Application Note

# Simplifying Connectivity for Smart Manufacturing

The value of the Industrial Internet of Things (IIoT) to manufacturers is indisputable as it helps them improve their operation to drive productivity and stay competitive. According to a recent survey by *Forbes Insights*, manufacturers,, more than companies in other industries, rely on heavy machinery to produce products and therefore have a deep interest in understanding the performance of these machines. More than 50% of manufacturing firms strongly agree that the IoT is opening up new lines of business for their organizations. Also, 52%, of manufacturers already have real-time monitoring of assets and products. Furtermore, the leading use cases in this sector are preventive maintenance (51%) and increasing productivity (49%).

In manufacturing, the IIoT is enabling digital transformation by connecting OT (Operation Technology) machines and devices to IT (Information Technology) systems. Thanks to connectivity, manufacturing intelligence can be realized in the following three phases to view your productivity performance in real time, forecast production quality, and transform your business:

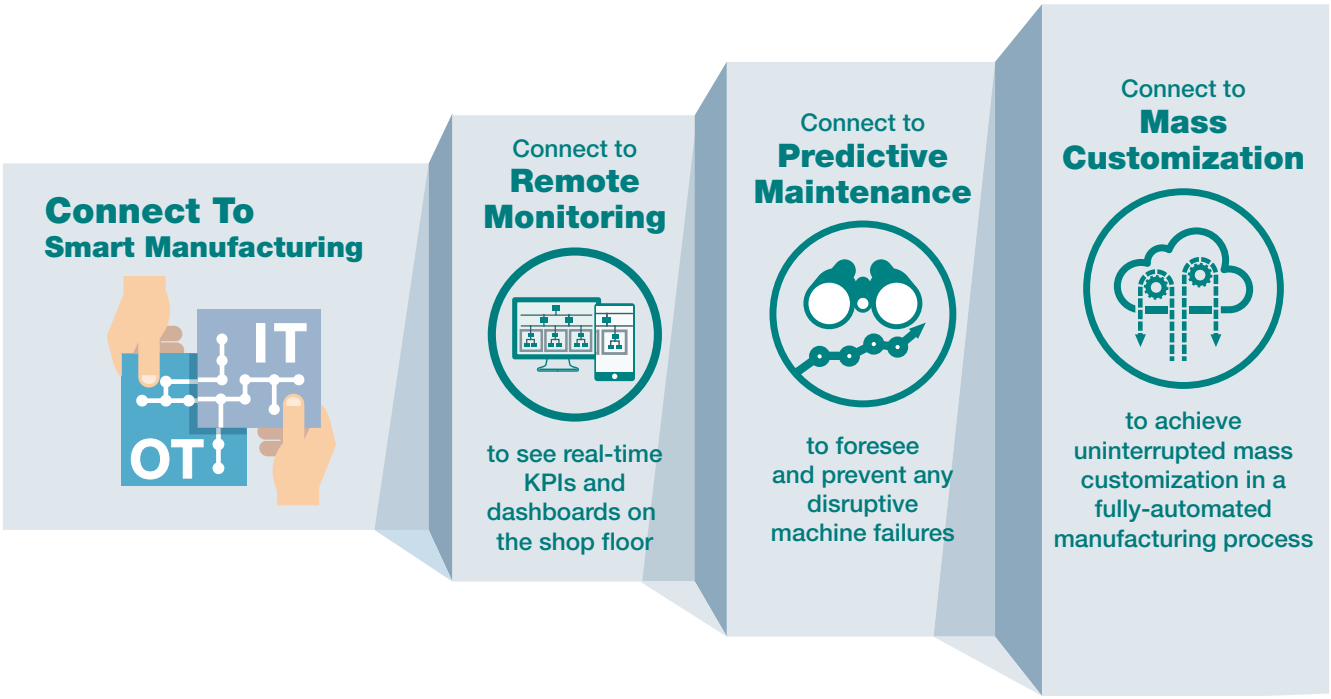



Figure 1: The IIoT is enabling three phase of manufacturing intelligence

Connectivity is the golden thread in smart applications, as the IIoT is completely reliant on communication to enable the industrial intelligence of digital transformation from the edge to the cloud. For the purpose of this application note, we will briefly illustrate trough a case study how connectivity can be achieved for each phase to pave the way for smart manufacturing.

# 1 Connect to Remote Monitoring

## A resilient and reliable network that connects a large number of existing data sources from various systems is critical to ensure accurate data in order to realize remote monitoring

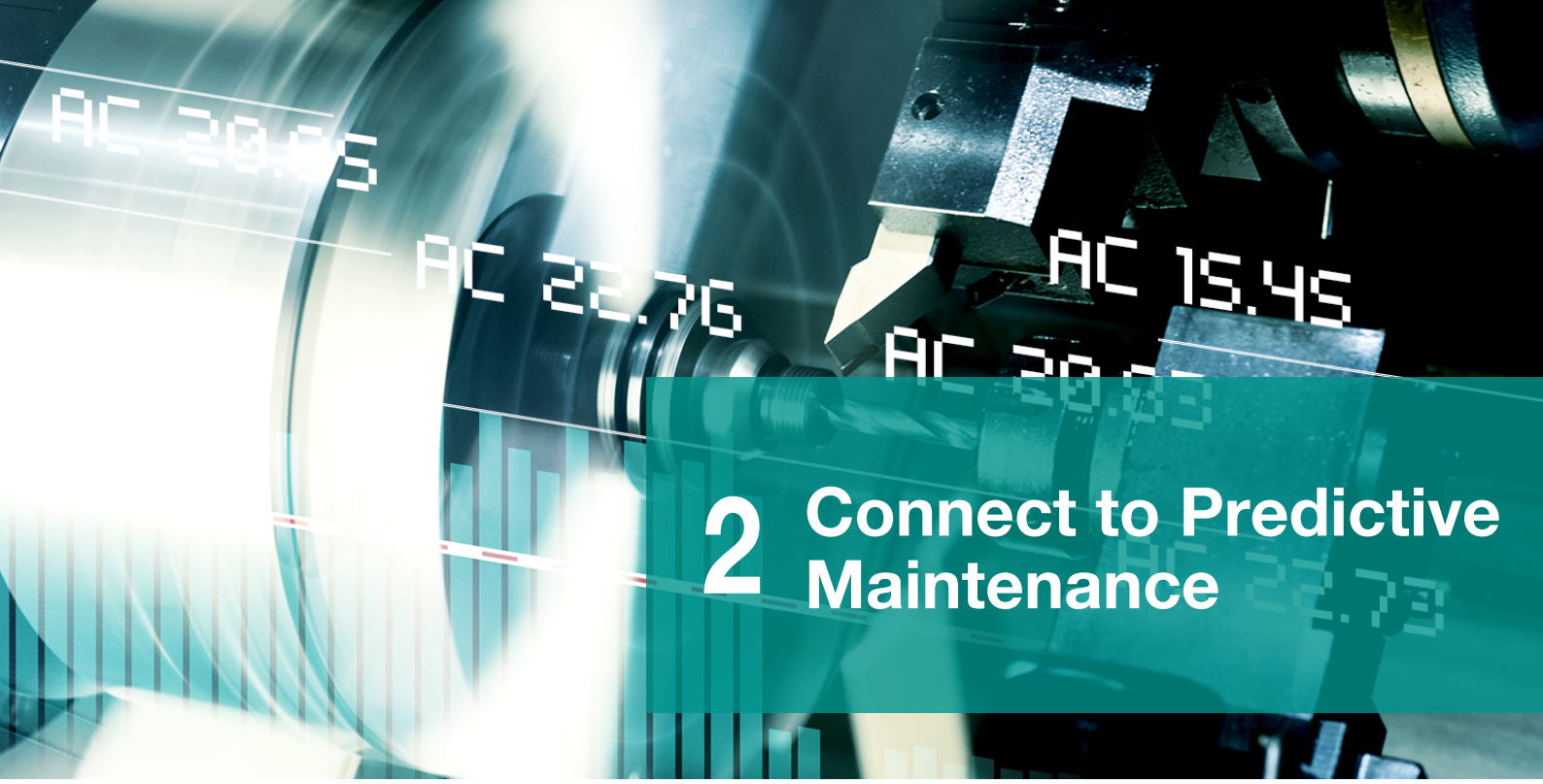
Remote monitoring gives production managers visibility and transparency of data that is often stored in decentralized silos, facilitating the overall monitoring of operations. Remote monitoring comes with many benefits for the manufacturing industry, from improving productivity to reduced downtime, to reducing operating costs.

With information readily available at managers' fingertips, they are able to address the highest production priorities in a timely manner. But without a resilient and reliable network, which connects sensors and other data-gathering devices on the shop floor, managers will adjust production planning based on unreliable data. What if we can simplify connectivity for you to connect a large number of subsystems?

### Case in Brief:

#### Smarter Shop Floor with Real-time Cloud-based Monitoring

Tech Manufacturing, a long-time manufacturer of machine metal parts for aerospace clients, needed to raise production capacity and reduce lead time for their clients' largest and most urgent orders. Moxa helped Tech Manufacturing connect their legacy machines and devices to collect data and push it to the cloud. This time-saving and cost-saving remote monitoring solution is already reaping benefits for the customer with increased productivity as the real-time dashboard makes it easy to identify critical production issues. Learn More



# 2 Connect to Predictive Maintenance

## To achieve optimized results for predictive maintenance, it is critical to acquire data from diverse data sources to increase the accuracy and precision of data

Predictive maintenance enables operators to predict when maintenance should be performed by determining the condition of their in-service equipment. Basically, predictive maintenance comes down to keeping equipment in good working order to prevent unexpected downtime, ensuring reliability. This practice brings huge cost savings in comparison with routine or scheduled preventive maintenance, because tasks are performed only when needed. **ARC Advisory Group** estimates that predictive maintenance can reduce maintenance costs by 50% and unexpected failures by 55%.

To further increase the efficiency of predictive maintenance, it is critical to leverage the ability of edge computers to preprocess increasing volumes of data acquired from sensors, meters, and other network devices, as well as to autonomously react before machine failures truly occur. What if we can simplify connectivity for you to acquire and preprocess diverse data?

### Case in Brief:

#### Connecting Data From Sensors to AIoT Systems With Ease


KPMG, a distinguished global firm providing audit, tax, and advisory services, leveraged AIoT (AI and IoT) technology to help an automotive engine parts manufacturer to increase yield and build predictive maintenance. More sensors were added to existing IoT devices to collect additional data on vibration, temperature, rotating speed, and electric current. Moxa's easy-to-use connectivity solutions were implemented to help send the data to a backend AI platform where, through analysis, control standards were established, making predictive maintenance possible as any deviation, which could result in the production of defective products, was immediately detected. The OEE was increased from 70% to 85%. **Learn More**

# 3 Connect to Mass Customization

## Secure remote access and holistic security for interconnected industrial control, IT, and OT subsystems are essential to achieving uninterrupted mass customization in a fully automated manufacturing process

Mass customization, which entails leveraging flexible computer-aided systems to tailor production output on a large scale, has emerged as a key strategy for helping manufacturers maintain market share in the age of Industry 4.0. These flexible manufacturing systems allow outputs to be customized at item level on a massive scale. What's more, mass customization allows manufacturers to meet customer expectations for products built to their exact specifications within an even shorter amount of time. Within this context, data integrity and consistency are imperative to ensure smooth operations and on-time deliveries.

In order to further reduce system downtime in a fully automated mass customization manufacturing process, it is necessary to be able to efficiently upgrade, troubleshoot, and maintain more connected machines from remote distances. Additionally, with more IT systems connected to industrial control systems (ICS), manufacturers also need to protect all these newly interconnected machines and industrial subsystems from internal and external threats. What if we can simplify connectivity for you to enable secure and reliable networks?

### Case in Brief:

#### Connecting Reliable Production Data in Interconnected Factories

The largest home appliance manufacturer in China uses Moxa's solutions to enhance production efficiency and flexibility by leveraging the power of a connected ecosystem. Industrial-grade hardware that provides redundancy protocols is combined with network management software to ensure network availability and health. A reliable and secure connection to the manufacturing systems also allows orders to be customized, logistics to be further automated, and customers to check the status of their orders. And as real-time data is supplied from the shop floor, production managers can monitor the production line more effectively and tackle any issues well before full-blown problems arise. Learn More