HighByte | Intelligence Hub

Solution Brief

- Critical features
- Core components
- Measurable benefits
- Technical specifications

Make Your Industrial Data Useful

HighByte Intelligence Hub is an Industrial DataOps software solution designed specifically for industrial data modeling, delivery, and governance.

DataOps (data operations) is the orchestration of people, processes, and technology to securely deliver trusted, ready-to-use data to all who require it. HighByte Intelligence Hub provides industrial companies with an off-the-shelf DataOps solution to accelerate and scale the use of operational data throughout the enterprise by contextualizing, standardizing, and securing this valuable information.

Run the software at the Edge to merge and model real-time, transactional, and time-series data into a single payload and deliver contextualized, correlated information to all the applications that require it. Together, we can make your industrial data more useful for whatever digital transformation project comes your way.

Critical Features for Industrial DataOps

CODELESS INTEGRATION

Collect and publish data over open standards and native connections—eliminating the need for custom-coded integrations. Easily configure and manage multiple connections and their respective inputs and outputs within the script-free interface. Collect data from SQL and REST source systems using dynamic requests leveraging inputs from other systems. Quickly integrate data from specialty systems and devices. Merge data from multiple systems into a complex modeled payload.
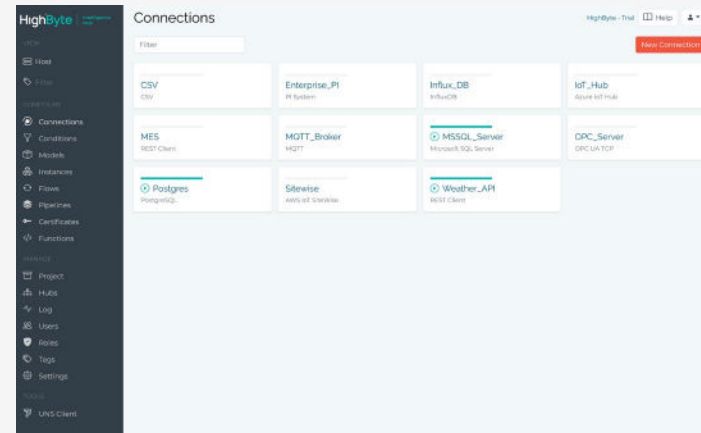
DATA CONDITIONING

Collect raw input data, condition the data, and pass conditioned data to instances or flows. Filter data through a deadband condition to reduce the jitter in a source sensor or measurement. Filter the data through an aggregate to buffer higher resolution data and provide statistical calculations using average, min, max, count, and delta at a slower rate to characterize the specified time period. Manipulate and transform raw input data into a usable format. Alarm on bad quality or stale data.

DATA TRANSFORMATIONS

Use the built-in transformation engine based on JavaScript notation to standardize and normalize data for comparison and application mismatches. The transformation engine enables you to perform calculations, execute logic to define new "virtual property" values, and decompose complex strings at the Edge to improve data usability and reduce transmission volume. Define global JavaScript functions or load third-party JavaScript or Node packages, then use them in any expression within the Intelligence Hub.

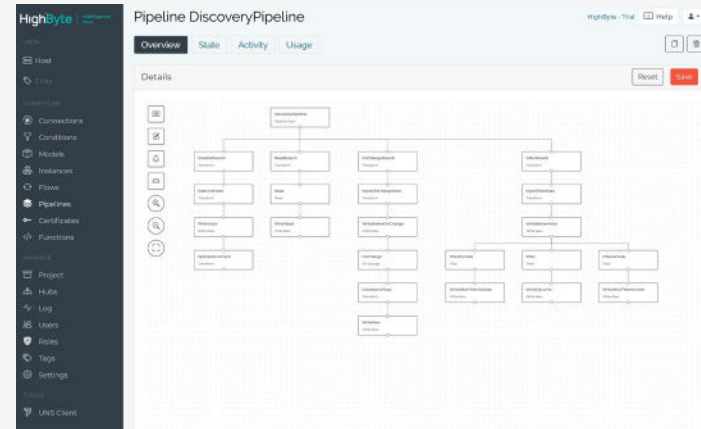# Critical Features for Industrial DataOps

DATA MODELING

Represent machines, products, processes, and systems with intelligent data models suited to your needs. Contextualize thousands of industrial data points by merging them with information from other systems, adding meta data, standardizing data attribute names and lists, and normalizing units of measure. Model hundreds of common assets in minutes with templatized inputs and instances.

CONNECTION FLOWS

Create data flows for raw data, modeled information, or files between connections at any frequency or event. Enable store and forward to buffer data to disk if target connection is lost. Manage data flows within HighByte Intelligence Hub, monitoring flow state and key metrics. See and be alerted to connection and flow failures through the Intelligence Hub and easily monitor the Intelligence Hub at scale using third-party system-monitoring applications.

DATA PIPELINES

Use the graphical data Pipelines builder to curate complex data payloads for systems like Amazon S3 and Azure Blob Storage and track the transformation of data through the pipeline. The builder includes steps to read, filter, buffer, transform, format, and compress payloads. Use the on-change stage to enable event-based delivery and report-by-exception. Use the switch stage to introduce conditional logic to your flow. Persist variables according to the length of the manufacturing event with state management capabilities.

Critical Features for Industrial DataOps

MQTT BROKER

Use the embedded MQTT broker that's tightly integrated with the Intelligence Hub's core data integration and contextualization capabilities to design a namespace that provides a real-time view of the state of business. The MQTT v3.1.1 and v5 compliant broker was built from the ground up by HighByte. It supports both JSON and Sparkplug payloads and can be quickly enabled in the UI. The broker is a critical component to rapidly building a local unified namespace (UNS) inside the factory.

REST DATA SERVER

The REST Data Server acts as an API gateway for industrial data residing in OT systems, so any application or service with an HTTP client can securely request OT data in raw or modeled form directly from the Intelligence Hub—without requiring domain knowledge of the underlying systems. This API exposes the Intelligence Hub's connections, models, and instances as well as the underlying values. Connect to the REST Data Server to access the Intelligence Hub as a transactional, request-and-response interface and programmatically browse the full Industrial DataOps infrastructure.

UNS CLIENT

Use the UNS client to visually discover and interrogate contents residing in any MQTT broker, negating the need for external testing clients. Simply select a connection and instantly visualize the namespace. The UNS Client can automatically detect and visualize message payloads including JSON, Sparkplug, text, and raw binary, and decode Protobuf to make payloads human readable for Sparkplug users. In addition to topic and message inspection, the UNS Client can also publish messages to topics.

EDGE DEPLOYMENT

Run HighByte Intelligence Hub on your choice of light weight hardware platforms including single board computers, industrial switches, IoT gateways, and industrial data servers at the Edge. Deploy as an individual software installation or Docker image to rapidly deploy and upgrade system software components.

Core Components for Enterprise Administration

SECURITY

Exchange data using the built-in security of connection protocols. Authenticate users and their roles through third-party identity providers with Security Assertion Markup Language (SAML). Securely move project configurations across environments with different connection credentials using external secrets support and the dedicated configuration construct for secure secret referencing.

CENTRAL MANAGEMENT

Connect multiple hubs to a single host that acts as the central hub. Once connected, administrators can log in to the central hub and easily switch between hubs to configure and monitor individual hub activity and compare configurations for differences. Administrators can also synchronize models, connections, or complete projects between hubs. The configuration is truly portable. Administrators can import and export JSON-based configuration files directly within the browser-based configuration UI.

HIGH AVAILABILITY

Deploy redundant Intelligence Hubs for critical data and pair the hubs as a primary and secondary. A secondary hub will be ready in a warm state ready to enable flows when it detects the primary is no longer responding.

PERMISSIONS

Create unique user names and passwords for each user. Assign a user to a role with a pre-defined set of permission claims or assign a user their own unique permission claims. Use Active Directory to manage authentication, authorization of users, and application settings. Create and maintain certificates in the hub configuration to authenticate and secure data transfer with other systems.

AUDITING

Enable audit logging to allow all configuration creations, modifications, or deletions to be logged to the event log as AUDIT type events. View all log events through the configuration and filter by type, source, or message text. Automatically back up the runtime's configuration file to a backup directory at a specified frequency and maintain a specified maximum number of these files.

PROJECT MANAGEMENT

The Intelligence Hub includes tags to define ad hoc collections of items in the configuration. These tags can easily be used to identify configuration related to a use case or a section of the factory or to limit permissions to specific people. The tags enable easy grouping to filter the UI, synchronize across hubs, and grant permissions within a hub.

Measurable Benefits for Operational Technology (OT), IT, and Line of Business

Accelerate analytics and other Industry 4.0 use cases with a digital infrastructure solution built for scale.

- Reduce system integration time from months to hours

- Improve data curation and preparation for AI and ML applications

- Scale operations metrics and analytics across the enterprise

- Reduce information wait time for business functions

- Eliminate time spent troubleshooting broken integrations

- Empower operators with insights from the Cloud

- Improve system-wide security and data governance

- Meet system integrity and regulatory traceability requirements

- Reduce Cloud ingest, processing, and storage costs and complexity

- Optimize data payloads for specific target applications and use cases

Technical Specifications

CONNECTIVITY

Connector	Inbound	Outbound
AWS		
Amazon Kinesis Data Firehose		✓
Amazon Kinesis Data Streams		✓
Amazon Redshift	✓	✓
Amazon S3		✓
AWS IoT SiteWise		✓
Azure		
Azure Blob Storage		✓
Azure Event Hubs	✓	✓
Azure IoT Edge	✓	✓
Azure IoT Hub	✓	✓
Files		
Apache Parquet	✓	✓
CSV	✓	✓
File	✓	✓
Google Cloud Platform		
Google Cloud Pub/Sub		✓
Google BigQuery	✓	✓
HTTP		
REST Client	✓	✓
Webhook	✓	
Modbus		
Modbus TCP	✓	✓

Technical Specifications

CONNECTIVITY

Connector	Inbound	Outbound
MQTT		
MQTT JSON	✓	✓
Sparkplug	✓	✓
OPC		
OPC UA TCP	✓	✓
Snowflake Data Cloud		
Snowpipe Streaming		✓
Snowflake SQL	✓	
SQL		
JDBC Driver	✓	✓
Microsoft SQL Server	✓	✓
MySQL	✓	✓
Oracle Database	✓	✓
PostgreSQL	✓	✓
SQLite	✓	✓
Streaming		
Apache Kafka		✓
Time Series		
InfluxDB	✓	✓
PI System	✓	✓

HighByte Intelligence Hub can also connect bi-directionally to AWS IoT Core and AWS IoT Greengrass through the MQTT connector.

Technical Specifications

SUPPORTING OPERATING SYSTEMS

- Windows Server 2012/2016/2019

- Windows 8/10/11

- Linux [any Linux distribution capable of running a JVM; tested with Ubuntu]

- macOS

SYSTEM REQUIREMENTS

- Java SE 11 or OpenJDK 14 [or newer]

- HTTP server [for hosting frontend]

- 1.4 GHz processor

- 1 GB RAM

- 1 GB available disk space

- Network capable [TCP]

These are minimal system requirements. Actual requirements will vary based on product configuration.

SOFTWARE DELIVERY

HighByte Intelligence Hub is an on-premises application configured remotely through a web browser or a REST-based API. The software is available as an annual subscription. Please visit highbyte.com/pricing to view licensing options.

Next Steps

Interested in learning more? Please contact sales@highbyte.com to request additional information, schedule a demo, or join our free trial program.

About HighByte

HighByte is an industrial software company in Portland, Maine USA building solutions that address the data architecture and integration challenges created by Industry 4.0. HighByte Intelligence Hub, the company's award-winning Industrial DataOps software, provides modeled, ready-to-use data to the Cloud using a codeless interface to speed integration time and accelerate analytics. Learn more at www.highbyte.com.

P.O. Box 17854, Portland, ME 04112
V3.4-042024