HIVEMQ | DELL Technologies

Enabling Industrial Digital Transformation with Dell Edge and HiveMQ data management

Hannover Messe 2025
Digital Transformation Theatre
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Smart Manufacturing: The Push to Digitization in Pharma

IIoT has a major impact on the global GDP:

0.8 percent, or

$816 billion in the next decade.

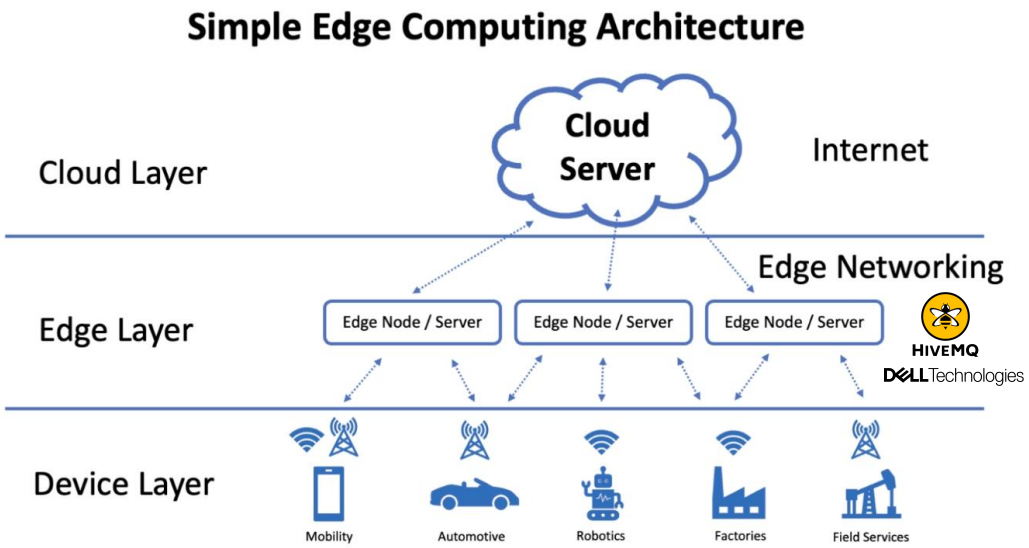
HiveMQ help Smart Manufacturing:

- **Monitor equipment health** in real-time
- **Ensure** high **product quality**
- **Process optimization,** and **regulatory compliance like GxP**

The Industrial Digital Transformation Imperative

- **Challenges in Traditional Industrial Operations**:
  - Data silos across systems
  - Lack of real-time visibility into operations
  - High maintenance costs
  - Scalability and security concerns
- **Why Digital Transformation?**
  - AI-driven predictive maintenance, process optimization
  - Real-time analytics for faster decision-making
  - Seamless Edge driven IT-OT convergence

Role of Edge Computing in Industrial IoT



- **Why Edge Computing Matters**
  - Reduces latency
  - Enhances security
  - Reduces cloud dependency and costs
- **Dell NativeEdge**
  - Simplifies edge operations
  - Centralizes management and orchestration
  - Zero-touch deployment
  - Secure device onboarding
  - Automated operations – from edge to cloud

MQTT and HiveMQ for Industrial Data Management

The Need for Reliable IIoT Messaging

- Industrial environments require low-latency, high-reliability data transfer
- Legacy protocols (OPC-UA, Modbus, etc.) create inefficiencies
- Data sitting in multiple silos and is hard to consolidate

Why HiveMQ?

- Enterprise-Grade MQTT Broker: Enables scalable, real-time, and secure data exchange
- High Availability & Fault Tolerance: Ensures uninterrupted factory operations
- Seamless Integration with Edge & Cloud: Facilitates AI, ML, and analytics

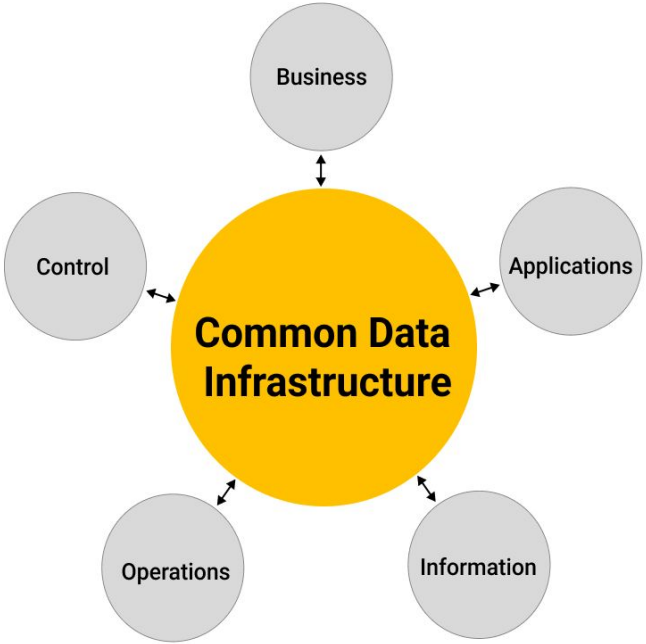
Unified Namespace (UNS) for Data Orchestration

What is UNS ?

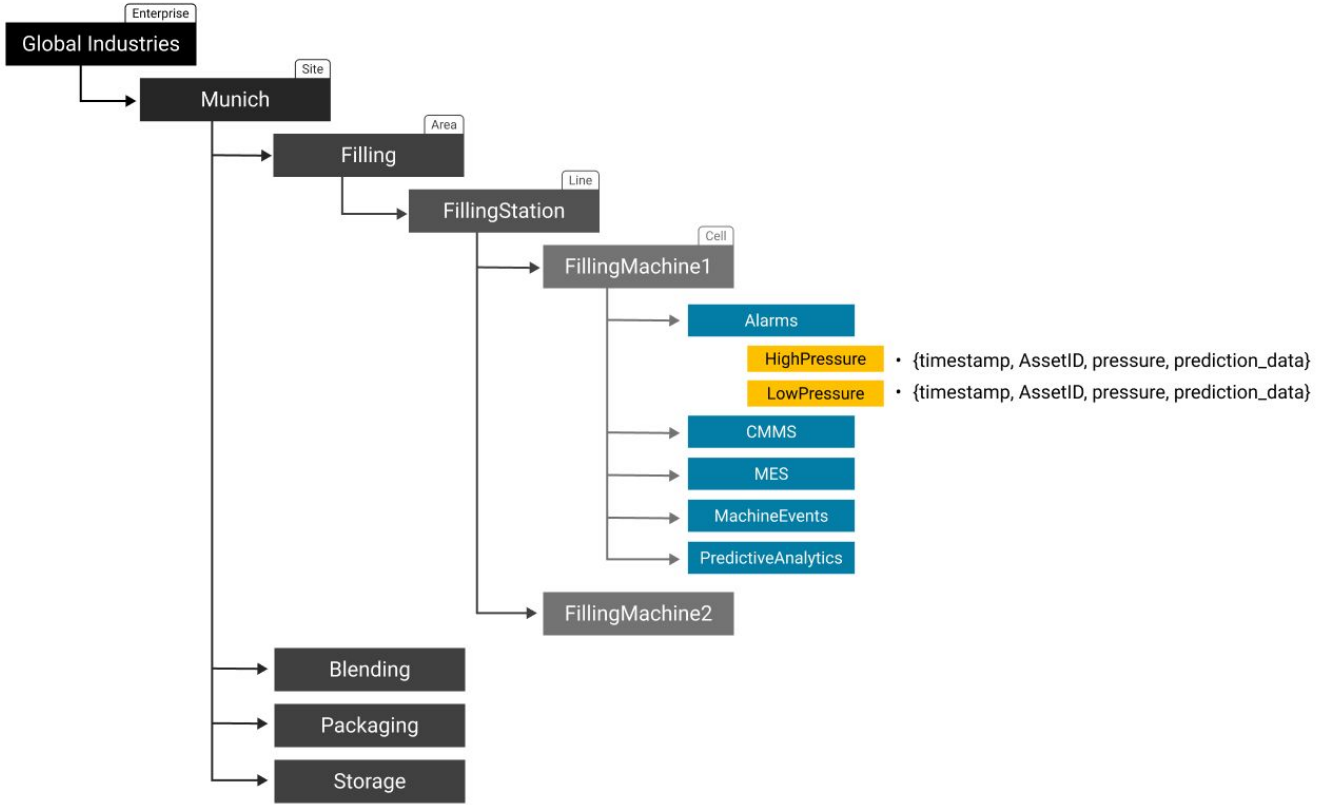
- Single Source of Truth for all business data
- Real-Time Data Representation
- Provides context to the data
- Foundation for Advanced Applications

What are the requirements for UNS ?

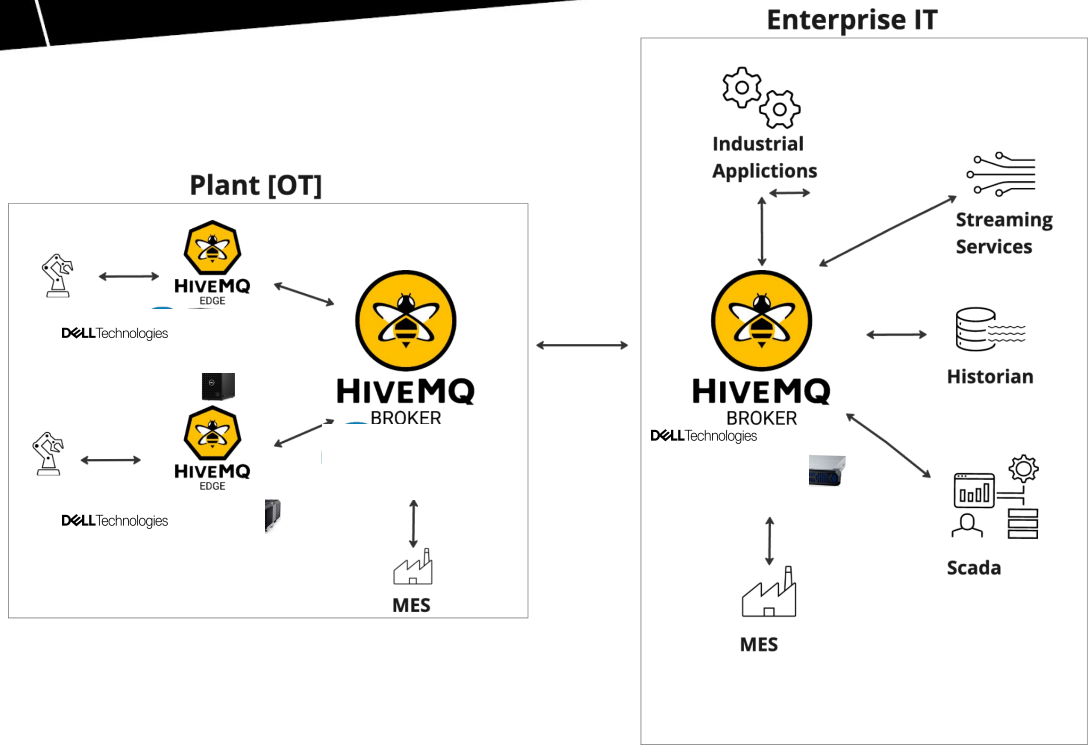
- Edge Driven
- Open Architecture
- Lightweight
- Report by Exception



Unified Namespace

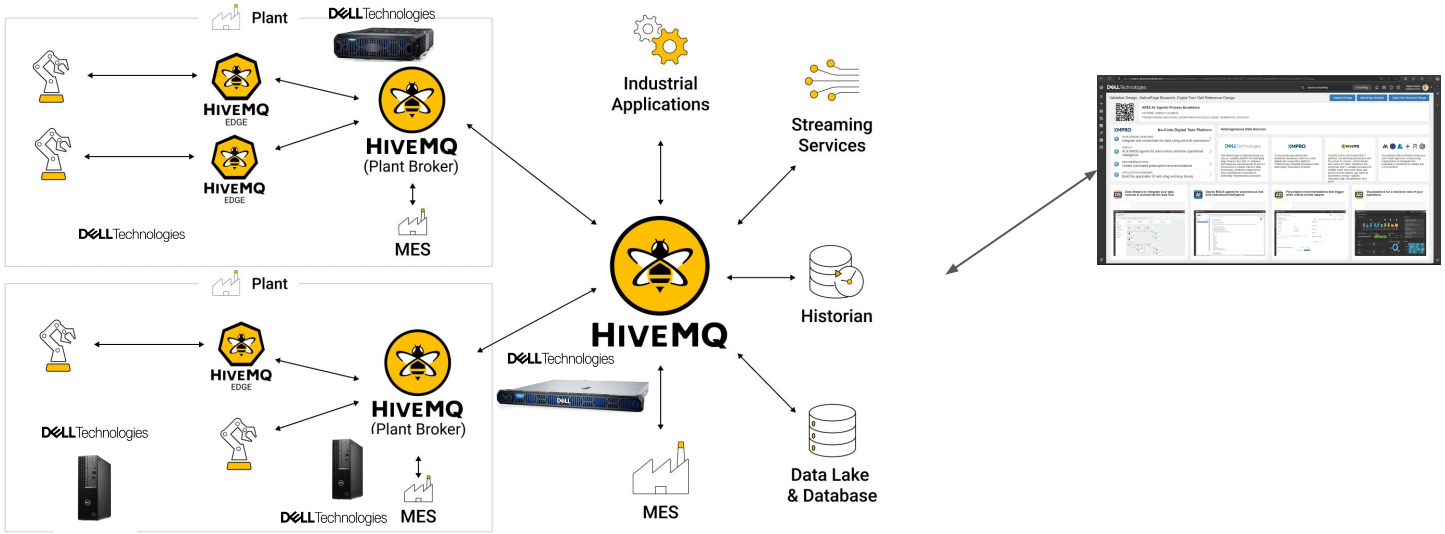


HiveMQ and Dell NativeEdge Data Architecture



- HiveMQ UNS **consolidates** the data from various OT sources like life sciences production machines, historians, PLCs and other systems
- It **cleanses, normalizes, transforms** and **contextualizes** the data
- It enables monitoring applications, analytics, digital twins and AI applications to power the stream analytics experience

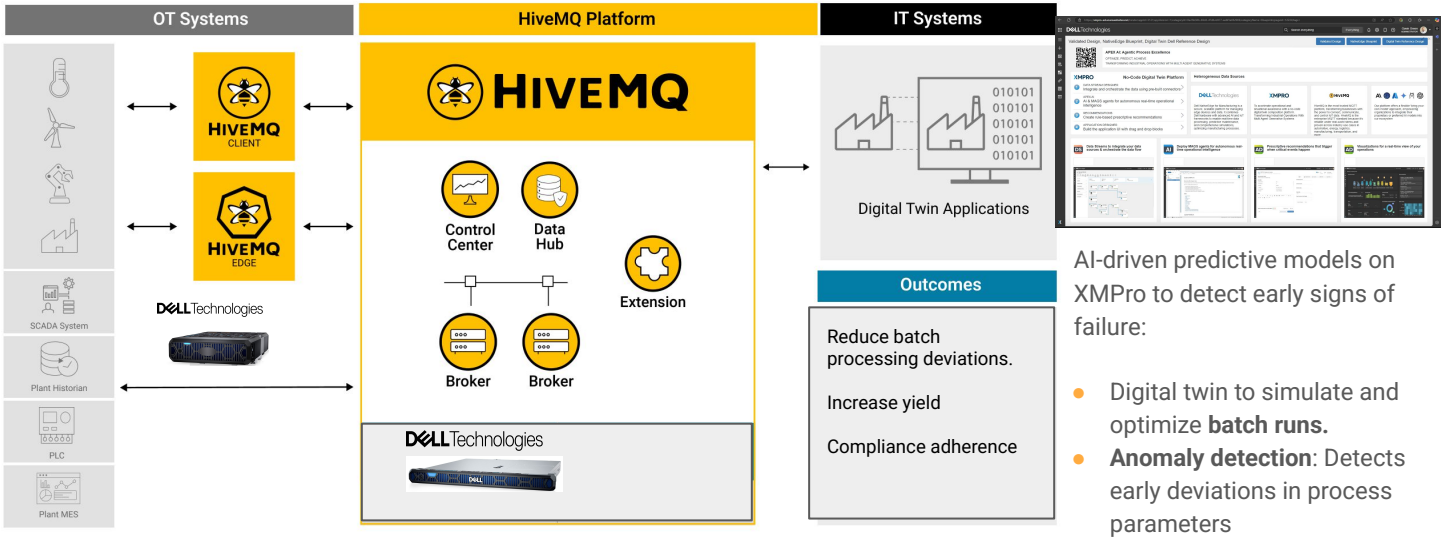
How Dell NativeEdge and HiveMQ enable Pharma Manufacturing



- **Dell NativeEdge** helps businesses centrally manage and securely scale their edge across multiple locations
- **HiveMQ Edge** helps enable interoperability between OT and IT systems by translating diverse protocols into the standardized MQTT format
- **HiveMQ Broker** is an event-driven, enterprise-grade messaging platform for the fast, efficient, and reliable movement of data to and from connected devices
- **XMPro** leverage AI to offer real-time analytics and insights from data

Deploy HiveMQ on Dell NativeEdge in easy 4 Steps

Use Case: Real-Time Shop Floor Data for Continuous Manufacturing Optimization



Vibration data, temperature, and pressure sensor data from legacy systems is streamed via **HiveMQ Edge**

Aggregate site wide data with **HiveMQ Broker** & build UNS

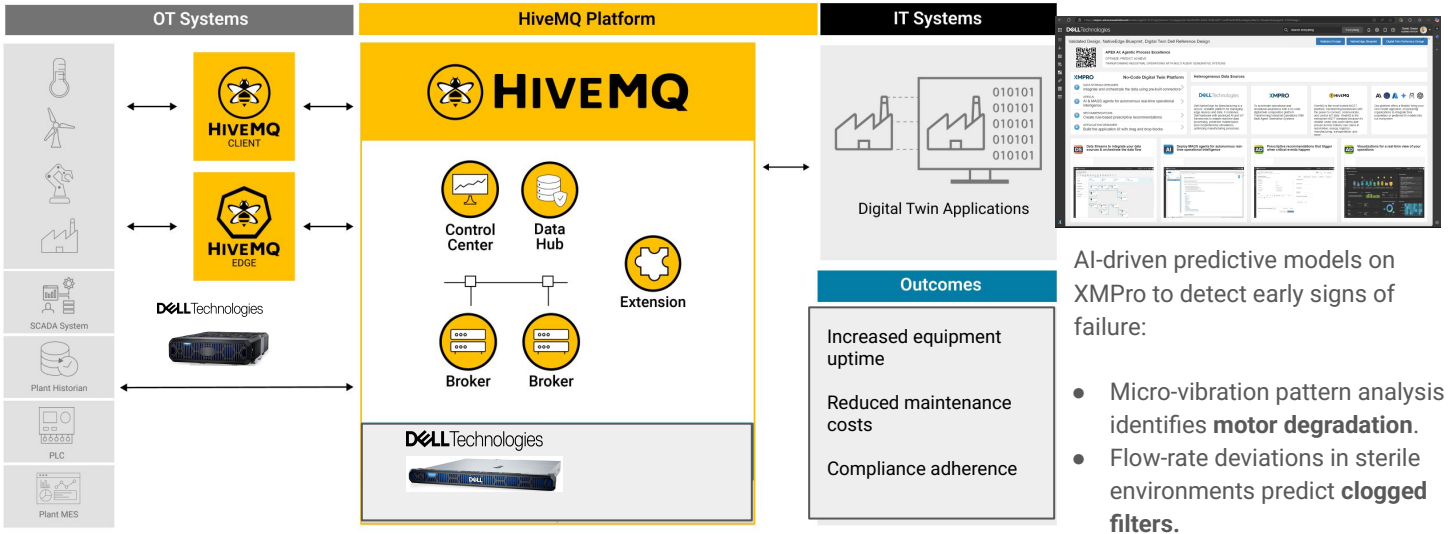
Normalize data with **Data Hub** (& other in-flight data operations)

AI-driven predictive models on XMPro to detect early signs of failure:

- Digital twin to simulate and optimize **batch runs.**
- **Anomaly detection**: Detects early deviations in process parameters
- Real-time overview of process parameters
- **Batch analytics**

HiveMQ + Dell EdgeNative

Use Case: Predictive Maintenance with Real-Time Data & Digital Twins



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AI-driven predictive models on XMPro to detect early signs of failure:

- Micro-vibration pattern analysis identifies **motor degradation**.
- Flow-rate deviations in sterile environments predict **clogged filters.**
- Temperature fluctuations in incubators indicate **chiller degradation**.

HiveMQ + Dell EdgeNative

Key Takeaways

Enhanced Industrial Data Security & Reliability

- Enterprise-grade security with TLS encryption, authentication, access control
- Reliable, fault-tolerant MQTT messaging prevents data loss during network disruptions
- Dell Edge hardware ensures high-performance computing with resilient, on-site processing

Eliminating Data Silos & Improving OT-IT Integration

- UNS architecture allows contextualized, structured data sharing across the enterprise
- HiveMQ enables interoperability between machines, IoT devices, MES, ERP, and cloud systems
- Dell Edge Compute processes data locally for real-time decision-making, reducing cloud costs

Key Takeaways

Real-Time Industrial Data Streaming for Smarter Operations

- HiveMQ + Dell NativeEdge enables secure, low-latency, and scalable industrial data movement
- MQTT-powered data streaming ensures seamless connectivity

Optimized Asset Performance & Predictive Maintenance

- Edge AI & ML improve predictive maintenance and failure detection
- Real-time streaming of machine health data enables proactive maintenance
- 50% faster response time for maintenance teams by integrating HiveMQ with Dell Edge AI models.

Scalable & Future-Proof Industrial Data Strategy

- Flexible deployment - Works on-premise, hybrid, or full cloud environments
- Scales from pilot projects to enterprise-wide rollouts without disrupting operations
- Supports Industry 4.0 & IIoT use cases, such as remote monitoring, digital twins, automation