REAL TRANSFORMATION
Edge, 5G, and IoT

Connecting people and machines to data
Every organization needs to be a digital organization, powered by data, running in a multi-cloud world.
Edge and IoT will **fuel the Digital Future** by transforming the physical world into data

175, 000, 000, 000, 000GB
The **Digital Future** demands a new perspective
The Digital Future demands **edge computing**

1. **Volume:**
The amount of data generated at the edge is growing at massive rates. Gartner predicts edge data will comprise 75% of enterprise data by 2022, up from 10% today.

2. **Speed:**
Many use cases cannot accept the inherent latency in sending data over a network.

3. **Uptime:**
Network downtime is a non-starter for use cases in which business continuity and safety are paramount.
IoT in a cloud-first world
IoT in a data-first world
Your things can **tell you things**

- Operational efficiency
- Mitigate risks (safety)
- Customer experience
- New revenue models
Edge and IoT create value but also **challenges**

- Business case
- Stakeholder alignment
- Interoperability
- Scale
- Analytics
- Security and manageability
5G: Enabling the Data-rich Edge
Mobile connectivity has fueled human progress

2G
- Cellular voice communications
  - Voice calling, text and email messaging
- 1998

3G
- Voice, data & applications
  - Web browsing applications
- 2001

4G
- Data at scale, more users & bandwidth
  - Rich media, video & voice
- 2009

5G
- Digital world, massive broadband, massive machine & ultra-reliable low latency
  - Billions of connected things, mobile broadband
  - AR/VR & 4K Video
- > 2019

- Changed work
- Changed business
- Changed culture
- Change the world
Digital Era is being fueled by the interwoven fabric of technologies...
Assets are getting connected and transformed
Into scalable smart systems...

...which scale up to create an intelligent world
5G vision is to be the transformative fabric across all industries

- Entertainment
- Energy/utility
- Retail
- Public transport
- Augmented reality
- Enhanced video services
- Real-time automation
- Remote operations
- Smart surveillance
- Autonomous robotics
- Monitoring & tracking
- Hazard maintenance
- Connected vehicle
- Automotive
- Manufacturing
- Healthcare
- Public safety

Source: Ericsson | The guide to capturing the 5G industry digitalization business potential
5G requires several industry-wide investment points

**Subscriber ecosystems**
- 5G Enabled Devices
- Consumer Electronics
- Laptops / Smartphones
- IoT Gateways
- Indoor Access / Small Cells
- Access (uCPE, SD-WAN)

**Radio access**
- 5G Spectrum
- 5G NR NSA / SA
- Small Cells / Densification
- 4G LTE Marco Cell
- Deep Fiber Investments
- Microwave / Fiber BH

**Far Edge & Edge**
- Fronthaul Switching / CSR
- C-RAN and vRAN
- MEC Platforms w/ VNFs
- Edge NFV-I / vEPC / NGC
- Edge Ready Facility (MDC)

**Network core**
- NFV-I Platforms w/ vEPC / vIMS / SGi-LAN
- Evolved to 5G Core (NGC)
- SDN Controllers
- Open Networking

**Metro transport**
- IP Everywhere
- Carrier SDN
- MPLS / CE / DWDM

**Service operations**
- MANO
- BSS Modernization
- OSS Modernization
- Analytics & Data Lakes
- Infra Monitoring, AI, ML
- IT Infrastructure

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5G expected performance improvements vs 4G

**Faster data rate**
- 4G: 80 Mbps
- 5G: 1+ Gbps
- Improvement: >10×

**Higher device density**
- 4G: 100K/ km²
- 5G: 1M/ km²
- Improvement: 10×

**Reduced latency**
- 4G: 10ms
- 5G: 1ms
- Improvement: 10×

**Lower energy**
- 4G: 1.0 mJ
- 5G: 0.01 mJ
- Improvement: 100×

- Makes wireless peak speeds potentially competitive with fiber
- Enables pervasive IoT (e.g., “every light bulb can be a smart light bulb”)
- Enables real-time applications (e.g., cloud-based computation for driverless cars)
- Enables high-speed data to battery-powered devices (e.g., cordless VR headsets)

Sources: 3rd Generation Partnership Project; IEEE; Bain & Company analysis
Dell Technologies Solutions
The Dell Technologies 5G experience
Enabling a wide range of end user use cases

Always ready, immersive productivity

Expansive media

Gaming supremacy

IoT & indoor solutions

Advanced networking
Dell EMC Ready Offers Accelerate the 5G Journey

**uCPE & SD-WAN ENTERPRISE EDGE**
Branch to Data Center form factors validated, integrated and delivered globally with choice of software to meet any use case.

**DISTRIBUTED NETWORK EDGE**
Transform how people and machines interact with digital services at the edge with infrastructure that can go wherever data demands.

**MICRO & MODULAR DATA CENTERS**
Modernize edge and on premise infrastructure at a fraction of the time & cost for vRAN, Edge Compute, and NFV / SDN deployments.

**TELCO CLOUD NFV SOLUTIONS**
Deliver lower risk, faster NFV deployments with Dell EMC pre-validated Ready Solution with VMware or RHOS Ready Architectures.

**SP ANALYTICS SOLUTIONS**
Accelerate digital transformation via advanced and modular network and business driven use cases on a unified data platform.

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