Transparent, reliable and effective industrial processes: **Aprotech and ChTPZ** collaboration



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The Chelyabinsk Tube Rolling Plant (ChTPZ) is one of Russia's largest manufacturers of steel pipes for the oil and gas refinement industry, machine-building, energy, construction, agriculture, aircraft engineering, and other industries. The enterprise offers its customers a wide assortment of welded and seamless pipes of various grades that meet the strictest global safety and sustainability standards.



ChTPZ runs the full cycle of pipe production, which includes dozens of high-tech operations that require substantial production capacities. This is why it is crucial to implement cutting-edge practices in industrial processes to enhance the quality of products and the efficiency of industrial asset utilization.

# Objective

One ChTPZ workshop cuts threads into pipes. This is done by two machines that work in combination to process a pipe from both ends. The market has a high demand for these pipes because they allow the customer to avoid additional threadwork before putting them into operation. Therefore, any failures in this industrial process could pose tangible risks that orders may go unfulfilled.

You can identify the reasons for failures and prevent losses by **analyzing the accumulated operational data of industrial machines and conducting timely maintenance**. To determine the capacity utilization of an industrial machine, sometimes all you need to do is simply monitor its performance indicators.

The industrial machines of ChTPZ are equipped with state-of-the-art Siemens CNC capabilities and generate a large volume of information about the operation of equipment. However, this **data is not transmitted anywhere.** It can only be accessed by an operator in the workshop. The operator can see the current errors or machine settings, but cannot trace the dynamics of the machine over a period of time. Because of this, it is impossible to analyze several important parameters that may be precursors of a failure or stoppage. This makes it difficult to determine the **cause of machine failure, downtime or tool breakage**.

In addition, the factory personnel responsible for product quality have to manually document a large amount of information related to the state of industrial machines. This incurs tangible expenses on time and resources.

Therefore, it is necessary to deploy technologies that can gather the required volume of data for a comprehensive analysis of equipment operations, and automate the processing and storage of this data. This would help personnel conduct timely maintenance while preventing failures, downtime and breakage.



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### Solution



To accomplish this task, ChTPZ teamed up with Aprotech to develop and launch a digital service called "**Monitoring industrial machines**" in the **Siemens MindSphere** cloud platform. Although this service is just a prototype, it is already resolving some important issues.

For instance, one of the main objectives of this service is to ensure secure and reliable data transfer from an industrial machine to the cloud. This objective is fulfilled by the **Cyber Immune industrial data gateway known as Kaspersky IoT Secure Gateway (KISG) 100**. This solution was developed by Aprotech and Kaspersky to connect to a Sinumerik 840D machine directly via the network interface to collect, preprocess and transfer operational data while protecting the connected equipment. This gateway's inherent resistance against existing as well as currently unknown cyberthreats is known as 'Cyber Immunity'. This means that the device will perform its critical functions under any circumstances. The Cyber Immunity of KISG 100 was made possible by the technologies of the **KasperskyOS** operating system that served as the foundation for the gateway.



Kaspersky IoT Secure Gateway Kaspersky IoT Secure Gateway 100 supports connections over the universal OPC UA protocol and collects a multitude of production information that was previously unavailable. It prepares data for transmission to the Siemens MindSphere IIoT platform, and this data stream flows only in one direction (from the field level to the cloud). In other words, it protects connected devices against any external influence by potential cybercriminals.

Siemens MindSphere is responsible for receiving and storing data on equipment operation. The platform also runs and operates a **machine monitoring application** developed by Aprotech and ChTPZ. This application lets you conveniently visualize the main operating parameters of industrial machines and utilize this data to interactively track key performance indicators.





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### Result



A service for monitoring industrial machines and visualizing the operating parameters for cutting threads in pipes has been developed and launched in the MindSphere industrial cloud platform.

For approximately 12 months, ChTPZ personnel have had real-time access to the service with current and archived data from this industrial operation.

#### Benefits of using the service

- Direct connection to equipment without having to build an expensive infrastructure
- High data transparency and control of the industrial operation
- Real-time monitoring of the equipment fleet
- · Prompt decision-making on process optimization based on data in the digital service

#### Potential uses for the service

- Scalability flexible and planned connection of new equipment to the service. Requires minimal expenditure from the customer
- Integration of digital services with existing internal enterprise systems
- Building data-based services for a variety of tasks

## **Project participants**

**PAO ChTPZ** is part of TMK (Pipe Metallurgical Company) and is Russia's main provider of large-diameter pipes for key industrial industries. ChTPZ has implemented a large-scale upgrade program and runs a number of cutting-edge industrial facilities. For example, its Vysota 239 is one of Europe's largest workshops producing large-diameter pipes, while its Eterno facility is a manufacturer of fittings for pipelines. ChTPZ pipes make up at least 70% of all active pipelines in Russia. **R&D Adaptive Production Technology (Aprotech)** is a subsidiary of Kaspersky that helps industrial enterprises effectively and securely complete their own digital transformation 4.0. This transformation is facilitated by cutting-edge software and hardware systems and vertical services based on an industrial IoT platform developed together with partners to accomplish specific production tasks.

# R&D Adaptive Production Technology (Aprotech)

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