

567 & Manufacturing

The dawn of 5G technology is here

Are you ready for its unprecedented possibilities?

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Manufacturing is poised to begin experiencing significant benefits from 5G

Unleash the full potential for your business

5G, the fifth generation of cellular wireless technology, is poised to begin helping transform the way the manufacturing industry operates. Through unprecedented speed, low latency, and bandwidth capacity, <u>5G</u> using millimeter wave spectrum (5G+) can enable manufacturers do more with the mega expansion of the <u>Internet of Things (IoT)</u>, as well as collect more data, and compute more information faster to make better business decisions. It can also be a catalyst for your own innovation—both in the creation and quality of products, and in how these products are delivered into the supply chain.

Because manufacturing plays such a key role in in the global economy, every manufacturer has the potential to impact companies in other industries, such as transportation, retail, healthcare, and many others. Since 5G will eventually help make it possible for companies to adopt new and emerging technologies – including advanced robotics, vision systems, augmented reality (AR), and artificial intelligence (AI), it can help you to achieve enhanced efficiency and reliability to manufacture the products your partners, customers, and clients depend on.

The 5G revolution will bring:



What's possible in manufacturing with 5G?

Of the many benefits, let's focus on 8.

1 Addressing Wi-Fi Capacity Limitations

From IoT and numerous other sources, you get data. Lots of data. This is great for the digitally transforming factory, however, the data generated and the increased number of computations per microsecond challenges the limits of what Wi-Fi® was designed for.

In order for the factory to adopt a digital transformation strategy, it's necessary for the <u>network</u> that supports it to keep pace with the technology that depends on it. The technologies of Network Edge Computing (NEC) and <u>Multi-access Edge Computing (MEC)</u> offer the interim step to 5G and address Wi-Fi capacity limitations that inhibit manufacturers from optimizing operations, addressing workforce challenges, and providing more reliable service to customers and the supply chain.

2 Intelligent infrastructure

As manufacturers adopt an intelligent infrastructure—one that uses machine learning, prediction, analysis, and self-correction to operate—5G will support smarter integration and analysis of the data that's generated by sensors. With so many interconnected technologies and endpoints (including robotics, mobility, and field-related applications), you need highly reliable—and highly secure—compute power to process the large blocks of data.

5G will help provide the highly secure foundation to efficiently move data out of corporate silos while also helping to ensure it stays safely within the walls of the facility. This goes beyond the mega expansion of IoT and into implementing smarter integration and analysis of data that's generated by sensors. With so many interconnected technologies that are dependent upon these and other endpoints - including that generated through robotics, mobility, and field-related applications, an increased level of reliability for the large blocks of data that must be transferred is required. 5G will ultimately provide the power and consistency needed for the intelligent infrastructure to breathe a new level of life into the possibilities manufacturers can explore to produce new products, services, and realize greater operational efficiencies.

"The pace of technology innovation is so high, with so many advances—cloud, IoT, AR/VR, software-defined networking that manufacturers are struggling with how to bring all of it together."

DAVID VAN DORSELAER

AVP Industry Solutions - Manufacturing and Transportation, AT&T Business

3 Augmented and virtual reality

For the successful adoption and sustainability of augmented reality (AR) and virtual reality (VR), which is also known as mixed reality or spatial computing when used together, both edge computing and a highly secure 5G network are critical.

5G will eventually enable manufacturers to achieve new levels of factory optimization through AR and VR. These technologies can display overlays to help to guide workers through production steps for intricate assembly processes. They can also help train new employees and potentially shorten their learning curve. In addition, manufacturers can direct operators located in the field and across the through repair procedures, potentially reducing the costs of dispatched or third-party labor. Other uses for these technologies in manufacturing include:

- Remote worker assistance
- Inspection and final approval
- Navigating complex processes through voice commands
- The picking process in shipping and receiving

The possibilities for AR/VR and Spatial Computing continue to grow and 5G will provide the foundation in its next evolution.

By using AR, a major aircraft manufacturer reduced the production time of complex assembly wiring by **25%** and cut error rates to **almost zero**.



4 Metrology/non-contact metrology and video as a sensor

The precise tolerances needed in manufacturing can be protected both by metrology and non-contact metrology. The data from this technology can reside at the edge of a network that can also carry the demand for consistent measurements and big data analytics that are required in near-real time. 5G with MEC is a reliable solution that can also help facilitate the integration of related applications and processes.

In addition, 5G-enabled video-as-a-sensor technology supports—

- Near-real-time situational awareness
- People counters
- Safety protocols
- Point-of-entry security
- Foreign object debris detection
- Autonomous material handling
- Temperature monitoring

5G will enable virtually seamless streaming so you can simultaneously use this data-intense application in more places throughout the factory. This can eventually translate into higher integrity alerts and faster response times.

> "Integrating video-based technology with IoT adds another layer of analytics to industrial manufacturing. Manufacturers can improve safety protocols with more sensitivity and insight into anomaly detection that can help reduce defects, improve efficiency, and reduce costs."

5 Autonomous-guided vehicles

Autonomous-guided vehicles (AGVs) that move through a factory floor, yard, or warehouse calculate billions of bits of data to process instructions and make intelligent decisions to navigate safely. With such heavy demand on the network, Wi-Fi alone can't deliver the reliability, bandwidth, or support required for virtually seamless performance. 5G eventually will.

MEC can provide the foundation for data to flow from the edge of the network where it's more easily accessible for prioritized processes. Coupled with 5G to handle the volume of data from sensors, endpoints, and other sources, AGVs will ultimately be able to communicate with their interface to avoid collisions, help avoid mistakes, and carry out their assignments.

"The top trigger for manufacturers to adopt industrial mobility technologies (i.e., from mobile robots to autonomous trucks) is **cost advantage (86%)** followed by **customer/supply expectations (47%)** and **increased safety (38%)**"



6 Digital twin technology

Digital twin technology can give you a view into the most complex machines. In factory floor and operations planning, digital twins help engineers design layout and flow before making costly installations and changes. In both of these scenarios, as well as others where this technology is used in manufacturing, 5G will eventually offer the capacity to integrate physical and virtual assets for tremendous, cost-saving flexibility.



"<u>Digital twin</u> technology enabled with the capabilities of 5G and MEC can really help our customers achieve their operational efficiency and productivity goals. Deeper insights into machine performance by remote AR, scenarios for flexible plant floor production lines, and virtual commissioning are some of the newer applications that customers are leveraging with this enhancing capability."

HUGH ARIF

Industry Solutions Architect, AT&T Business

Cost savings

Manufacturers will use 5G in collaboration with LTE and Wi-Fi to bring the level of flexibility both in operations and investment priorities in their facilities. By migrating areas of their business from wired to wireless, they can reduce the number of required access points, realize a significant reduction in investment, and experience relief on network bandwidth as prioritized data is moved to MEC and 5G. And while greenfield facilities can experience these benefits from day one, brownfield facilities can migrate to 5G in a modular fashion based upon business priorities.



8 Global integration

Manufacturers that implement 5G in multiple facilities may see their capabilities and potential multiply. As 5G continues to expand across the globe, it will have a ripple effect throughout the supply chain. New levels of efficiency can connect partners in transportation, retail, healthcare, and other industries. All who rely on manufacturing to provide quality goods to customers and clients can benefit from manufacturing facilities having highly reliable, highly secure, enhanced throughput. In addition, 5G will eventually help all sectors transfer more bits of data and larger files within their operations and between businesses.



This is the factory of the future

AT&T and Samsung collaborate to discover new use cases for 5G in manufacturing

In June 2019, AT&T Business, Samsung Austin Semiconductor, and Samsung Electronics America unveiled the first manufacturing-focused 5G Innovation Zone in America.

The research space explores using 5G in combination with LTE and Wi-Fi to illustrate key use cases. The testing helps demonstrate how the unprecedented bandwidth, speed, and low latency of 5G using millimeter wave (5G+) extends operational possibilities in the manufacturing industry.

Applications being tested include health and environmental sensors, automated material handling, industrial IoT and robotics, and mixed reality for training employees. The project will expand to address other challenges in the manufacturing industry and examine additional ways that 5G will benefit manufacturers in building the factory of the future.

Preparing for 5G

What does your manufacturing operation need to do to prepare for and take advantage of 5G?

Consider adopting Multi-access Edge Computing (MEC) as a technology to help transition to 5G.

Identify opportunities in both IT and OT, and bring key decision makers together to consider the primary technologies, processes, and applications that will realize the improved efficiencies and integrations 5G can eventually provide.

Find a partner who is leading the way in 5G.



AT&T offers an **edge-to-edge** approach to network solutions. As a leader in technology, media, telecommunications, and the 5G revolution, we are uniquely positioned to transform your digital capabilities through 5G innovations and **Edge-to-Edge IntelligencesM**.

Discover how we can help you begin realizing the benefits of 5G and other solutions for digital transformation at <u>att.com/manufacturing</u>.

Sources

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