



Data centric architecture for manufacturing

Unified data management for manufacturing data

Many Industrial IoT (IIoT) use cases are implemented as standalone projects without considering scaling and operations. With a consistent architectural approach and comprehensive platform, costs are reduced and the move to production is simplified.



Challenges of traditional enterprise architectures

The problem most manufacturers are facing today is a situation that could be described as data anarchy. Years of continuous, incremental improvements and projects to optimize operations has resulted in numerous data silos. Driven by the functional needs of specific departments, applications have been introduced and extended, and a patchwork of scripts, interfaces, and links to support on-demand data exchange has emerged. The digitization of production requires the connection of additional, time-sensitive data sources, such as plant floor assets, sensors, video, which intensifies the problem.

Challenges of scaling industry 4.0 use cases

Monitoring of Overall Equipment Effectiveness (OEE), Predictive Maintenance, Digital Twin, Condition Monitoring, and many other IIoT use cases are being piloted. When scaling pilot projects, point-to-point connections between IT and OT are not an option. In reality, data is generated from multiple sources across the organization. As manufacturers look to replicate successful use cases, the necessary lines of communication across impacted tools become increasingly complex. Besides required management efforts, teams are often unwilling to exchange data. This exposes a lot of risk and is typically not allowed between IT and OT networks. As a result, manufacturers trying to integrate legacy systems with new digital technologies often struggle to compete with the digital native competitors. They lack the architecture and often the mindset and resources to access the right data at the right time.

These traditional architectures lead to the following problems:

- Untrusted data due to low data quality, low protection and missing metadata management
- Implementation of interfaces drives costs and hinders agility
- Data existing in silos hinders value generation through advanced analytics/[artificial intelligence](#) (AI)
- Event data (for example, [Internet of Things](#) [IoT]) is not fully available for all applications in real time
- Architecture driven by data center-focused view with limited scalability

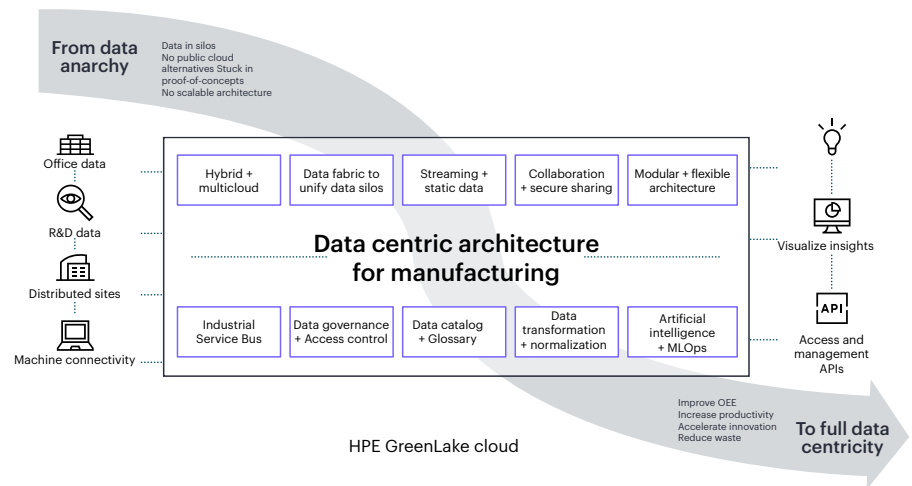
Introducing the data centric architecture for manufacturing

The implementation of an architectural approach like the data centric architecture for manufacturing eliminates point-to-point connections between data producers and consumers. Moreover, it enables a Secure Path for transporting critical data. The data centric architecture for manufacturing from HPE enables data-driven digital transformation and data sovereignty. The architecture framework facilitates fast and reliable

integration of any data source in the customer's organization, as well as in the wider ecosystem using real-time streaming technologies such as Apache Kafka or [HPE Ezmeral Data Fabric](#).

The data-centric approach leads to **new insights** through data analytics and reduces the cost of integration. It fosters **value creation** with new services on the customer's data. These new services include specific insights on demand, as well as participation in **data sharing ecosystems** and data spaces of relevant data or role-centric apps (for a given time).

The data-centric architecture for manufacturing supports the implementation of a **Data Mesh**, where data is treated as product. In addition, the architecture is proven for **security-sensitive environments**.



Why data centric architecture for manufacturing

Industrial service bus:

The industrial service bus enables industrial connectivity, essential to connect multiple plants in a single architecture. At the same time, production can run independently from connection to the central data hub allowing to accommodate the unique needs and use cases of individual plants.

GDPR compliance:

Control of GDPR-relevant data, facilitation of information requests and control on the need to delete by helping ensure business and legal requirements at the same time are simplified.

User-centric apps:

Enable a user-focused and decentralized app development.

Analytics as a service:

Leverage the value of data and information in the organization, use AI/machine learning (ML) capabilities, along with containerized data management.

Bridge data silos:

The data hub as a central platform for data exchange, together with the end-to-end data governance capabilities enables a digital twin of all available information in the enterprise, thus, breaking down the data silos. Data centric architecture for manufacturing enables the creation of a **data fabric** that facilitates central access to distributed data.

Secure data management:

With the data centric architecture for manufacturing, secure data management from edge to cloud is enabled with full scalability: metadata management, monitoring of data flows, control of GDPR relevant data, simplification of information requests and control of the need for deletion by ensuring business and legal requirements at the same time, as well as the incremental realization of the data catalog.

Data centric architecture for manufacturing is a powerful way to help manufacturers keep control of their data, maintain more **data sovereignty**, and enable the organization to generate value from all information in their organization. It supports the **legal needs for data privacy, data protection**, and faster data access. The data-centric architecture framework is effective in brownfield spaces where integration with existing systems and processes is paramount. The approach does not require a massive transformation initiative and supports an agile approach with a step-by-step implementation of minimum viable products. The architecture can be implemented with both open-source components and enterprise-grade solutions from HPE [on-premises](#) or hybrid.

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