Smarter Shop Floor With Cloud-Based Monitoring

Company: Tech Manufacturing

Location: Pennsylvania, U.S.A

Project Introduction

Tech Manufacturing is a long-time manufacturer of machined metal parts for aerospace clients such as Boeing, Lockheed Martin, and Bombardier. In order to stay competitive, they needed to raise production capacity and reduce lead times for their clients' largest and most urgent orders. However, their 5-axis CNC machines were already running 24 hours a day up to 7 days a week.

Jerry Halley, Chief Engineer at Tech Manufacturing, determined that smarter operation and real-time performance data would increase productivity and extend the useful life of their existing machines. "It was clear to me that we needed, first and foremost, a much better understanding of how our machines were actually performing for us in real-time," at Tech Manufacturing. "In addition, if we had both live and historical machine performance data available, we should be able to identify any technical or process issues that were detrimental to individual or overall productivity."

Achieving these goals meant the deployment of a CNC monitoring system that uses a combination of hardware and software to collect, analyze, and visualize various performance metrics. However, the productivity gains of such a system would need to be carefully weighed against the cost and effort of deployment, especially if Halley would need to maintain a new and unfamiliar server-based IT infrastructure. The ideal system, Halley realized, would be easily deployed without a high degree of specialized IT equipment, knowledge, or effort, and would not require repeated software installations, updates, or configuration.

Application Requirements

- Live dashboard with alerts based on historical and target performance metrics
- Easy to use with existing CNC machines that may or may not have built-in Ethernet interface
- Does not require high investment or expertise in specialized IT infrastructure, servers, or software
- Knowledgeable and experienced integration and vendor support team

Equipment Monitoring

- Data collection from CNC machines, PLCs, or manual machines
- Collect from Ethernet or RS-232-based devices
- Track multiple types of cycle time
- Real-time equipment dashboard with automatic updating
- Designed and built to evolve, integrate, and grow

Moxa Product Features

- Compact size for easy installation
- Standard TCP/IP interface and versatile operation modes
- Easy configuration by web console or Windows utility
- Multiple options for single/multiple ports and wired/wireless connectivity

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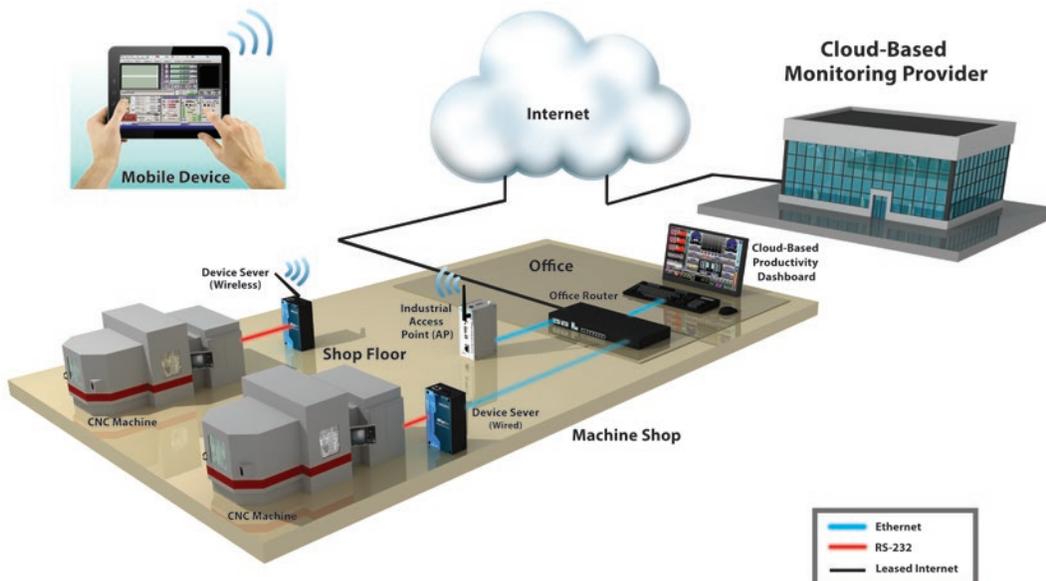
Solution

Shop Floor Automations, one of the most prominent systems integrators in North America specializing in CNC monitoring systems, assisted Tech Manufacturing with the planning and deployment of a cloud-based system. Each CNC machine was connected to Tech Manufacturing's existing local area network. For legacy machines that did not have a readily available Ethernet port, Shop Floor Automations worked with Moxa to develop easy-to-deploy solutions. "The industrial networking units from Moxa make it easy for us to get our clients' legacy machines connected to the cloud," said Greg Mercurio, President of Shop Floor Automations. "For industrial users like Tech Manufacturing, these solutions are invaluable in extending the capabilities and useful life of their still-functional but older CNC machines."

With the machines connected to the local network, a rich set of machine performance data was now available for viewing and analysis by cloud-based software such as Scytec DataXchange or Predator Machine Data Collection. The monitoring software collected and stored this data in the Cloud, and in near real-time presented it in the most useful and easy-to-understand way for machine shop owners. Key performance metrics were organized on a visual dashboard, which updated automatically and rotated through multiple sets of data, so owners and machine operators were able to see exactly how productive each cell was, down to the machine level.

"Getting our CNC machines connected and monitored has made it much easier for us to deliver on our clients' build to print orders with maximum efficiency and minimum lead time. It is lot easier to get connected than a lot of people may realize."

Jerry Halley, Chief Engineer at Tech Manufacturing

Highlights

- Setup was completed in less than a day with almost zero additional IT infrastructure or maintenance effort.

- A visual dashboard presents rich performance metrics for each cell and machine with automatic updates and alerts

- The machine shop was able to make significant improvements to overall productivity and extend the useful life of their still-functional but older CNC machines

Business Benefits

Since cloud-based software does not require additional local IT infrastructure and servers, Tech Manufacturing was able to minimize their upfront cost and effort of deployment. "Most clients perceive it to be difficult and expensive to get set up with CNC monitoring," according to Mercurio. "However, with today's cloud-based solutions, you can be set up in less than a day, with almost zero additional IT infrastructure or maintenance effort."

The live visual monitoring dashboard made it easy for Halley to identify the most critical productivity issues. For example, Tech Manufacturing discovered set-up times on certain machines to be unnecessarily long, meaning hours of lost productivity every day. With a relatively simple rearrangement of setup sequence and on/off times, Halley was able to achieve immediate and significant productivity gains with those machines.

With comprehensive machine performance data on hand, Tech Manufacturing was also able to receive more effective service from CNC manufacturers. Service calls were backed by highly relevant historical metrics, making it easier for manufacturers to identify and troubleshoot potential hardware issues. "With our intimate knowledge of how our machines should be performing normally," said Halley, "we found that manufacturers were much more willing to provide support when we requested it because they knew we were not wasting their time."
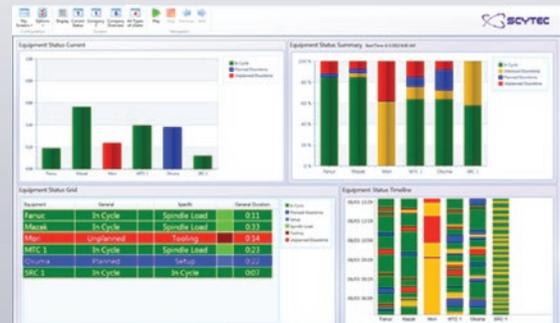
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