



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

Speaker



Matthias Hofschien

Senior Consultant Professional Services



matthias.hofschien@hivemq.com



[linkedin.com/in/matthiashofschien/](https://www.linkedin.com/in/matthiashofschien/)

- 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

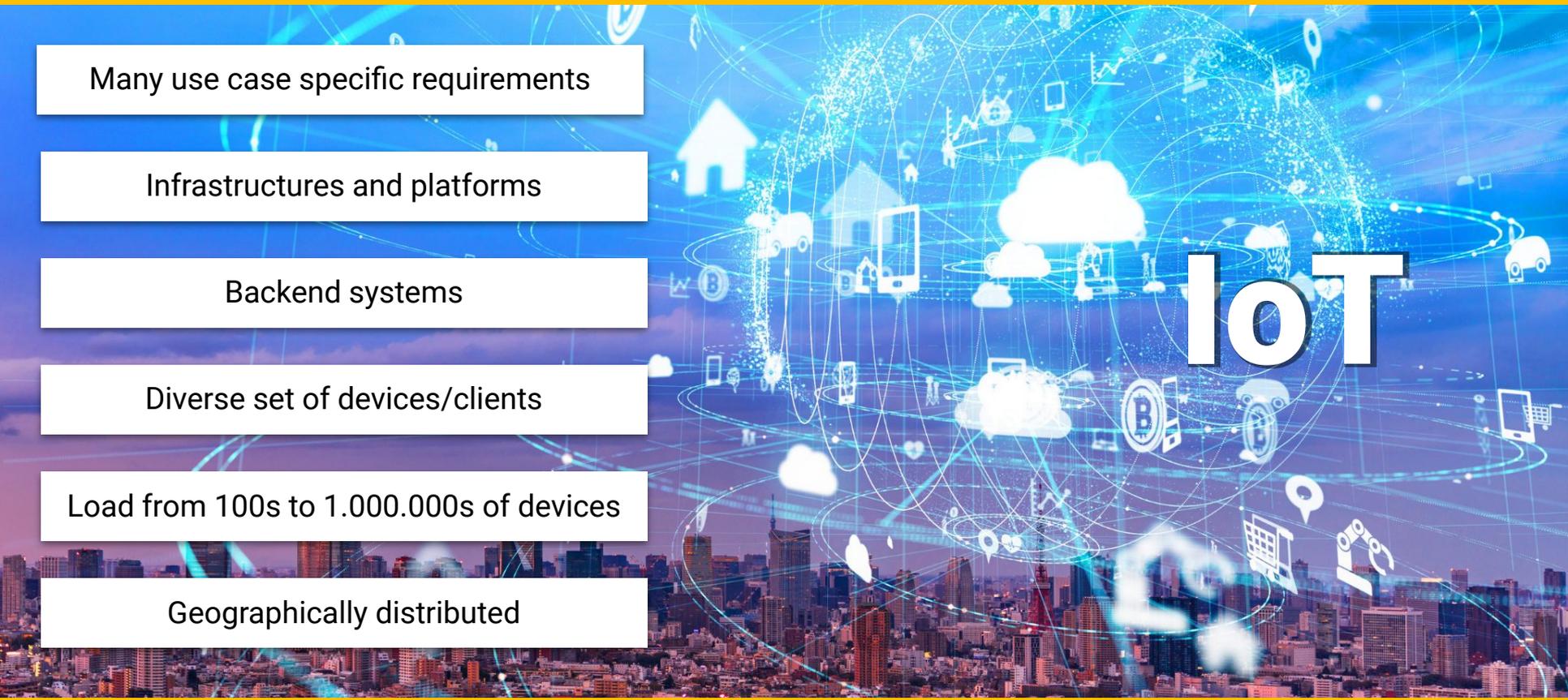
Infrastructures and platforms

Backend systems

Diverse set of devices/clients

Load from 100s to 1.000.000s of devices

Geographically distributed

A vibrant blue background featuring a city skyline at the bottom. Overlaid on the skyline is a complex network of glowing white and blue lines representing data connections. Various icons are scattered throughout, including a house, a car, a cloud, a smartphone, a Bitcoin symbol, a location pin, and a shopping cart. The letters 'IoT' are prominently displayed in large, white, bold font with a black outline on the right side of the image.

IoT



Solutions Needed

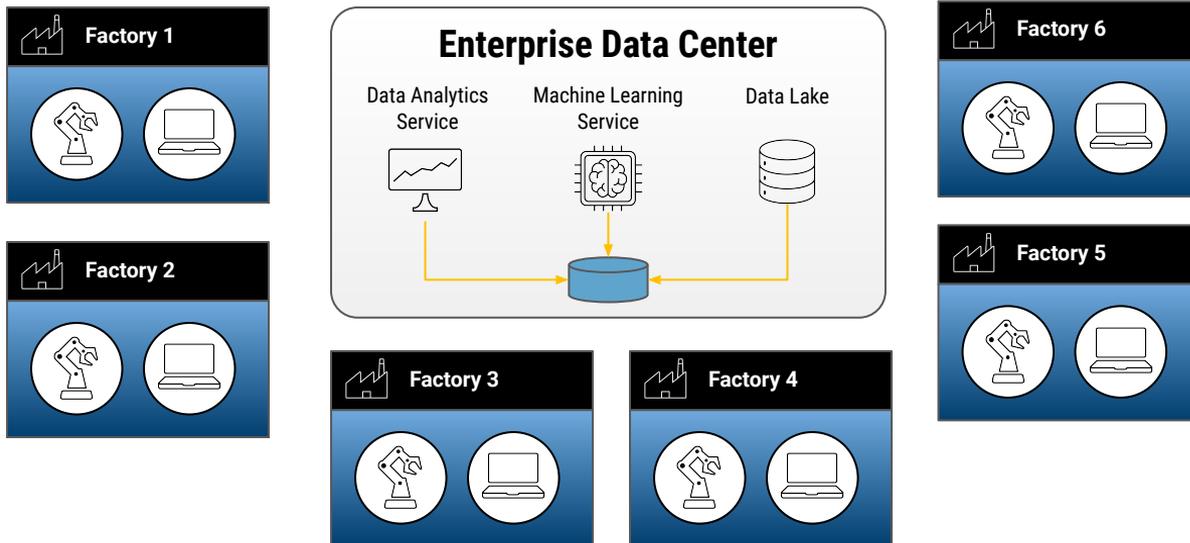
- Payload agnostic solutions
- Scalability, reliability and availability
- Interoperability for hybrid device scenarios through standard compliance
- Deployment agnostic solutions
- Flexible integrations with existing applications and systems



MQTT Use Cases



IIoT/Industry 4.0

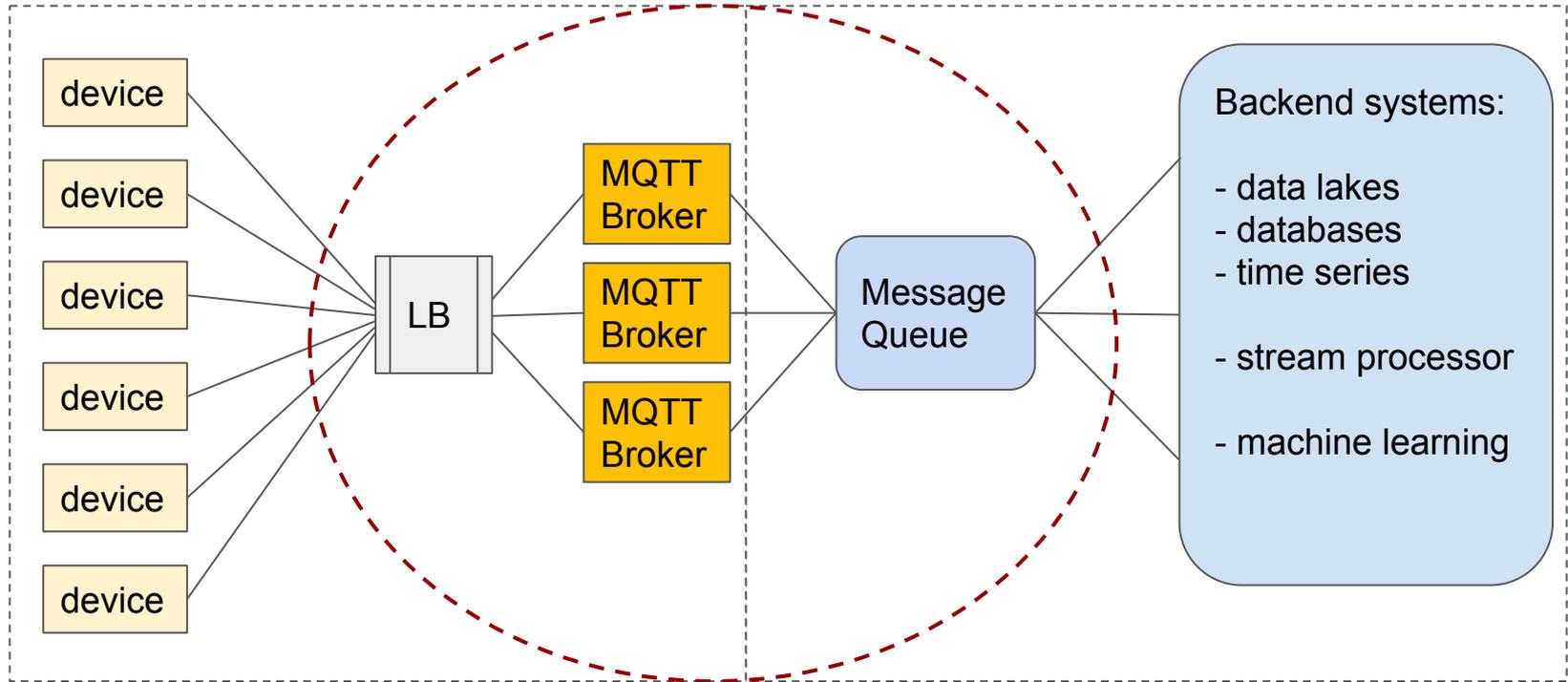


- Production visibility and monitoring
- Automated data collection
- Increased machine utilization

- Predictive maintenance
- Facility management
- Optimized logistics



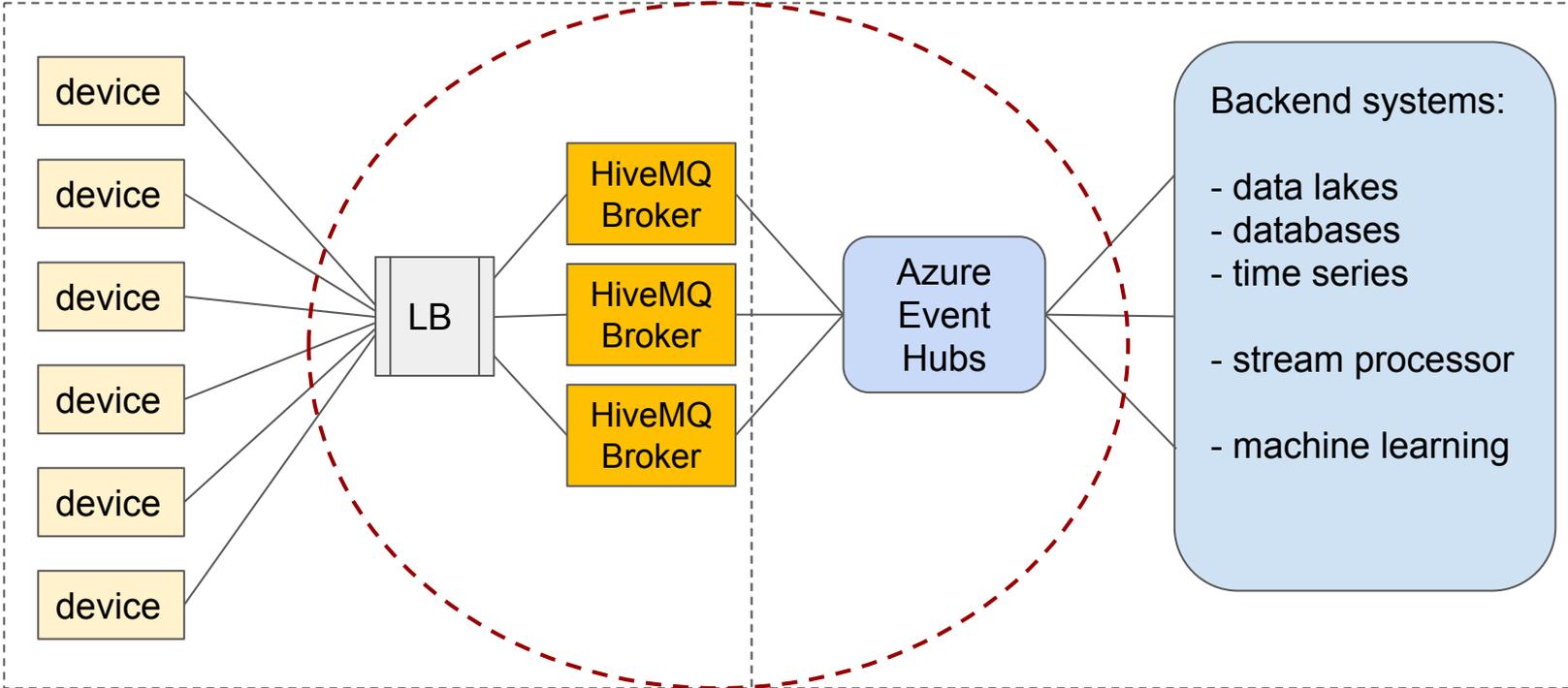
Architecture Overview



HiveMQ and Azure Event Hubs



Architecture Overview



Setup

Create Namespace

Event Hubs

Basics Tags Review + create

Project Details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *

Resource group * [Create new](#)

Instance Details

Enter required settings for this namespace, including a price tier and configuring the number of units (capacity).

Namespace name *

Location *
 The region selected supports Availability zones. Your namespace will have Availability Zones enabled. [Learn more.](#)

Pricing tier (View full pricing details) *

Throughput Units *

Your deployment is complete

Event Hub

New input

Event Hub namespace *

Event Hub name * Create new Use existing

Event Hub schema type *

JSON

CSV

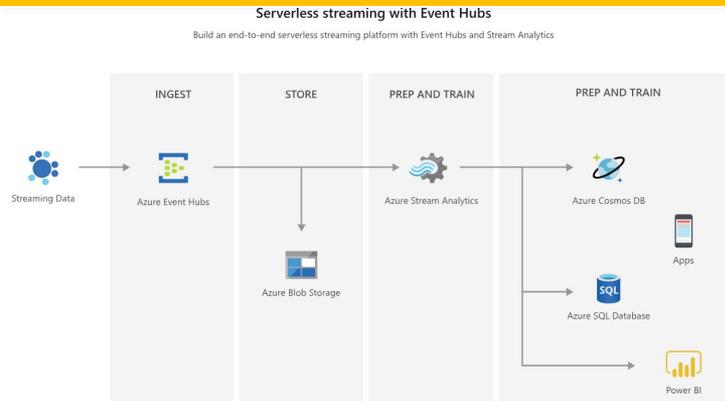
- comma (,)
- semicolon (;)
- space
- tab
- vertical bar (|)

Avro

Other (Protobuf, XML, pro)

Encoding

Event compression type

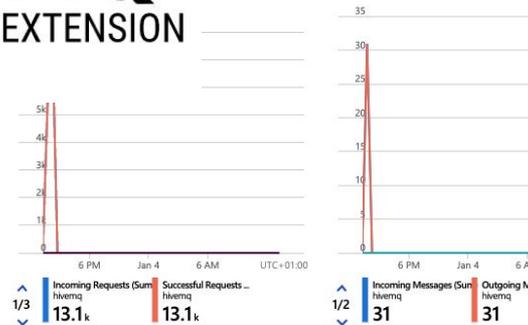


HIVEMQ

ENTERPRISE EXTENSION FOR KAFKA

Status Message Retention **1 DAY** Partition Count **5**

Messages



NAMESPACE CONTENTS
0 EVENT HUBS

KAFKA SURFACE
ENABLED

ZONE REDUNDANCY
ENABLED

Deployment name: hivemq
Subscription: [Microsoft Azure Sponsorship](#)

```
kubectl config get-contexts
kubectl config delete-context <name>
az login
az aks get-credentials --resource-group BlogPost --name webinar
```



Setup

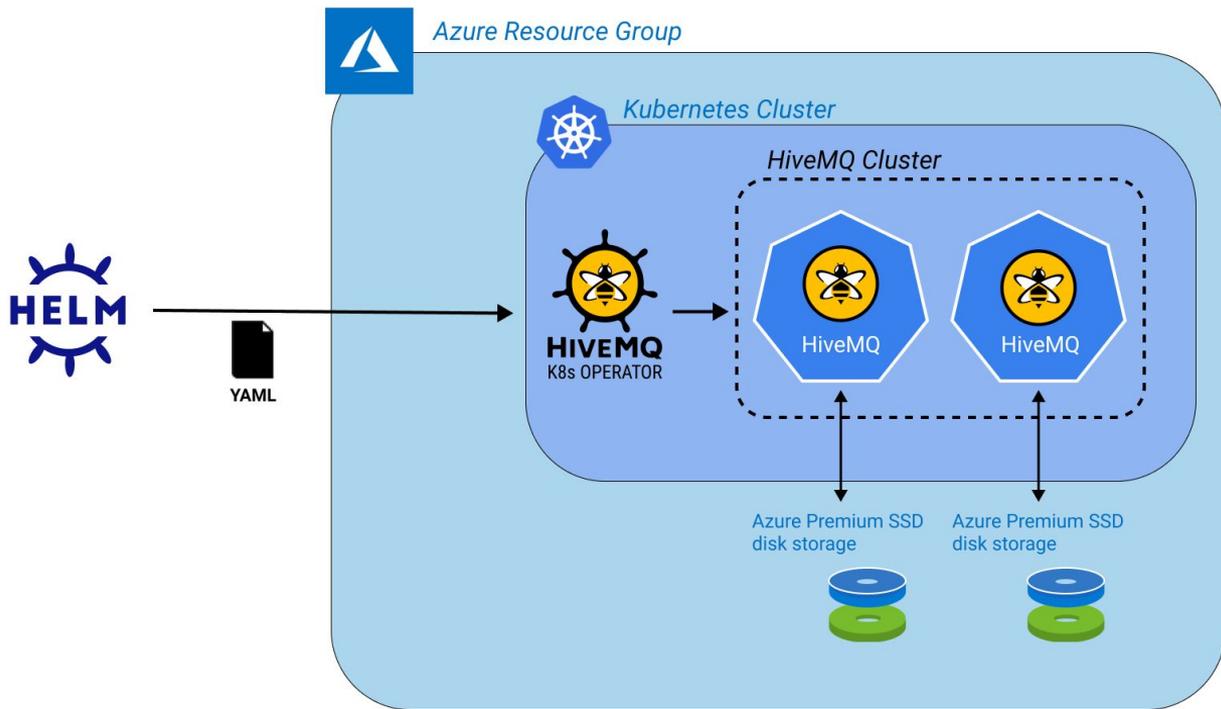


- These **blog posts** describe the technical details:
 - [Connect HiveMQ to Azure Event Hubs](#)
 - [Deploy a HiveMQ cluster on Azure Kubernetes Service](#)
- The [HiveMQ documentation](#) provides detailed information and many resources to install HiveMQ in other environments.



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

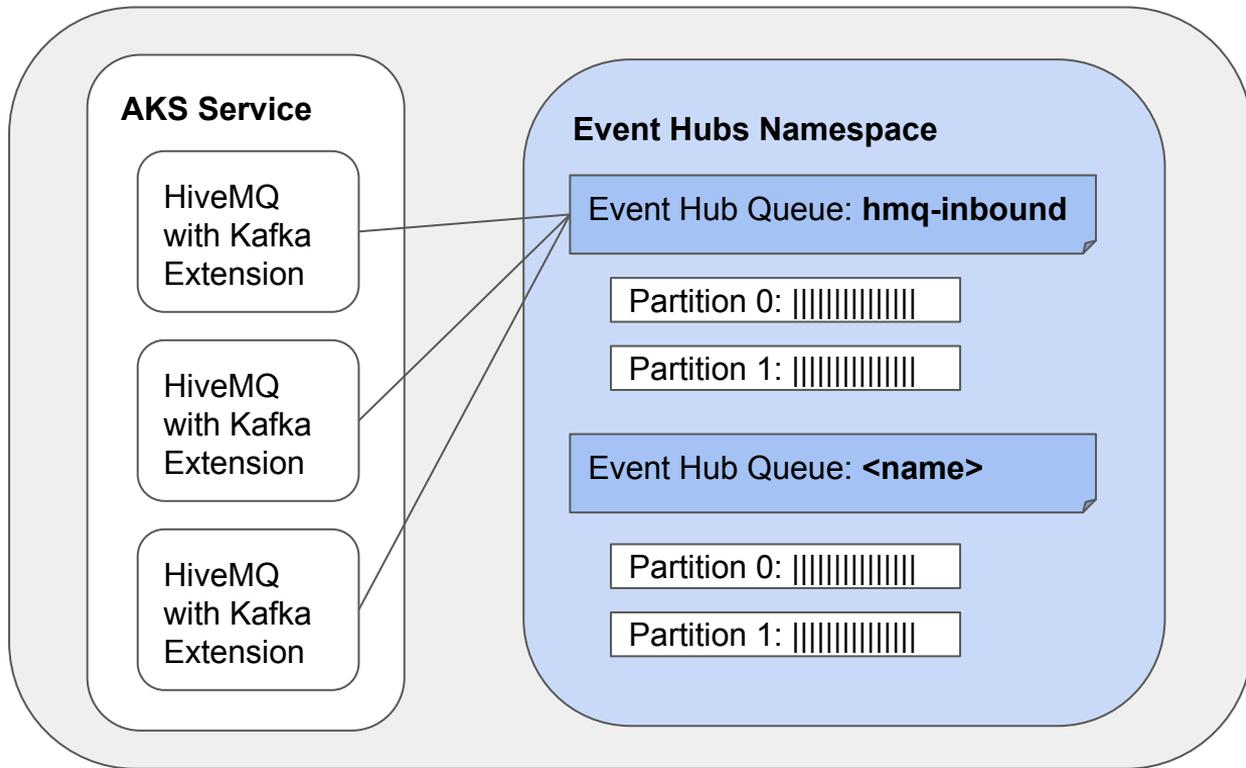
Kafka

Kafka cluster

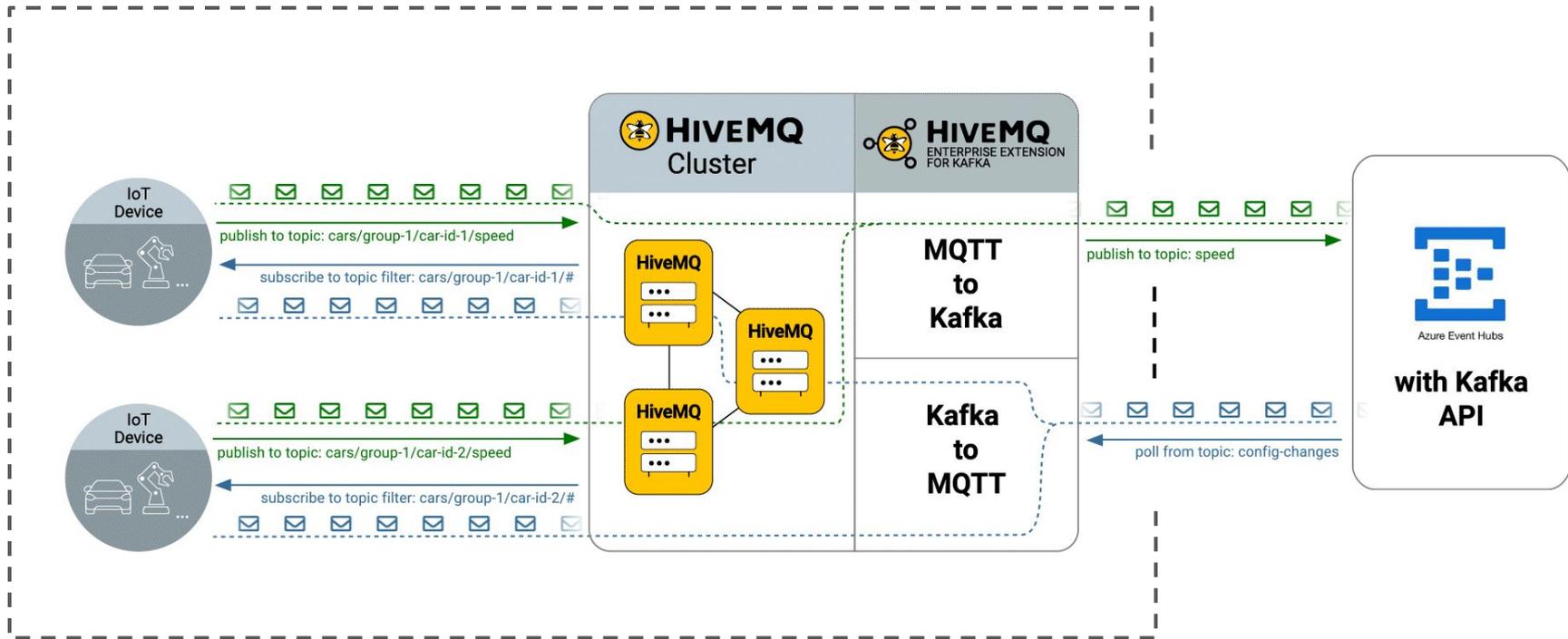
Kafka topic

Partition

Azure Resource Group



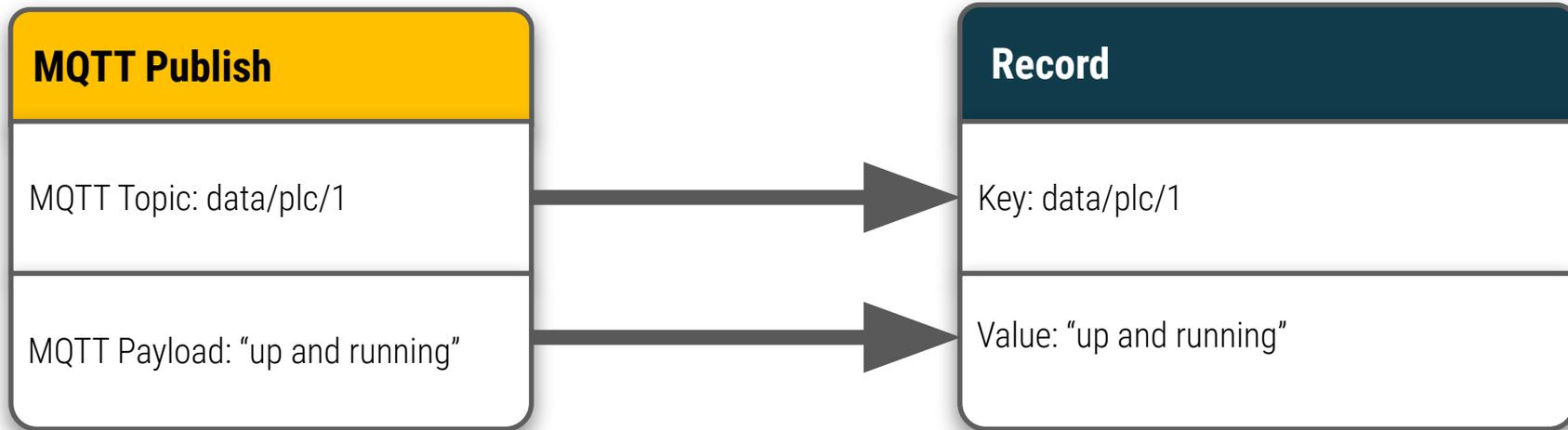
Set up HiveMQ Enterprise Extension for Kafka



HiveMQ Enterprise Extension for Kafka details

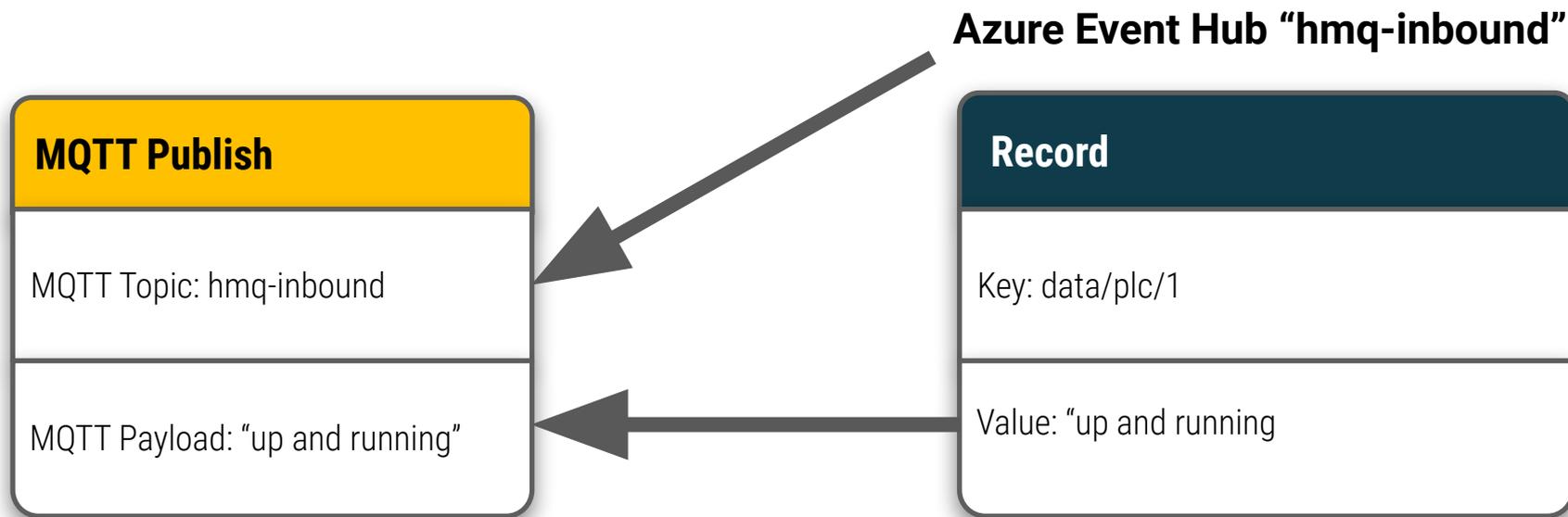
Ping - Pong example with two MQTT clients

Azure Event Hub “hmq-inbound”



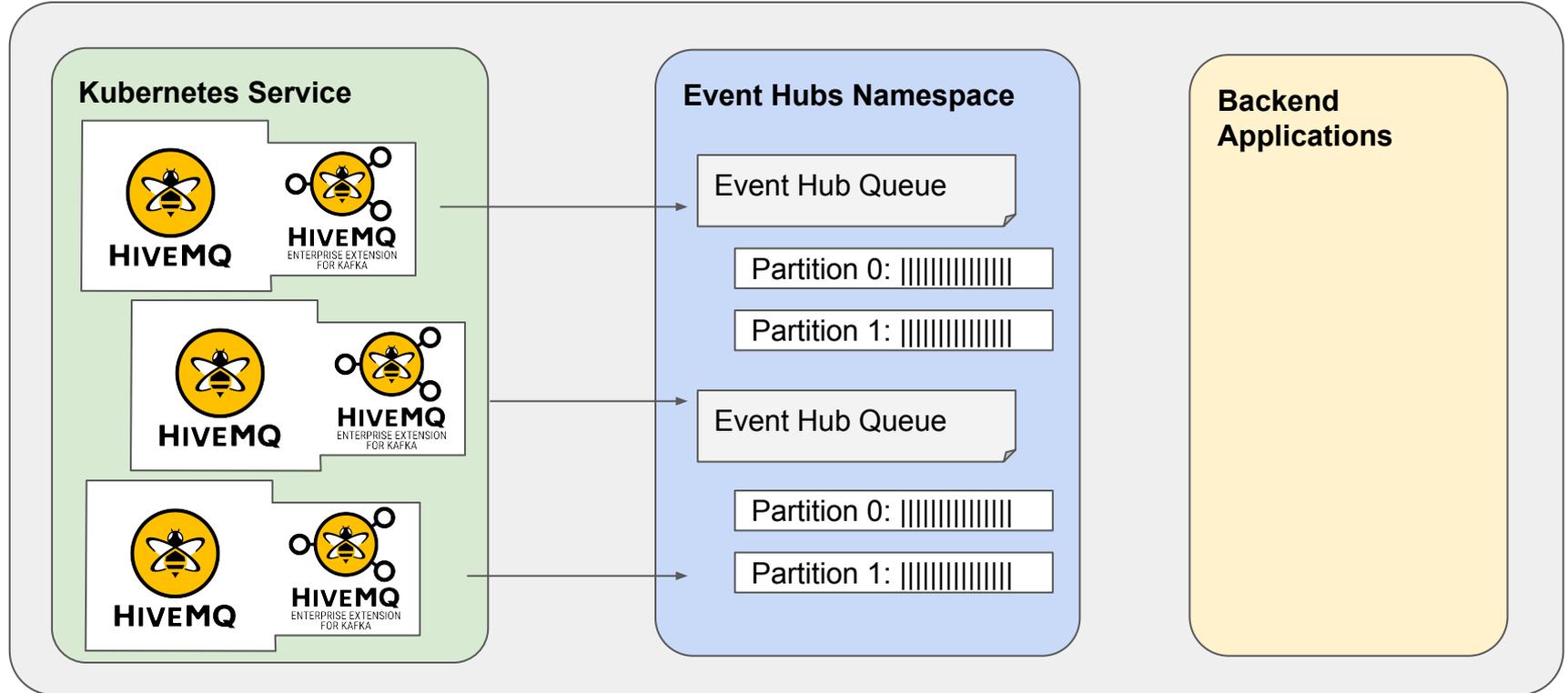
HiveMQ Enterprise Extension for Kafka details

Ping - Pong example with two MQTT clients



Final Setup

Azure Resource Group



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](#)



HIVEMQ

[Evaluate HiveMQ](#)



HIVEMQ
CLOUD

[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

Contact Details

Matthias Hofschien

✉ matthias.hofschien@hivemq.com

in [linkedin.com/in/matthiashofschien/](https://www.linkedin.com/in/matthiashofschien/)

