WHITEPAPER

The power of organized data

Unifying operational live feeds with enterprise-wide information is key to successful automation in industries and infrastructure.

Executive Summary:

Industrial automation technology offers industrial companies new opportunities to streamline operations, increase efficiency, and cut costs. Through the Industrial Internet of Things (IIoT), vast amounts of data relevant to all levels of a business are becoming available in real time. Yet, without a holistic data strategy and tools to quickly unify, organize, and contextualize such volumes of data, it is challenging to extract relevant insights – important opportunities might be missed. This White Paper gives you the insights you need to sharpen your data strategy and empower your teams.

Introduction

Leading companies are using an edge-to-enterprise approach – unifying their data and tools and making them accessible to the entire data set, be it live feeds on asset operations and processes (the edge) with people management or financial and business goals (enterprise) information. This unified, organized, contextualized approach to data management enables better system design, giving your teams new levels of clarity and efficiency and to make better decisions and drive higher productivity and increased revenue.

Digital transformation

In a turbulent, competitive market, industrial companies must constantly improve operations, increase efficiency, and raise productivity. Even a 1% improvement in efficiency can have a significant impact on operations. Yet, with globalized business models and supply chains, unifying data in real time is challenging. Old methods of communication and collaboration will not drive growth, indeed they may even hold growth back.

Leading industries are embracing digital transformation, from industrial processes to enterprise-wide systems, taking advantage of innovation to create tight, secure connections between subsystems at each layer of their business, no matter where they are located.

Achieving successful transformation is not a straightforward process. Unifying diverse data streams, including alarms, pressure management, maintenance schedules, work schedules, production data, financing data, revenue, expenses, inventory/silos information, supply chain, engineering information, and more takes time and expert knowledge of the operations. Without a tailored digital solution designed to extract relevant information in an organized manner, the sheer multitude of uncontextualized data becomes an obstacle, and it is difficult to organize teams and make agile decisions that maintain productivity even in fluctuating circumstances.

Edge computing provides logic at the source, because results can be shared in real time via the cloud. HMI/SCADA software gives operators and managers insight into live operations on or off premise, while the power of the cloud provides both connectivity and the breadth to unify multiple data streams into a complete and holistic view.

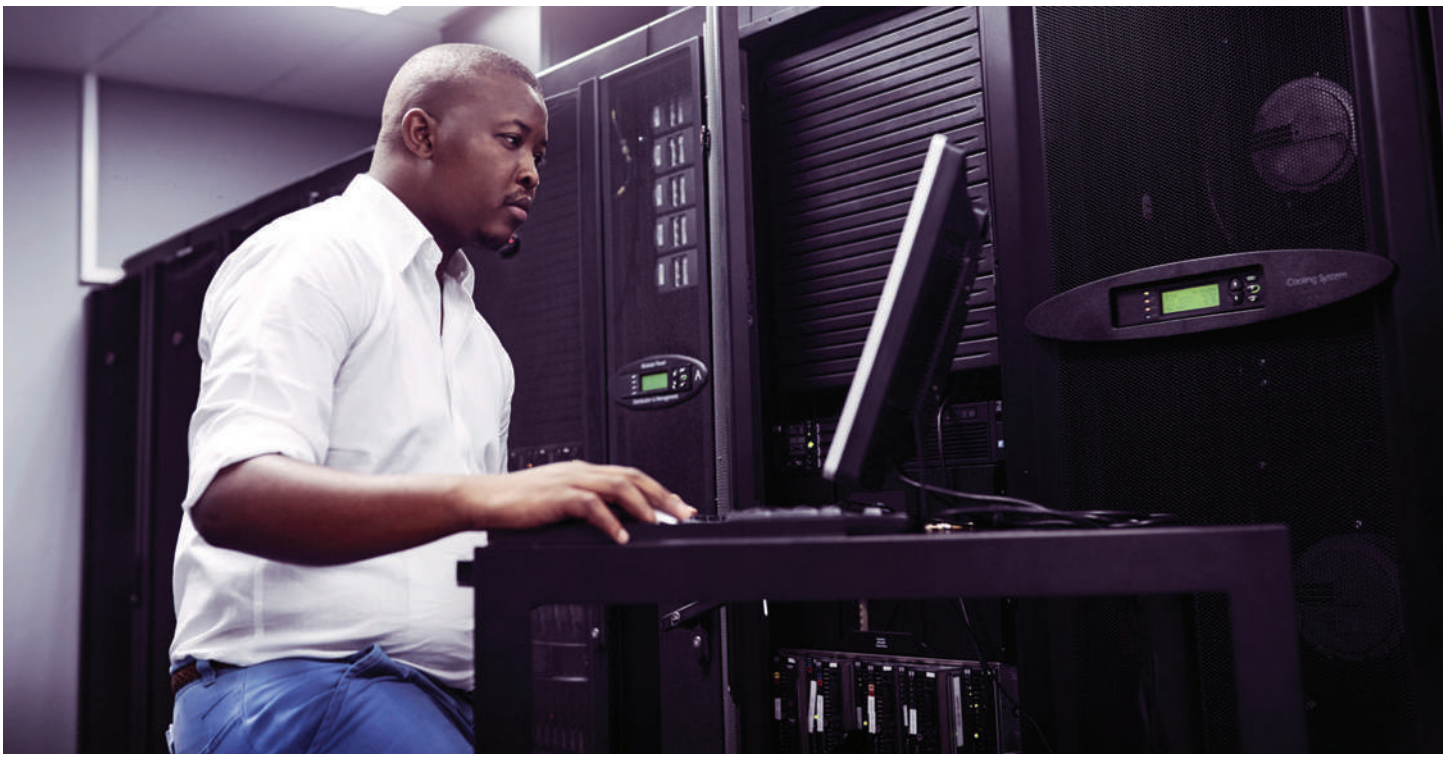
What operators need is a platform that provides a flexible toolset, as well as digital experts and technology that can bring together multiple disparate streams of information into a rich, concise, actionable set of insights that is contextualized for people at all levels of the organization, enabling them to make better decisions. They also need experts who understand the specific business context and the industrial operating environment.

Why you need a strategy that spans your Edge-to-Enterprise

This is where an edge-to-enterprise strategy comes in. This new paradigm can transform industrial and enterprise operations, tightly integrating your business from top to bottom. Traditional businesses operate in different layers, and data collected at each layer is not always available to other layers when they need it, and in the right context. For example, legacy HMI and SCADA systems cannot always handle the volume of data business need to collect. Outdated systems require operators to sift through large chunks of data in silos, independently performing calculations to extract relevant information in isolation. Without the ability to holistically analyze system trends and proactively deal with potential problems before they occur, teams are often forced into a reactive mode without the ability to make informed decisions that could benefit the long-term health of their operations.

A comprehensive software approach that spans edge device management software to HMI/SCADA and beyond can help solve this challenge. A unified approach makes it possible for teams to leverage data collected at all levels into a rich resource of concise, actionable information, contextualized for people's different roles within an organization. By using hardware-agnostic software, you can also enable your people to track live key performance indicators (KPIs) and display them in an easy-to-read format, regardless of the location or device they are using.

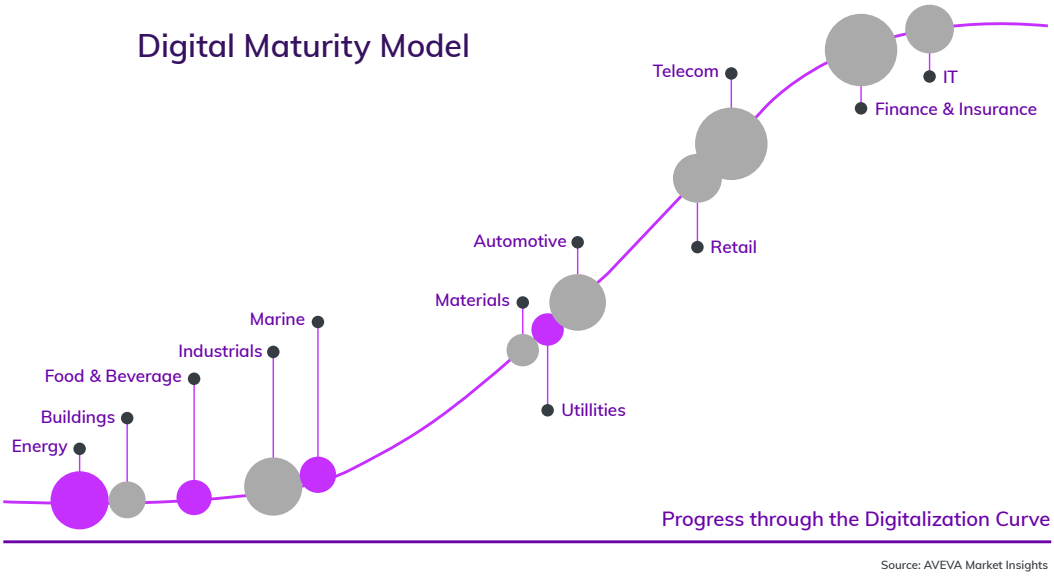
Whether your user is an engineer managing process operations at a plant, or a business leader looking for opportunities for increased efficiency and growth, it is important to evaluate software partner companies to make certain they include the necessary tools for the whole team to make better decisions for the business.



Hard-wiring for business continuity

Whether simple or complex, industries are only just beginning to accelerate along the digital transformation curve. It doesn't matter whether gathering and analyzing data involves connecting to an ERP or maintenance system, the process should be simple and secure. Ultimately, it should provide a context from both OT and IT perspectives to everyone in the team.

With an edge-to-enterprise strategy for system design, data aggregation, and processing, you can connect to PLCs, RTUs, or almost any other data source to improve efficiency and create a single source of truth for your operations team.



Source: AVEVA Market Insights

Building the right template for your design

To avoid long-term integration challenges, it's helpful to avoid over-customization of process modules. A templated approach to large-scale systems makes them much easier to maintain and adapt in 10, 20, or 30 years. System integrators frequently utilize templated system components to create solutions that are highly specialized but require very little code customization to develop and scale. Code customization can be impractical too, especially when it comes to evolving and growing services and operations.

Most big projects require hierarchical data analysis – the ability to take a complete view of a facility, city, regional, interstate, country, or even a global perspective. As an example, it's possible to create one view, a "single pain of glass," to compare efficiencies of 350 data centers between continents. In these situations, it's important to incorporate alarming and historical process graphs into systems. It's impractical to manage a multitude of different objects to represent similar data.

Best practice is therefore to build a single object that can be used in different contexts, where data points from many sites can be compared simply. It is critically important to choose a platform that allows an application to be designed in this way.

Enterprise-level solutions often involve providing access and visibility to data from a variety of proprietary hardware systems through a single, common interface. Again, your solution needs to be hardware agnostic to equally leverage the data, and so that it can model the physical assets in a similar manner. This makes it easier to build a solution that scales well and simplifies your teams' tasks of interpreting the data.

To achieve scale, it helps to be able to easily templatize smaller system elements and then duplicate across sites. Command and control applications like those involving smart infrastructure need to be able to see data in context, and to provide information to a large set of users in real time. To accomplish this, you need a system platform that can cleanly aggregate data from various applications and subsystems.

How we help different sectors to transform

Data Centers

Data centers may not directly produce anything, but they are the backbone of a modern, digitally enabled business. Their biggest expense is usually energy costs, and their complex infrastructure, which includes HPC resources, lighting, security, and personnel, must be maintained in a secure, stable, and efficient way. By collecting detailed information about every facet of the data center's operations and bringing it together in a unified, easy-to-read format, maintenance and engineering personnel can always quickly and effectively organize themselves to keep the data center operating at peak performance.

Airports

Airports contain many different operations running simultaneously, including baggage handling, security, escalators and elevators, and all the staff working in different areas. Many of these operations are tightly coupled, and delays in one area can have costly impacts on a multitude of other areas. By creating a "system of systems" from all of these different subcomponents that provides people at all levels with information they need from every part of the airport's operations, costly downtime can be massively reduced, and problems quickly isolated and contained while allowing everything else to function normally.

Smart Cities

A city is one of the most complex and difficult operations to manage, being comprised of thousands of different parts that, when operating correctly, enable people and businesses to thrive and grow. Maintenance workers, firefighters, ambulances, police, transportation networks, and many other resources must be managed strategically and efficiently to enable the city to function at its best.

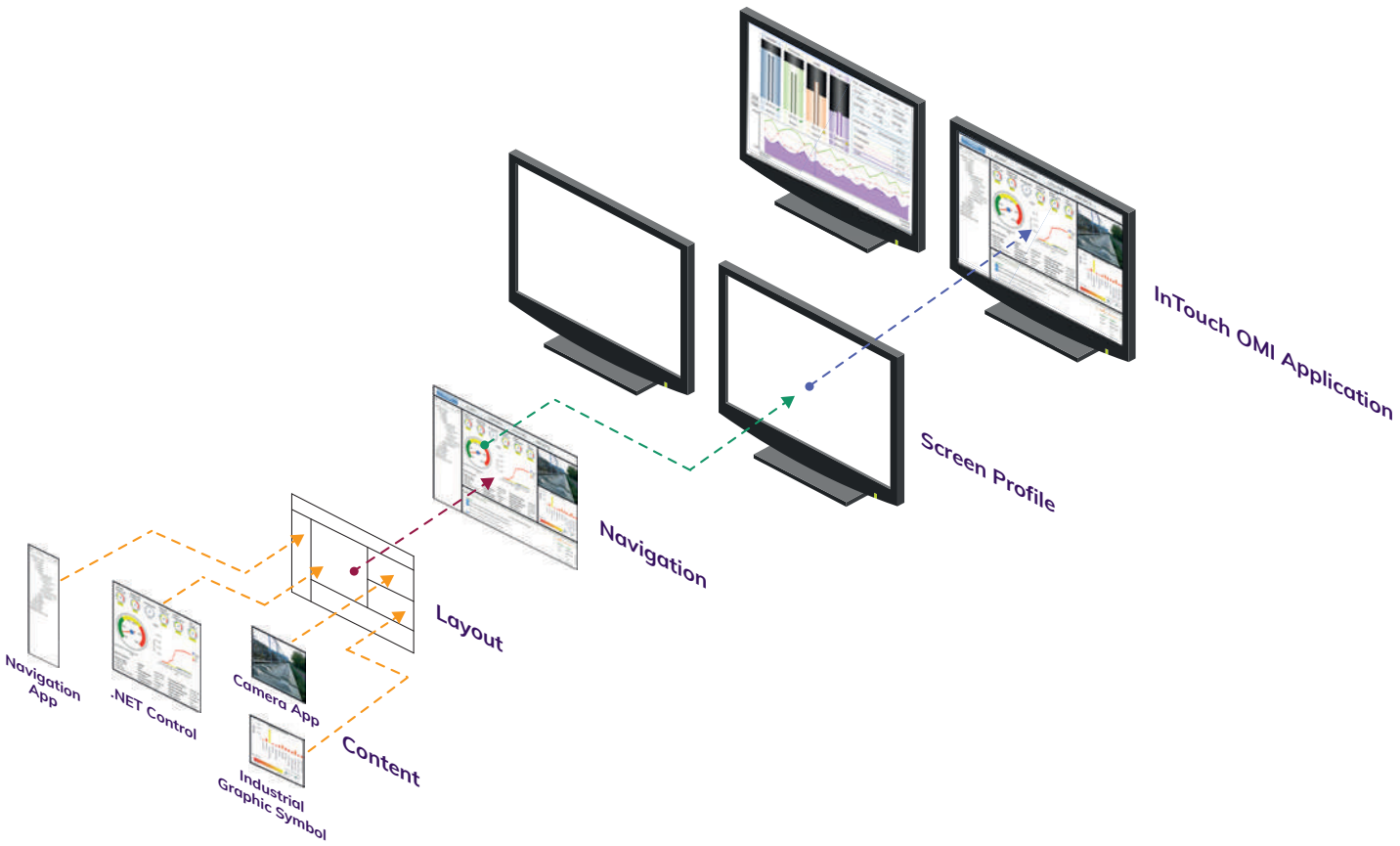
By collecting data from all these disparate sources and putting them all together in a single unified interface, it becomes much easier to respond effectively to problems, manage the impact of maintenance and building projects, and continue building a safe, empowering environment for the city's people. Smart cities, which are powered by a full stack of flexible, robust software, do a better job of managing and allocating resources effectively.

Data-driven development and iterative deployment

To be efficient, you need to ensure that all alarms are fully acknowledged across your systems. It's all too easy for individual notifications to drop off the radar, with risky consequences. An intelligent data system can incorporate context and alarm analytics, alongside workflow maintenance and ERP connections. An intelligent system design incorporates context and analytics for alarms as well as workflow maintenance and ERP connections.

All these considerations should be taken into account in the design of a unified command and control center. It is common to see the evolution of a system from a single plant to a broad multisite operation with diverse applications. An effective deployment of such a system can be accomplished using a smart-city application that centrally manages machine control KPIs, workflow, standard operating procedures, and situational awareness. All machines in a system connect with this centralized application to provide data in a single view.

Extensive interoperable software solutions offer unique deployment capabilities. Every application can be designed, built, and deployed with object structures that make it considerably easier not only to modify, but also to maintain and manage it. This strategy underlies the concept of a Digital Twin, where a data representation of an asset is connected to real-time information flows, providing a consolidated perspective and giving your teams the opportunity to visualize maintenance data, operational data, and other asset information to run analytics and predict and prevent equipment failure or negative trends. It is possible to have hundreds of these templates or more, to create a logical hierarchy of objects to conduct asset modeling and inform operational decisions from a central point. System Platform works with hundreds of drivers and can connect with virtually any data source.



A holistic approach to system design which incorporates your entire enterprise from field to on prem can lay the foundations for further business growth from the outset. For example, an object library that is centrally maintained during the early stages of a project can be deployed at rollout and become a living resource during the system lifecycle – a single source of truth for your entire team. This innovative strategy has been proven to add significant value to very large projects. Incorporating simulation makes it simple to provide a broader view of data and information in context to inform operational decisions that help to improve efficiencies like energy savings or productivity improvements. Scalable, smart infrastructure is the backbone of some of the largest systems in the world.

Establishing a foundation for integrating real-time data across an enterprise gives your teams the option to drive a wider digital transformation throughout your industrial operations, including engineering, planning, scheduling optimization, and asset performance management. Software companies with broad and deep portfolios of industrial control software are well positioned to drive value across both the asset and operations lifecycle. Iterative development, iterative deployment, templatized approach, and data-driven system development are critical components in the effective development and deployment of an edge-to-enterprise system.

Conclusion

Advances in computing and industrial automation technology are increasingly providing industrial companies with the opportunity to collect large amounts of real-time data and transform it into actionable insights that enable the business to operate much more efficiently and productively. You need broad, flexible solutions to succeed, and we are happy to recommend a checklist for edge-to-enterprise success:

1. Data-and hardware-agnostic system
2. Flexibility to scale across assets and geographies, via the cloud
3. Expert industry knowledge to design your systems and processes to meet your exact requirements
4. Agile framework to deliver the right information to the right people at the right time
5. Scale to connect every layer of the organization into an efficient, collaborative, and productive environment.

Discover more about how you can build the most agile edge-to-enterprise platform that will deliver the right information to the right people in your team at the right time, connecting every layer of an organization together in an efficient, collaborative, and productive environment.

Contact us today to discover the full scope of AVEVA's Edge-to-Enterprise capabilities: **sw.aveva.com/monitor-and-control/aveva-edge-to-enterprise**