Webinar

Introduction to MQTT Sparkplug

Plug'n Play Interoperability for IIoT

HiveMQ & OPTO 22

Our Speakers

Dominik Obermaier

HiveMQ CTO & Co-founder

linkedin.com/in/dobermai/

@dobermai

Benson Hougland

Opto22 VP of Marketing & Strategy

linkedin.com/in/bhougland/

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Introduction to HiveMQ

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

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Lots of Data Silos

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Spaghetti Architecture

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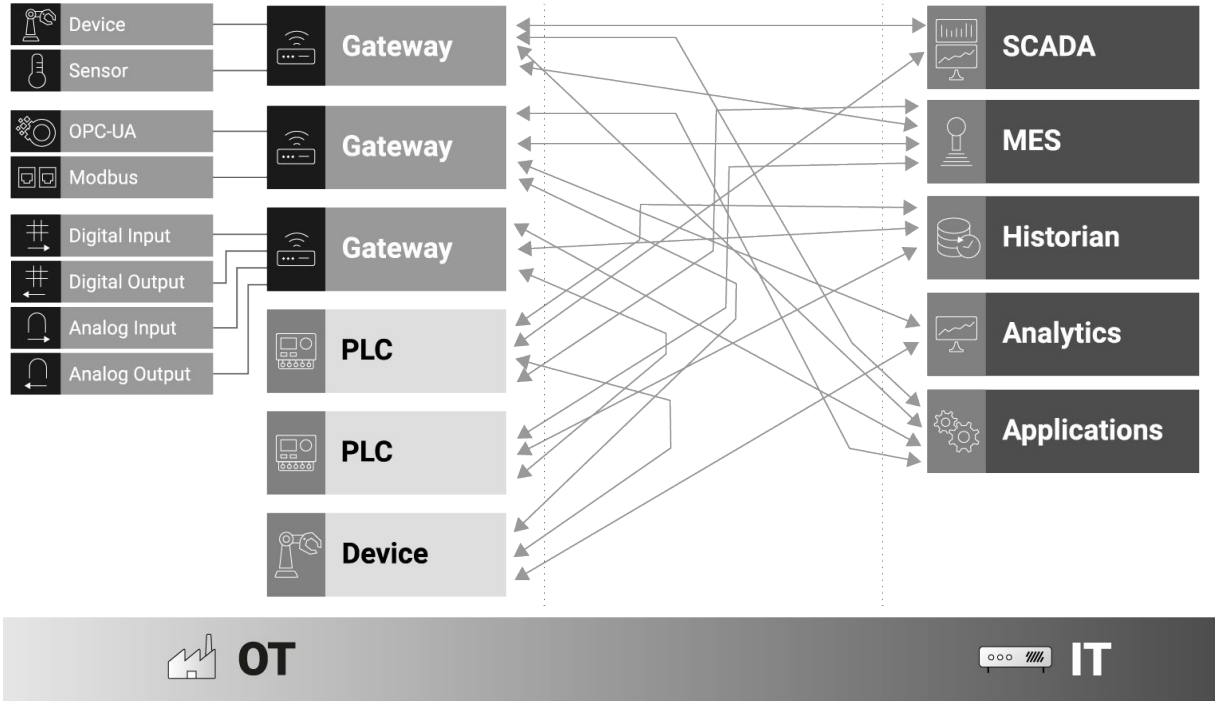
Siloed OT Systems - No Interoperability



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Challenges

- Difficult to change workflows and processes
- Difficult to setup a new system/facility
- Difficult to analyze data across the entire system

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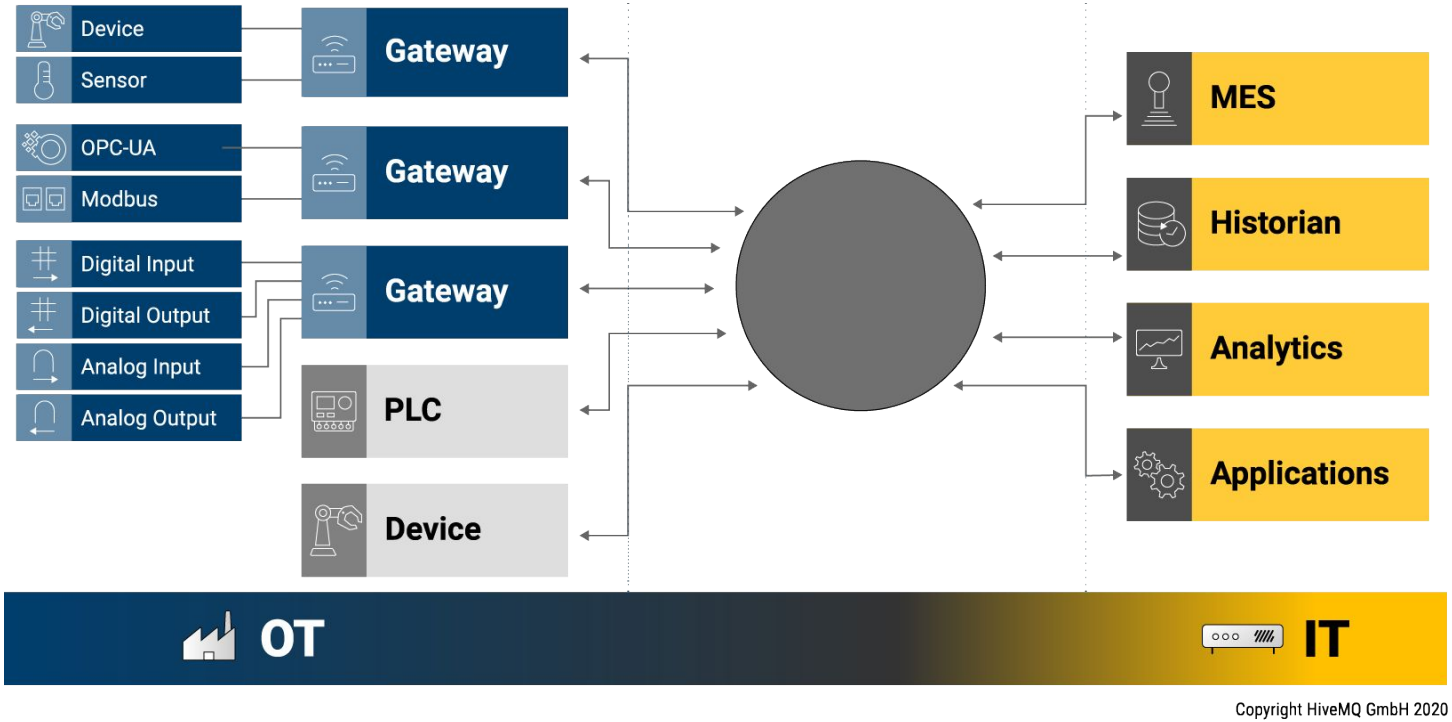
Decoupled Architecture



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- Decoupled clients and broker
- Publish/Subscribe protocol
- Extensible
- Reliable

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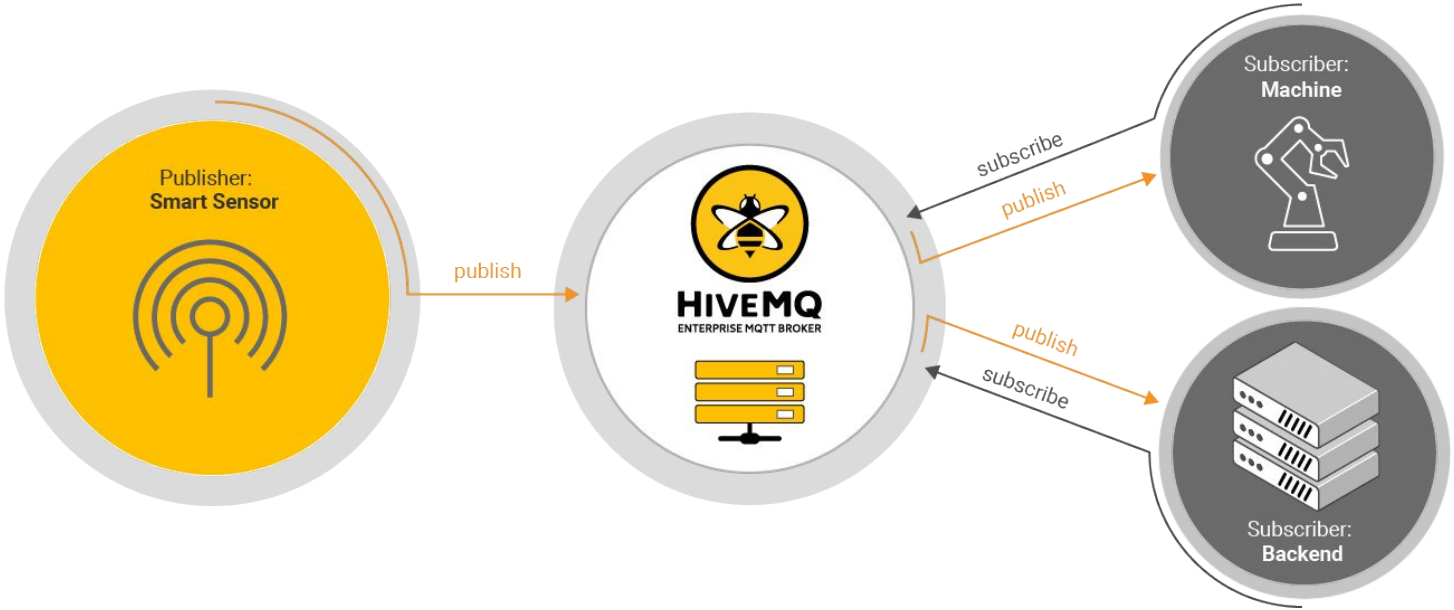
Pub/Sub Pattern



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But There Are Still Issues

- Devices and endpoints have different topics, payloads and data structures
- Applications assuming specific formats and structure
- Data agnostic - payload must be interpreted but no context

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INTRODUCING

Sparkplug

A simple, open specification, that will enable plug and play interoperability between IIoT devices and IIoT applications.

Sparkplug Defines:

- Topic namespace
- Data Model and Structure
- Extensible process variable payload
- Defines MQTT state management

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KEY CONCEPTS

- Continuous Session Awareness
- Report by Exception
- Interoperability by consistent data format
- Auto Discovery

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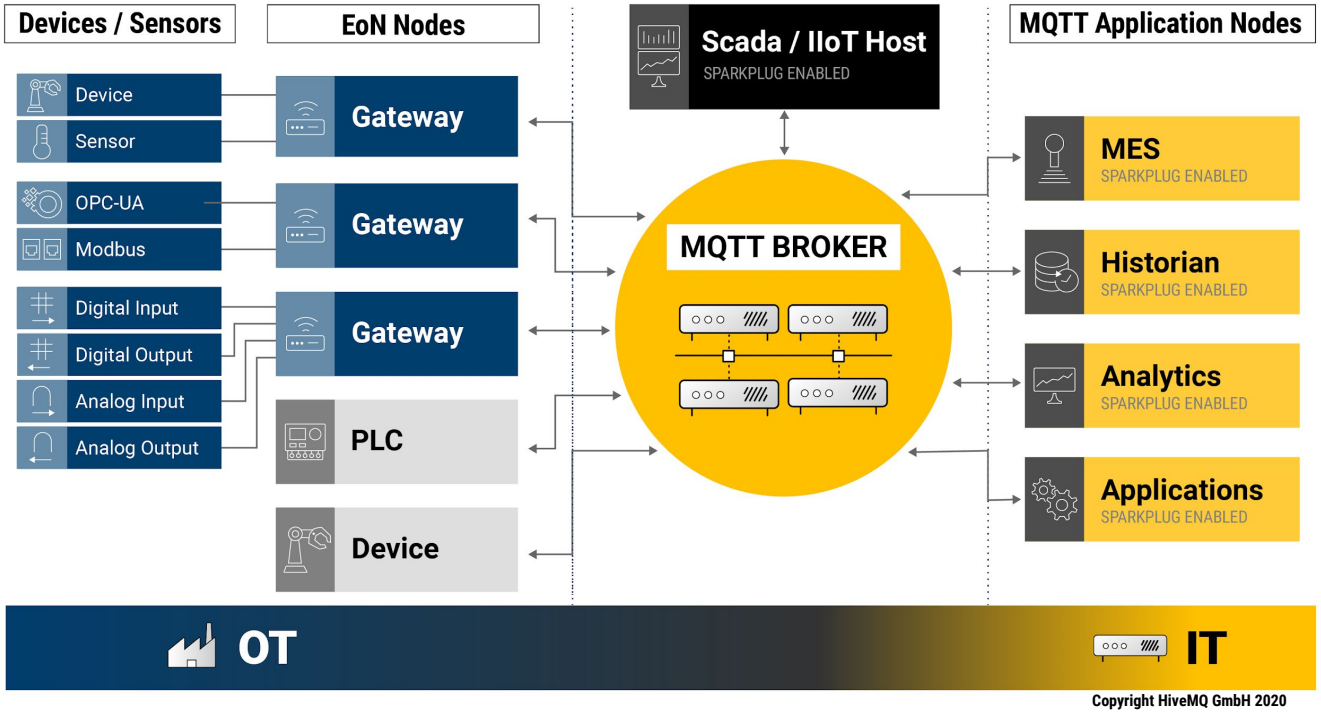
MQTT Sparkplug Architecture



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SCADA / IIoT Host

- Application responsible for monitoring and control MQTT EoN node
- Maintain continuous session state awareness of all participants (machines, devices, PLCs, sensors, gateways and applications)
- Not responsible for establishing or maintaining connections directly to the device
- In Sparkplug, devices, EoN and SCADA/ IIoT Host connect to central MQTT broker to publish and subscribe to data; allowing report by exception

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EDGE OF NETWORK (EoN) NODES

- EoN provide physical and logical gateway function for devices that don’t implement Sparkplug
- EoN manage the state and session of itself and the connected sensors
- EoN allows devices that implement protocols like OPC-UA, Modbus, and proprietary PLC to connect to a Sparkplug architecture

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DEVICES/ SENSORS

- Devices and sensors are the key endpoints in any industrial automation system
- Devices and sensors connect with EoN that bridge the data from these devices into the Sparkplug protocol

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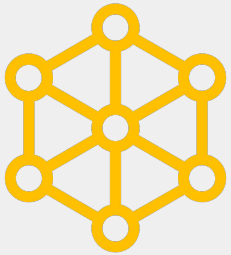
MQTT APPLICATION NODES



- MQTT Application Nodes can produce and consume Sparkplug messages but don’t act as a SCADA / IIoT Host.
- Typically Application Nodes are MES, Historians, Analytics systems

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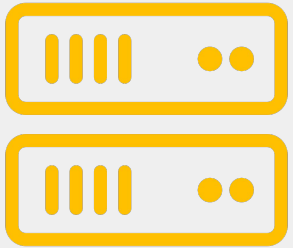
MQTT BROKER



- MQTT broker is the central data distribution point in a Sparkplug architecture
- MQTT broker requirements:
  - 100% compliant to MQTT 3.1.1
  - Requires features like Retained Messages, Last Will and Testament and QoS
  - Not all MQTT brokers support these features: MS Azure IoT Hub and AWS IoT can’t be used with Sparkplug

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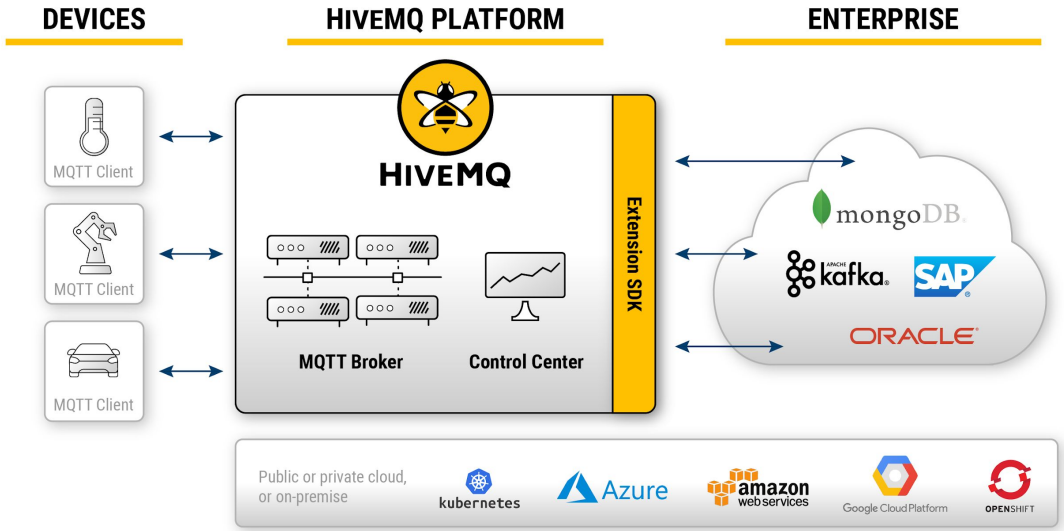
HiveMQ MQTT Platform



- High availability
- 100% MQTT compliant
- Scalability
- Observability
- Enterprise Security
- Integration with OT/IT Systems

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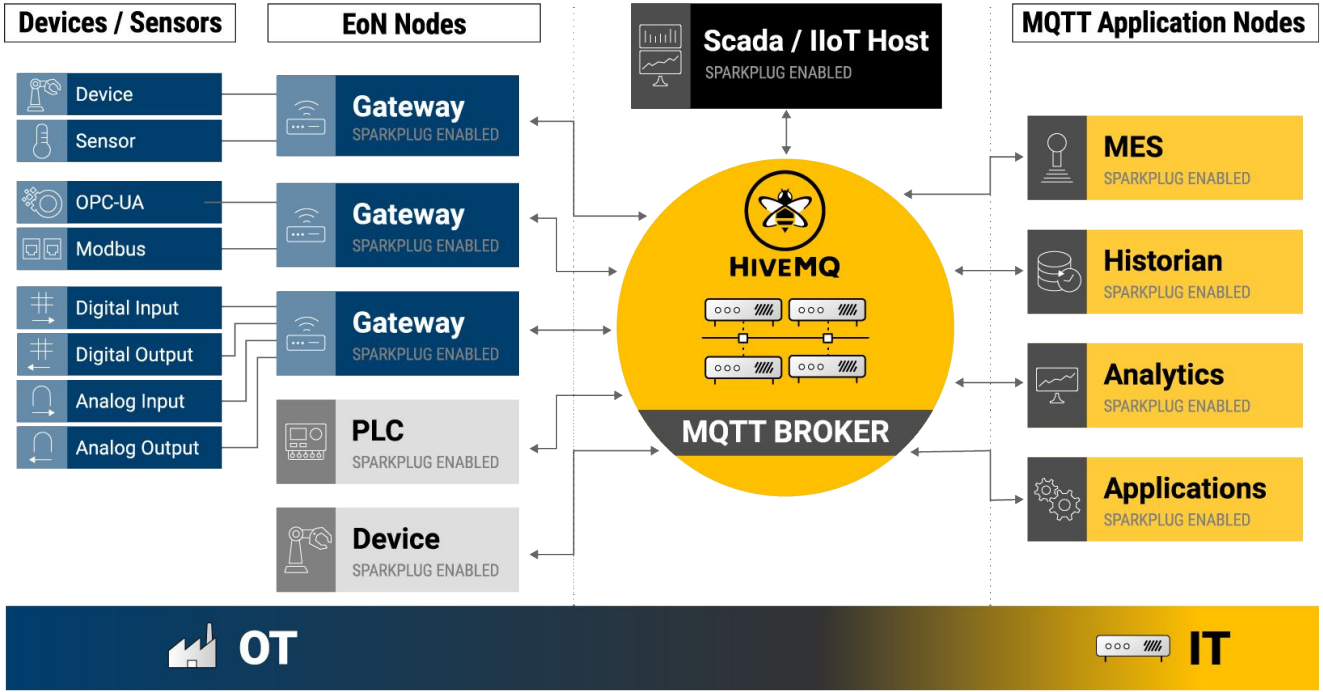
MQTT with Sparkplug Architecture



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Introduce the Demo

MQTT Sparkplug Messages

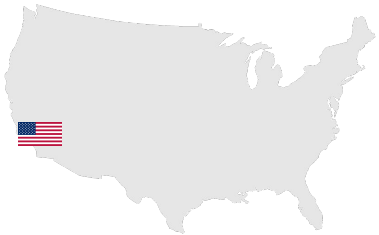
HIVEMQ CLOUD

influxdb

Grafana

Confluent Cloud

mongoDB.



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Demo

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Resources / Next Steps

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