

Webinar

# Debugging MQTT Client Communications with MQTT.fx® and HiveMQ Cloud



&

SOFTBLADE

# WELCOME



## Magi Erber

- Product Manager @HiveMQ
- Conference Speaker
- Author
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## Jens Deters

- Founder, CEO @Softblade
- Branch Manager @codecentric
- Conference Speaker
- Author of MQTT.fx
- Cloud native architectures
- IIoT, Industry 4.0



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We asked our customers...

bservability



# Use Cases



**Connected Car**



**IIoT /  
Industry 4.0**



**Logistics**

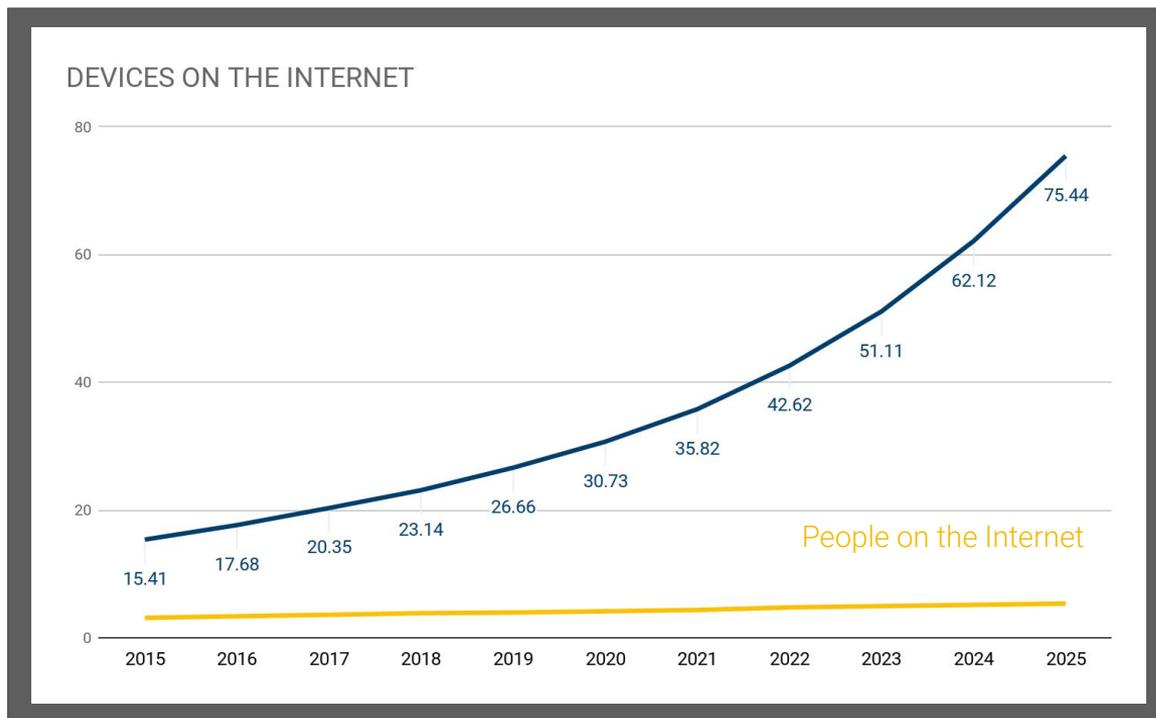


**Telecommunication**



**IoT Messaging  
Middleware**

# The Internet of Things is Huge



# HiveMQ - Enterprise MQTT Broker



# HIVEMQ

- ▶ Connectivity and Messaging Platform
- ▶ Based on standard IoT protocol (MQTT)
- ▶ 100% compatible to all MQTT versions (v3.1, v3.1.1, v5)
- ▶ Scales to more than 10 million always-on devices
- ▶ Allow multi-cloud and Enterprise software integration
- ▶ Integrated observability and insights

# Observability and Insights from Operations

The image displays the HiveMQ web interface, showing a dashboard with various metrics and a detailed view of a client connection.

### Dashboard Overview

**Key Metrics:**

- Connections: 250,000
- Inbound Publish Rate: 4.974 / s
- Outbound Publish Rate: 4.976 / s
- Subscriptions: 200,000
- Retained Messages: 0
- Queued Messages: 0
- Cluster Nodes: 3

**Connections per Cluster Node (stacked):** A line chart showing the number of connections over time for three nodes: vNLXP (blue), huAKh (green), and Qylyf (red). The x-axis ranges from 09:20 to 10:05, and the y-axis ranges from 0 to 250,000.

**Active License Information:**

- Cores Used: 24 / 24
- License Type: Valid, Commercial License

**Statistics per Cluster Node:**

- Qylyf: CPU 25% (8 cores)
- Total Inbound Publish Messages: 526,492
- Total Inbound Volume: 541.54 MB

### Client Detail View

**Client Information:**

- Client ID: subscriber-client-000000000
- Connected Since: 2020-04-21 10:03:01
- Session Expiry Interval: 0 Seconds
- Message Queue Size: 0 Messages

**Connection Details:**

- Client IP: 35.174.153.227
- Username: hivemq
- MQTT Version: MQTT5
- Keep-Alive: 60 Seconds

**Restrictions:**

- Maximum Bytes per Second Inbound: Unlimited
- Maximum Bytes per Second Outbound: Unlimited
- Maximum Message Size: 256.00 MB
- Maximum Message Queue Size: 1,000 Messages
- Drop Strategy for Queued Messages: Discard

**Proxy Protocol:**

- Signature: 35.174.153.227:11014
- Destination IP:Port: 10.5.80.244:8883

**Client List Table:**

Client ID	Username	IP Address	Connection Status
subscriber-client-000000000	hivemq	35.174.153.227	Connected
subscriber-client-000000001	hivemq	35.174.153.227	Connected
subscriber-client-000000002	hivemq	35.174.153.227	Connected
subscriber-client-000000003	hivemq	35.174.153.227	Connected
subscriber-client-000000004	hivemq	35.174.153.227	Connected
subscriber-client-000000005	hivemq	35.174.153.227	Connected
subscriber-client-000000006	hivemq	35.174.153.227	Connected
subscriber-client-000000007	hivemq	35.174.153.227	Connected
subscriber-client-000000008	hivemq	35.174.153.227	Connected
subscriber-client-000000009	hivemq	35.174.153.227	Connected
subscriber-client-000000010	hivemq	35.242.217.206	Connected
subscriber-client-000000011	hivemq	35.242.217.206	Connected
subscriber-client-000000012	hivemq	35.242.217.206	Connected
subscriber-client-000000013	hivemq	35.242.217.206	Connected
subscriber-client-000000014	hivemq	35.242.217.206	Connected
subscriber-client-000000015	hivemq	35.242.217.206	Connected
subscriber-client-000000016	hivemq	35.242.217.206	Connected
subscriber-client-000000017	hivemq	35.242.217.206	Connected
subscriber-client-000000018	hivemq	35.242.217.206	Connected
subscriber-client-000000019	hivemq	35.242.217.206	Connected
subscriber-client-000000020	hivemq	35.81.164.56	Connected
subscriber-client-000000021	hivemq	35.81.164.56	Connected
subscriber-client-000000022	hivemq	35.81.164.56	Connected
subscriber-client-000000023	hivemq	35.81.164.56	Connected
subscriber-client-000000024	hivemq	35.81.164.56	Connected

# Technical IoT Challenges

## Scalability

- Massive scalability required for millions of devices

## Instant Data Delivery

- Critical systems need reliable and instant data transfer

## Unreliable Networks

- Excellent customer experience for IoT apps and devices



We need **open standards**  
designed for the  
**Internet of Things**



# MQTT

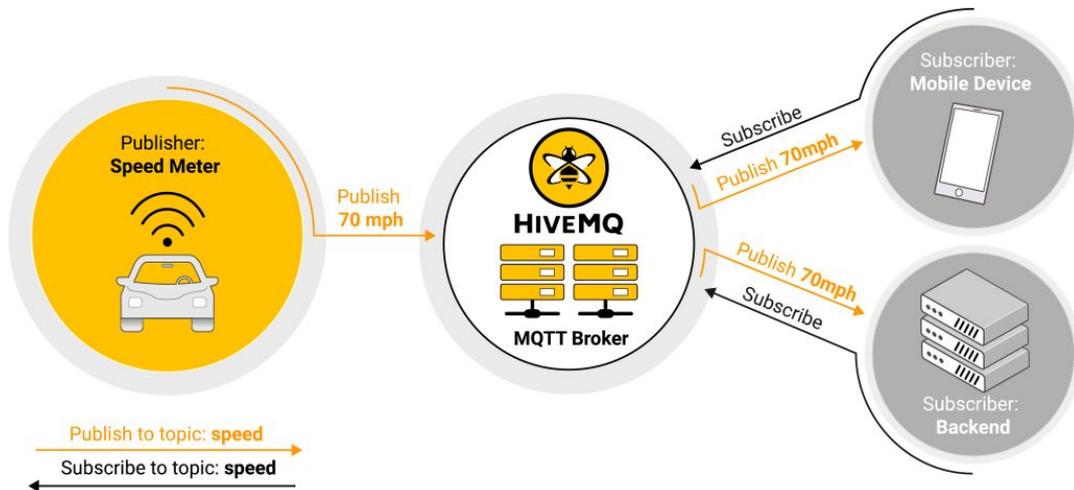
# What is MQTT?



- ▶ (I)IoT Messaging Protocol
- ▶ Created for extreme scale and instant data exchange
- ▶ Publish/Subscribe based architecture
- ▶ Easy on the device side, pushes all implementation complexity to the server
- ▶ Built for machines and constrained devices (binary, data agnostic)
- ▶ Designed for reliable communication over unreliable channels

# What is MQTT?

- ▶ Lightweight protocol on top of TCP/IP
- ▶ Publish / Subscribe pattern using topics
- ▶ De-coupling of sender and receiver



# MQTT Use Cases



**Push Communication**

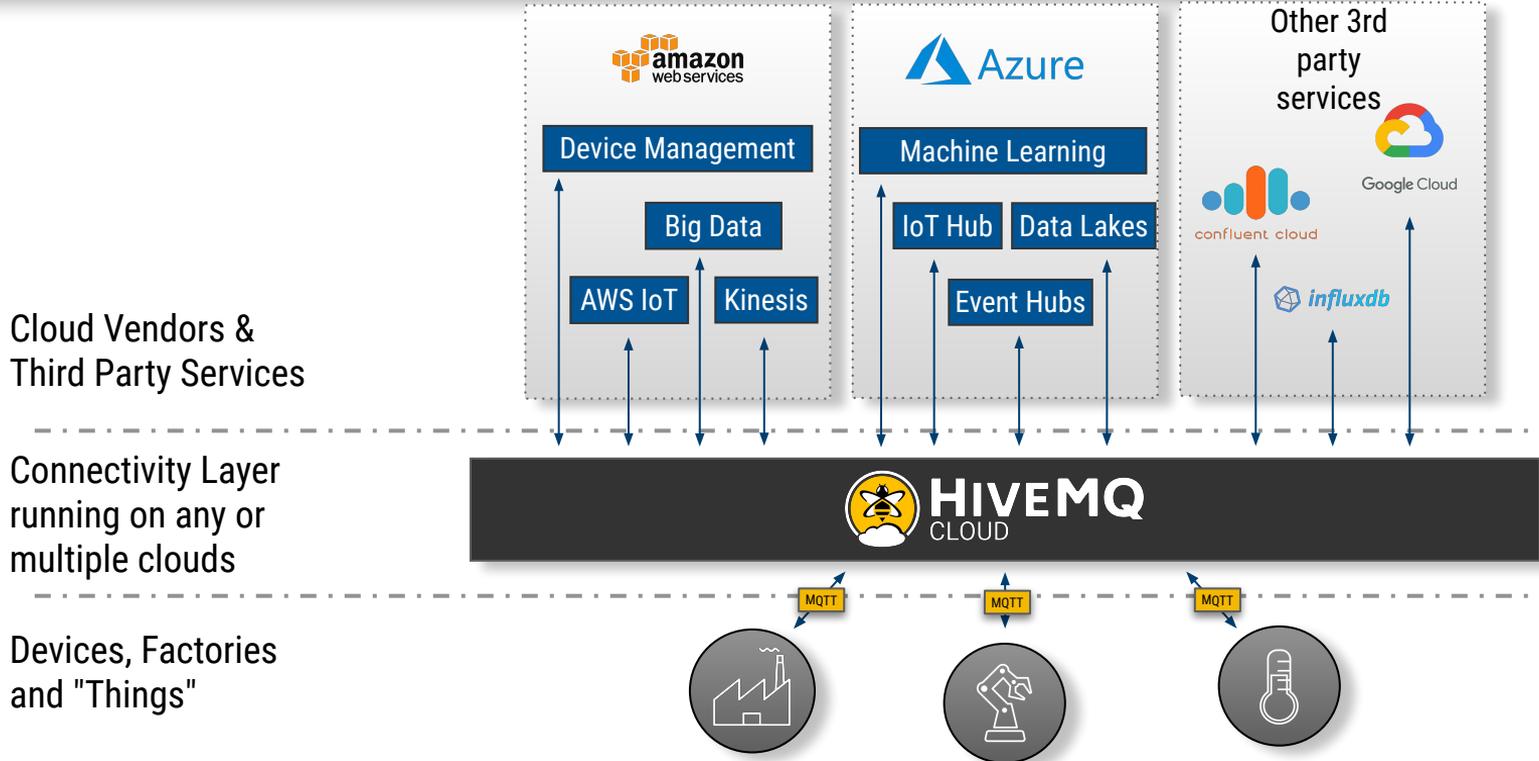
**Reliable Communication over  
unreliable networks**

**Constrained Devices**

**Low Bandwidth and High  
Latency**

**Industrial Message Bus**

# Cloud-Native IoT Messaging



# MQTT Toolbox



- ▶ Reliable tools for the everyday use
- ▶ Providing insights while debugging MQTT client behaviour

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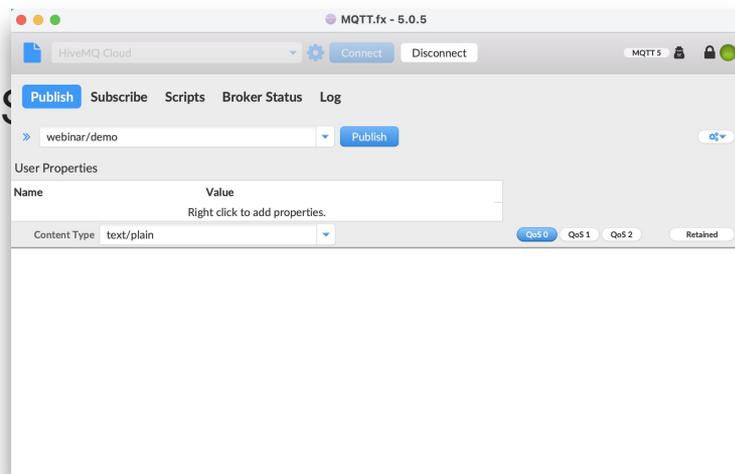
# MQTT.fx: A Brief Introduction

- **Started in 2014** as a private project
- Target: easy to use desktop application for MQTT testing and debugging
- the worldwide community has grown rapidly accordingly with MQTT popularity
- 1000s of users worldwide: smart home enthusiasts, cloud platforms tutorials, book, across all industries
- Since 2020 MQTT.fx is now at Softblade



# MQTT.fx Feature Highlights

- **Native installation packages** for all platforms (Windows, MacOS, Linux)
- Integration of the [HiveMQ MQTT-Clients](#) for full MQTTv5.0 support
- **Connection profiles** for broker connections
- **Topics Collector**
- **Security** (user name/password, support for SSL)
- **Logging Console**



# MQTT.fx MQTTv5 Support

- Published Messages
  - “User Properties” of the message
  - “Content Type” of the message payload
- Received Messages
  - “User Properties” of the message
  - Display of return codes and reason codes (if present in the message)
  - Display the content type of the message payload
  - Automatic selection of the appropriate payload decoder to decode the payload based on its content type

# MQTT.fx Add-Ons

## Payload Decoders Presets

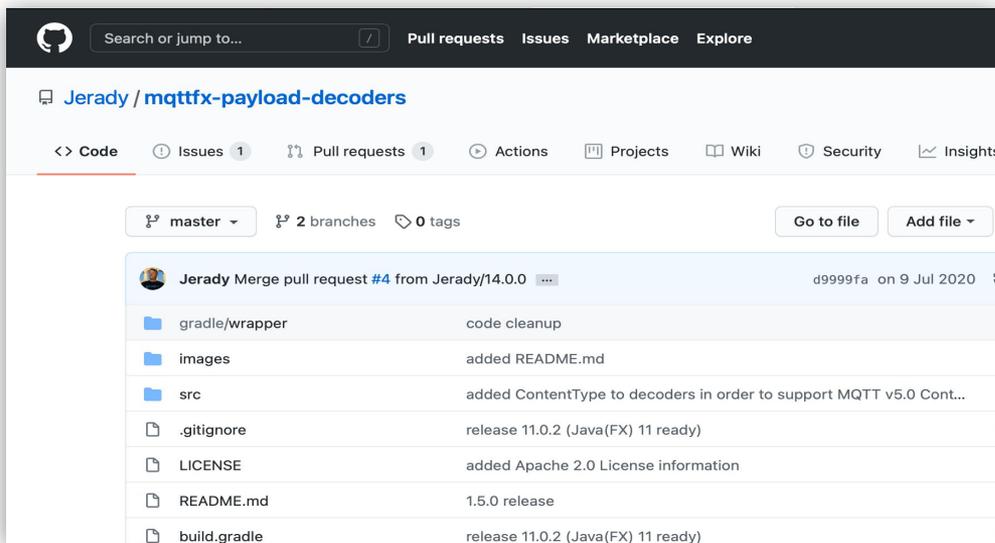
### Payload Decoders

Name	Version	ContentType
Base64 Decoder	1.1.0	text/base64
Hex Format Decoder	1.1.0	application/hex
JSON Pretty Fomat Decoder	1.1.0	application/json
Plain Text Decoder	1.1.0	text/plain
Sparkplug Decoder	1.1.0	application/sparkplug

# MQTT.fx Add-Ons

## Custom Payload Decoders

<https://github.com/Jerady/mqttfx-payload-decoders>





**HANDS ON!**

MQTT.fx | Coming Soon

Advanced



Sparkplug<sup>®</sup>

Support

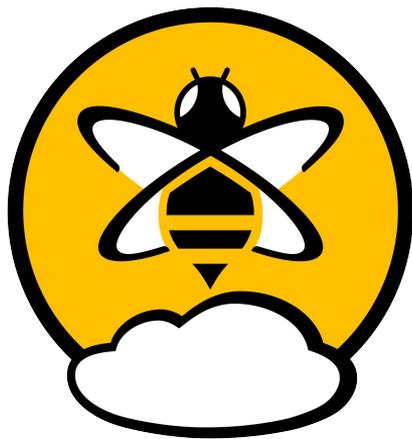
Get MQTT.fx

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# HiveMQ Cloud News



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CLOUD



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**Questions?**

# THANK YOU

For attending the webinar



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