

MACHINE OPERATOR AUTHENTICATION

ENABLING WORKFORCE TRACKING AND OPTIMIZATION
THROUGH SECURE AUTHENTICATION



Operator identity is often a missing link in manufacturing data. To optimize plant processes, manufacturers need to know not only what machines and materials were used and at what times but also who was in control. Reliable and secure operator authentication is critical for plant security and IP protection, effective workforce tracking and management, and manufacturing optimization.

THE IMPORTANCE OF KNOWING “WHO”

Industry 4.0 is all about data. The “Industrial Internet of Things” (IIoT) enables manufacturers to track various metrics highly granularly across the entire production cycle, from material usage to production yields to total cycle time. Centralized data analysis within a Manufacturing Execution System (MES) allows unprecedented insights into production capacity, equipment uptime and utilization, maintenance requirements, and other critical aspects of plant performance. Using data to drive decisions helps plant managers and executives identify areas for improvement, optimize processes, and improve productivity and cost control.

One crucial metric is often missing in all this data: **operator identity**. We may know exactly how much time a piece of equipment was powered on, what tools and materials were used, and precisely what was done the entire time the machine was operational, but not who was in control.

In most factories, workers gain access to the building and clock in using a company ID badge but use other, less trackable means of authentication to access individual production cells, machines or vehicles on the production floor. Shared physical keys, RFID fobs or PINs are still common for access to production equipment and material-handling vehicles. Some machines have a Human-Machine Interface (HMI) that requires a username and password, but these may be commonly shared in some company cultures. This means that managers have limited visibility into the activities of specific workers beyond the clock-in and clock-out times and no way to track which workers were operating which machines at what times.

WHY DO YOU NEED TO KNOW WHO?

Machine operator identity provides greater visibility into worker activity, productivity, per-unit labor costs and other important metrics, enabling data-driven decisions around:

- + Training Needs
- + Quality Control
- + Machine Troubleshooting
- + Scheduling
- + Compliance
- + Workforce Optimization



Without operator identify, manufacturers are missing an essential element of plant optimization. Reliable operator authentication at the machine level is needed to link metrics such as material use, product quality and production output to individual workers. By tracking workforce activity at the machine level, manufacturers can gather valuable insights into individual and team performance, allowing them to optimize processes, improve productivity, minimize variation and enhance overall plant performance.

HOW WORKFORCE TRACKING ENABLES MANUFACTURING OPTIMIZATION

Workforce tracking refers to the ability to accurately identify individual workers and monitor their activities as they interact with various machines and equipment within the manufacturing facility. This is achieved through reliable and secure authentication methods that link their unique operator identity to a specific piece of equipment at a particular time. Linking operator identity at the individual machine level—and not just at the cell or line level—provides much more granular detail into how workers spend their time across each shift and how individual machines are utilized, by whom, and for which projects. Adding operator identity to all the other data collected in a manufacturing facility provides critical insights that allow managers to make better workforce and production management decisions.



In addition to user identification, a machine authentication system also allows access levels to be set for individual users. This prevents unauthorized or untrained personnel from operating expensive machinery, protecting assets, production processes, and valuable IP that may be held on the machine, such as part or tool specs. Machine authentication and workforce tracking support compliance with increasingly strict industry and government standards and insurance requirements for occupational safety and cybersecurity. Access levels can also be set

CASE STUDY:

TRACKING PRODUCTION COSTS AND OPERATOR EFFICIENCY

A multinational engineering and technology company customer of Polaris Automation, Inc. wanted to get better insights into the true production costs of individual part numbers. This required greater granularity into how much time individual workers spent in various operations across the plant.

Workers used their company ID badge to clock in at the beginning of the shift, but the company had limited visibility into how individual workers spent their time once clocked in. Polaris Automation specified, and the customer added, universal RFID readers from ELATEC to the HMIs of each individual machine across the plant. This allowed workers to easily sign into each machine.

Machine authentication enabled the client company to get a better picture of unit costs by looking at how many people were at each station and for how long. Now, they can track not only machine performance, but also operator performance on each piece of equipment, so they can identify training needs and improve efficiencies across all operations.

for different types of users based on training levels, certifications or job responsibilities. For example, different access levels may be set for line operators, supervisors and maintenance technicians that dictate which machine functions they are authorized to access, change or control. Secure access control improves plant safety and minimizes the risk of intentional or accidental damage to equipment and production line disruptions. When we know exactly who is operating each machine at all times, we can use that data to drive workforce and production optimization in various ways.

- + **Labor costs:** What are the actual labor costs for each piece going through the production line? How much time are different employees spending on each piece, and during what processes?
- + **Workforce utilization:** Is the workforce fully utilized at all points in the shift, or are there times when some workers are waiting for a machine to be freed up or for a more experienced technician to become available? Do adjustments need to be made in scheduling or in the physical layout of the production line to ensure that machine availability matches worker availability?
- + **Operator efficiency:** How does each operator's performance compare to others? Are there variations in output, quality, or speed that can be attributed to individual workers? Can these differences be used to identify best practices or areas where additional training is needed?
- + **Machine preferences:** Do certain operators perform better on specific machines or tasks? Can this information be used to assign workers to the most appropriate machines or tasks, optimizing both individual performance and overall productivity?
- + **Safety and compliance:** Are there any patterns of non-compliance or unsafe behavior among operators? Can targeted safety training and enforcement be implemented to reduce risks and ensure compliance with regulations and best practices?
- + **Skill gaps:** Are specific skills or competencies lacking within the workforce? Can targeted hiring, training, or mentorship programs be implemented to address these gaps and improve overall workforce capabilities?

WHY RFID?

- + Enables reliable identification and authentication of individual operators
- + Secure, encrypted communication between the card and reader prevents cloning or hacking
- + Fast and contactless, so it won't slow workers down
- + Works even in dirty, hazy or humid factory conditions
- + Can leverage the same ID card workers already carry for building access

MACHINE AUTHENTICATION WITH RFID

To make workforce tracking effective, manufacturers need a reliable way to track employee activities down to the individual tool and machine level. A machine authentication system that crosses all tools, machines, robots, vehicles and equipment provides complete transparency into worker activities across the shift; managers know exactly where each person was at any time and what they were working on.

Radio-frequency identification (RFID) provides secure, reliable user authentication and access control for industrial machines. For most manufacturers, an RFID reader that can read the same badges that employees already use for building entry is the optimal choice.

- + RFID is easier to manage and more secure than a password or PIN system, reducing IT time and minimizing hacking risks.
- + Unlike shared physical keys or fobs, it enables identification of the individual operator.
- + In contrast to biometric systems, RFID does not require workers to remove masks or gloves for identification.
- + RFID is reliable even in hot, hazy, dirty, or high-humidity environments, where technologies like biometrics, magstripe cards or optical readers can fail.
- + In environments where mobile device use is practical and safe, RFID readers can also be configured to allow authentication via NFC or Bluetooth® Low Energy (BLE).



RFID readers enable workers to sign into individual machines quickly and easily as they go about their day. Authentication is fast and contactless; workers simply wave their ID card (or, in some cases, a smartphone or wristband) near the reader, which is connected to the HMI and/or programmable logic controller (PLC) for the machine. A unique operator identity number is used to identify each user. The reader can send information to the MES or other backend systems to enable efficient workforce tracking and confirm that the operator is authorized to use the equipment.

HOW RFID WORKS FOR MACHINE AUTHENTICATION

RFID cards have two main components:

- + an integrated circuit that can store and process information
- + an antenna to transmit or receive a signal

Each RFID card stores a unique data set—such as a number—that serves to identify the card and, by extension, the person carrying it. When a card with an embedded RFID tag is in close proximity to an RFID reader, the reader transmits a radio signal to interrogate the tag. The radio signal activates the tag, which then uses the power in the radio signal to respond to the reader with its unique ID.

The reader can be embedded into the machine, tool or robot. Once the tag is read, the reader connects to backend systems to confirm access levels for the operator. If authorization is confirmed, a signal is sent to the HMI or PLC to enable operation. Differentiated access levels for machines can be set based on operator identity.

ACCESS SOLUTIONS FOR THE SMART FACTORY

Machine authentication is just one access application for the smart factory. In a unified access system, employees can use their company ID badge to access everything they need across the plant, from physical access to production areas and elevators, to sign-on to workstations and printers, and even company amenities such as parking, EV charging, vending and the cafeteria. A harmonized access system provides even more granular detail into worker movements and activities across the shift. It also offers convenient access for employees while enhancing security and safety for the plant.



To make it all work, manufacturers need a reader compatible with the access technologies they already use for building entry and time-and-attendance. That way, workers don't have to carry multiple cards to access different machines and applications throughout the factory. Workers are also much less likely to share their primary ID cards. A unified system is more convenient for workers and simpler for IT to set up and manage.

ELATEC's universal RFID readers provide an optimal solution. With a universal reader, manufacturers can leverage the identification media they already have in place for easier implementation of machine authentication and other access applications. And with various form factors and a powerful software development kit, the readers can be integrated into a wide variety of machine and device types.

UNIVERSAL ACCESS: THE ELATECTWN4 MULTITECH LINE OF READERS

Powerful, versatile readers for Smart Manufacturing.

- + 60+ transponder technologies, plus mobile authentication via NFC and BLE
- + Wide range of form factors and housing options for a variety of applications
- + Powerful software development kit for easy customization
- + Encryption for secure and sensitive industrial applications
- + Secure remote updates for easy reconfiguration and security maintenance
- + Certified for use in as many as 110+ countries

While a critical component, the RFID reader is but a part of the total solution. ELATEC leads by bringing in appropriate partners to develop and implement the optimal solution based on the end customer's needs, including such requirements as communication with the factory network via MQTT.

THE ELATEC ADVANTAGE FOR THE SMART FACTORY

ELATEC's powerful, flexible reader technology gives manufacturers and system integrators a real competitive advantage, both now and in the future. ELATEC can help OEMs, system integrators and machine builders developing Smart Factory solutions:

- + **Expand internationally:** ELATEC readers are certified for sale in as many as 110 countries globally.
- + **Maximize market opportunities:** ELATEC readers support nearly every card technology available, including HF and LF, and an ever-expanding portfolio of compatible mobile credential access control solutions via BLE and NFC.
- + **Reduce total lifecycle costs:** ELATEC readers simplify inventory management with a virtual single-part number solution and can be easily and remotely updated or reconfigured without replacing inventory.
- + **Deliver customer advantage:** ELATEC readers reduce configuration expenses, extend product life, and support advanced functionality and security requirements, providing product differentiation for device manufacturers and software developers.
- + **Prepare for the future:** With ELATEC, you'll be ready for whatever comes next. Our readers can be reconfigured to address emerging opportunities and customer requirements.

Service	Products	Software
The world's best RFID products and software come with the world's best service. Our team is with you all the way with expert advice and hands-on help, from needs analysis and product selection to implementation and post-sales support.	Find the optimal product for every project. We offer single- and multi-frequency readers/writers in many configurations. We can also customize solutions for your application – no other reader on the market offers more options or can be customized as quickly!	Our software solutions help you get the most out of your RFID reader/writer. Our Software Development Kit lets you configure your reader with easy-to-use software tools for your exact security standards, communication protocols, and IT infrastructure.

READY TO GET STARTED WITH MACHINE AUTHENTICATION?

The access control experts at ELATEC can help you design an authentication system that fits your production environment.

Contact us for a consultation.

elatec.com

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