How to Stream IoT (MQTT) Messages Into the Azure Event Hubs Service

Speaker

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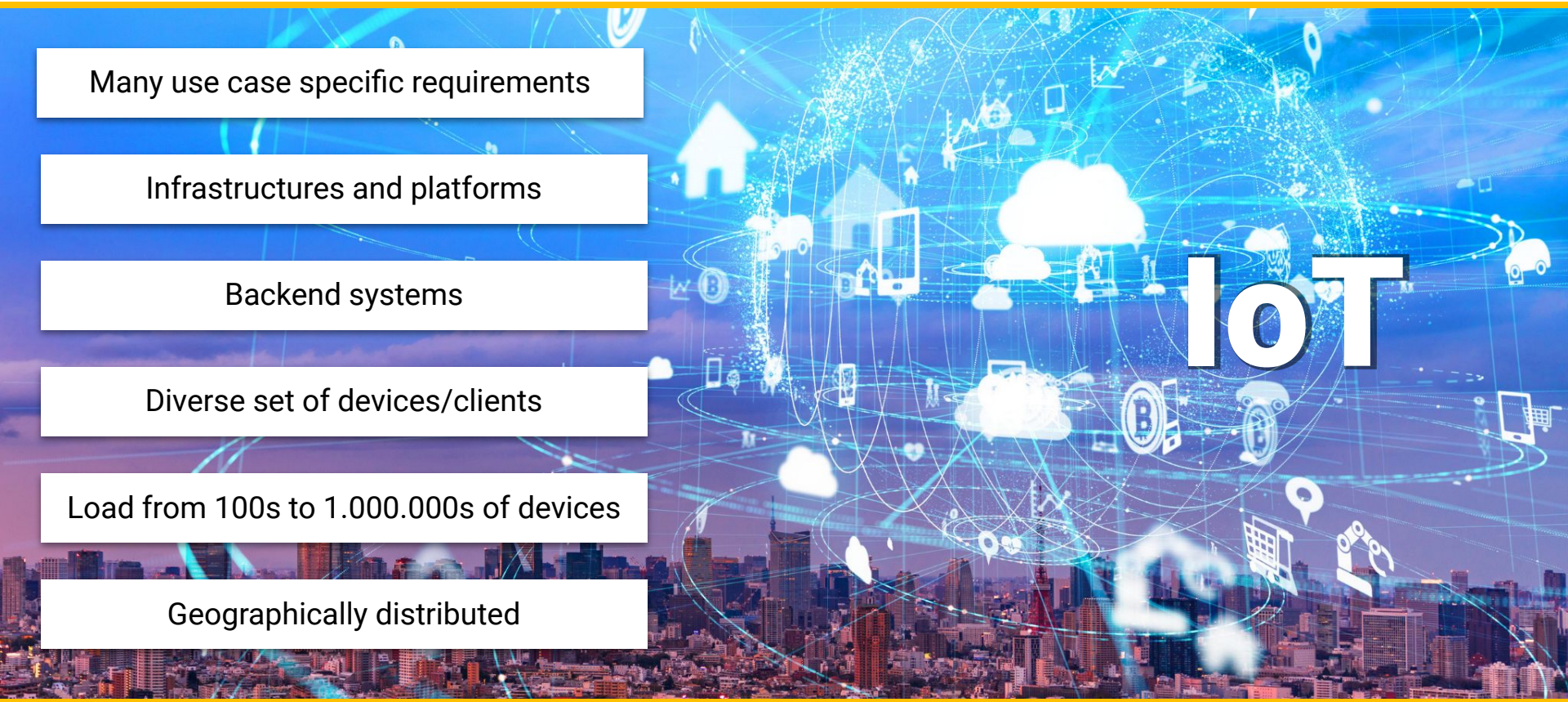
- Matthias works for HiveMQ Professional Services and supports HiveMQ customers to implement their IoT and MQTT use cases and architectures.
- He has been working on streaming architectures for many years and how to store, analyse and integrate data for different use-cases. Leveraging on his years of experience, he is helping HiveMQ customers build mission-critical solutions and solving their challenges.

AGENDA

- IoT Architecture challenges
- HiveMQ and Azure Event Hubs
- Considerations
- Summary
- Q & A

IoT Architecture Challenges

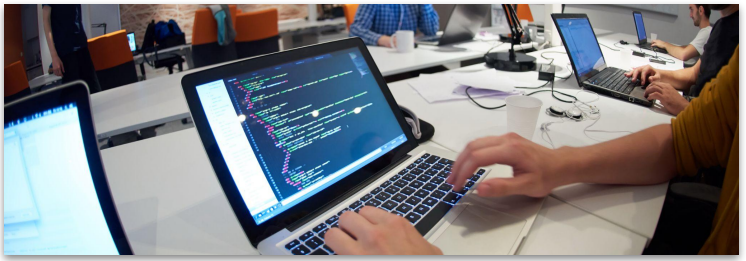
Diversity as a Challenge



- Many use case specific requirements
- Infrastructures and platforms
- Backend systems
- Diverse set of devices/clients
- Load from 100s to 1.000.000s of devices
- Geographically distributed

Solutions Needed

- Payload agnostic solutions
- Scalability, reliability and availability
- Interoperability for hybrid device scenarios through standard compliance
- Deployment agnostic solutions
- Flexible integrations with existing applications and systems

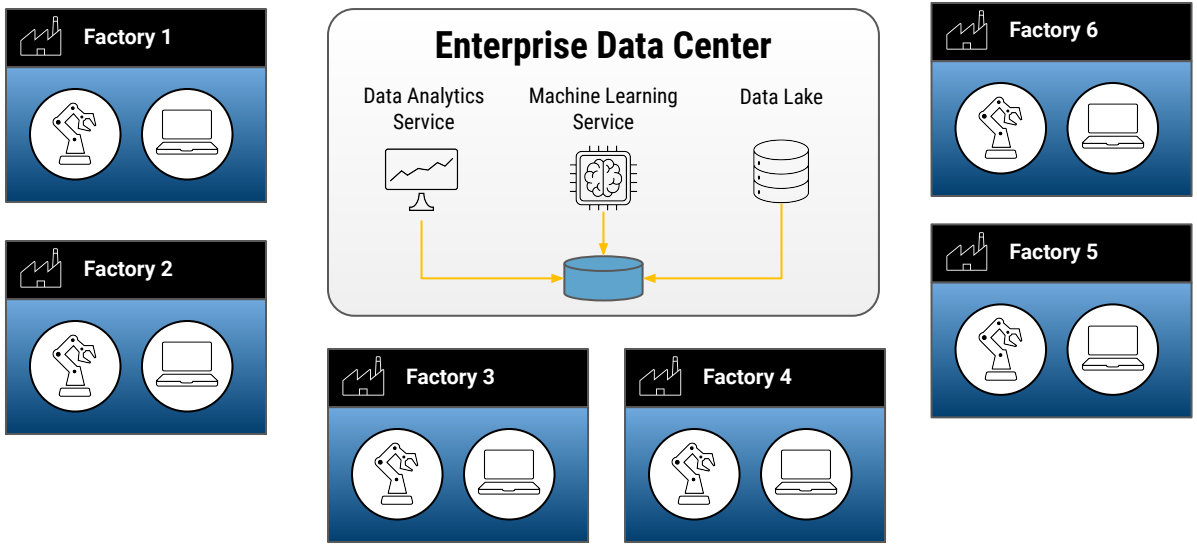


MQTT

MQTT Use Cases

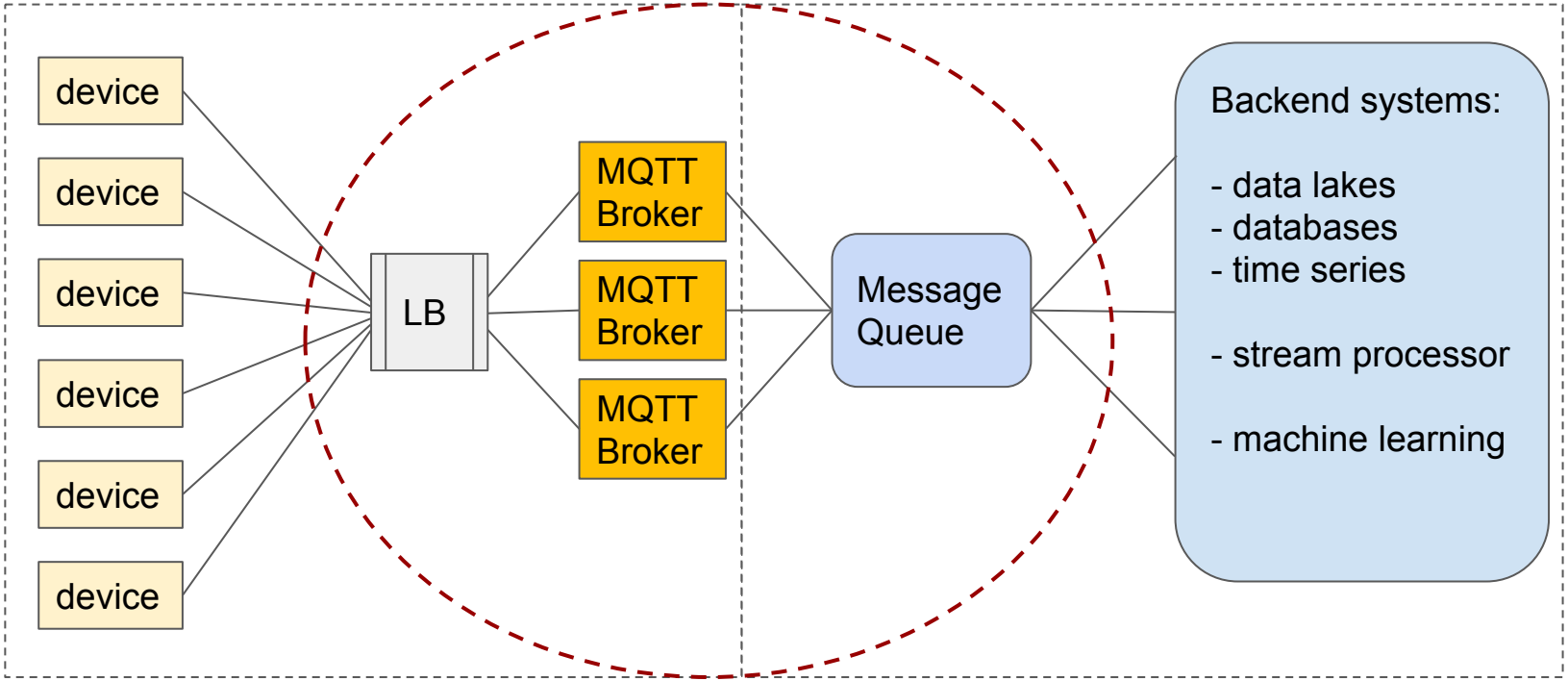
HIVEMQ

IIoT/Industry 4.0



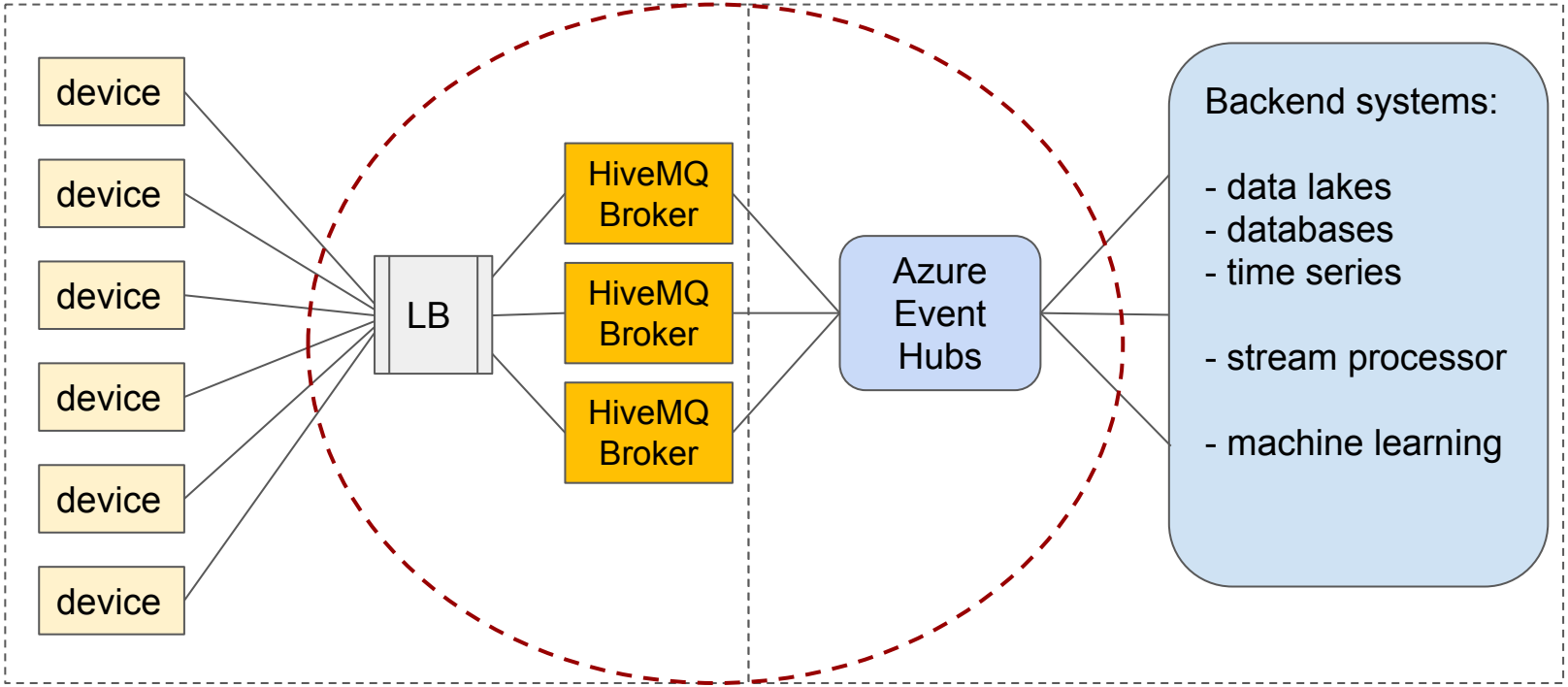
- Production visibility and monitoring
- Automated data collection
- Increased machine utilization
- Predictive maintenance
- Facility management
- Optimized logistics

Architecture Overview

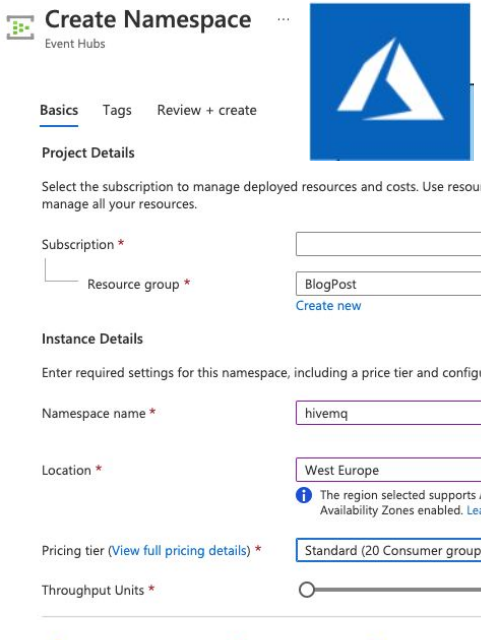


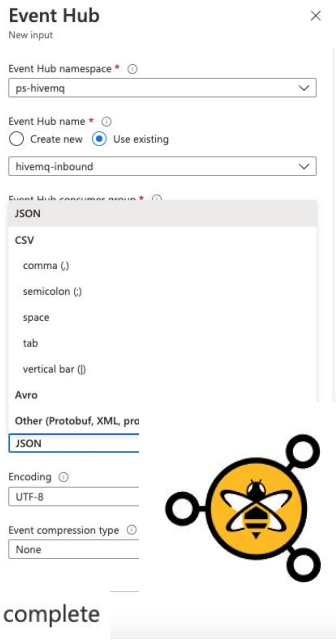
HiveMQ and Azure Event Hubs

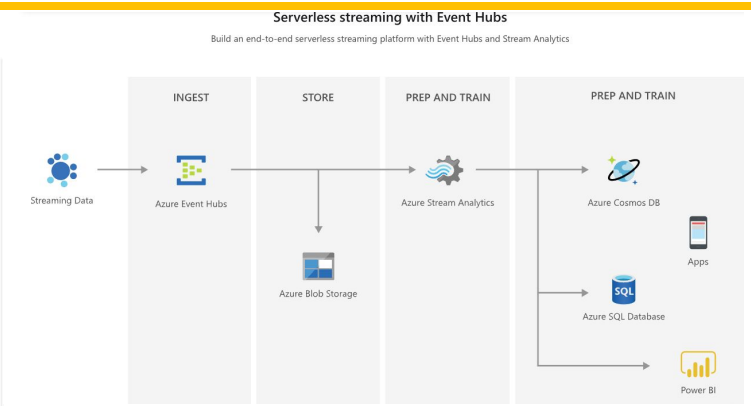
Architecture Overview

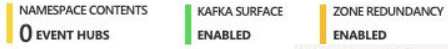


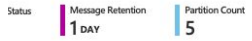
Setup

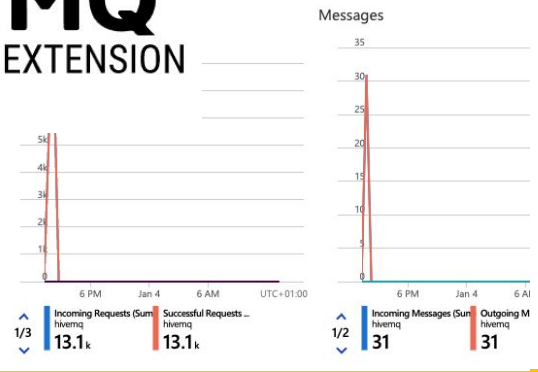










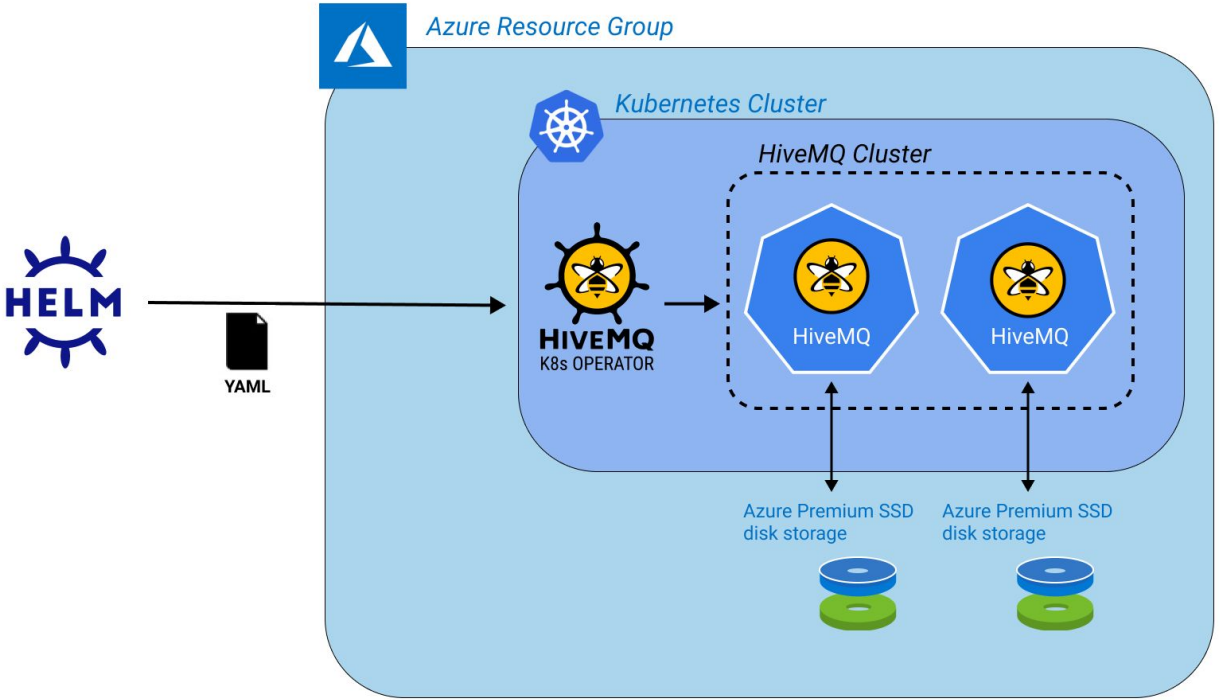


Setup

- These **blog posts** describe the technical details:
  - Connect HiveMQ to Azure Event Hubs
  - Deploy a HiveMQ cluster on Azure Kubernetes Service
- The HiveMQ documentation provides detailed information and many resources to install HiveMQ in other environments.

Set up HiveMQ on Azure Kubernetes Service

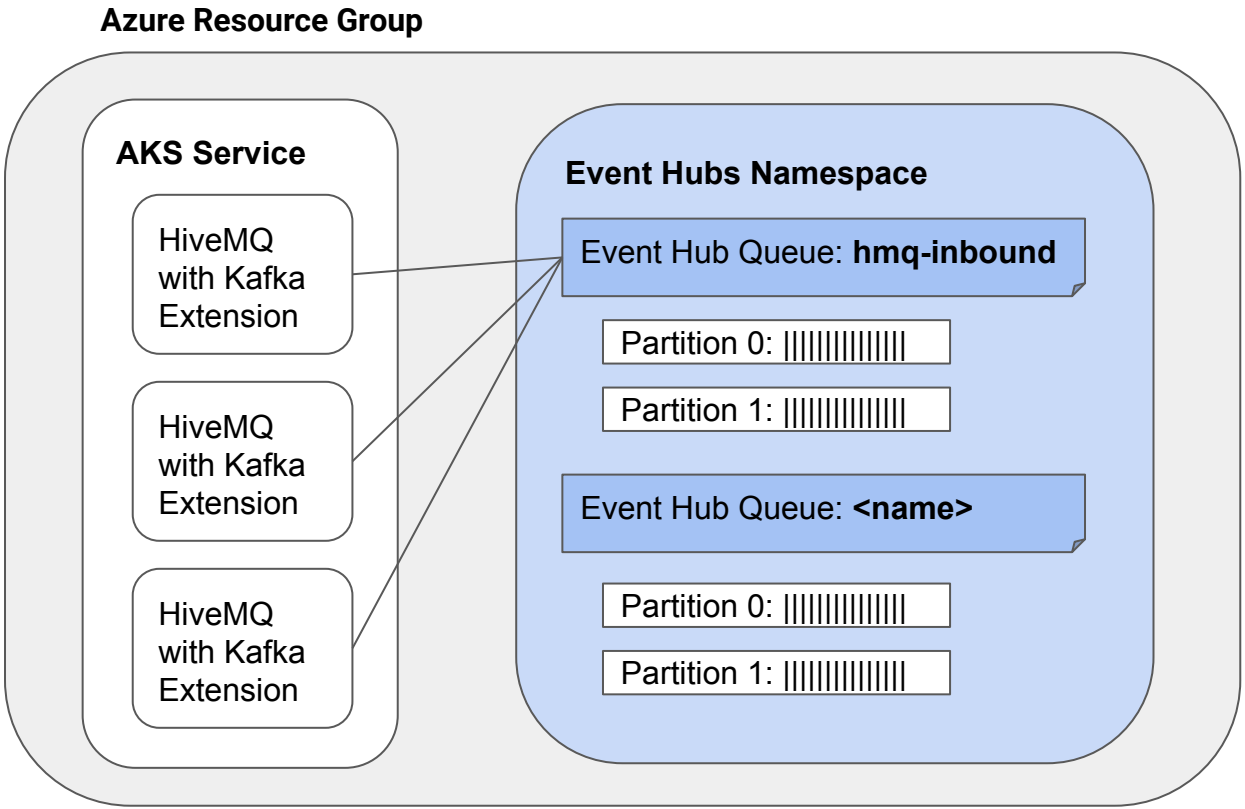
- AKS cluster
- Helm charts for the HiveMQ Operator
- HiveMQ cluster with 2 nodes (4 CPU, 4G)



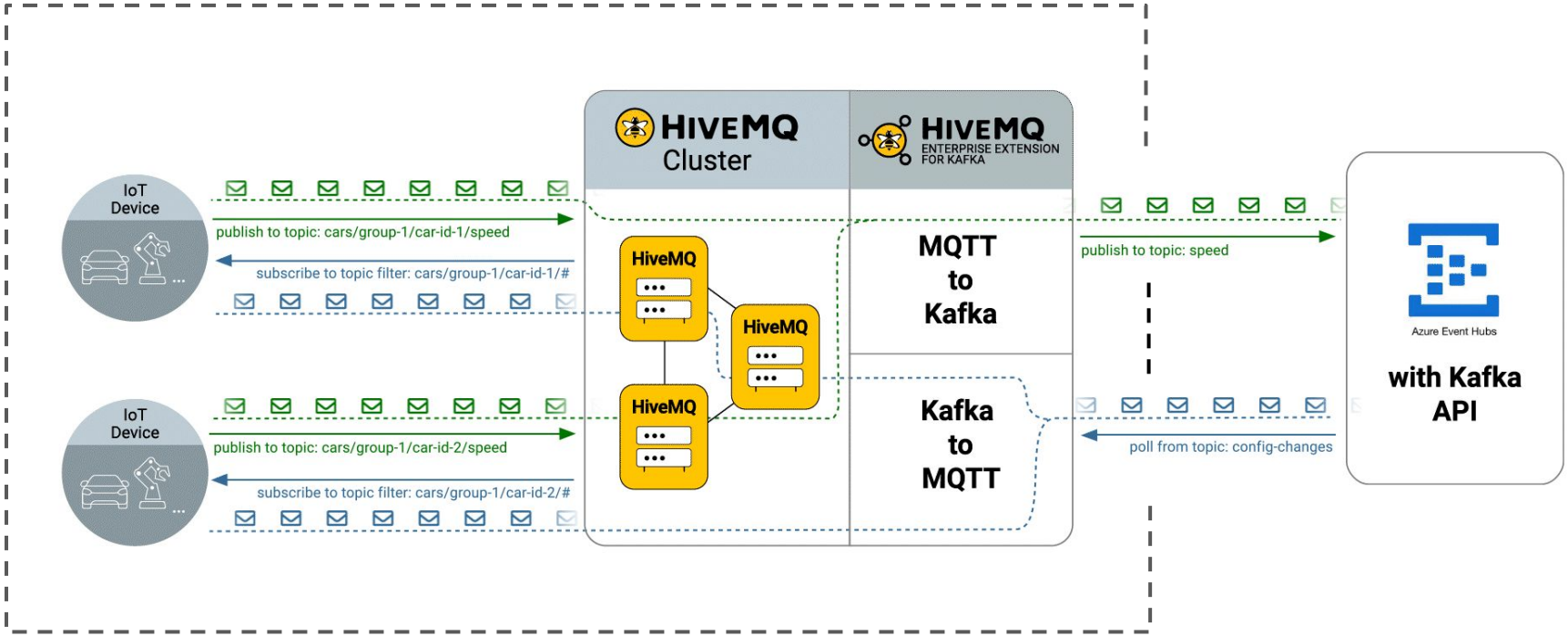
Set up Azure Event Hubs

Azure Event Hubs
Event Hubs Namespace
Event Hub (queue)
Partition

Kafka
Kafka cluster
Kafka topic
Partition

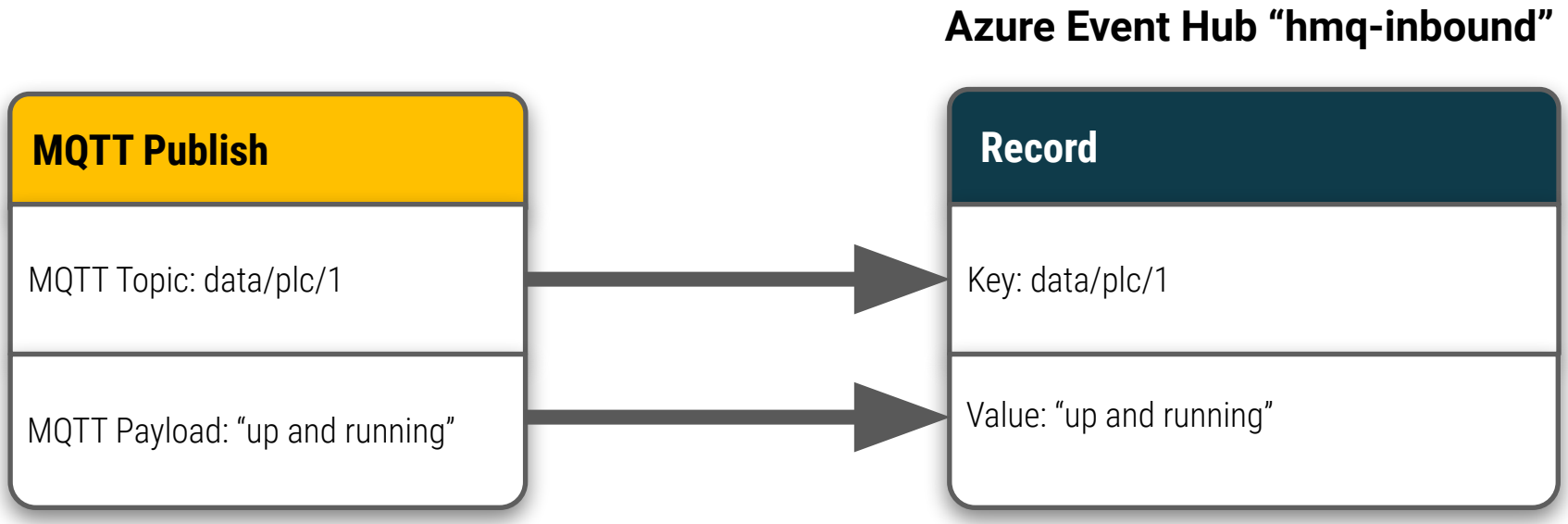


Set up HiveMQ Enterprise Extension for Kafka



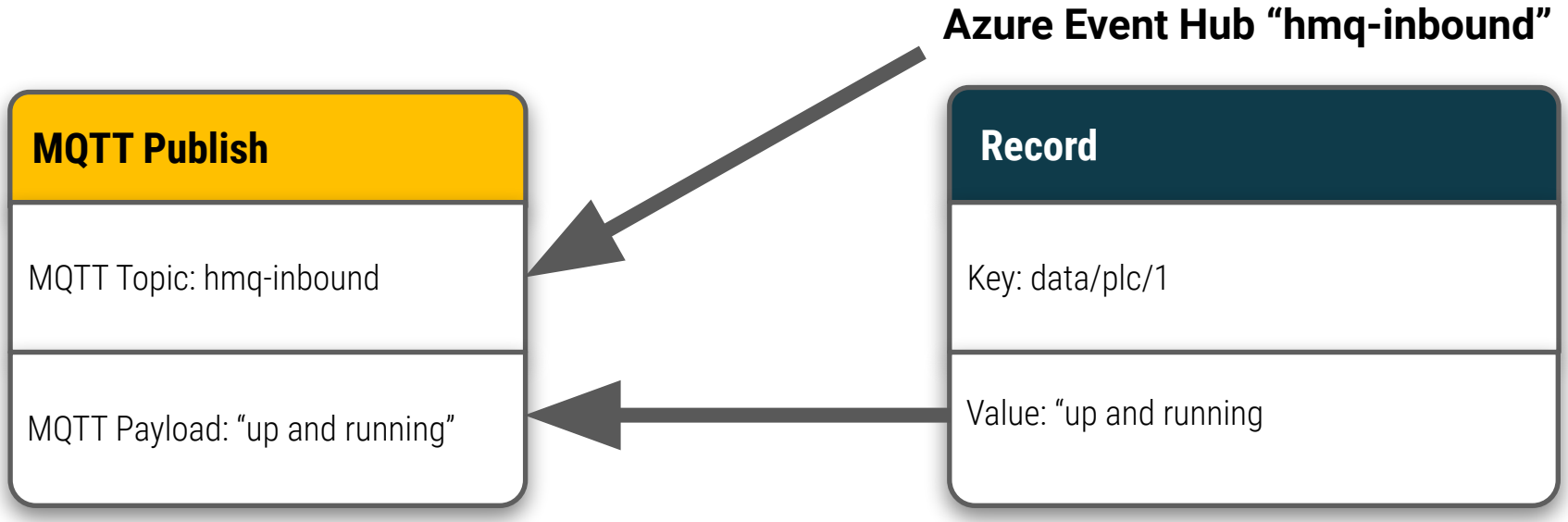
HiveMQ Enterprise Extension for Kafka details

Ping - Pong example with two MQTT clients

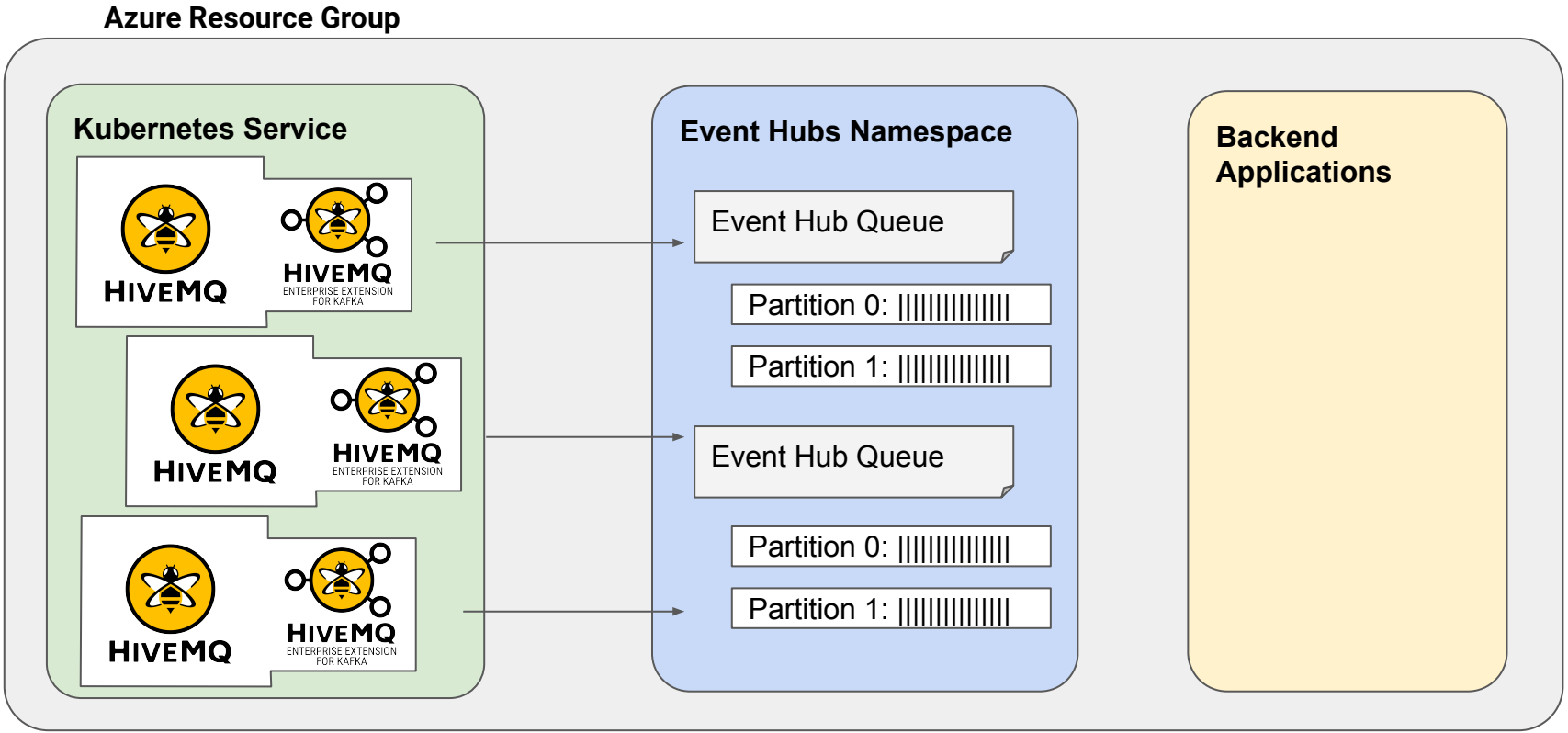


HiveMQ Enterprise Extension for Kafka details

Ping - **Pong** example with two MQTT clients

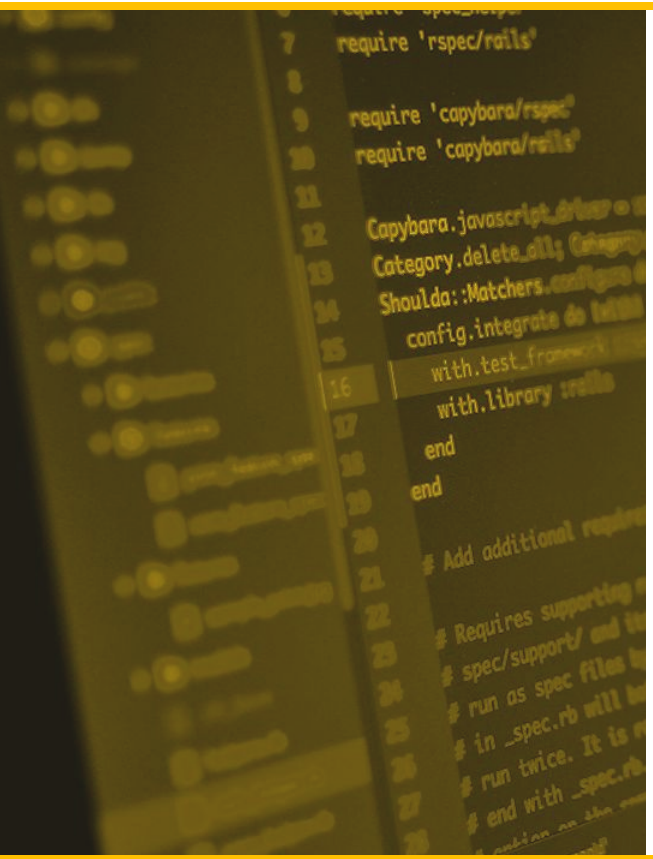


Final Setup



Considerations

IoT Architecture considerations



- A message queue that decouples enterprise data consumers for more flexibility
- A scalable and reliable MQTT message broker that is 100% MQTT compliant (+ optional features)
- Azure customers can use Azure Event Hubs as a message queue

Advantages of a message queue

- doesn’t add load to MQTT broker
- data is consumed only once
- messages are buffered
- new data consumers can be added
- exploratory data analysis is possible
- central place for data governance

Advantages of a 100% MQTT Compliant Broker

- 100% MQTT + all optional features
- Full range of MQTT features available for use cases
- Payload agnostic, support for any data format
- Full flexibility for topic tree design
- Full support for fan-in and fan-out scenarios
- Full support for wildcards
- Retained messages, sessions, last will messages, return codes and error codes, user properties and more

Missing MQTT Features (Azure IoT Hub)

- Publish only to device specific topics
- Subscribe only to device specific topics
- No support for QoS 2 (disconnect)
- No support for retained messages (on the broker)
- No choice of clientid (must be deviceid)
- No choice of username
- Only TLS connections and Websockets
- No MQTT 5 support

Missing MQTT Features (AWS IoT Core)

- Topic tree limited to 7 levels (0/1/2/3/4/5/6/7)
- Topic cannot exceed 256 bytes
- Max message size 128 KB
- Max 512 KB throughput per connection/second
- Max 50 subscriptions per client
- No QoS 2 support
- Limit on number of retained messages (5000)
- Quotas and limits may differ between regions
- No MQTT 5 support

Summary

Advantages of HiveMQ on Azure with Event Hubs

- 100% MQTT + optional features
- Scalability, elasticity, reliability and availability
- Event Hubs as message queue to leverage Azure data services

Resources

Get Started with MQTT

Evaluate HiveMQ

Try HiveMQ Cloud

HiveMQ Documentation

HiveMQ Blog:
Connect HiveMQ to Azure Event Hubs

HiveMQ Blog:
Deploy a HiveMQ cluster on Azure Kubernetes Service

ANY QUESTIONS?

Reach out to community.hivemq.com

THANK YOU

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