## **Welcome to Our Webinar**

Building an Enterprise Unified Namespace (UNS) to Power Your Smart Factory

HOSTED BY IN COLLABORATION WITH

lan Skerrett Head of Marketing at HiveMQ John Harrington Chief Business Officer at HighByte

We will start this session shortly

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Welcome to Our Webinar

## Building an Enterprise Unified Namespace (UNS) to Power Your Smart Factory



## **Speakers**



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## Agenda

#### **01** Introduction

- □ HiveMQ
- □ HighByte

## **02** Unified Namespace (UNS)

- Industrial Data Integration Challenges
- Integration Patterns
- □ What is a UNS
- UNS Ecosystem
- UNS Structure
- Use Case

## 03 Conclusion

- HighByte Intelligence Hub
- □ HiveMQ
- Next Steps

## Introduction to HiveMQ

- Founded in 2012, based outside of Munich
- HiveMQ helps move data to and from connected devices in an efficient, fast and reliable manner
- 130+ customers with production IoT applications





/Flughafen München

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## **Our Customers...**

- Building new digital products
- Improving customer experience
- Creating more efficient operations



# HighByte

On a mission to provide manufacturers with the critical data infrastructure required for Industry 4.0



Headquartered in **Portland, Maine** USA



Established in **August 2018** by founding team with 50+ years of experience delivering industrial software solutions



Serving **dozens of the** world's most innovative industrial companies with software deployments in 9 countries



Working with **a global network** of distributors, system integrators, and technology partners to support our customers



Delivering solutions to a wide range of industries, including Food & Beverage, Pharmaceuticals, Pulp & Paper, Industrial Products, Consumer Products, Energy & Mining, and more



Recently named **DataOps Solution of the Year** by the 2021 Data Breakthrough Awards program recognizing outstanding data technology products and companies

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## Agenda

#### **01** Introduction

- ✓ HiveMQ
- ✓ HighByte

#### 02

- **Unified Namespace (UNS)** 
  - Industrial Data Integration Challenges
  - Integration Patterns
  - What is a UNS
  - UNS Ecosystem
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## Manufacturing's Technology Landscape Has Changed

#### Industrial data architectures have become exponentially more complex



#### State of Industry 4.0

- Increased number of users and systems that want access
- Data lacks context, uniformity, and not correlated for use outside of operations
- Engineers are writing custom code and redundantly modeling data in each consuming application
- Flow of information is complex, not well understood, and presents security concerns

## Data Challenges Are Threatening Industry 4.0 Success

#### The existing data infrastructure does not support scale and broad adoption



IT systems using industrial data are not scaling.



Custom scripts are slowing integration time and creating technical debt.



Data science is spending 80% of time finding and preparing data for analytics.



IT is paying high, variable cloud storage and processing fees for unusable data.

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OT is backlogged with requests to grant access to and explain machine data.

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Security is unknown.

#### Integration design patterns: Hub Architecture

#### Benefits

- Central location to manage integrations
- Streamline data flows
- Codeless configuration of integrations
- Reuse data transformations where applicable



#### Integration design patterns: Cloud Gateway

- Benefits
  - OT team contextualizes and curates data
  - Govern and standardize data sent to the cloud
  - Accelerate data usage in the cloud



## Integration design patterns: Unified Namespace (UNS)

- Benefits
  - Open and accessible industrial data for the company
  - Highly scalable
  - Consistent, standardized data structures
  - Easy to traverse the structure and subscribe to required data



## *"Consolidated, abstracted structure by which business and industrial applications can exchange industrial data"*

### What is a Unified Namespace

"Consolidated, abstracted structure by which business and industrial applications can exchange industrial data"

#### "Consolidated, abstracted structure"

- MQTT Broker
  - Scalable
  - Open
  - Secure
- MQTT Topics
  - Organization of information

#### "exchange industrial data"

- Data Transfer
  - Publish / Subscribe
- MQTT Payloads
  - Complex data sets
  - Open standard information
    models
  - Custom payloads for use case
  - Standardized
  - Normalized
  - Contextualized
  - Consolidated

#### Unified Namespace Broker



#### Challenges

- Many systems with industrial data do not support MQTT
- Many systems with MQTT publishing are constrained how and where the data is published
- Many payloads require data from multiple systems
- Data is not standardized across devices, vendors or implementors
- Data is not described in an understandable structure
- Data is not assembled for business use cases
- Target systems do not support MQTT
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Broker + Intelligent Gateway



#### Challenges

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 Target systems do not support MQTT

Broker + Intelligent Gateway (Inbound and Outbound)



#### Challenges

- Many systems with industrial data do not support MQTT
- ✓ Many systems with MQTT publishing are constrained how and where the data is published
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- ✓ Data is not assembled for business use cases
- Target systems do not support MQTT

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Broker + Intelligent Gateway (Inbound and Outbound)



- Topic Structure
- Payload
- Governance
- Use Case
- How To
- Benefits

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### **UNS Structure/Hierarchy**

### **Topic Path**

- MQTT topics are structured in a hierarchy similar to folders in a file system.
- ISA 95 Hierarchy is a logical organization of industrial information
  - Company
    - Site



#### **Define UNS Information Payloads**

#### Payload

- A discrete set of information that is correlated and time or event synchronized
- In many cases the payload is defined by the use case and is dictated by the subscribing system

#### 

- Profit & Loss
- Schedule

#### 🖵 Line

- OEE
- Lot data
  Electropic Data
- Electronic Batch Records
- u Cell
  - Compliance
  - Quality
- Asset
  - Predictive asset maintenance
  - Power Consumption

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#### Namespace Governance

- Critical to the success of the UNS
- Control the publication of data to the UNS, focus on consistency, usability and reliability
- Define standard structures and replicate these across like applications
- Define users and roles
- Create audit logs and baseline rollback points

## **UNS Use Cases**

- Production Metrics OEE/SPC
- Dashboards
- Predictive Maintenance
- Batch Details
- ERP Schedule
- Work Orders
- Recipe
- Setpoints

- Quality
- Work Cell Reports
- Power Consumption
- Building Monitoring
- Inventory Consumption
- Compliance
- Electronic Batch Reports
- Process Trains
- Traceability

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## How to setup a UNS

- 1. Infrastructure
  - MQTT Broker
  - Intelligent Gateway
- 2. Define UNS Structure/Hierarchy to organize the data
  - ISA95
- 3. Identify use cases and where the data will be accessible in UNS structure
- 4. Define data structures for use cases
  - Any standard approaches to structuring the data
  - Include context to uniquely identify, clearly define and use specific nomenclature
- 5. Identify systems that create the input data
  - Some data may need to be calculate from other systems
- 6. Identify the target system data requirements
  - Structures, context, and frequency
- 7. Iterate, Iterate, Iterate
  - Do not try to replace everything at once
  - Expect analytics, dashboard and reporting data requirements to change
  - Expect changes in the source data systems

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## **Unified Namespace Benefits**

- Accelerate data usage by business teams
- Make the data highly accessible
- Simplify system integrations
- Distribute the effort
- Enable factory agility
- Leverage open standards and COTS solutions
- Allow the data consumer/user to decide what they need



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02

## **Unified Namespace (UNS)**

- ✓ Industrial Data Integration Challenges
- ✓ Integration Patterns
- $\checkmark$  What is a UNS
- ✓ UNS Ecosystem
- ✓ UNS Structure
- ✓ Use Case

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Broker + Intelligent Gateway (Inbound and Outbound)



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## Introducing HighByte Intelligence Hub

#### Streamline your data architecture & reduce time to deploy new systems

- Data modeling and management abstraction layer
  - Standardize and contextualize information models
  - Consolidate and normalize data
  - Manage information flows
- Designed for OT information accessibility
  - Edge-native, on-premises
  - Light-weight
  - Web-based
  - System agnostic
  - Codeless interface



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## Why HighByte Intelligence Hub

Designed for OT to unlock the value of industrial data for the enterprise

#### Built for industrial data

 Real-time data collection, standardization, contextualization and publication

#### Ready to scale

- 10,000+ data flows supported with no built-in product limitations
- Centrally manage multiple hubs' configuration

#### **Built-in security**

- Secure protocol communication
- Users, Roles and Audit log

#### Fast to deploy, easy to maintain

- Designed for OT with browser UI and codeless implementation
- Containerized

#### **Experienced team**

- HighByte team from Industrial software industry
- Customer focused

#### Low cost

Annual subscription of \$5000 / hub or \$12,500 / site

## Introducing HiveMQ

![](_page_31_Figure_1.jpeg)

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## **Multi-Factory Deployment**

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![](_page_33_Picture_1.jpeg)

![](_page_33_Picture_2.jpeg)

![](_page_33_Picture_3.jpeg)

![](_page_33_Picture_4.jpeg)

![](_page_33_Picture_5.jpeg)

Implements business critical reliability

Scales to millions of devices

Support for high availability and always-on connections

In-depth observability and monitoring of connected devices

Integration of IoT data with enterprise services

Freedom to run anywhere

## ANY QUESTIONS?

![](_page_34_Picture_1.jpeg)

## **THANK YOU**

## **Contact Details**

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