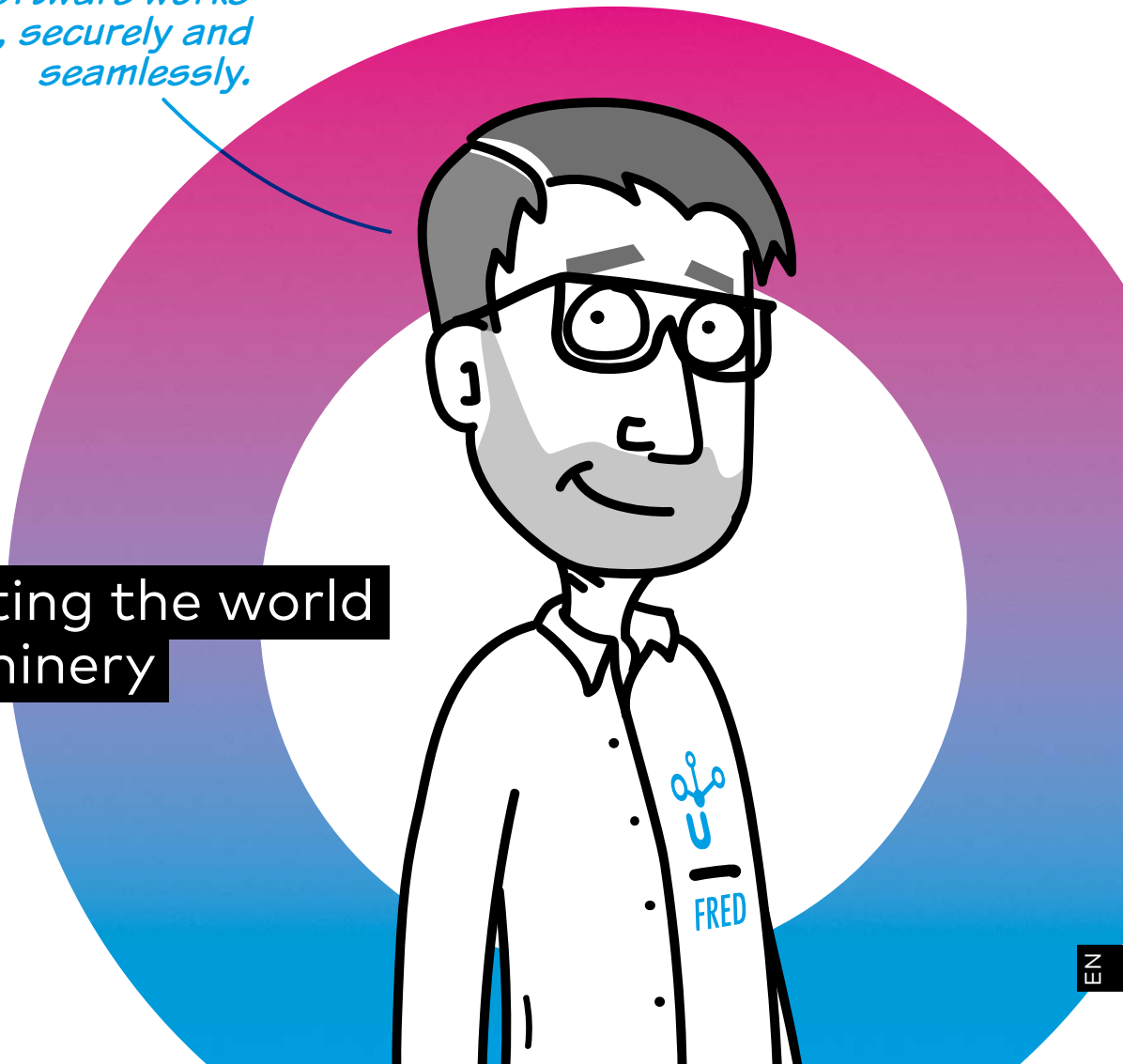
umati

universal
machine technology
interface

*Welcome and see how* **CONNECTIVITY** *between your machinery and your software works – easily, securely and seamlessly.*




# connecting the world of machinery

BASED ON OPC UA

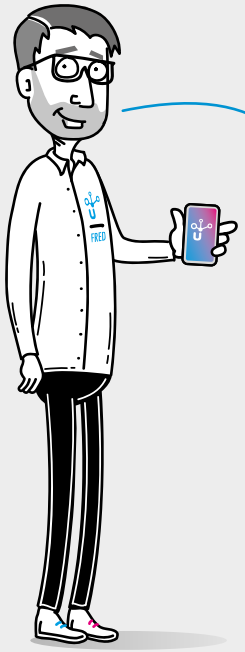
EN

# The umati promise: Make connectivity between machinery and software easy, secure and seamless – to help customers exploit added value from data.

**Connectivity is key** for all machinery in the 21st century. It means getting data in and out of devices and software systems – preferably via open, standardized interfaces.

umati is a **global initiative** for the promotion of open communication interface standards for machinery and production equipment.

umati brings together machine builders, software producers and users in a strong community. **umati partners** share their experience to benefit from the identical implementation of OPC UA standards.



*Hi, I'm Fred, your umati guide!*

*The number of umati partners is growing continuously. To see who has already endorsed umati, visit* **WWW.UMATI.ORG/PARTNERS**

Our **mission** is to provide true "plug and play" functionality in the field of machinery, so it becomes easier for users to participate in a data-driven economy.

umati **supports** users and machine builders by creating a strong international community; raising market awareness through joint marketing; ensuring identical implementation of the endorsed OPC UA specifications; and proving the power of open, standardized data exchange ecosystems through live demonstrations.

umati relies on **OPC UA as the global interoperability standard**. Standardization work takes place in multiple "Joint Working Groups" involving various sectors of the machine building industries and the OPC Foundation. This guarantees that the individual needs of different technologies are taken into consideration and ensures maximum transparency and the support of a strong global community.

**OPC UA** and the **OPC Foundation:**

- provide a **framework for standardized communication** (**HOW** to communicate)
- **support standardization** of specific needs for various technologies (**WHAT** is to be communicated)
- make the standards **available worldwide with no license fee**.

# You want to connect the machines on your shop floor to your IT system, such as MES or ERP? You want to exploit your data to make your production more efficient, reduce waste and costs, and save money? umati is here to help!

Use cases

| Your job | Page | Asset Management 8 | Key Performance Indicators (KPI) 9 | Preventive Maintenance 10 | Predictive Maintenance 11 | Production Control 12 | Production Monitoring 13 | Traceability 14 | Quality Management 15 | Energy Monitoring 16 | Load Management 17 | Product Carbon Footprint (PCF) 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Salesman 4 | * | * | * | * | * | * | * | * | * | * | * |
| | Purchasing Manager 4 | * | * | * | * | * | * | * | * | * | * | * |
| | Production Manager 5 | * | * | | | | | * | * | * | * | * |
| | Machine Shop Owner 5 | * | * | | | | | * | | | | * |
| | Shift Planner 6 | | | | * | * | | | | | * | |
| | Process Planner 6 | | | | | * | * | | | * | * | |
| | Maintenance Engineer 7 | | | * | * | | * | | | | | |
| | Machine Operator 7 | | | | | | * | | * | | | |


**YOUR JOB** *needs to get done? Find out on the next few pages how umati can help...*

*... or you have a certain* **USE CASE** *in mind? From page 8 you can see how umati can help you get exactly the data you need.*

# Your job – our support!

*I am a* **SALESMAN**. *I present offers to our customers and guide them through the sourcing process to find the solution that best fits their needs.*

*I want to be sure that...*

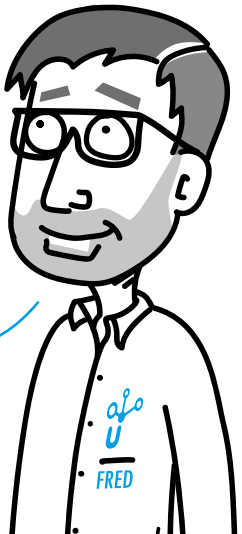
- *connectivity and compatibility can be achieved without extra engineering.*
- *I can propose a suitable solution straight from the price list.*
- *the solutions we offer are easy to understand, long-lasting and fit the customer's individual needs.*

*I am a* **PURCHASING MANAGER**. *I ensure that our production facilities are equipped with the best equipment at a reasonable price.*

*I need to make sure that...*

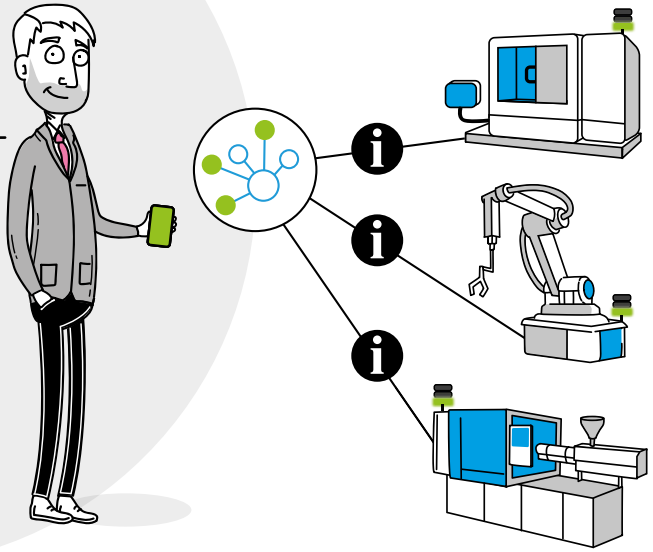
- *new machines and assets fit into our existing "eco-system" of software and machinery.*
- *connectivity can be realized without too much extra cost.*

**SALESMEN** *and* **PURCHASING MANAGERS** *don't want to get too involved in the technical details, but they want to understand why and how standardized solutions can meet their needs and help them to find the best value.*

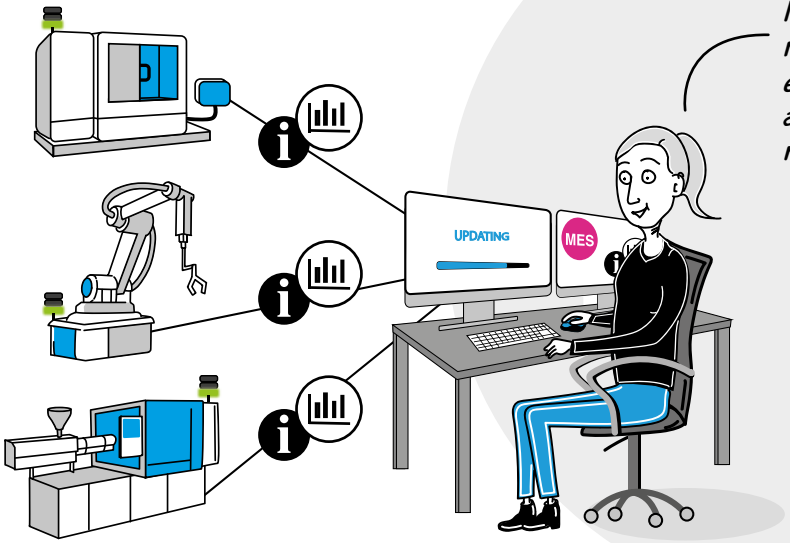


*Hi! I am a* **PRODUCTION MANAGER**.
*I want to know...*

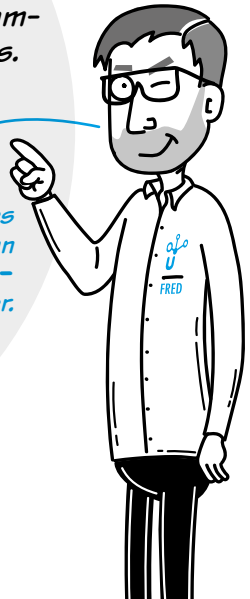
- *if all my machines are working properly – so I can be sure of delivering my parts in time.*
- *Are there any downtimes? Do I lose money? What's happening...??*

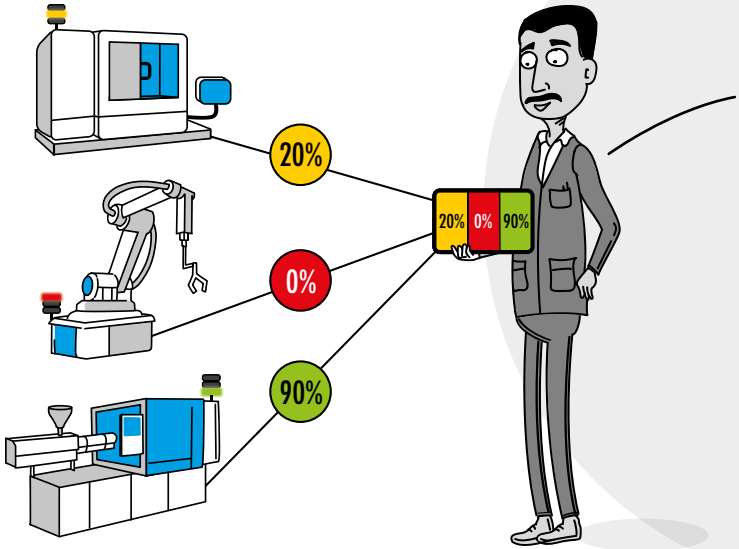


*I am the* **OWNER** *of a* **SMALL MACHINE SHOP**.
*I want to connect new machinery to my existing software environment without spending a lot of money on programming individual interfaces.*




*This also makes the job of an* **IT ADMINISTRATOR** *easier.*






*As a* **SHIFT PLANNER,**
*I am responsible for delivering on time.*

*I want to know...*

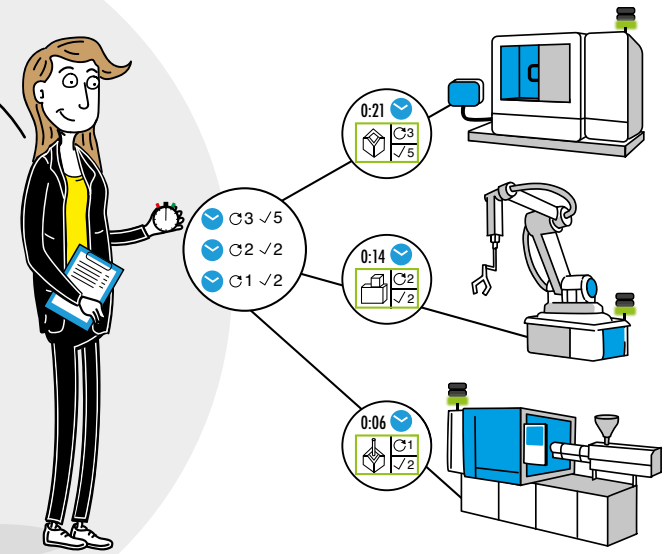
- *the utilization of my machine.*
- *are there idle times, breakdowns or limited availability?*

*I need to know immediately so I can re-organize!*

*As a* **PROCESS PLANNER,**
*my task is to plan ahead for maximum utilization of our assets.*

*I want to...*

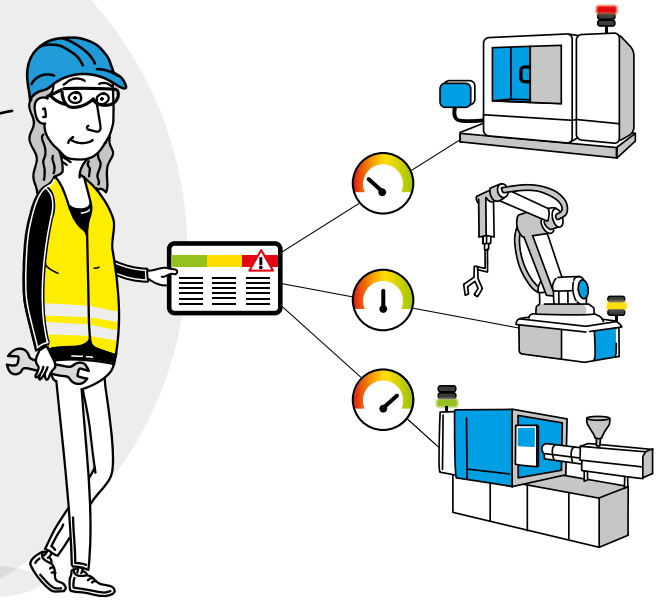
- *have an overview of all current jobs.*
- *know how the machines are performing.*
- *know which tools are in use in which machine.*
- *upload programs and recipes to prepare for future jobs.*

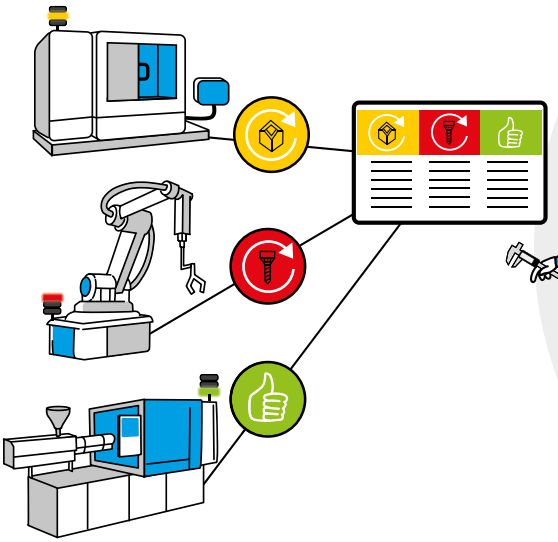


*As a* **MAINTENANCE ENGINEER**, *I make sure that the machines are ready for use.*

*I need to know...*

- *the current condition of all machines and assets.*
- *upcoming services and maintenance tasks.*
- *immediately if any disruptions occur so we can fix them as soon as possible.*





*As a* **MACHINE OPERATOR**, *I am usually responsible for more than one machine. I need to make sure that they are loaded with tools and raw parts.*

*I need to know...*

- *which machine to attend next*
- *what to do next*
- *are there any errors, warnings or malfunctions?*

# Use cases

## Asset Management

... is the process of strategically planning, monitoring, and managing assets (i.e., production facilities, machinery, equipment and other resources) to ensure efficient utilization, maximum output and high-performance production capacity.

Simplify Asset Administration

Accelerate Start-Up

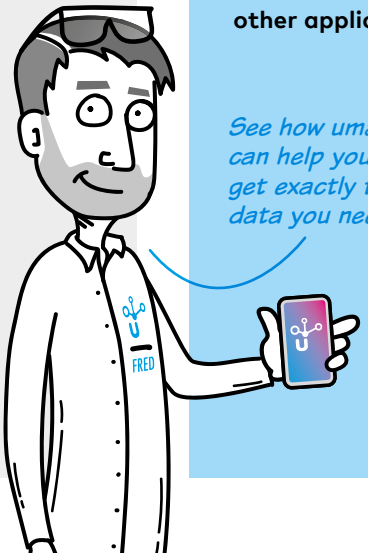
Optimize Performance

**your goals**

- **Maximize the life cycle and performance** of the assets, ensuring their availability and reliability while optimizing the costs
- Ensure the continuous **operational readiness** of plant and machinery

**how umati helps**

- **Identical implementation** of identification data of individual assets
- Contains **all data needed** to identify production assets
- **Topological relationship between assets** is (implicitly) mapped
- Identification is basis for **many other applications**




**your benefits**

- **Minimize** unplanned downtime
- Improve **production efficiency**
- Adherence to **delivery dates**
- **Minimize unnecessary expenditure** on spare parts, repairs and downtimes
- **Asset inventory identification**
- Easier **asset management**
- **Condition monitoring**
- **Maintenance and repair scheduling**
- **Spare parts procurement**
- **Performance optimization**
- **Compliance** with regulations and standards
- **Faster commissioning of new assets** or the replacement of old assets in an existing production structure

## Key Performance Indicators (KPI)

... are metrics to evaluate the success of a company, a department, or a specific project. KPIs can be used to measure and improve the performance of a production process.

Monitor Perfomance

Increase Efficiency

**your goals**

- Assess productivity, efficiency and quality of production processes through **objective variables**

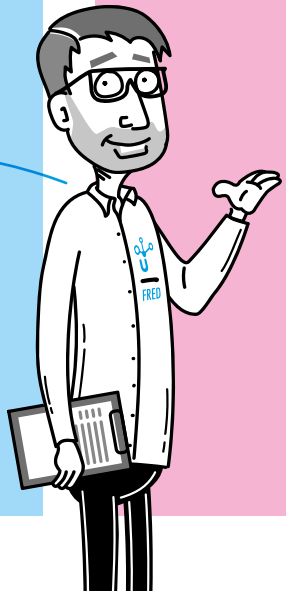
**how umati helps**

- KPIs are applied uniformly to the **entire range of production equipment** using different OPC UA Companion Specifications
- Current status and operating mode of machines and systems **immediately available**
- **Good comparability** of data

**your benefits**

- **Transparence** through continuous performance monitoring and evaluation
- **Early detection** of bottlenecks, inefficient processes, or quality problems
- **Initiate actions** for improvement

*Your general benefits:*
**SAVE TIME AND COST**
*through seamless flow of data based on standardized data interfaces – independent of a specific use case.*



## Preventive Maintenance

... prevents potential failures and damage to equipment or facilities by scheduling regular inspections, maintenance and repairs.

Minimize Down Times

Schedule Maintenance

Improve Efficiency and Availability

**your goals**

- Avoid unforeseen downtime and repairs by **adhering to maintenance schedules**
- **Increase** the efficiency, availability and lifetime of machines and other assets

**how umati helps**

- **Simple "Operation Counter" and "Lifetime Counter"** provide information on how long a machine has been in operation

**your benefits**

- More **efficient planning** of maintenance times
- **Combine information** from operating hours counter, maintenance records, operating conditions, and the expected life of the asset
- **Identify** when to replace a specific component

## Predictive Maintenance

... uses continuous monitoring and data analysis to predict potential failures or malfunctions and implement targeted maintenance actions before damage or production downtime occurs.

Minimize Down Times

Schedule Maintenance

Improve Efficiency and Availability

**your goals**

- Avoid unforeseen downtime and repairs by **analyzing lifetime-relevant data**
- **Increase** the efficiency, availability, and lifetime of machines and other assets

**how umati helps**

- **Standardized information models** for implementation
- OPC UA for Machinery Basic Building Block "Process Values" provides mechanisms for describing **actual and target values and related information**
- Transmit and display **sensor information** and other values uniformly

**your benefits**

- **Collect sensor data**, such as vibration, temperature, pressure, power consumption etc.
- **Analyze data** using a variety of methods (model-based, statistical methods, machine learning/AI) to identify patterns, anomalies and correlations that may indicate possible failures or deviations
- **Drive forecasts** to enable early planning and implementation of maintenance activities
- **Optimization of maintenance schedules** through continuous monitoring

## Production Control

... is at the core of every manufacturing company. A part of production planning and control (PPC), it essentially consists of enabling and monitoring of production jobs and aims at creating an effective and efficient production process.

Increase Flexibility

Increase availability

Improve Efficiency

**your goals**

- **Increase flexibility**
- **Strengthen reliability**
- **Improve efficiency**
- **Maximize asset utilization**
- **Maximize productivity**
- **Minimize unpredictable delays**
- **Avoid over- or underproduction**
- **Prevent waste of resources**

**how umati helps**

- **Collect operating data** via production data acquisition systems (PDA) or Manufacturing Execution Systems (MES) without additional interfaces
- **Exchange job-related information** based on ISA 95 Job Control and OPC UA for Machinery
- **Scalable application** from simple to very complex order management systems, covering a variety of assets and standards

**your benefits**

- **Central** control for the effective and efficient execution of production processes
- Monitor **asset availability**
- Monitor the **current status of asset utilization**
- Schedule the **job sequence**, including assets, human resources and materials
- **Prioritize jobs** based on deadlines, inventory, degree of utilization, or bottlenecks

## Production Monitoring

... is the continuous monitoring of the operation and performance of production processes. This ensures that they run efficiently, without errors and in accordance with the defined standards and quality specifications.

**Identify Problems earlier**

**Enhance Transparency**

**Increase Productivity**

**your goals**

- **Continuous monitoring** of the entire sequence and performance of the production
- Provide an **overview** of the production status at all times

**how umati helps**

- Production plants and machines are typically controlled and monitored by a **higher level system** (e.g. MES). These systems should rely on open, standardized interfaces.
- **Data flow together seamlessly** via a variety of standards, i.e. ISA 95 Job Control and OPC UA for Machinery Companion Specification.
- Building blocks, for example, are the **harmnized implementation** of stacklights or key performance indicators

**your benefits**

- Comprehensive **transparency** of the production processes
- **Informed decision making** and better planning
- **React quickly** to any problems or bottlenecks that arise
- **Minimize downtime** and ensure efficient production
- **Optimize** production performance
- **Increase productivity**
- Make better use of **production capacity**
- **Shorten lead times**
- **Increase profitability**

## Traceability

... is the ability to track the entire life cycle of a product or component along the supply chain. It enables companies to collect and track information about the origin, manufacture, delivery and use of a product.

Analyze Errors and Causes

Manage Callbacks

Improve Product Quality

**your goals**

- **Track and trace** the entire life cycle of a product
- **Failure Mode Analysis**
- **Improve recall management**
- **Improve product quality**

**how umati helps**

- **Collect operating data** and order results via production data acquisition systems (PDA) or Manufacturing Execution Systems (MES) without additional interfaces
- **ISA 95 Job Control** and OPC UA for Machinery Companion Specification
- **AutoID specification**

**your benefits**

- **Quick identification and return** of defective products or components
- **Analyze quality problems** to determine the causes and initiate appropriate actions
- **Trace the origin and location** of components and raw materials along the supply chain
- **identify responsible parties** in case of product defects or safety problems
- **Traceability** in the event of a recall
- **Monitoring/assessment of environmental impacts** along the supply chain
- **Identification of opportunities** to improve sustainability

## Quality Management

... ensures the quality of manufactured parts or products in order to minimize defects, meet customer requirements and improve the overall quality of production.

Detect Errors

Reduce Waste

Improve Product Quality

**your goals**

- **Error detection**
- **Scrap reduction**
- **Improved product quality**
- **Reliability**

**how umati helps**

- **Collect operating data, evaluation and result parameters** via production data acquisition systems (PDA) or Manufacturing Execution Systems (MES) **without additional interfaces**
- **ISA 95 Job Control** and OPC UA for Machinery Companion Specification
- **Transfer complex test reports** with OPC UA for Machinery - result transfer specification

**your benefits**

- **Acquire and analyze machine performance data** from sensors
- **Continuous monitoring and analysis of parameters** (e.g. temperature, pressure, speed, vibration, ...)
- **Identification of problems or deviations**
- **Integration of testing and measuring systems** in the production line
- **Quality feature testing** during production and thus automated monitoring and evaluation of product features
- **Use algorithms and machine learning** for automatic detection of deviations / errors
- **Identify patterns / trends / systematic errors** and causes of quality problems

## Energy Monitoring

... comprises the recording, monitoring and analysis of the energy consumption of machines or plants to improve energy efficiency.

Identify Energy Savings Opportunities

Obtain Transparency of Consumption

**your goals**

- **Identify energy saving potential**
- **Transparent consumption statistics**
- **Minimize energy consumption**

**how umati helps**

- **Consideration of different variables**, including electricity, steam, hot water, coal, petrol or compressed air
- **Harmonized implementation of the use case** across multiple Standardization Working Groups
- **Information model** to describe measuring points of consumption or generation of energy flows (measuring points contain one or more different values)

**your benefits**

- Continuous **monitoring, recording, analysis and optimization of energy consumption**
- Use sensors, measuring devices and software solutions to **record energy consumption**
- **Identify inefficient operating conditions**
- **Uncover energy saving potential**

## Load Management

... involves managing and distributing the energy load in order to maximize energy efficiency, reduce costs and ensure the reliability of the energy supply system.

Save on Energy Tarriffs

Increase Energy Efficiency

Ensure Security of Energy Supplies

**your goals**

- **Optimize Energy consumption**
- **Take advantage of cheap electricity prices**
- **Increase energy efficiency**
- **Energy supply security**

**how umati helps**

- **Consideration of energy availability, tariff structure, energy efficiency** of machinery and equipment, production planning and the energy consumption mix
- **Harmonized implementation of the use case** across multiple Standardization Working Groups
- **Information model** to describe the mapping of energy measurement variables at various measurement points

**your benefits**

- **Adjust energy** demand to energy availability and costs
- **Peak load avoidance and power consumption smoothing**
- **Benefit from cheaper tariffs** in times of low demand
- **Avoid overloads** of the energy system

## Product Carbon Footprint (PCF)

... is the total amount of greenhouse gas emissions generated during the life cycle of a product, including emissions from the production, transport, use and disposal of the product.

Reduce Emissions

Create Transparency

Comply with Regulations and Reporting Obligations

**your goals**

- **Emission reduction**
- **Transparency**
- **Proof of compliance**

**how umati helps**

- Harmonized provision of **energy and resource consumption data** across the entire shop floor
- **Assign collateral energy consumption** during production to individual products by combining energy consumption variables and order data

**your benefits**

- **Comply with legal reporting obligations**
- **Monitor energy consumption, greenhouse gas emissions** and other environmental impacts during production
- **Identify areas with great environmental impact**
- Overview of **individual sources of emissions**
- **Promote** the use of environmentally friendly technologies and materials
- **Contribute** to the reduction of greenhouse gas emissions
- Positive **brand image**
- **Meet customer demand** for environmentally friendly products
- Position the company as a **sustainable and environmentally conscious player**


You need more information about umati? Have a look at UMATI.ORG
FRED


*Experience*
*live connectivity*
*with **umati.app***

umati is operated by

VDMA
*www.vdma.eu*

VDW
*www.vdw.de*

**info@umati.org**
**umati.org**

V-UA4MT-SALES-11.2025