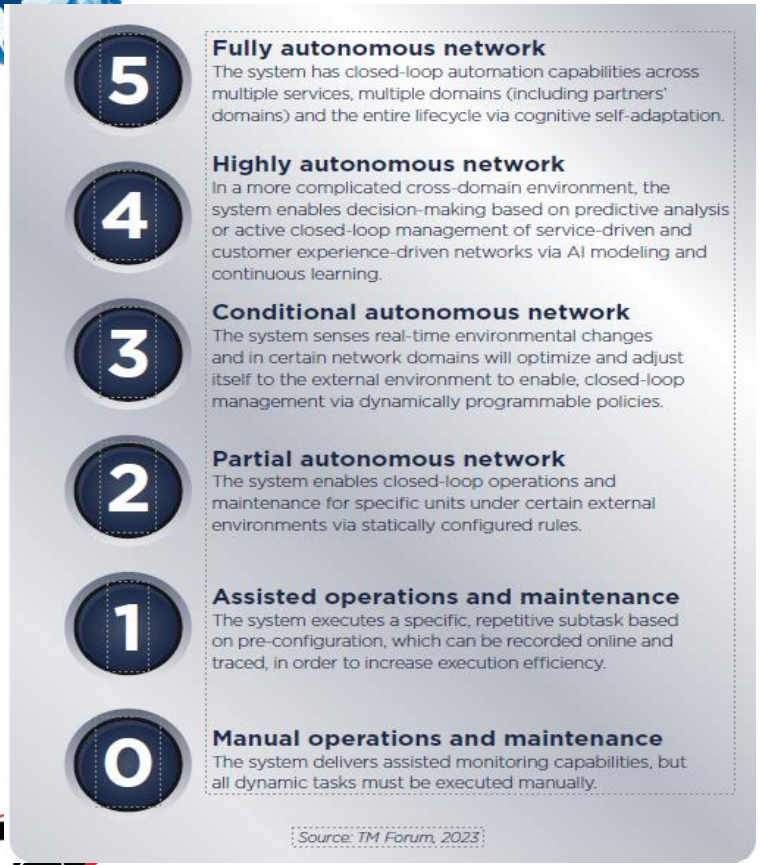
SERVICE LEVEL AGREEMENTS
- Availability
- Performance
- Security

RESOURCES EFFICIENCY
- Compute, storage, network
- Connectivity, power, cooling
- People

POLICIES AND REGULATIONS
- Carbon footprint
- Sustainability
- Privacy



Automation/Autonomy



- Today, most operators are between Levels 2 and 3, but some including China Mobile, China Telecom, China Unicom, MTN, Orange and Telecom Argentina are aiming to achieve Level 4 autonomy for at least some processes by 2025.
- The Chinese telcos are the most ambitious. China Mobile is aiming for Level 4 autonomy for nearly all the services the company is providing.

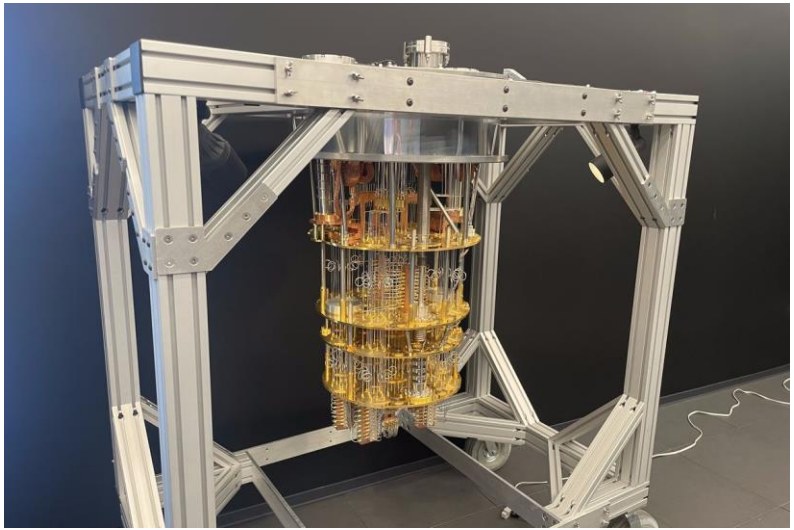
Impact on data center design and operations

- Increased power density
- New technologies
- Increased focus on:
  - Service-level performance
  - Sustainability
  - Efficient use of resources

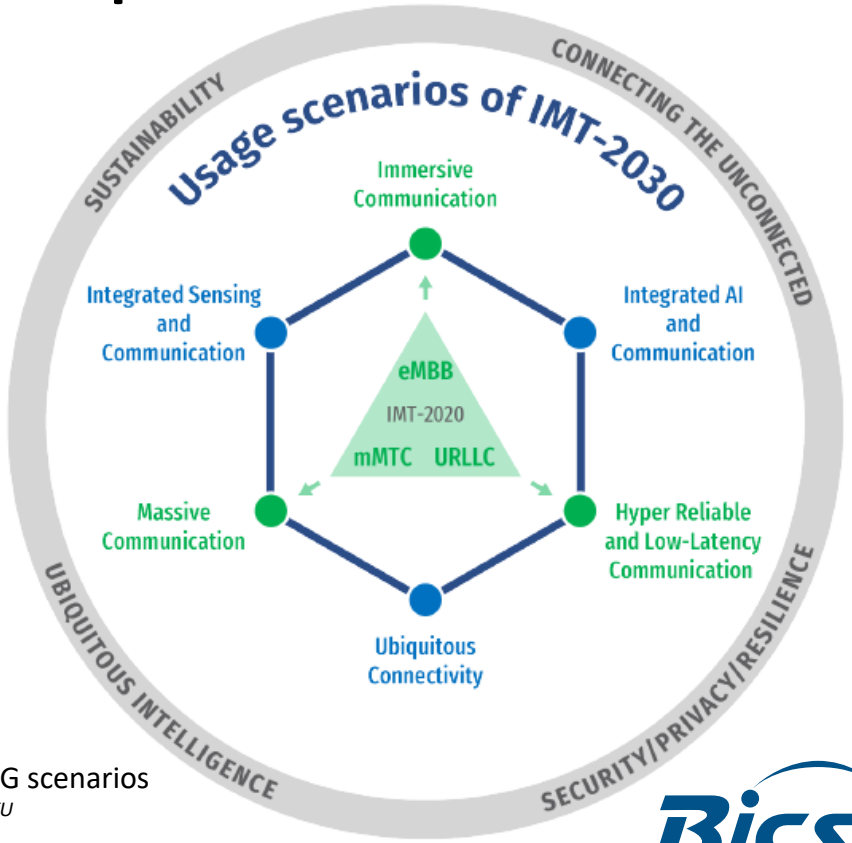
TIA-942-C: newly released revision

- Requirements clearer and simpler
- More adaptability to local conditions based on risk assessment
- In-line with current best practices
- More freedom to implement (focus on outcomes)
- Enables newer technologies
- Considerations for sustainability and efficiency
- Annexes A-F are normative

Evolution never stops…



Quantum computer
IBM



6G scenarios
ITU

In summary

- Data center industry will continue to grow and evolve
- Get prepared for new technologies and enhanced focus on sustainability and services performance
- Stay connected with industry trends and best practices
- Keep your operations processes up to date as the technology and industry priorities continue to evolve

Gracias

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