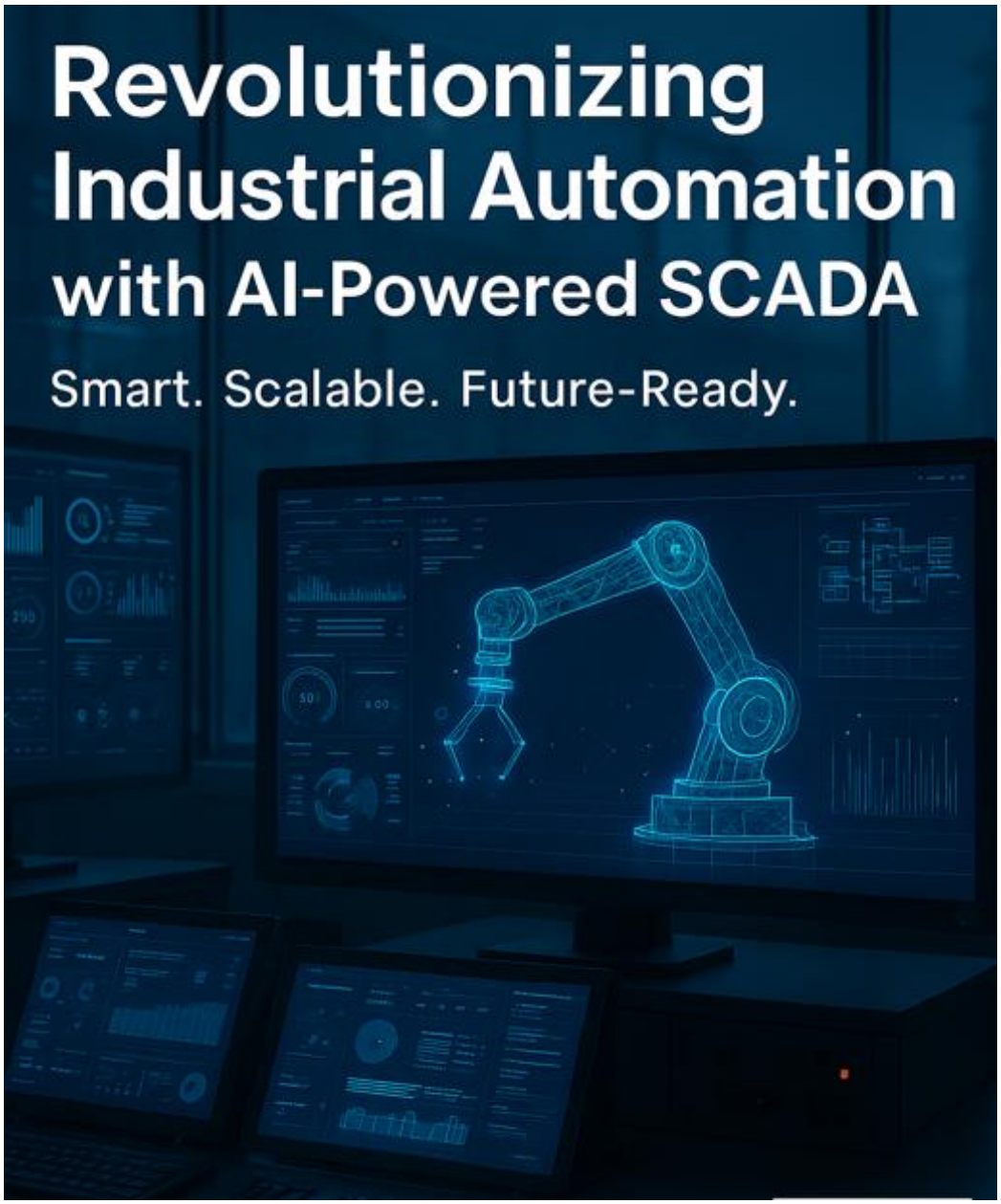
Zamperio
Tansforming the Nation

EBOOK

Powering Zamperio- From Code to Completion

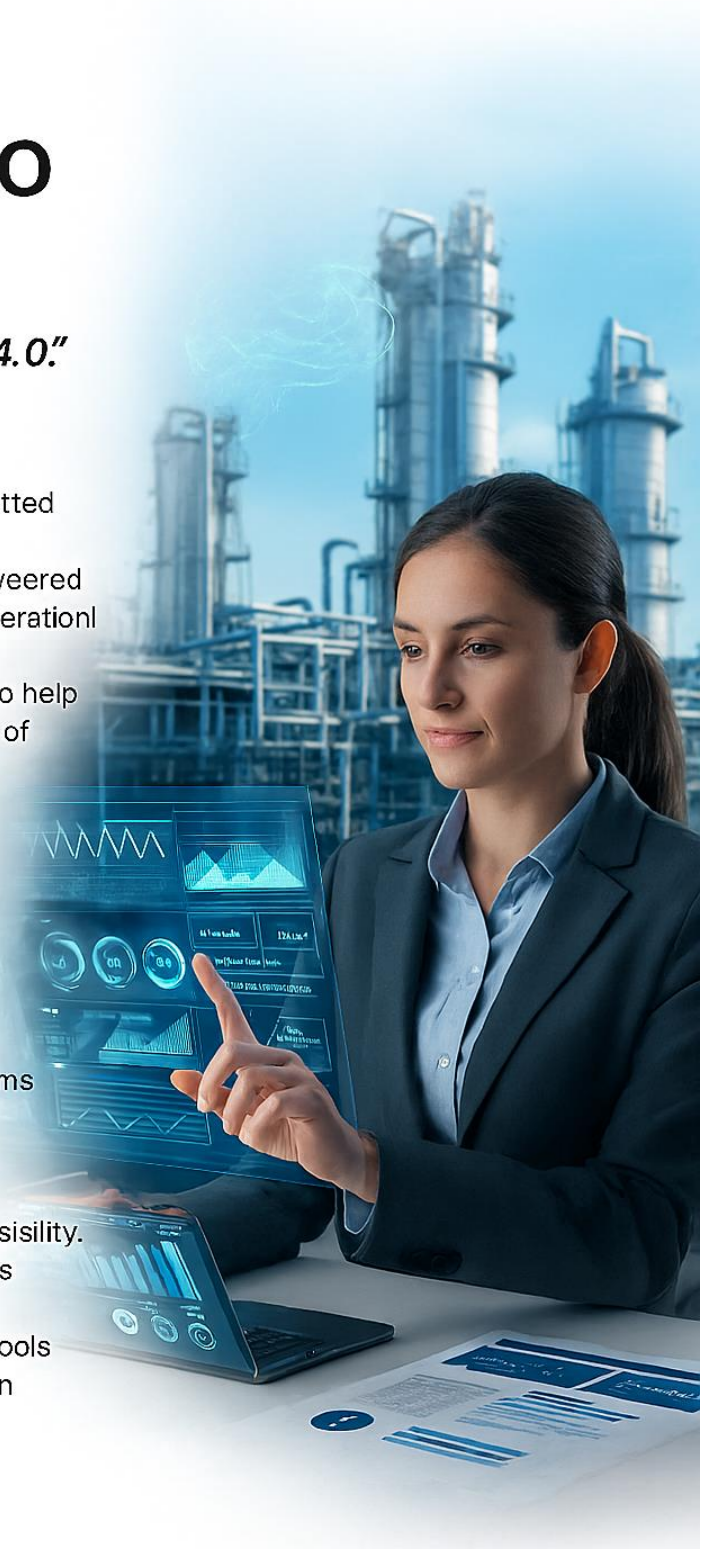
Zamperio Software Applications



Zamperio

ABOUT ZAMPERIO

"Shaping the Future of Industry 4.0."



Vision

At Zamperio, we are committed to transtorming industrial automation through AI-poweered SCADA tools that bridge operationl intalligence with smart connectivity. Our vision is to help industries step Into the era of predictive and responsive control systems.

Mission

"Empowering efficiency through AI-driven SCADA solutions."

We design intelligent systems that adapt and learn—providing operators with real-time data, advanced analytics, and remote accesisility. Leveraging robust protecols llke **Modbus TCR/IP and** serial communication, our tools ensure seamless integration across legacy and modern industrial environments.

What do industrial applications need?

Although industrial applications can leverage many things from mainline application development, they often have more stringent or more specific requirements than your average web portal, mobile, or desktop app.

Reliability

Industrial applications require uncompromising reliability—failures can result in significant material losses, environmental harm, or risk to human safety. Zamperio is a robust and time-tested platform, benefiting from over two decades of continuous development and rigorous validation. Built on C++, it offers engineers deep control and visibility into system behavior, along with the ability to perform comprehensive static analysis for early fault detection.

Functional Safety

Functional safety builds upon core reliability and is essential in applications where human safety is at stake. In such cases, certification to recognize safety standards is often required. Zamperio integrates seamlessly in safety-certified environments and developers can design user interfaces that accommodate multiple safety levels within the same system architecture.

Protocols and Peripherals

Industrial systems must interface with a wide range of external devices—PLCs, CNC machines, sensors, printers, and more. Zamperio supports a broad set of protocols and peripherals through a comprehensive library of tested drivers and plug-ins. Leveraging C++'s low-level hardware access, the platform ensures precise and reliable communication across all connected components.

Performance

Industrial applications are frequently constrained by hardware resources while demanding high performance. Zamperio excels in these conditions, delivering fluid, hardware-accelerated user interfaces even on low-cost embedded systems. C++ enables highly optimized, deterministic code, ideal for timing-critical operations and direct hardware interfacing.

Security

Security is not optional in industrial environments—it is a fundamental requirement. C++ offers an extensive suite of tools for static code analysis, enabling developers to identify and mitigate vulnerabilities early in the development cycle. With Zamperio, you can build applications that meet strict industrial security standards.

Remote User Interface

Remote access—whether via tablet, smartphone, or desktop—is increasingly essential in industrial control and monitoring systems. Zamperio includes built-in capabilities to extend existing user interfaces for secure and responsive remote interaction, without duplicating development effort.

KEY FEATURES OF ZAMPERIO AI SCADA TOOL

Smart Features Designed for Industrial Excellence

AI-Powered Insights

Utilizes real-time ⁄iata processing and machin learning to detect patterns, anomalles, and predict equipment failures before they occur.

Real-Time Dashboards

Dynamic visual dashboards to monitor, analyze, and interact with live plant data across all connected devices.

Predictive Maintenance

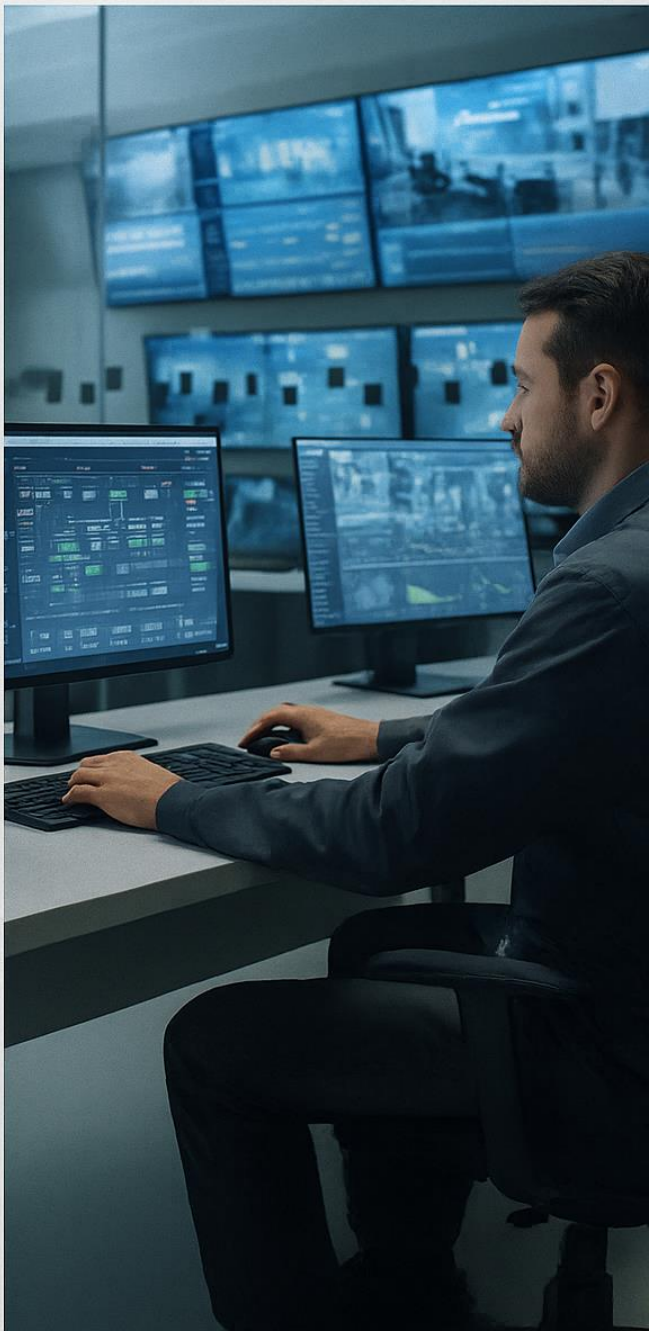
Reduce downtime and mantenance costs by forecasting tailures and scheduling timily intervenntions.

Advanced Alarm Intelligence

Prioritize critical alarms and reduce alarm floods through AI-assisted fiitering and decision logic.

Multi-Protocol Support

Supports *Moobus TCP*/IP and *Serial RTU* for seamless integ- ration with PLCs, meters, sensors, and legacy equipment.



Empowering Smarter, Connected Operations

Remote Monitoring & Control

Securely monitor, analyze, and control plant oprations from any location – enabling true 24x7 situational awareness and responsiveness across devices.

Scalable Architecture

Whether you're operating a compact facility or a large industrial network, Zamperio scales effortiessly. Expand your control system horizontally or vertically – no core changes required

User Role Management

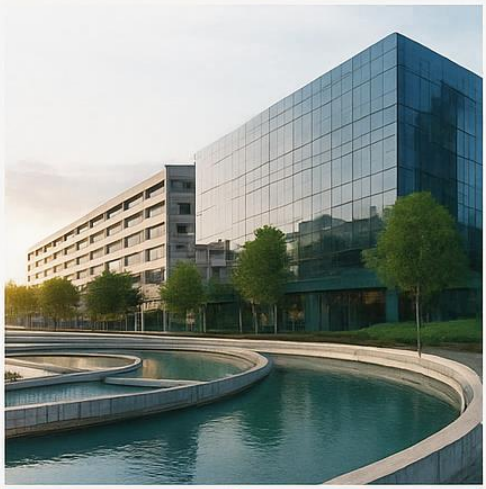
Assign user roles with precise access permissions to ensure control and visibility are avallable only where needed – boosting safety and compliance.

AI-Assisted Optimization

Beyond monitoring – the systemleams and suggests optimal operation strategles, helping reduce energy consumption and boost process efficiency.

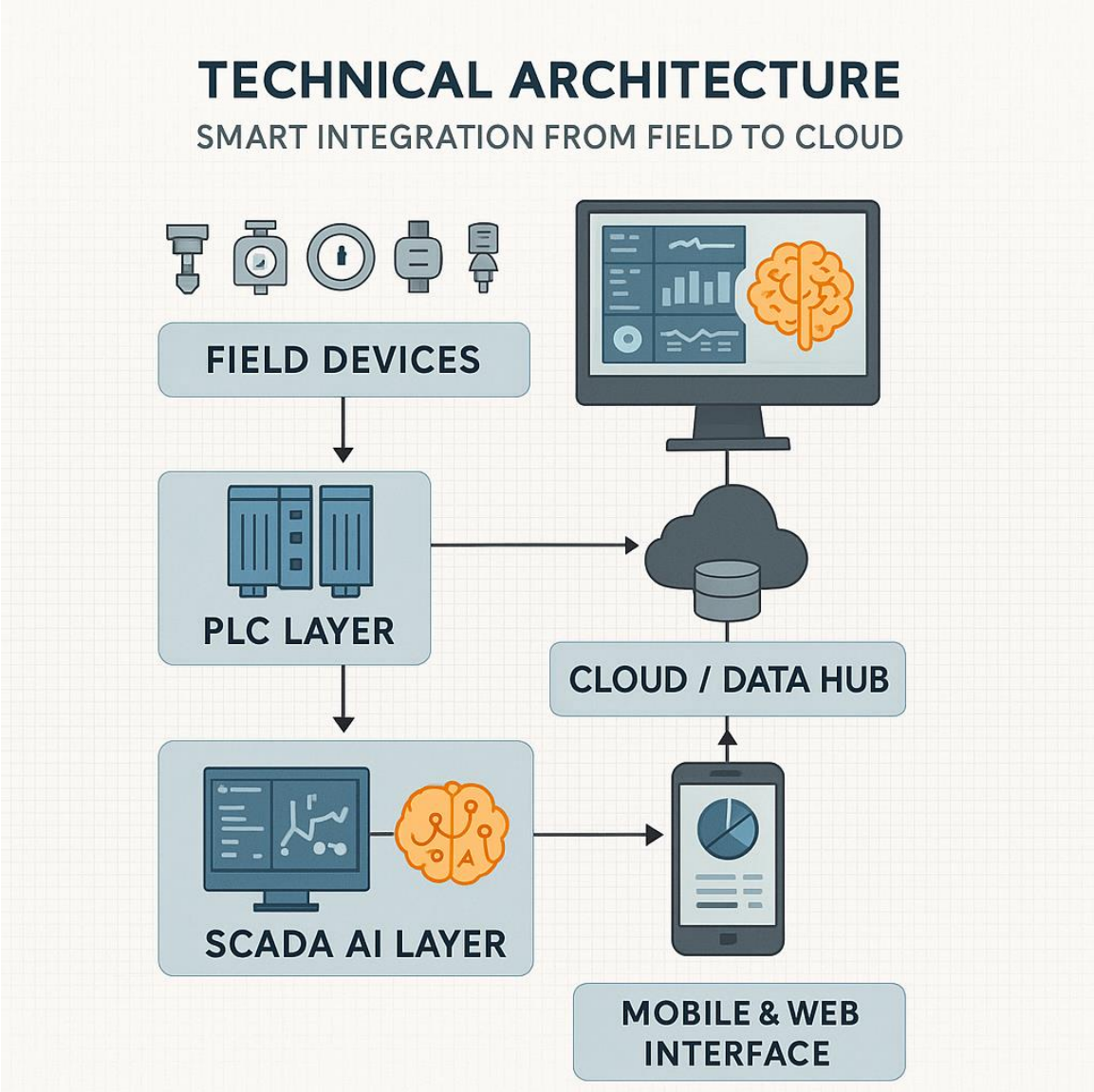
Versatile Applications Across Industries

- **Water Treatment & Utilities**
  Automate pump operations, tank level monitoring, and leekage detection.
- **Smart Buildings & Infrastructuren**
  Monitor HVAC, lighiting elevators, and energy usge. Enable energy optimization through AI-assisted analylics.
- **Manufacturing Plants**
  Visualize production line performance in real-time. Detect anomalies and improven OEE.
- **Power & Renewable Energy**
  Track load balancing, grid synchronization, and fault logs. Analyze energy trends and optimize usage



Zamperio Delivers Real Impact

- **25% reduction in unplanned downtime**
- **Improved** decision-making through AI-powered analytics
- **20% gain in operational efficiency**
- Secure and scalable SCADA architecture


TECHNICAL ARCHITECTURE
SMART INTEGRATION FROM FIELD TO CLOUD
FIELD DEVICES
PLC LAYER
SCADA AI LAYER
CLOUD / DATA HUB
MOBILE & WEB INTERFACE

Industrial Relevant Interface

Core Industrial Features

Zamperio offers a comprehensive set of foundational tools that significantly streamline the development of industrial applications. These core features—such as advanced container classes, Unicode string handling, timers, state machines, database integration, and robust file management—are widely used across a broad spectrum of projects.

Zamperio further enhances this foundation by offering versatile methods for building modern, responsive user interfaces. More importantly, ZECPL includes specialized capabilities designed specifically for industrial developers—enabling the creation of applications that are both efficient and production-ready.

Zamperio for Industrial Automation Solutions

Zamperio is a comprehensive suite of technologies designed to meet the demanding requirements of industrial automation. Built on the proven ZECPL framework, it provides developers with a modular, flexible toolkit—allowing them to select only the components needed for their specific application.

Zamperio for Automation

In addition to its core capabilities, Zamperio for Automation is a value-added package designed to address a common industrial challenge: the secure and reliable management of devices and data across.

MQTT Integration

Zamperio provides a MQTT client library, built on the standardized publish-subscribe protocol. This protocol ensures reliable, low-bandwidth data exchange between devices and components, while meeting stringent requirements for state correctness and security. Its lightweight design and robust performance make it ideal for IoT and other distributed automation systems.

Key Features for Industrial Applications

- Protocols – Support for a wide range of industrial and automation equipment, including networking devices and fieldbuses.
- Virtual Keyboards – Optimized for touch-based interfaces, enabling fully enclosed, waterproof designs for harsh environments.
- Charts and Tables – Create visually rich dashboards, alarm systems, and production job lists with ready-made UI components.
- Internationalization – Built-in support for multi-language and multi-region applications, essential for global deployment.
- Remote UI – Enable remote monitoring and control via web browsers, tablets, and mobile devices—no installation required.

Core Industrial Features

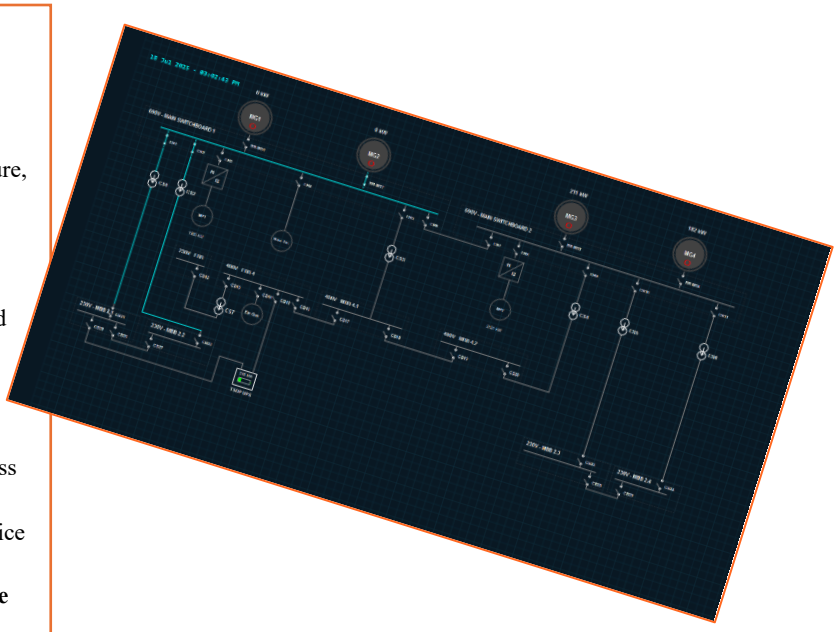
OPC UA – Secure & Standardized Data Exchange

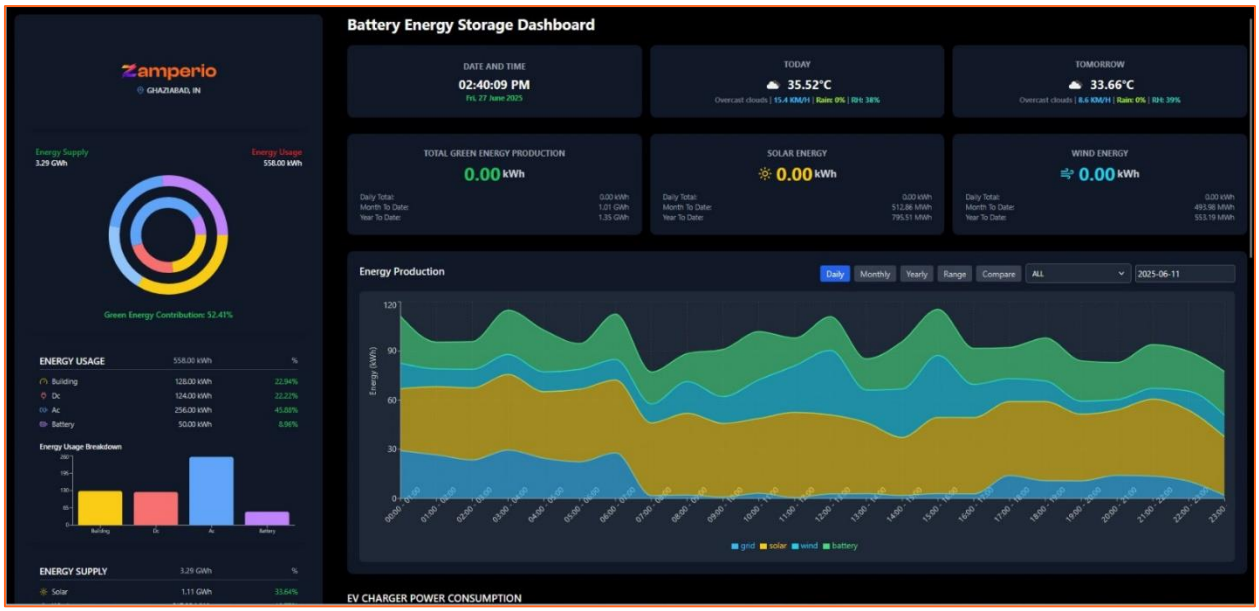
OPC UA (Open Platform Communications Unified Architecture) is a powerful protocol designed for secure, reliable, and platform-independent data modeling and exchange in industrial environments.

By leveraging object-based data structures and robust built-in transport security—including certificate-based authentication and industry-standard cryptographic algorithms—OPC UA provides a standardized and secure framework for industrial communication.

In the context of **Zamperio**, OPC UA enables seamless sharing of both **Zamperio-specific and C++ objects** across distributed systems. This makes it an ideal choice for a wide range of industrial automation applications requiring **interoperability**, **data integrity**, and **secure communication**.

Below, we highlight some of the most notable ZECPL features that stand out in the context of industrial development.





Where to go for more

Interested in getting started with Zamperio? Maybe you want to learn more specifics of subjects discussed in this eBook?

Zamperio – detailed info: contact@zamperio.uk