SOLUTIONS FLYER

LEVERAGING CONVERGENCE TO BUILD END-TO-END SMART ECOSYSTEMS

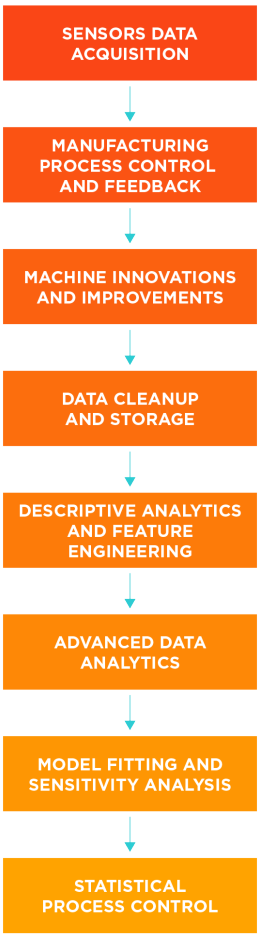
Smart ecosystems span a variety of industries, technologies, and applications. They provide the backbone for operational innovation, efficiency, futureproofing, sustainability, and autonomy. Smart ecosystems harness the convergence of many technologies, and generally utilize data gathered from multiple sources to optimize operations, processes, systems, and products.

The evolving built-to-specs smart energy management ecosystem is a prime example of technology convergence – it maximizes artificial intelligence (AI), data analytics, and Internet of Things (IoT) technology create sustainable energy platforms. These smart platforms are more efficient when generating, distributing, and using energy, which brings them closer to net-zero emissions and reduces their environmental footprint.

Smart Energy Platform Requirements

Smart energy platforms must be resource- and cost-efficient, and they must give users the ability to share resources and fine-tune them through predictive analytics. Because of the inherent challenge of navigating a complex, heterogenous system, smart ecosystems need an architecture that ensures users can seamlessly connect and exchange all its assets.

Apart from forecasting future energy demands and predicting maintenance, smart ecosystems must give users easy access to edge applications, automated workflows and reporting, and real-time data visualization. Add data from business systems and applications and everything evolves into an integrated view of operations – which breaks down any previously established information silos. With varied requirements across different functions and tiers in the organization – spanning insights, control, and automation – platforms must factor in a multi-layered approach that caters to the entire value chain by aggregating data from the right sources, at appropriate points in the process, and applying AI where required.



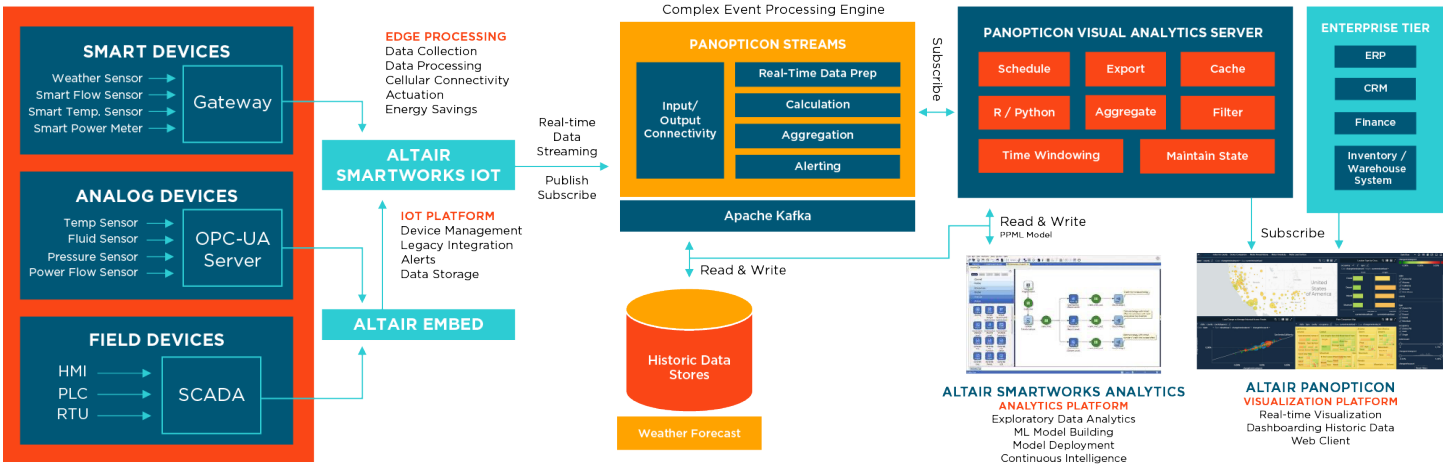
Technology Architecture for a Smart Energy Ecosystem

An integrated platform is the answer to all the above requirements and facilitates:

- Asset connectivity - SCADA, OPC, smart devices etc.
- Data processing and signal processing for operational analytics
- Real-time, visualized insight generation and application development
- Application deployment at various levels
- Machine learning model development for maintenance and demand forecasting analytics
- Assets' digital twin creation

Leveraging Convergence

The convergence of IoT, real-time data streaming, data analytics, and system simulation lets users explore design and operation decisions and optimizes performance. It also predicts loads and failures in advance. Predictive/prescriptive/prognostic insights derived from data intelligence helps users see what could happen and what can be done regarding load-balancing and maintenance. Users can also develop a mitigation plan to handle sudden loads and avoid equipment failure with suitable surrogate models for running advanced simulations with near real-time sensor data.



Meeting Smart Energy Platform Objectives

Energy ecosystems built with Altair technology create a homogenized, scalable, automated platform that covers a variety of energy equipment that's connected and aggregated to build a decision-making system that improves system and process efficiency and optimizes performance. Forecasting models predict future energy requirements based on the historical and recent load patterns, and local weather forecasts and their likely impact on energy generation.

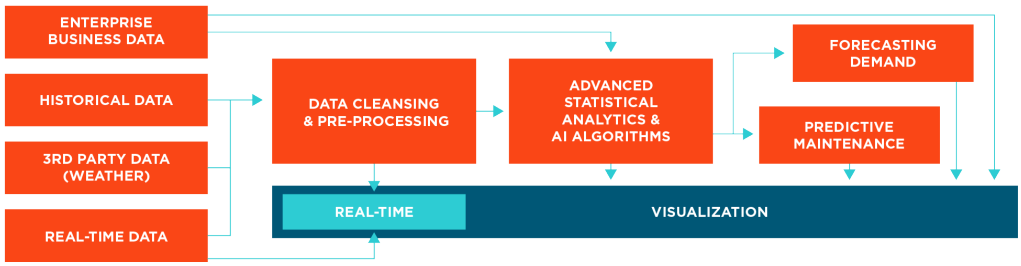
A data-driven approach reduces event-response time, makes predictive maintenance a reality, and provides a single-pane dashboard to monitor and control equipment remotely. This also has a significant impact on inventory control, thus improving the procurement process.

Altair-enabled ecosystems cut across siloed systems and improve asset visibility, which in turn improves assets' energy efficiency. It lets users establish clear maintenance priorities, giving them the power to distinguish the critical equipment from non-critical equipment.

IMPROVED
DEMAND FORECASTING

IMPROVED
PREDICTIVE MAINTENANCE

REDUCED
OPERATING COSTS



A better control over the edge, a highly responsive device management and analytics technology on the cloud, and a single-pane visibility of the whole operation makes the smart ecosystem:

- Effective and efficient in energy generation, distribution, and management
- Better at forecasting energy demand and load balancing
- More sustainable
- Intuitive and reliable

Building Digital Twins

The convergence of technologies provides an ideal environment for creating digital twins – both physics-driven and data-driven. This bolsters the energy ecosystem. With physics-based twins, users can easily understand a piece of equipment's remaining useful life, its structural faults and their likely impact on performance, and the results of process and operations simulations. 1D and 3D simulations based on real-time data that employ reduced order modeling (ROM) for quicker response to events extend the power of digital twins to improve overall equipment efficiency and extend equipment life. With digital twins, product innovations, shortened development times, and increased energy efficiency are all at your fingertips.