

Getting Started

# Edge-to-Cloud Architecture Using MQTT and InfluxDB 3.0



# WELCOME

## Kudzai Manditereza

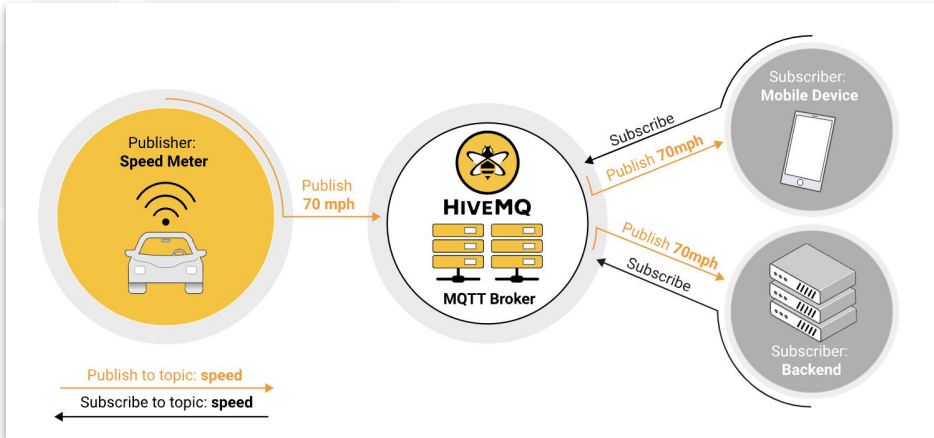


- Developer Advocate at HiveMQ
- Helping solution architects and developers adopt Industrial IoT for Manufacturing Digital Transformation
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# Introduction to MQTT



Publish-Subscribe

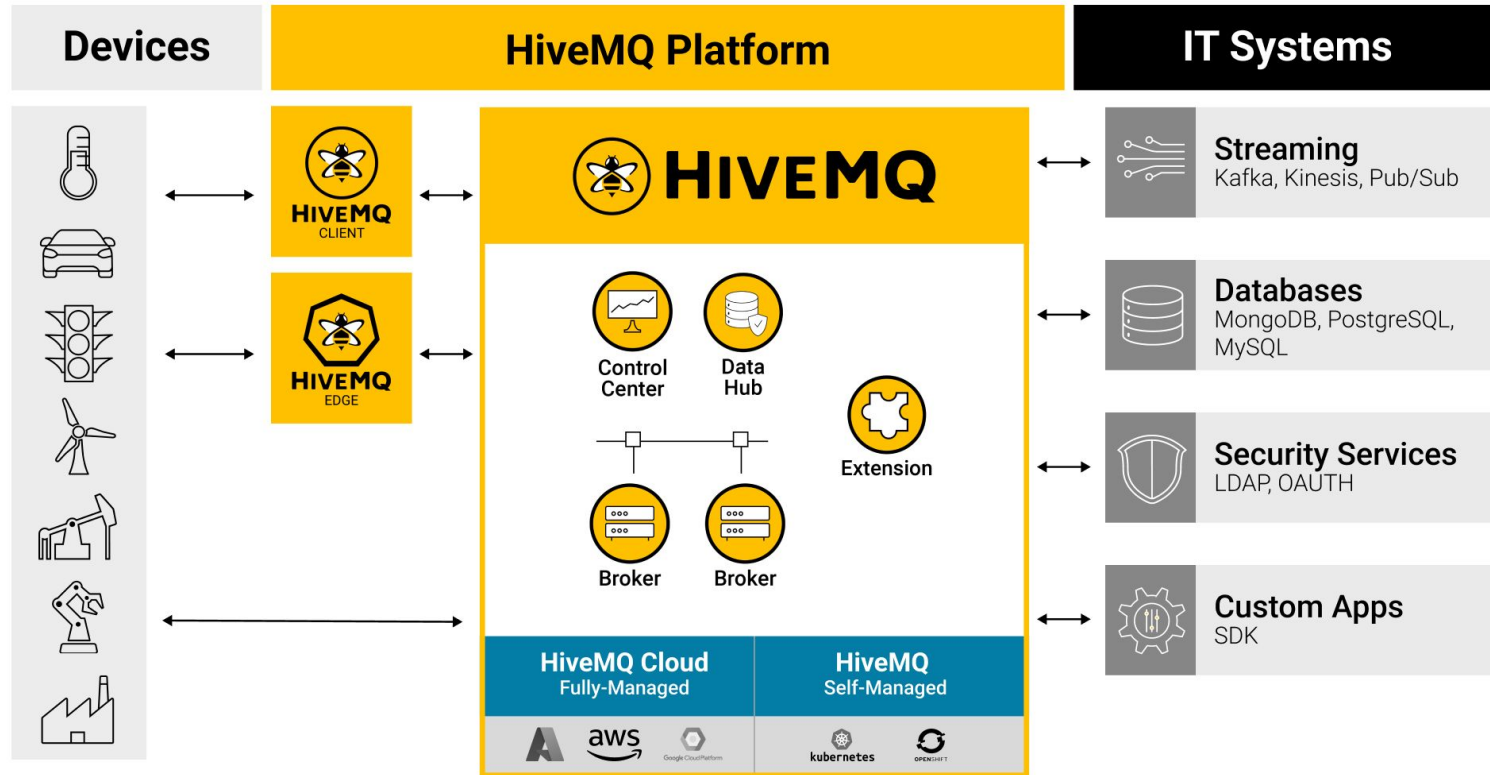
Open Architecture

Lightweight

Edge-Driven



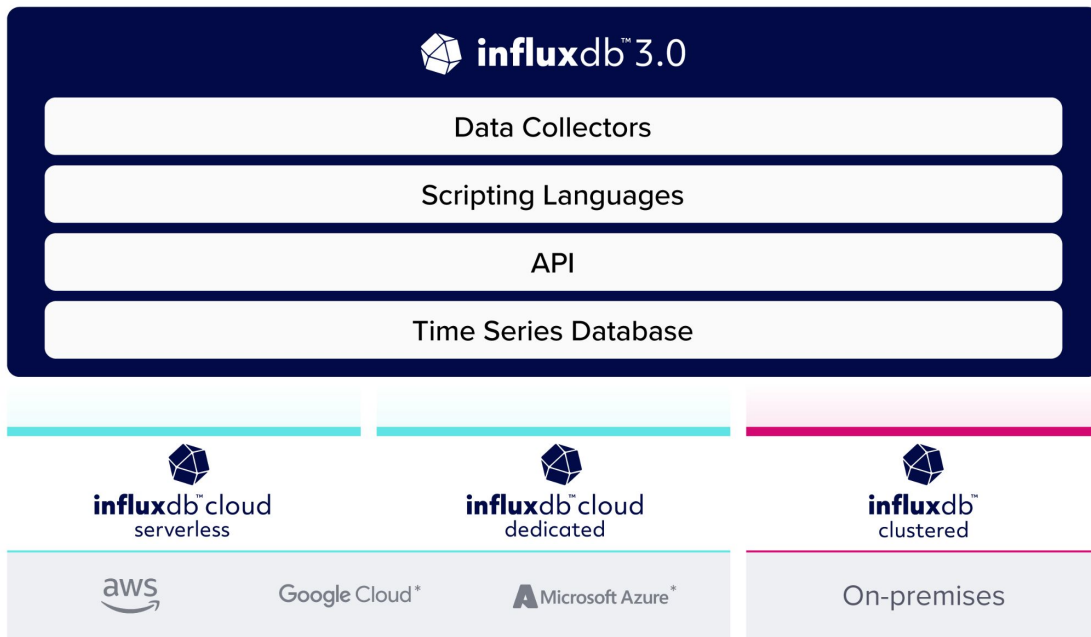
# HiveMQ MQTT Platform



# What is InfluxDB?

## InfluxDB. It's About Time.

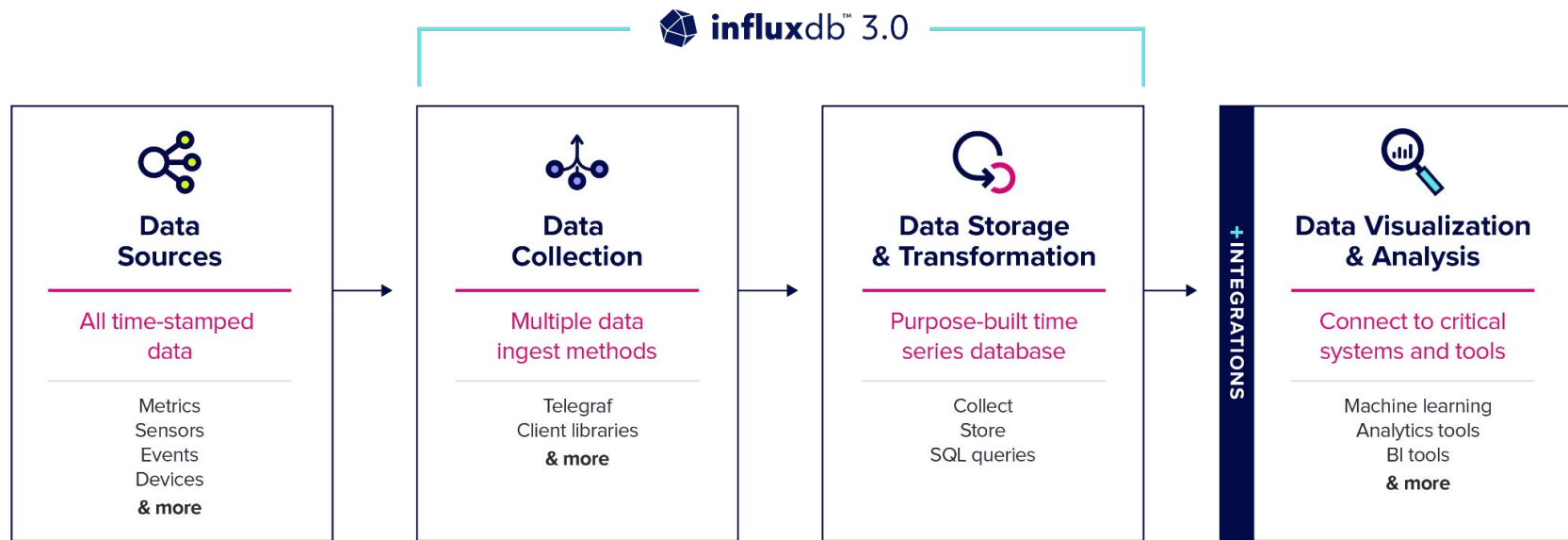
Manage all types of time series data in a single, purpose-built database. Run at any scale in any environment in the cloud, on-premises, or at the edge.



\* Availability to be announced

# InfluxDB Platform

Database & platform for handling time series data at massive scale

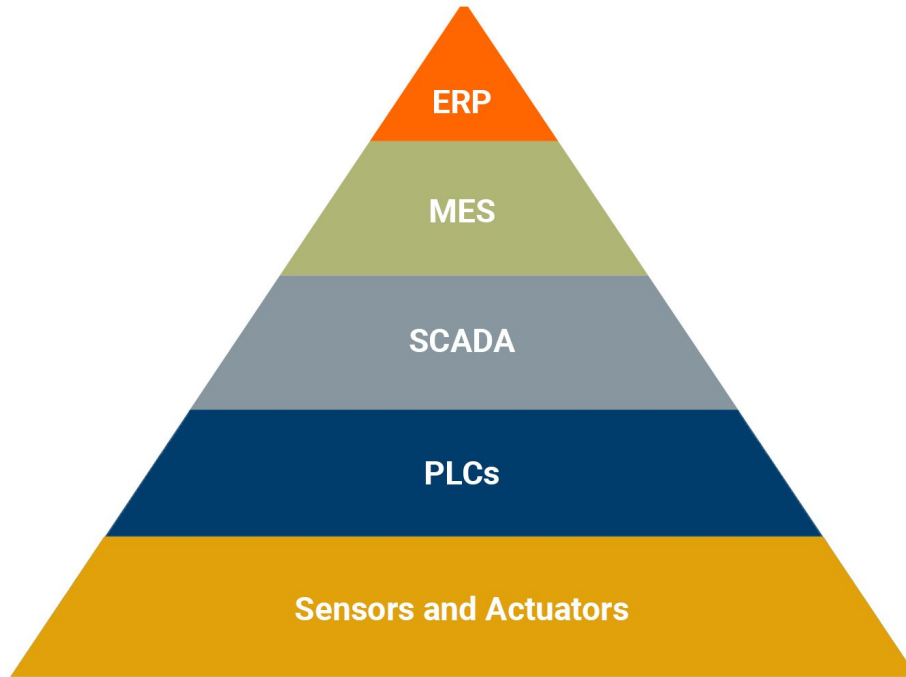


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# Demo

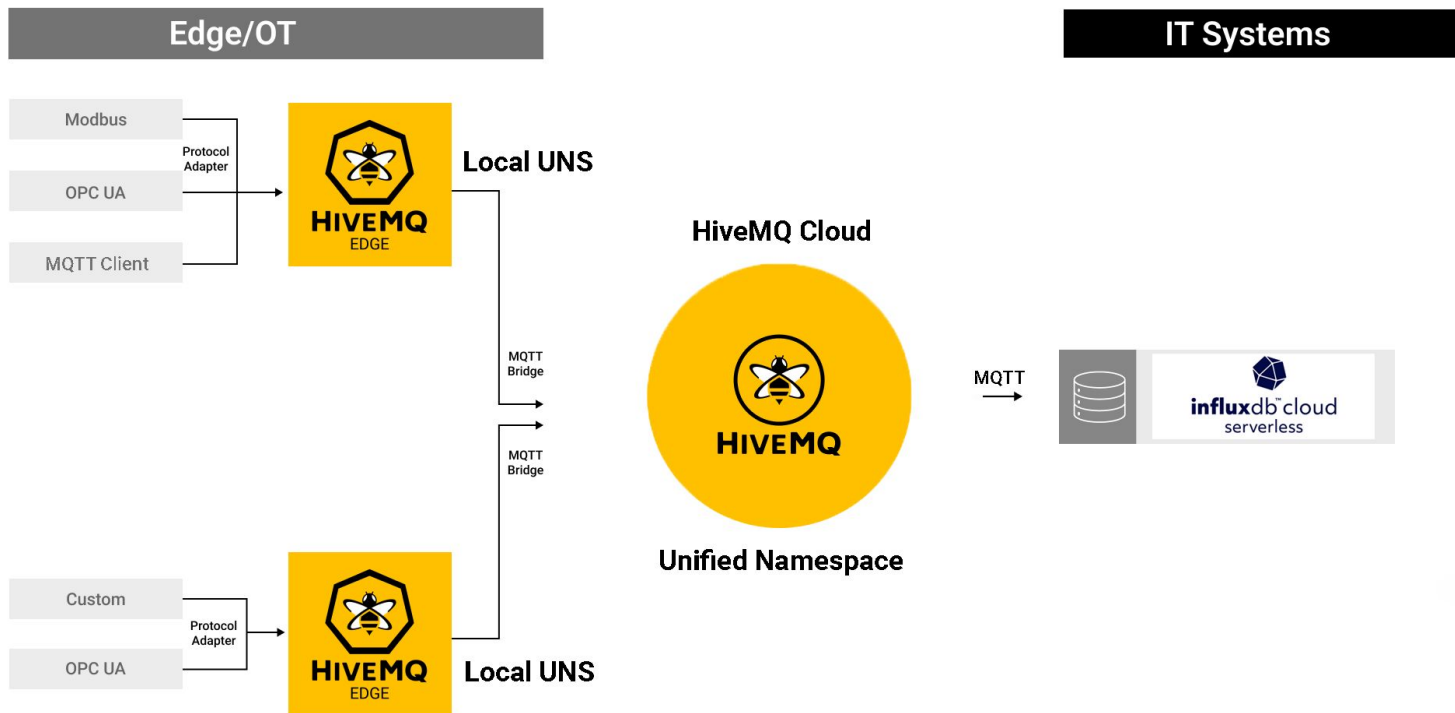


# Traditional Industrial Data Architecture

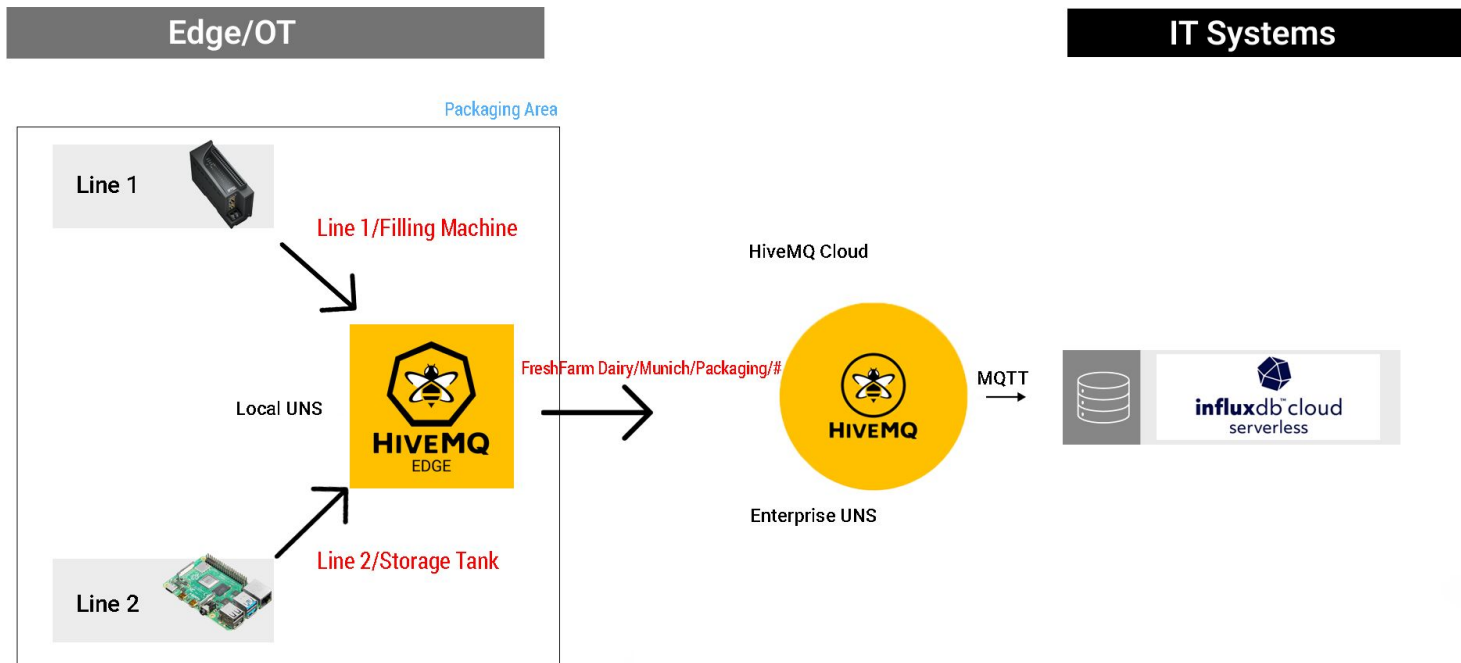




# Edge-to-Cloud Architecture with MQTT & InfluxDB 3.0



# Edge-to-Cloud Architecture with MQTT & InfluxDB 3.0





**HIVEMQ**  
EDGE  
[ 2023.5 ]

HiveMQ Edge

- 🏠 Home
- 🔗 Workspace
- ⇄ MQTT Bridges
- ⇄ Protocol Adapters
- Extensions**
- 📁 Unified namespace
- External resources**
- 📄 Useful articles
- 📄 GitHub
- 📄 Documentation
- 👉 Logout

# Welcome to HiveMQ Edge

Connect from and to any device and send streams of data to your enterprise.

## Get data flowing

### From Devices To HiveMQ Edge

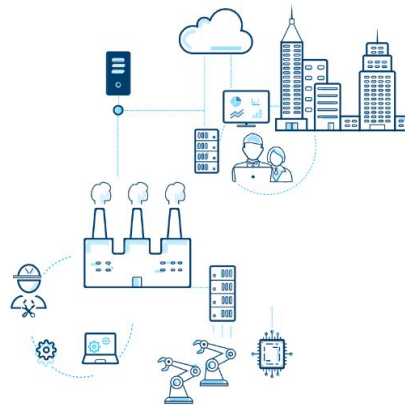
📄 Use HiveMQ Edge modular Protocol adapters to connect to local and network based devices.  
⇄ [Use a Protocol Adapter](#)

### From HiveMQ Edge to the Enterprise


📄 Connect your HiveMQ Edge MQTT Broker to your Enterprise using MQTT Bridge connections.  
⇄ [Use a Bridge](#)

### Connect To HiveMQ Cloud

📄 You should connect your HiveMQ Edge deployment with a HiveMQ Cloud MQTT Broker, which will be the source of truth for your business data.  
🔗 [Connect To HiveMQ Cloud](#)



localhost:8080/app/mqtt-bridges/my-uns-bridge




# HIVEMQ EDGE

[2023.5]

**MQTT bridges**

A MQTT bridge lets you connect two MQTT brokers together. They are generally used for shared systems.

my-uns-bridge	
	e82f848307f04b4f8fd8[...]s1.eu.hivemq.cloud
Port	8883
Client Id	
Local subscription	1
Remote subscription	0

Status **CONNECTED**

**Update the bridge configuration**

Name: my-uns-bridge

The unique name of this bridge

Connection details | Broker Configuration | Security

Host \* e82f848307f04b4f8fd82f15edd9df45.s1.eu.hivemq.clc Port \* 8883

Username: hivemqedge1 Password: .....

Local | Remote

Subscriptions to your local MQTT Broker are used to forward messages from this HiveMQ Edge to a remote MQTT broker.

Filters \* {#} Destination \* {#}

The list of topics used to filter the messages. MQTT wildcards are supported.

The destination topic. You can use '{#}' to keep the original topic.

Advanced configuration

Delete Update the bridge





**HIVEMQ**  
EDGE  
[ 2023.5 ]

**HiveMQ Edge**

- Home
- Workspace
- MQTT Bridges
- Protocol Adapters

**Extensions**

- Unified namespace**

**External resources**

- Useful articles
- GitHub
- Documentation

[Logout](#)

# Unified Namespace

Set your unified namespace architecture.

[+ Set up a unified namespace](#)

## ISA-95 Unified Namespace

A Unified Namespace is a middleware solution that allows you to collect data from various industrial systems, add context to it, and transform it into a format that other systems can understand.

ISA 95 provides a convenient way of structuring data sources in relation to their position within a manufacturing enterprise, hierarchically.

[Go to hivemq website to know more](#)

## Recommended format

By ISA-95

**Enterprise / Site / Area / Line / Cell**

## My namespace prefix

**FreshFarm Dairy / Munich / Packaging**

### Enable Unified Namespace



When enabled, unified namespace will provide tokens that can be used in topics to apply UNS convention to your data.



filter nodes

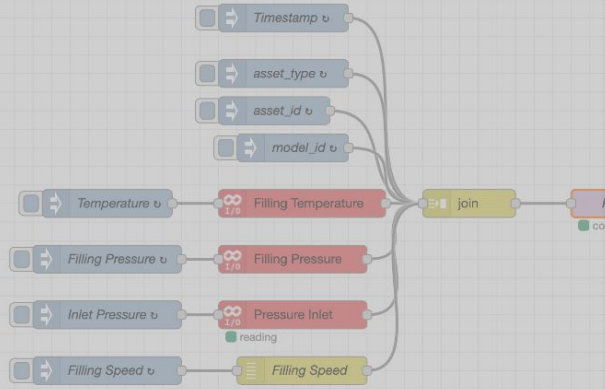
IO Simulation

MQTT Client

FILLING MACHINE DATA

- common
  - inject
  - debug
  - complete
  - catch
  - status
  - link in
  - link call
  - link out
  - comment

- function
  - function
  - switch
  - change
  - range
  - template
  - delay
  - trigger
  - exec
  - filter



Edit mqtt out node

Delete Cancel Done

Properties

Server: HiveMQ Edge Macbook

Topic: Line 1/Filling Machine

QoS: 0 Retain: true

Name: Publish MQTT

Tip: Leave topic, qos or retain blank if you want to set them via msg properties.

Enabled

debug

all nodes all



Not Secure | 192.168.0.39:1880/#flow/1905c66440e15558

Node-RED

filter nodes STORAGE TANK DATA SIM

common

- inject
- debug
- complete
- catch
- status
- link in
- link call
- link out
- comment

function

- function
- switch
- change
- range
- template
- delay
- trigger
- exec
- filter

Timestamp v

asset\_type v

asset\_id v

model\_id v

Temperature v

Tank Temperature

Tank Pressure v

Tank Pressure

Tank Level v

Tank Level

join 7

mqtt out node

Delete Cancel Done

Properties

Server HiveMQ Edge Macbook

Topic Line 2/Storage Tank

QoS 0 Retain true

Name Publish MQTT

Tip: Leave topic, qos or retain blank if you want to set them via msg properties.

config

all unused

On all flows

mqtt-broker

HiveMQ Edge Ma... 1

STORAGE TANK DATA SIMULATION

Enabled

The screenshot shows the Node-RED web interface. On the left, there are two panels for node selection: 'common' and 'function'. The main workspace contains a flow for 'STORAGE TANK DATA SIM'. It starts with four input nodes: 'Timestamp v', 'asset\_type v', 'asset\_id v', and 'model\_id v'. These are connected to a 'join 7' node. Below this, there are three more input nodes: 'Temperature v', 'Tank Pressure v', and 'Tank Level v'. Each of these is connected to a corresponding function node: 'Tank Temperature', 'Tank Pressure', and 'Tank Level'. All these function nodes are connected to the 'join 7' node. The output of the 'join 7' node is connected to an 'mqtt out' node. The right-hand panel shows the configuration for this 'mqtt out' node. It includes fields for 'Server' (HiveMQ Edge Macbook), 'Topic' (Line 2/Storage Tank), 'QoS' (0), 'Retain' (true), and 'Name' (Publish MQTT). A tip message is displayed below these fields. At the bottom of the panel, there is an 'Enabled' checkbox.



# ☰ 🐝 Your Clusters

Data

- ☁ Clusters +
  - FREE #1 Serverless
  - FREE #2 Serverless

Billing

📄 Billing & Payment

### What's New 🐝 ×

Streamline Integration of IoT Data via Confluent Cloud with HiveMQ Cloud Starter

[LEARN MORE](#)

🔍 Help

📄 Documentation

🗣 Feedback

🚪 Logout

CREATE NEW CLUSTER

**Serverless**  
FREE ● Running

**URL**  
f19aadd447964b9284a56ce9e0fe5dca.s1.eu.hivemq.cloud

**Port (TLS)**  
8883

**Started**  
Sun, Sep 17, 2023, 4:55 PM

[MANAGE CLUSTER](#)

**Serverless**  
FREE ● Running

**URL**  
e82f848307f04b4f8fd82f15edd9df45.s1.eu.hivemq.cloud

**Port (TLS)**  
8883

**Started**  
Fri, Jul 14, 2023, 9:57 PM

[MANAGE CLUSTER](#)





# Cluster Details

OVERVIEW

ACCESS MANAGEMENT

INTEGRATIONS NEW

WEB CLIENT

GETTING STARTED

Data

Clusters +

FREE #1 Serverless

FREE #2 Serverless

Billing

Billing & Payment

## What's New ✕

Streamline Integration of IoT Data via Confluent Cloud with HiveMQ Cloud Starter

[LEARN MORE](#)

? Help

📄 Documentation

💬 Feedback

🚪 Logout

## Cluster Information

Current Plan  
Serverless

Current Tier  
FREE

Name  
f19aadd447964b9284a56ce9e0fe5dca

Cloud Provider  


[CHANGE PLAN TO PAY AS YOU GO](#)

▶ [What is included in my plan?](#)

## Connection Settings

Cluster URL EDIT

f19aadd447964b9284a56ce9e0fe5dca.s1.eu.hivemq.cloud

Port

8883

Websocket Port

8884

TLS URI

f19aadd447964b9284a56ce9e0fe5dca.s1.eu.hivemq.cloud:8883/mqtt

Websocket URI

f19aadd447964b9284a56ce9e0fe5dca.s1.eu.hivemq.cloud:8884/matt



us-east-1-1.aws.cloud2.influxdata.com/orgs/0a76188b08918cd7/load-data/subscriptions

HiveMQ kudzai.manditereza@hivemq.com Get \$250 free credit **UPGRADE NOW** KM

# Load Data

SOURCES BUCKETS TELEGRAF **NATIVE SUBSCRIPTIONS** API TOKENS

Filter subscriptions... Sort by Name (A → Z) **+ CREATE SUBSCRIPTION**

<b>FreshFarm Dairy - Line 1</b>	
Edge to Cloud Connection	
<b>No Notifications</b> RUNNING e82f848307f04b4f8fd82f15edd9df45.s1.eu.hivemq.cloud:8883/FreshFarm Dairy/Munich/Packaging/Line 1/# Last Modified: 7 days ago Last Modified By: kudzai.manditereza@hivemq.com ID: 62b46f0d48562000	
<b>FreshFarm Dairy - Line 2</b>	
This subscribes to every thing published on line 2	
<b>No Notifications</b> RUNNING e82f848307f04b4f8fd82f15edd9df45.s1.eu.hivemq.cloud:8883/FreshFarm Dairy/Munich/Packaging/Line 2/# Last Modified: 7 days ago Last Modified By: kudzai.manditereza@hivemq.com ID: 62b5bd4c2752b000	



us-east-1-1.aws.cloud2.influxdata.com/orgs/0a76188b08918cd7/load-data/subscriptions/62b46f0d48562000

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### FreshFarm Dairy - Line 1

Native MQTT

STATUS: **RUNNING** [STOP](#) [CLOSE](#) [EDIT](#) [VIEW DATA](#)

#### BROKER DETAILS

Subscription Name\*  
FreshFarm Dairy - Line 1

Description  
Edge to Cloud Connection

Protocol	Hostname or IP Address*	Port*
MQTT	e82f848307f04b4f8fd82f15edd9df45.s1.eu.hivemq.cloud	8883

Enable SSL

`mqtt://e82f848307f04b4f8fd82f15edd9df45.s1.eu.hivemq.cloud:8883`

#### Client ID

We will generate a Client ID for you, but some providers require you use their Client ID. If your provider requires a specific Client ID, the connection will fail without it. Check your provider's documentation to verify whether you need to use their Client ID.

f49d502d-093a-40bc-a8e0-a00681bb9f47

Use Custom Client ID

#### SECURITY DETAILS

[NONE](#) [BASIC](#) [CERTIFICATE](#)



us-east-1-1.aws.cloud2.influxdata.com/orgs/0a76188b08918cd7/load-data/subscriptions/62b46f0d48562000

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### FreshFarm Dairy - Line 1

Native MQTT

STATUS: RUNNING STOP

[CLOSE](#) [EDIT](#) [VIEW DATA](#)

#### SECURITY DETAILS

NONE  BASIC  CERTIFICATE

Username\*  Password\*

---

#### Topic Subscription

Topic\*

Subscribe to a topic to start receiving messages.

#### WRITE DESTINATION

Bucket: demo-bucket



us-east-1-1.aws.cloud2.influxdata.com/orgs/0a76188b08918cd7/load-data/subscriptions/62b46f0d48562000

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### FreshFarm Dairy - Line 1

Native MQTT

STATUS: **RUNNING** [STOP](#)

[CLOSE](#) [EDIT](#) [VIEW DATA](#)

## Define Data Parsing Rules

Data format: json

### TIMESTAMP

JSON Path to Timestamp

Timestamp precision

### MEASUREMENT

JSON Path  Name

JSON Path\*

Data Type

### TAG

Name\*

Data Type

Navigation icons: Home, Up, Chart, Dashboard, Settings, Alerts, Help, Profile

Workflow steps: Connect to Broker, Subscribe to Topic, Define Data Parsing Rules



us-east-1-1.aws.cloud2.influxdata.com/orgs/0a76188b08918cd7/load-data/subscriptions/62b46f0d48562000

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### FreshFarm Dairy - Line 1

Native MQTT

STATUS: **RUNNING** [STOP](#) [CLOSE](#) [EDIT](#) [VIEW DATA](#)

**FIELD**

Name\* ? Data Type

temperature Float

JSON Path\* ?

\$.filling\_temperature

**FIELD**

Name\* ? Data Type

filling\_pressure Float

JSON Path\* ?

\$.filling\_pressure

- Connect to Broker
- Subscribe to Topic
- Define Data Parsing Rules



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# Data Explorer

Switch to old Data Explorer

Graph CUSTOMIZE Local SAVE AS

_time	_value	_field	_measurement	asset_id	topic
2023-10-05 15:51:00	102.7	inlet_pressure	filling_machine	1001	FreshFarm Dairy/Munich/Packaging/Line 1/Filling Machine
2023-10-05 15:51:00	67.58	tank_level	storage_tank	2003	FreshFarm Dairy/Munich/Packaging/Line 2/Storage Tank
2023-10-05 15:51:00	47	filling_speed_bottle_per_min	filling_machine	1001	FreshFarm Dairy/Munich/Packaging/Line 1/Filling Machine
2023-10-05 15:51:00	24.42	temperature	filling_machine	1001	FreshFarm Dairy/Munich/Packaging/Line 1/Filling Machine
2023-10-05 15:51:00	16.58	tank_pressure	storage_tank	2003	FreshFarm Dairy/Munich/Packaging/Line 2/Storage Tank
2023-10-05 15:51:00	14.32	filling_pressure	filling_machine	1001	FreshFarm Dairy/Munich/Packaging/Line 1/Filling Machine

Query 1 (0.16s) + View Raw Data CSV Past 5m SCRIPT EDITOR SUBMIT

FROM: demo-bucket

MEASUREMENT: filling\_machine, groov\_rio\_remote\_io, pressure\_sensor, storage\_tank, All Measurements

Filter 1: \_field (6): filling\_pressure, filling\_speed\_bottle--, inlet\_pressure, tank\_level, tank\_pressure, temperature

Filter 2: asset\_id (2): 1001, 2003

Filter 3: topic (2): FreshFarm Dairy/Munic-, FreshFarm Dairy/Munic-

WINDOW PERIOD: AUTO (10s), Fill missing values

AGGREGATE FUNCTION: AUTO (mean, median, last)

No tag keys found in the current time range



us-east-1-1.laws.cloud2.influxdata.com/orgs/Oa76188b08918cd7/data-explorer

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# Data Explorer

Switch to old Data Explorer

Table CUSTOMIZE Local SAVE AS

	_start	_stop	_time	_value	_field	_measurement	asset_id	topic
_field = temperature _measurement = filling_machine asset_id = 1001 topic = FreshFarm Da...	2023-10-05 14:37:14 GMT...	2023-10-05 14:42:14 GMT...	2023-10-05 14:37:20 GMT...	24.29	temperature	filling_machine	1001	FreshFarm Dairy/Munic...
_field = tank_level _measurement = storage_tank asset_id = 2003 topic = FreshFarm Dairy...	2023-10-05 14:37:14 GMT...	2023-10-05 14:42:14 GMT...	2023-10-05 14:37:30 GMT...	24.29	temperature	filling_machine	1001	FreshFarm Dairy/Munic...
_field = tank_level _measurement = storage_tank asset_id = 2003 topic = FreshFarm D...	2023-10-05 14:37:14 GMT...	2023-10-05 14:42:14 GMT...	2023-10-05 14:37:40 GMT...	24.29	temperature	filling_machine	1001	FreshFarm Dairy/Munic...
_field = inlet_pressure _measurement = filling_machine asset_id = 1001 topic = FreshFarm f...	2023-10-05 14:37:14 GMT...	2023-10-05 14:42:14 GMT...	2023-10-05 14:37:50 GMT...	24.29	temperature	filling_machine	1001	FreshFarm Dairy/Munic...
_field = inlet_pressure _measurement = filling_machine asset_id = 1001 topic = FreshFarm f...	2023-10-05 14:37:14 GMT...	2023-10-05 14:42:14 GMT...	2023-10-05 14:38:00 GM...	24.33	temperature	filling_machine	1001	FreshFarm Dairy/Munic...
_field = filling_pressure _measurement = filling_machine asset_id = 1001 topic = FreshFarm	2023-10-05 14:37:14 GMT...	2023-10-05 14:42:14 GMT...	2023-10-05 14:38:00 GM...	24.33	temperature	filling_machine	1001	FreshFarm Dairy/Munic...
_field = filling_pressure _measurement = filling_machine asset_id = 1001 topic = FreshFarm	2023-10-05 14:37:14 GMT...	2023-10-05 14:42:14 GMT...	2023-10-05 14:38:20 GM...	24.33	temperature	filling_machine	1001	FreshFarm Dairy/Munic...

Query 1 (0.14s) View Raw Data CSV Past 5m SCRIPT EDITOR SUBMIT

FROM: demo-bucket

MEASUREMENT: filling\_machine, storage\_tank

Filter 1: \_field (6)

Filter 2: asset\_id (2)

Filter 3: topic (2)

WINDOW PERIOD: AUTO

AGGREGATE FUNCTION: mean

No tag keys found in the current time range





**ANY  
QUESTIONS?**



# Resources

[HiveMQ Edge – A Software-based Industrial Edge Protocol Converter](#)

[MQTT Essentials – The Ultimate Guide to MQTT for Beginners and Experts](#)

[Unified Namespace Essentials \(UNS\)](#)

## Try HiveMQ



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For Free](#)



[Evaluate  
for Free](#)

