5 Use Cases for Cloud Computing in Manufacturing

The manufacturing industry is no novice to applying technology solutions to innovate, improve planning, and productivity within the shop floor. In the 60s' the industry rode the wave of technology advancements and adopted time-keeping systems and production-tracking systems to implement lean manufacturing concepts. Manufacturers also made a dent in the 80s' by leveraging computer-aided design and computer-aided manufacturing applications to revolutionize industrial designing.

The trend of adopting technology continued into the dot-com era where manufacturers adopted enterprise relationship platforms (ERP) and developed inventory management processes to improve customer satisfaction. Today, relatively new technological solutions are available to assist manufacturers with navigating a complex manufacturing ecosystem driven by increased demand, government regulations, and the need for strategies that guaranty sustainable revenue growth. Cloud computing or the industrial cloud is one such solution and in this post, 5 critical areas where it can be applied will be discussed.

Connecting the Dots

Adoption rates of data-producing technologies within the manufacturing industry are at unprecedented levels. Deploying IoT, smart devices, and other equipment within the average manufacturing floor leads to the production of large data sets from utilizing these assets. In earlier days, the data from these sources were largely ignored as long as throughput from production cycles could be measured.

Introducing interconnected systems championed by Industry 4.0 meant capturing and analyzing produced data to develop smart manufacturing facilities that were more efficient and safer for shop floor operators. The big data sets the average shop floor produces require a scalable centralized platform to collect and normalize data. Generally, on-premise data storage technologies were used under the guise of ensuring information security but the total overhead cost means it's no longer viable.

The total cost of setting up an on-premise data storage facility with 1024GB of storage space is approximately $235k over a seven-year period. Conversely, the cost of subscribing to a cloud computing service over seven years is $119k. Highlighting, how cost-effective cloud computing is when used to bring manufacturing data under one umbrella. Other costs to consider include dealing with downtime which is

a personal task for on-premise computing resources while maintenance is handled by the cloud computing service provider.

Supporting Manufacturing Applications

The industrial cloud is a virtual environment that provides a supportive environment for industry-specific applications. A perfect analogy for the industrial cloud is that it serves as the foundation of a building that supports structures such as doors, windows, and other floors. The industrial cloud provides manufacturers with the tools to develop applications such as OEE apps or IoT monitoring apps that can be adapted for web and mobile use.

In this scenario, the cloud serves as Software as a Service (SaaS) platform and subscribers get a plethora of development tools to work with. Manufacturers can capture data and develop the applications used to gain data-driven insight from it. The cloud also supports the use of APIs that automate the collection and normalization of data from diverse data-producing sources.

For example, APIs can support the collection of data from deployed equipment, edge devices, and IoT frameworks. The collected data is then automatically normalized into specified sections or categories depending on how they intend to be used. The automation cloud computing supports save data analysts from executing the repetitive and time-consuming task of inputting data into an app or spreadsheet.

Improving Edge Computing Applications

The need for decentralized data analysis has been pinpointed as one of the crucial requirements needed to achieve the smart factory. Here, decentralization refers to the ability of individual shop floor assets to analyze data and take action without having to communicate or receive instructions from a centralized platform. Although edge devices can handle data analytics, they are equipped with limited computing resources to manage smaller analyses.

For facility-wide analysis or to manage large scale deployments of IoT solutions, more computer resources are required. Cloud computing provides scalable infrastructure to support the data edge devices churn out or discard. Edge IoT platforms are also backed by cloud infrastructure and these platforms are used to monitor and manage edge devices such as autonomous robots and the diverse sensors deployed on the shop floor.

Enabling Digital Transformation Applications

Digital transformation of the manufacturing shop floor will bring big gains to manufacturers who embrace digitization. The gains come from utilizing solutions such as risk-based scheduling software, the digital twin, demand forecasting, and capacity planning tools to make data-driven decisions and to implement automated activities.

The cloud provides a supportive platform that enables the use of the aforementioned technologies when transforming processes. For example, optimized analysis from cloud-based scheduling and simulation platforms can be accessed through mobile devices by diverse members of a production cycle regardless of their location. Thus, providing stakeholders with a single source of truth when implementing new manufacturing policies or dealing with complex operational challenges.

The digital twin also leverages cloud computing to manage the big data sets streamed through IoT devices deployed within the shop floor to a digital twin platform. The scalability the industrial cloud offers ensures that increases in the production of real-time data do not overwhelm the computing resources of digital twin applications.

Reducing Operational Cost

As stated earlier, relying on the industrial cloud drastically reduces the cost of maintaining on-premise storage and computing resources by half. Cloud computing supports the move to Industry 4.0 and the diverse hardware and software applications needed to deliver the smart factory. Subscribing to a cloud service provider leaves the responsibility of configuring, updating, and maintaining the infrastructure to the service provider.

On average, cloud service providers come with more information technology experience than manufacturing operators who are more comfortable with operational technologies. Leveraging the support service providers offer, empowers and gives the manufacturer the freedom to focus on the important task of producing quality throughput in an optimized environment.

Conclusion

The industrial cloud provides the computing resources required to power the large scale digital transformation implementations the manufacturing industry is undertaking. These 5 use cases highlight the possibilities of utilizing cloud computing to deliver sustainability but leave the responsibility of deciding individual implementation strategies to the manufacturer.