

Case Study

5G Enabled Machine Monitoring

Industry/Sector: Manufacturing, Research and Development

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Introduction

MTT developed a solution to enable advanced asset management and predictive maintenance. MTT's innovative Sensor Toolkit, part of the "5G factory of the future" project, delivers a modular and targeted solution. By combining real world parameter changes and true digital twin machine tools we are making strides towards predicting maintenance activities and production failures before they happen.



Challenge / Opportunity

With rising costs of production, insights into a machine's utilisation and health are key. The approach is underpinned by ISO-standard performance measurements, enhanced by continuous monitoring through the MTT Sensor Toolkit. This independent system collects temperature, vibration and current data, according to a client's needs. By capturing and analysing these parameters we can see how an asset changes over time and predict areas of concern. We then combine these findings with regular machine measurement to develop a geometric digital twin, this enables MTT through our analysis software to predict the machining outcome of the asset to single digit Micron levels.

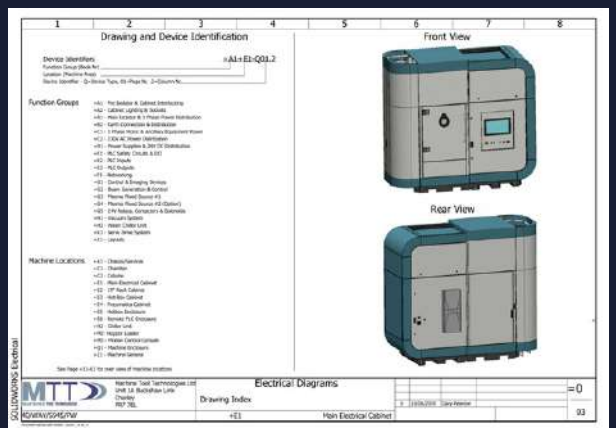
Throughout this case study MTT utilised both sensor tool kit and our analysis software to understand the machine's behaviour and how changes can affect productivity or indicate unplanned maintenance.

Results And Impact

The successes of this project revolved around data capture, data processing, 5G network integration and communication with other systems.

MTT were able to capture data from a machine, process and send this across a 5G network. This data was assessed on a networked server and actionable insights sent back to the Toolkit. This data workflow opens possibilities for comprehensive production monitoring, predictive maintenance scheduling, and adaptive process control, underpinned by AI-driven insights gleaned from data across the industry.

MTT's vision extends far beyond the confines of this project, aiming to embrace the paradigm shift towards intelligent, autonomous manufacturing ecosystems, with the ability to optimise and customise a manufacturing solution to a client's needs.



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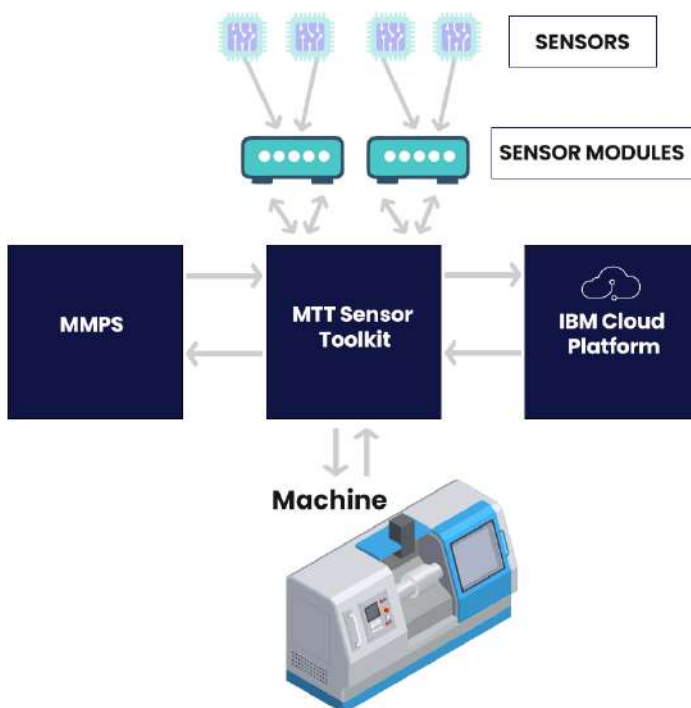
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Lessons Learnt and Tools Used

The primary takeaway from this project revolves around effective data management. This system can produce terabytes of data daily, posing the risk of overwhelming the network if not managed efficiently. Determining which data to retain and which anomalies warrant attention presents an ongoing challenge for the industry. MTT has demonstrated their ability to utilise digital technology to provide optimised solutions. These efforts yield tangible benefits such as reduced product wastage and streamlined maintenance practices. Looking ahead, MTT aims to expand this product, seamlessly integrating machines, data processing, and AI across the industry. This vision paints a picture of future factories where optimisation and innovation converge to drive efficiency and productivity to new heights.

This project utilised a variety of tools developed by MTT. The sensor toolkit is a hardware and software solution developed by MTT that includes data capture and analysis capabilities. MTT also build a digital twin to predict machining outcomes before they happen, increasing the impact of decisions made throughout the project.

MTT Sensor Toolkit - Architecture





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