

OT integration

A critical foundation block in the data-driven factory



OT integration enables manufacturers to get real business value from their data. Ineffective integration, however, can lead to missed opportunities, higher costs, and errors that can compromise the factory safety, performance, and quality of products being produced.

Many challenges come with integrating the OT stack, including integrating existing assets, which can be many years old, an expanded attack surface, and a talent drought.

But as technology advances, manufacturers must transform their processes to become more data-driven and secure a competitive advantage in an increasingly disrupted marketplace.

Manufacturers are looking to embrace artificial intelligence (AI) and machine learning (ML) to gain valuable insight from OT, for example. This helps to reduce downtime, increase productivity, streamline processes, improve worker safety, and provide greater visibility into supply chains.

The effective use of data can make factories more efficient and ultimately profitable. But successful convergence of information technology (IT) and operational technology (OT) is paramount to achieve this and deploy new digital services. This means that data from OT systems must be available in a usable format from which IT systems can analyze and gain insight.

Storing, retrieving, and understanding data

However, combining the world of IT and OT is complex, not least because the priorities of IT and OT teams can be very different. While IT focuses on data confidentiality, integrity, and availability when it comes to data security policies, OT covers the real-time machinery and technologies that perform industrial operations. Operating technologies traditionally have a set function that demands humans to oversee the process at key points.

The problem is many factories still have local solutions deployed to support their processes, and that 95%¹ are still using paper-based entries. This, coupled with local solutions, makes it almost impossible to standardize and benchmark factories or onboard any new systems.

Data often sits in siloed, unconnected systems without the ability to link, analyze and read it. There is also no single source of the truth in a central repository to collect, consolidate and correlate data. Without this, an organization cannot guarantee that everyone is basing their decisions on the same data.

In addition, modern OT systems utilize software infrastructure and operating systems acquired from IT, which increases the overlap of skills required to manage OT and IT environments. Thus, they advocate the use of IT best practices for OT management.² Generally, this is defined by OT vendors moving from proprietary platforms to Microsoft, UNIX, and Linux operating systems, and TCP/IP communications.³

The challenges of IT/OT convergence

The future of manufacturing operations is data-driven. This demands that organizations integrate IT and OT where possible – not just the technology but also the people and processes. The historical IT and OT landscape create significant challenges regarding different architectures, protocols, and approaches that have evolved to address various problems. IT focuses on information, and OT on physical machines and outcomes.

Every manufacturer is at different stages in their digitalization journey, and each faces unique challenges depending on its manufacturing operations. Many have legacy systems on the factory floor using old firmware. Systems lack the flexibility to evolve due to a lack of standardization.

IT applications are usually standardized across the factory to ensure compatibility and interoperability. OT solutions rarely are. Excel spreadsheets are commonly used for manufacturing reporting, for example. Different versions and vendors can be used across a single factory site, which makes convergence extremely complex. In addition, dealing with outdated hardware and software versions on OT networks also poses a significant hurdle.

Other IT/OT convergence problems include connectivity and data collection issues, cloud integration complexities, and scaling troubles. OT may use different protocols than Edge devices, used to transmit data between the local network and the cloud, for example, which may make harvesting data problematic.

“By 2024, 30% of industrial organizations will have become leaner and more agile than their competitors by making real-time operational insights available anytime, anywhere, to anyone.”⁴

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There are also cultural differences to overcome. Historically OT and IT have had different priorities. Fears over change, fragmented OT, exposure to security vulnerabilities, and risk to process integrity must all be carefully managed.

Integration transformation to realize the value of data

Easily connecting and accessing data across systems should be the core enabler for use cases that can get real business value from operational data.

IT and OT each produce unique and valuable data about the organization, operations, business processes, and the behavior of people and activities essential to getting real-time visibility across operations for smart decision-making. Data integration can enable the adoption of new digital services, leading to increased automation, production, and improved quality of manufactured goods.



How to put your data to work

Efficiently integrating business and operational data is pivotal in creating a data-driven factory. However, IT/OT integration is complex and requires strategic thought and a holistic integration program to bridge both environments successfully.

Here are six crucial steps to consider when it comes to IT/OT integration:

1 Assess your legacy estate

Every manufacturer is at different stages in their digitalization journey, and each faces unique challenges depending on its manufacturing operations. Many have legacy systems on the factory floor using old firmware. Systems lack the flexibility to evolve due to a lack of standardization. As a result, they do not have a complete inventory of their assets. It is essential to run an audit to see how the IT/OT assets link together. Establishing this maturity model will help better understand the factory's IT/OT estate and uncover any vulnerabilities or quick-win integration opportunities.

2 Securely extending OT data to the cloud

Extending OT network connections to IT and cloud environments requires the implementation of additional internal OT security measures, which by its very nature, is complex. Thoroughly evaluate requirements so that any modifications can be made to the OT network, which serves as a foundation for the integration.

3 Choose use cases

With convergence, scalability can be an issue. Edge devices may produce a wealth of data that will swamp the IT system if not properly planned. It isn't a case of rip out and start again. Start small and cherry-pick the use cases that will benefit the most from integration. Assess all use cases to determine whether they fit into the transformation roadmap and will have defined business benefits and an impact on competitive advantage.

4 Create strategy

IT/OT integration projects go wrong because they are not adequately planned and do not embrace organizational change, data governance, and cross-team collaboration. It is imperative to create an overarching IT/OT integration strategy that includes common governance, consistency across data and skills, and security guidelines. This includes standardized industrial connectivity for continuous improvement. Ensure it plans for scale. Every change should start with defining the impact on the business and clearly showing the challenges involved.



5 Find a partner

From a security perspective, companies often struggle with identifying their own OT networks. These may have been created over many years on an ad hoc basis, leading to severe vulnerabilities. Many manufacturers are worried about moving forward with integration due to security worries. Work with a trusted partner to make sure cybersecurity is a key enabler of digital investment and central to integration.

6 Be prepared to execute gradually

Every factory is different. Even when scoped, there will be hidden challenges. To manage this scenario, start with small and manageable projects but with one eye on scaling them up across factories. A flexible roadmap should be created for rolling out expansion plans.

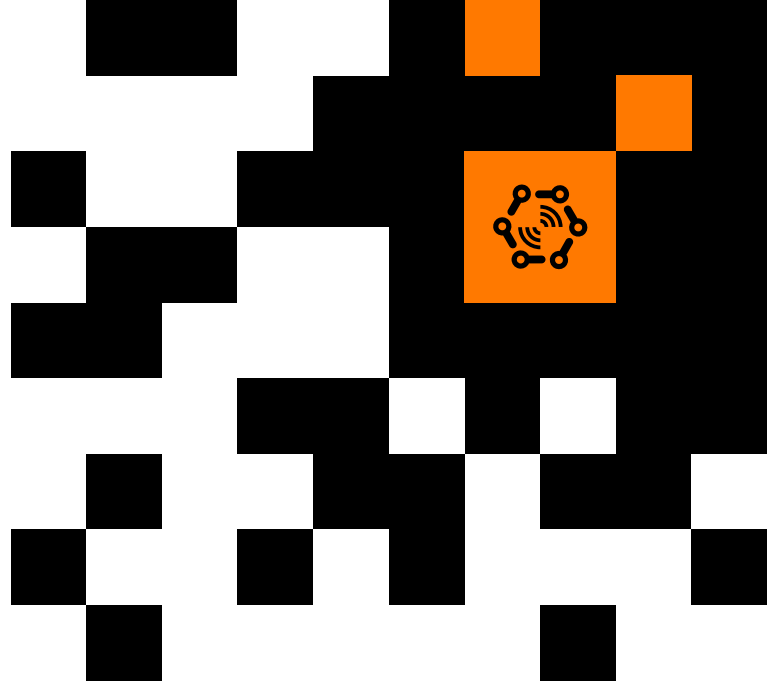
“By 2025, 40% of manufacturers will have deployed enterprise-wide AI-based tools to support the decision-making process and maximize the value of data, resulting in up to 5% improvement in revenue/profit.”⁵

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Summary

With increasing competition triggered by digitalization, manufacturers can no longer rely on legacy systems for success. A mature IT/OT integration approach results in faster data access via fewer resources and enhanced uptime. Successful integration requires a trusted partner, cross-functional collaboration, and a combined, centralized IT/OT model.

A major challenge is aligning and integrating IT and OT technologies, departments, data, and processes. But it is a critical step in any manufacturer's journey to digital transformation, supporting the enterprise's continuous productivity, safety, and sustainability improvement.



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A consultancy-led approach to transforming data and creating value for the business



Auditing data assets and analytics maturity to create an overarching data-driven strategy



Design and build a central Unified Namespace (UNS) as a centralized repository for structured data to make it meaningful to all components in the enterprise



Data governance expertise to ensure the quality of data and manage its use



Help you focus on areas of your business where technology and a data-driven approach will have the greatest impact



Create easy-to-use dashboards so employees can track and optimize product quality and efficiently manage all manufacturing-related costs

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4. IDC Futurescape: worldwide future of operations predictions 2023 <https://blogs.idc.com/2022/12/14/idc-futurescape-worldwide-future-of-operations-2023-predictions/>
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6. Orange / IDC road to digital transformation https://www.orange-business.com/sites/default/files/idc_infobrief_the-road-to-digital-transformation_may2020.pdf



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