

# IQUILA IN AUTOMOTIVE MANUFACTURING

## OUR CHALLENGE

In the automotive manufacturing industry, a critical challenge is managing latency and ensuring real-time communication across the production line. This challenge is particularly evident in an automated assembly plant where robotics, sensors, and control systems must function in perfect synchrony to maintain precision and efficiency. Any delay or disruption in the communication network can cause significant production slowdowns, leading to defects in assembled vehicles and costly downtime.

To address this issue, we needed to implement a low-latency, high-throughput network infrastructure capable of handling the vast amounts of data generated by IoT devices and automated systems in real-time. Additionally, incorporating advanced edge computing solutions would help process data locally, reducing dependency on central servers and further minimizing latency. Ensuring robust, reliable communication channels in such a precise environment is crucial for maintaining seamless manufacturing operations and upholding stringent quality standards.

## KEY CHALLENGES



### Latency and real-time communication:

Manufacturing processes require real-time communication between machines, sensors, and control systems, making low latency and high throughput crucial. Any delay can disrupt the production line, leading to inefficiencies and defects.



### Network reliability and uptime:

Ensuring continuous operation is critical as any network downtime can halt production, causing significant financial losses.



### Scalability:

As our facilities grow and adopt more IoT devices, the network must scale efficiently to handle increased data and device connections. A flexible infrastructure is necessary to adapt to new production lines or process changes.

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#### Cybersecurity:

Manufacturing networks handle sensitive data related to designs, processes, and supply chains. Robust cybersecurity measures are vital to protect this data and prevent cyber-attacks that could disrupt operations.



#### Interoperability:

Automotive manufacturing involves machines and systems from various vendors using different communication protocols. Ensuring interoperability and integrating legacy systems with modern devices is essential.



#### Bandwidth management:

Managing high data volumes from IoT devices, sensors, and cameras is essential to ensure smooth data flow without congestion.



#### Environmental factors:

Manufacturing environments can be harsh, with high temperatures, dust, and vibrations affecting network hardware and performance.



#### Compliance and standards:

Adhering to industry-specific regulatory requirements and standards for data handling and network security is crucial. Ensuring the network infrastructure supports high-quality standards is necessary for automotive manufacturing.



#### Edge computing:

To reduce latency and handle large data volumes locally, edge computing solutions are required.

## THE SOLUTION

Implementing iQuila Enterprise effectively addressed the networking challenges in our automotive manufacturing plants by ensuring low latency and high throughput through advanced network optimization and enhancing network reliability with robust redundancy and failover. Its scalable architecture supports the growing number of IoT devices and automated systems, while comprehensive cybersecurity features protect sensitive data from cyber threats. The iQuila solution facilitates seamless interoperability between various machines and systems, effectively managing high data volumes and prioritizing critical control data to maintain real-time operations. Designed to withstand harsh manufacturing environments, it mitigated interference from machinery and electronic devices, ensuring stable and consistent network performance.

The solution supported compliance with industry standards and regulatory requirements, crucial for maintaining the high-quality standards necessary for our organisation, iQuila Enterprise's support for edge computing reduced our latency by allowing the processing of data locally, enhancing the efficiency of real-time applications and minimizing delays. The inclusion of iQuila's Layer 2 networking capabilities allows for direct, point-to-point communication between devices on the same network layer, further reducing latency and enhancing performance. A key feature of iQuila Enterprise is the inclusion of a 1500 MTU (Maximum Transmission Unit), which optimizes packet size for efficient data transfer. This reduces the need for packet fragmentation, improving our overall network performance by ensuring data is transmitted more smoothly and reliably. This is particularly beneficial within our plants, where local processing of data is crucial for immediate decision-making and rapid response times.

Furthermore, iQuila Enterprise streamlined communication and data sharing with our suppliers through secure network integration, improving supply chain coordination and operational efficiency.

This holistic approach ensures a reliable, secure, and scalable network infrastructure, crucial for maintaining our advanced manufacturing processes and upholding the stringent quality standards required by our plants.