

The evolving role of wireless technology to support Highly Automated Driving

Jyoti Sharma
Technology Strategy



Verizon confidential and proprietary. Unauthorized disclosure, reproduction or other use prohibited.

Evolution of technology

1G

- Analog voice



2G

- Text messaging
- Digital voice capacity
- Security



3G

- Data and applications



4G^{LTE}

- High-speed data for phones and other mobile devices
- Internet of Things (CAT-M1)
- Expanding capabilities



5G^v

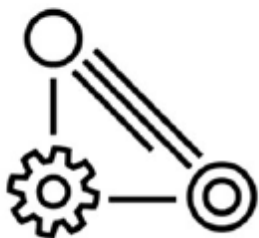
- Low latency
- Massive Internet of Things scale
- Security by design
- High bandwidth (spectrum width of hundreds of MHz)



5G—the fourth Industrial Revolution

First Industrial Revolution

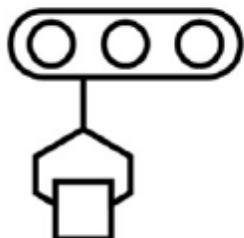
Water and steam power
The work one could do was no longer constrained by that individual's physical strength or endurance.



First mechanical loom, 1784

Second Industrial Revolution

Electrical energy and division of labor
Electrical energy means work can be done almost anywhere. Mass production becomes possible.



First conveyor belt, 1870

Third Industrial Revolution

Electronics and information technology
It becomes possible to offload mental work to machines, allowing businesses to do for thought what had been done for physical objects.



First programmable logic controller, 1969

Fourth Industrial Revolution

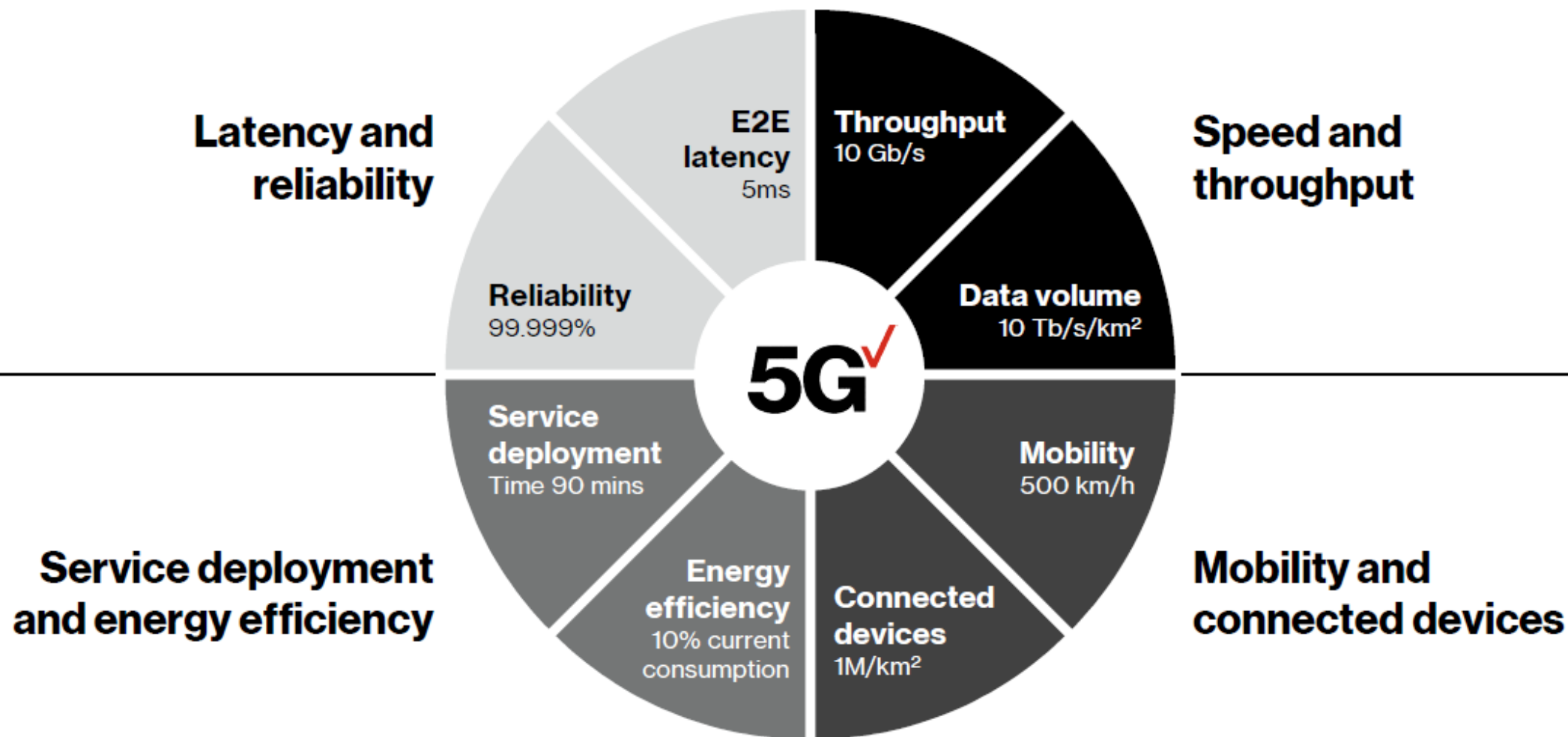
Real-time enterprise (RTE)
Machines will begin doing both mental and physical work with greater autonomy, allowing previously unforeseen gains in productivity.



Edge computing

Degree of complexity

5G currencies/capabilities



Building blocks of 5G



All-band (low-band, mid-band and millimeter wave) spectrum



Ultra-dense small cell deployment



New Radio

- Advanced coding and modulation
- Massive multiple input, multiple output (MIMO)
- Waveforming
- Flexible spectrum use
- Flexible/full duplex



Software defined networking (SDN)/network function virtualization (NFV) + 5G next-generation core (NGC)

- Network evolution
- Network slicing
- Service-based architecture
- Operational agility
- Universal adaptive core

5G digital transformation

Vision for the 5G workplace: Revolutionize industry by enabling real-time enterprise (RTE) to harness information, actions and events. Right now.



IoT applications and massive connectivity



Deep network and edge applications integration



Low latency, automated operational intelligence



Multi-access edge computing (MEC)

What is edge computing?

Multi-access edge computing (MEC) enables cloud servers to run closer to endpoints, reducing latency and speeding local processing. Think of having the cloud in your back pocket.

