The connected car has been around for over two decades. However, unreliable cellular networks, the limitation of HTTP for bi-directional communication and now the requirement for handling spikes in connectivity traffic have created growing challenges. Increasingly the automotive industry is focused on the need to deliver better user experience, create new revenue streams and improve vehicle performance.

To do this the industry is turning to MQTT, a lightweight publish/subscribe protocol, to create a reliable and scalable connected car platform to reach millions of cars.

- The reliability challenges of connected cars, the benefits of MQTT versus HTTP, Real world lessons from projects with Audi & BMW, how to build a MQTT scalable connected car platform.

Our customers are...

- Building new digital products
- Improving customer experience
- Creating more efficient operations & insights

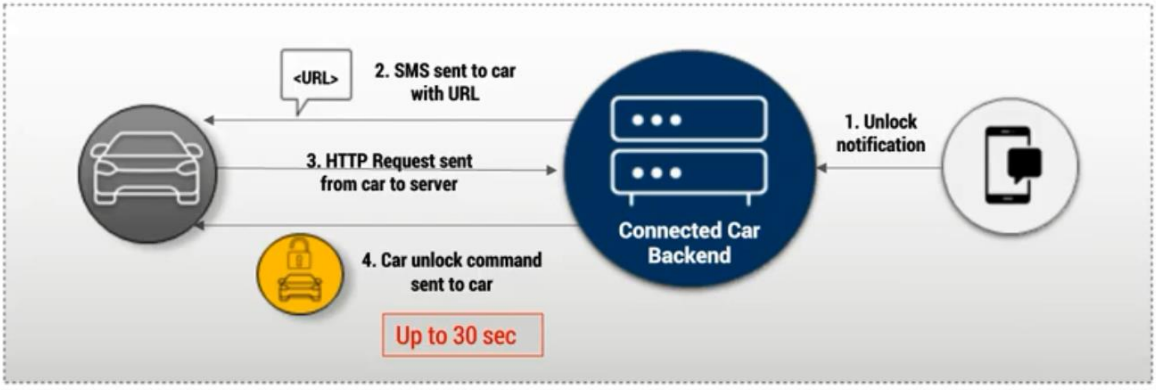
LIBERTY GLOBAL · Itron · winterhalter · DAIMLER · Flughafen München · BMW · Audi · SIEMENS · Honeywell

Automotive Customers

- Connected car platforms
- Car sharing services
- Connected car services

BMW · Audi · DAIMLER · SiriusXM · AUTONOMIC · ECARX

Current Challenges



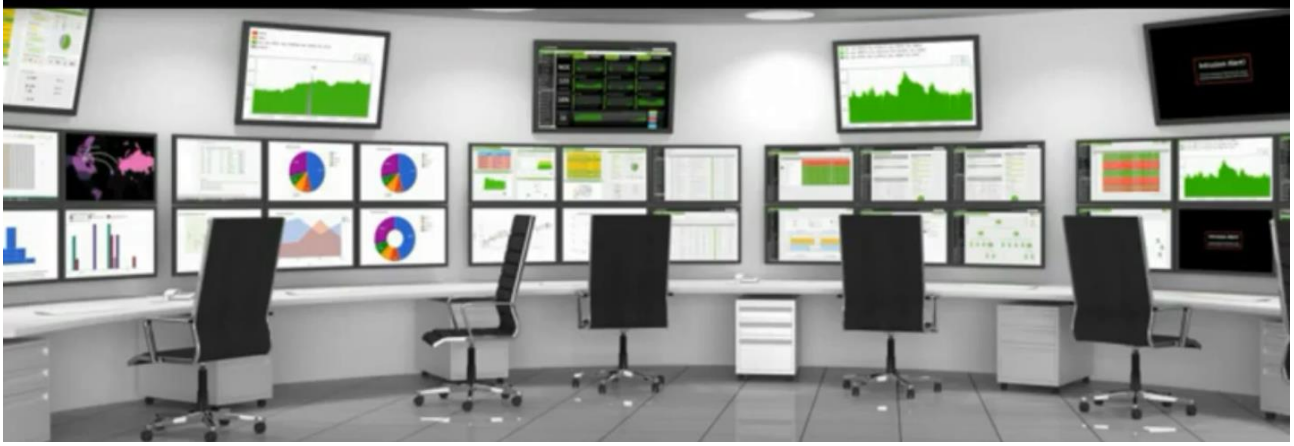
Challenge #1 Unreliable Networks and Network Latency

Challenge #2 Broadcast messages to large fleets of vehicles

Challenge #3 Scaling up to meet demand

Challenge #4 Integration with Enterprise Systems

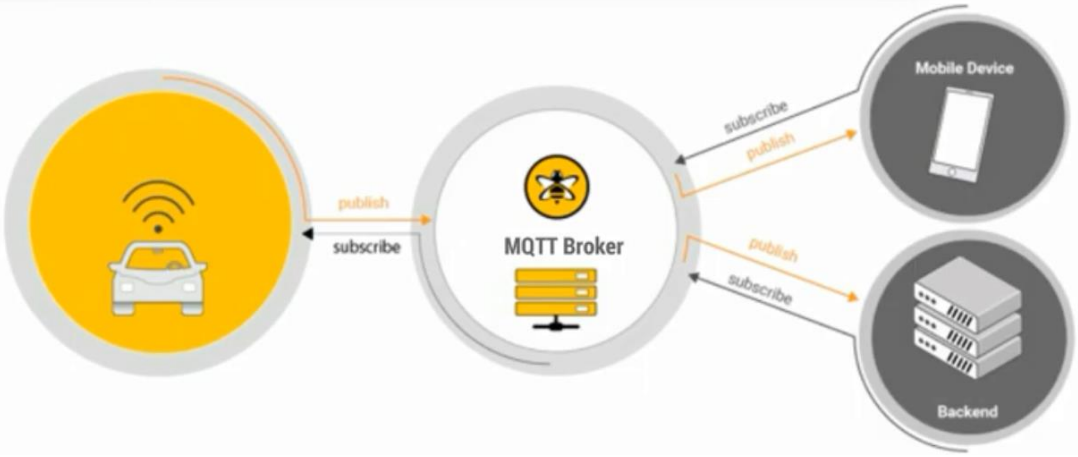
Challenge #5 Monitor and Troubleshoot Deployments



What do you think is the biggest challenge in automotive?

Unreliable networks & network latency	42.4%
Broadcast messages to large fleets of vehicles	4.5%
Scaling up to meet demand	21.2%
Integration with existing enterprise systems	25.8%
Monitor and troubleshoot deployments	6.1%

A New Architecture



Connected Car Protocol: MQTT

MQTT

- Lightweight, simple client
- Pub/Sub protocol
- Persistent Connections
- Quality of service levels

http://

- Request/Response handshake for each connection
- No ability for bidirectional
  - SMS is used but is unreliable
- No quality of service
- No queuing of messages for lost connection

New Technologies found

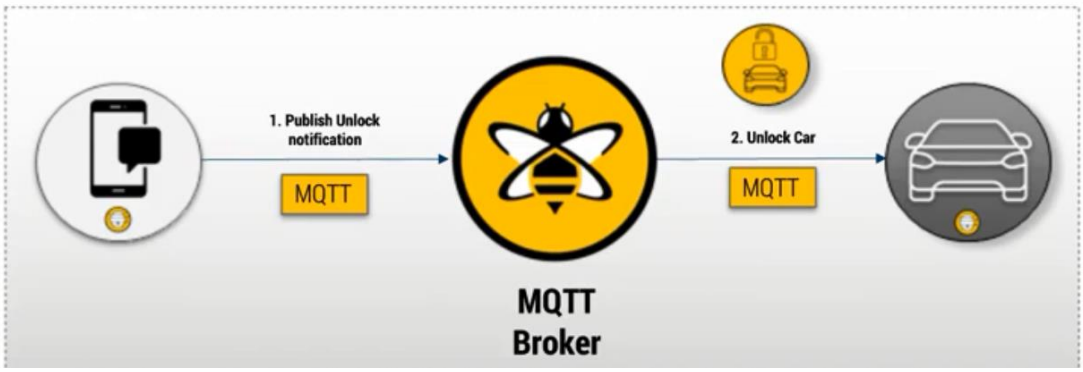
Internet of Humans

http://

Internet of Things

MQTT

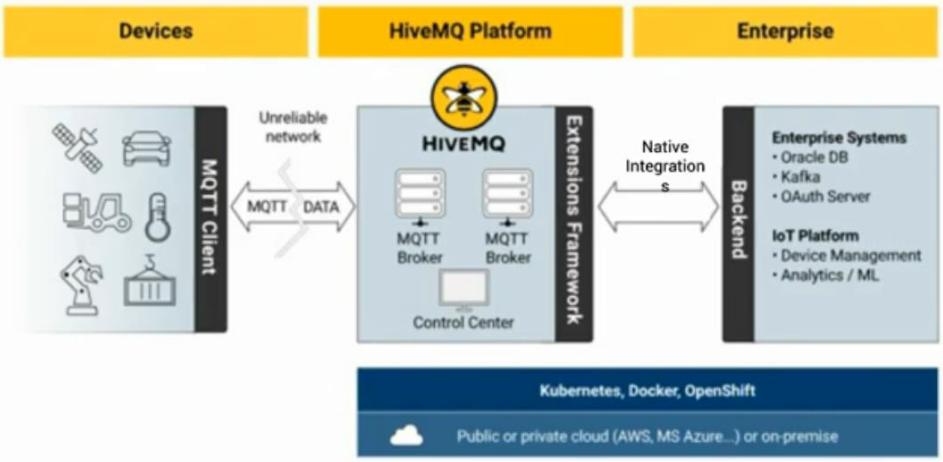
Remote Door Unlock with MQTT



MQTT is just a protocol, right?

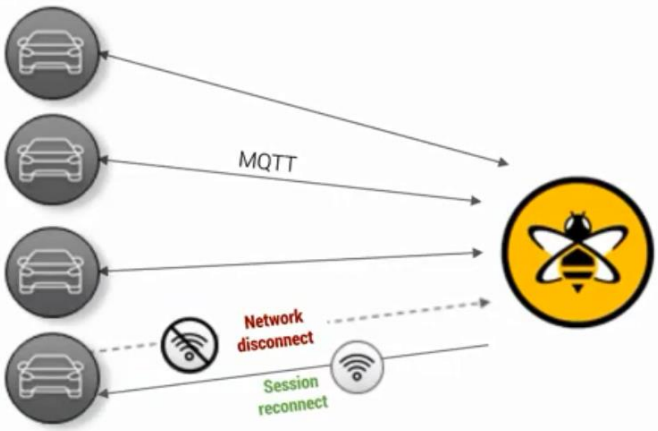
Enterprise MQTT Platform

HIVEMQ



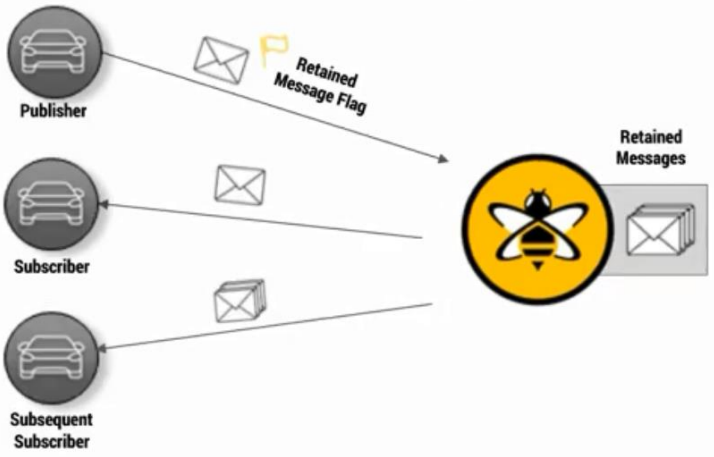
10mio+ Persistent Always-on Connections

- Persistent sessions
- Reconnect after network disconnect
- Bi-directional communication
- Massive scalability



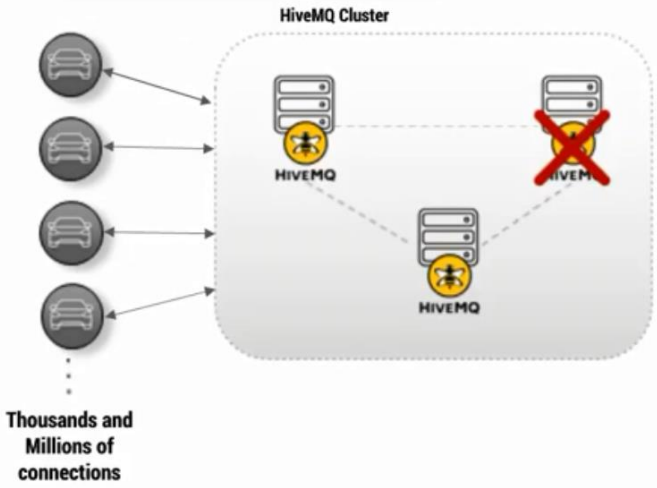
Guaranteed and Reliable Data Delivery

- Quality of Service messaging
  - At most once (0)
  - At least once (1)
  - Exactly once (2)
- Retained Messages
- Offline queued messages

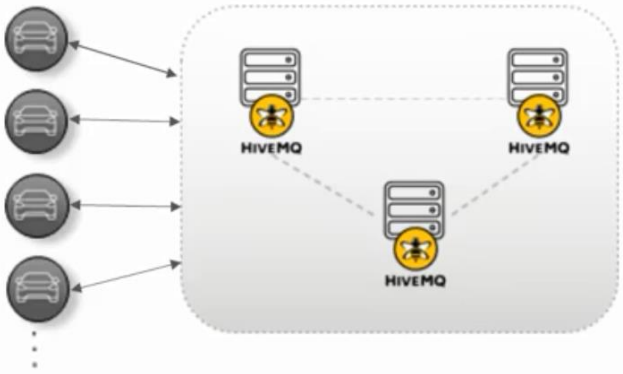


Elastic Scalability and Auto Heal

- Automatically scale up and down
- Connections distributed across clustered nodes
- Masterless cluster architecture so end user doesn't experience latency if cluster node is down

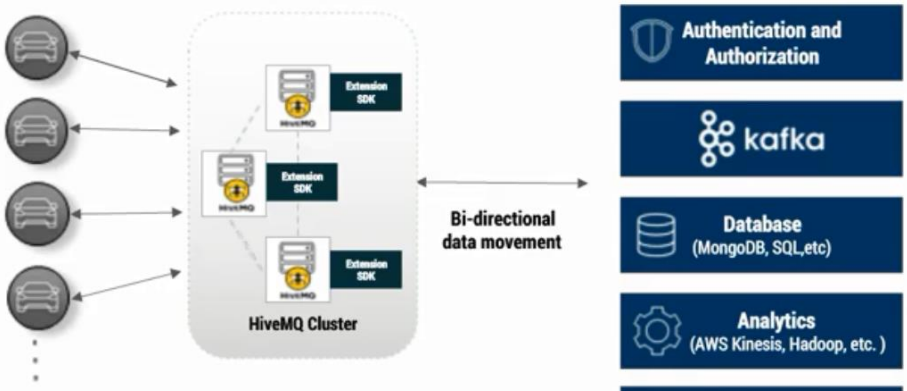


Cloud Neutral Deployment

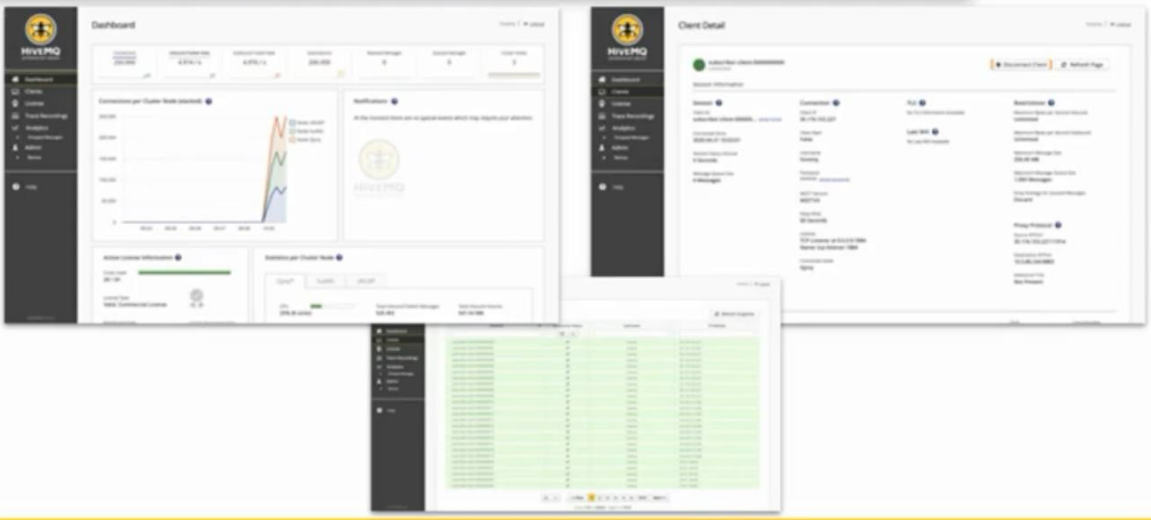


- Cloud
- Container
- Managed service
- VM
- Bare metal

Open API and Extension Framework



Observability and Insights from Operations



HiveMQ for Connected Cars

- 10 mio+ Persistent Always-on Client Connections
- Guaranteed and Reliable Data Delivery
- Elastic Scalability and Auto Heal
- Cloud Neutral Deployment
- Open API enables Custom Integration for Enterprise requirement
- Observability and Insights for Operations

ECARX Case Study

Independently operated by Geely Holding Group

- **Key Challenge:**
  - Manage connectivity between car and cloud
- **What HiveMQ provided:**
  - Latest MQTT standard, especially MQTT 5
  - MQTT 5 has improved the reliability of overall system
  - Extension framework for easy message flow of MQTT connection

ECARX

Result

- **2 million Geely cars connected**
- **Average of 350,000 simultaneous connections**
- **30% cost reduction**

HiveMQ: The Standard for Connected Car

OEM

Third Party Platforms

Suppliers

Expect to have more than 50% of automotive OEMs using HiveMQ by 2022