Automating new facilities demands a low-latency IT infrastructure

As the third decade of the 21st century takes shape, enterprises from manufacturers to energy companies have weighty decisions to make.

One key category of strategic decision is the nature of the facilities they need in an era of automation, artificial intelligence (AI), Big Data Analytics, and optimal efficiency. For some, retrofitting existing facilities will make sense. For others, it is time to re-imagine the facilities they need to succeed in the Fourth Industrial Revolution and build them from scratch. Those facilities will be as automated as possible, using robots where appropriate and connected with Internet of Things (IoT) devices.

To bring that vision into reality requires confronting the fact that the facility itself rests on a much broader digital foundation. Factories, warehouses, distribution centers and many other facilities exist in several industries and serve different types of customers where efficiencies are defined in different ways (e.g., throughput, turnaround times, profitability, etc.). To modernize their missions requires integrating them into the overall data flowing through the enterprise and automating their functions wherever possible.

Challenge: Capturing data, controlling robots, automating processes

Automating processes in these new facilities will mean many things. You can't automate a process that is not well understood, so data becomes a building block of these new facilities. The IoT will be deployed in these facilities to capture data. That data acquisition is just the first step in a much larger process of continuous improvement.

Industry-Specific Use Cases

- **Manufacturing:** Monitor OEE (overall equipment effectiveness) across the factory floor through IoT and smart sensors and use predictive maintenance tools to detect and fix potential problems before they happen.

- **Logistics:** Real-time asset tracking and increased visibility across the supply chain, analytics driven procurement, and real-time inventory management for an efficient and transparent value chain.

- **Energy:** Manage and monitor operations effectively to avoid costly equipment outages, improve safety and balance supply and demand.

This operational data can be produced in huge volumes. Some of that data might be critical to refining operations. Yet, some of it might be background noise. These data volumes might also come in bursts, with long periods of very little activity.

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Managing this data flow and making the proper discriminations of important bits must be done in real time.

Analyzing this incredible and potentially inconsistent volume of data is generally understood to be done in the cloud where AI and ML can be applied. Those cloud datacenters, however, may be located thousands of miles away from wherever this data is being captured. Transporting every bit of data – the background noise along with the important bits – can be costly.

When algorithms are built to enhance operations through precision control of local resources, running that business logic in cloud data centers introduces latency in the control functions. In several instances, robots will be moving around at speeds ranging from slow and deliberate to quite fast in robot-only environments where the machines are aware of each other and automatically route around each other. Controlling them from a cloud data center thousands of miles away introduces latency. This latency potentially compromises the precision of movements and the safety of workers sharing the factory floor. Milliseconds matter when efficiency requires controlling assets that are moving in real time.

Solution: Edge computing on-premises precisely controls robots and other assets in motion

The technological underpinning of this new type of facility is an Acquire, Analyze, Act architectural solution. Intelligent Solutions from Lumen® Edge Computing integrates the consulting services, network and management services, hardware and software to architect and build an Edge Computing solution that powers these Acquire, Analyze, Act use cases.

Many of the cloud data center enterprises used for advanced analytics and AI processing are already on Lumen fiber networks. This allows Lumen to expand data center functionality out into the network and put key resources where they are needed to optimize this virtuous cycle.

Storage as a Service can be built into the network for edge resources on or off-premises depending on need. This creates a data base camp where the IoT-collected data can be stored as acquired. This alleviates constantly streaming data to the cloud over the network.

The base camp can then provide some level of processing to separate the data that needs to be passed up to the cloud, optimizing expensive analytics processing in the cloud and reducing the cost of data transmission.

Attempting to control robots and other automated processes in these facilities from a cloud data center that might be thousands of miles away makes little sense from a latency standpoint. Lumen experts can architect a localized cloud-like application hosting environment that places business logic close to the facility. Since these are newly constructed facilities, these capabilities can even move on-premise. With other resources built into the network, the footprint inside the facility can be kept to a bare minimum. In most cases, the actual equipment can be purchased from Lumen, consolidating everything onto one bill.

Results: Efficiency, security, lower costs

These architectures composed of Lumen Intelligent Solutions components, expertise and managed services can provide the foundation for exceptionally efficient new facilities driving modern enterprises. Consider just a few effects of this edge computing infrastructure for different types of firms:

- Reduced latency for robotic control applications in manufacturing facilities

- Real-time control of automated facilities

- Lower network costs from transporting only relevant data to the cloud

Edge computing approaches put data processing and storage closer to the network edge where people, processes and items in motion reside. Edge computing complements both cloud computing and the IoT, creating a seamless, low latency virtuous cycle.

Visit Lumen today for more information or contact a Lumen Expert for consultation to get started.

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