

The Future of V2X and Road Safety with 5G and MQTT

A Webinar with HiveMQ and Vodafone



HIVEMQ



vodafone

Discover how new innovative technology based on 5G and MQTT will improve road safety



Speakers



Dominik Obermaier

CTO and Co-Founder of HiveMQ

✉ dominik.obermaier@hivemq.com

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



Dr. Guido Gehlen

Head of Connected Mobility Technology, Vodafone

✉ Guido.Gehlen@vodafone.com

[in](https://www.linkedin.com/in/guido-gehlen-7a5a45a) [linkedin.com/in/guido-gehlen-7a5a45a](https://www.linkedin.com/in/guido-gehlen-7a5a45a)



WHAT IF ...

WE COULD MAKE
EUROPEAN ROADS
SAFER FOR EVERYONE?

AutomotiveIQ Webinar
with HiveMQ

Guido Gehlen

Vodafone Business



Road Traffic Safety is still a major challenge

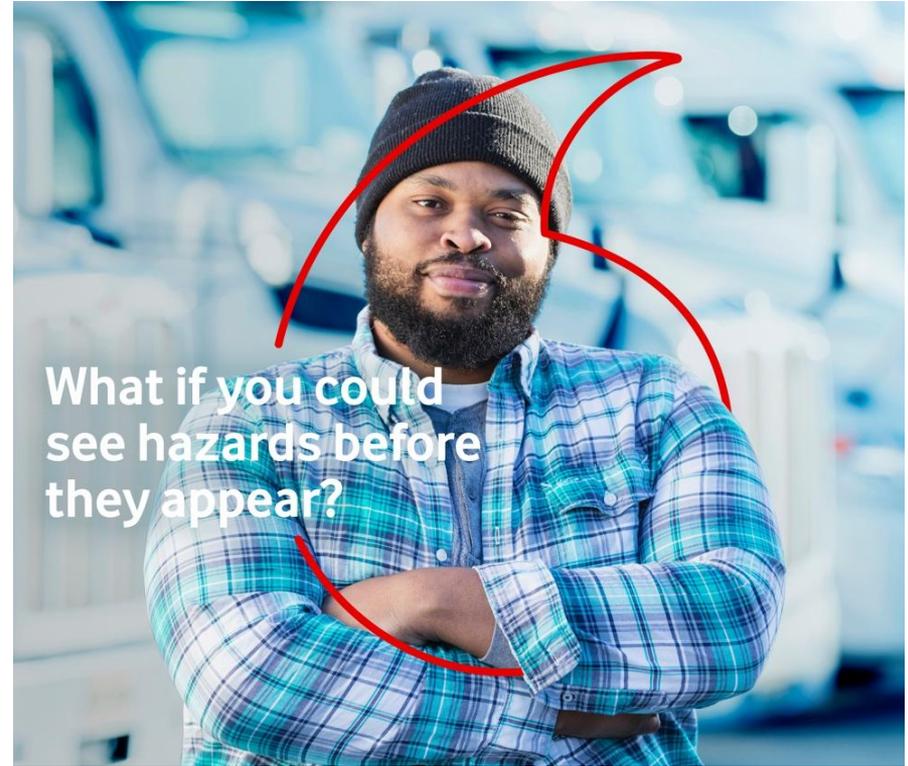
especially for Vulnerable Road Users

- 3500 persons killed in road traffic globally every day
- More than 50% of the deaths are among vulnerable road users (pedestrians, cyclists, and motorcyclists)
- Since 2009 pedestrian and bicyclist fatalities have risen substantially
- Road traffic injuries are the leading cause of death for children and young adults aged 5-29 years



Vodafone is committed to make European Roads Safer for Everyone

- Secure and reliable communication channel for V2X Services leveraging 5G and Edge Cloud
- Platform to distribute, broker and validate V2X messages in real-time
- Digital Infrastructure Provider for Road Operators
- Trusted Platform provider for European road operators and mobility service providers



How Vodafone is addressing Digital Roads?

5G

Open
Ecosystem

Edge
Compute

Edge V2X
Platform



Edge Computing changes the game



Cloud computing



Flexibility, agility and pay-as-you-go cost efficiency

Multi-access Edge Computing

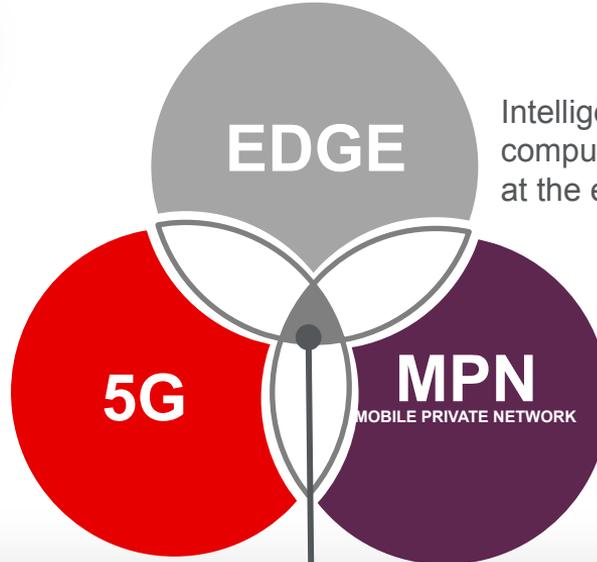
Combines the best of both worlds



On premise or on device edge

Low latency, data volumes and data privacy

Super-low latency communications



Intelligent computing at the edge

Guaranteed service levels and security with both 4G and 5G options



AR/VR



Gaming



IoT



V2X

Transformed experiences



Drones



Healthcare



Factory



Robotics

Delivering ultra-low latency communications and intelligent services in previously hard-to-reach places



The benefits of Edge Computing – Enabling digital roads



Low latency for real-time operations and complex decision-making in seconds, new use cases and applications



Bandwidth efficiency as applications are hosted locally



As data processing moves to the edge, computing power increases (cheaper devices, longer battery life and improved UX)



Data privacy, security with resilient backup options



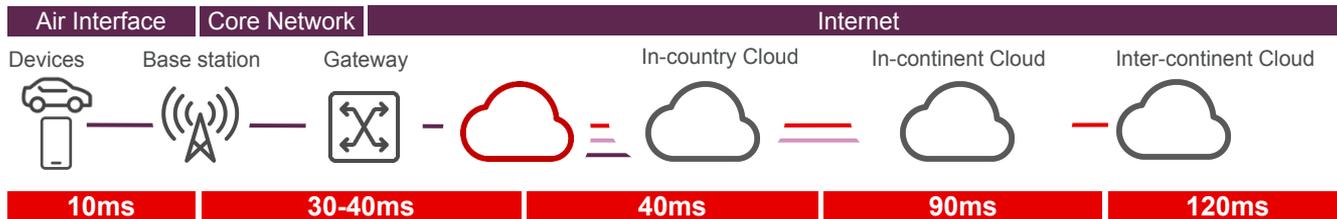
Regulatory compliance as data is stored in a physical location



Latency impact of the Network Edge

Without MEC

Approx. latency
 $\Sigma 80 - 170\text{ms}$



With MEC

Approx. latency
 $\Sigma 10 - 30\text{ms}$



4G

10ms

10ms

Upgrading core network, reducing by 20-30ms

5G

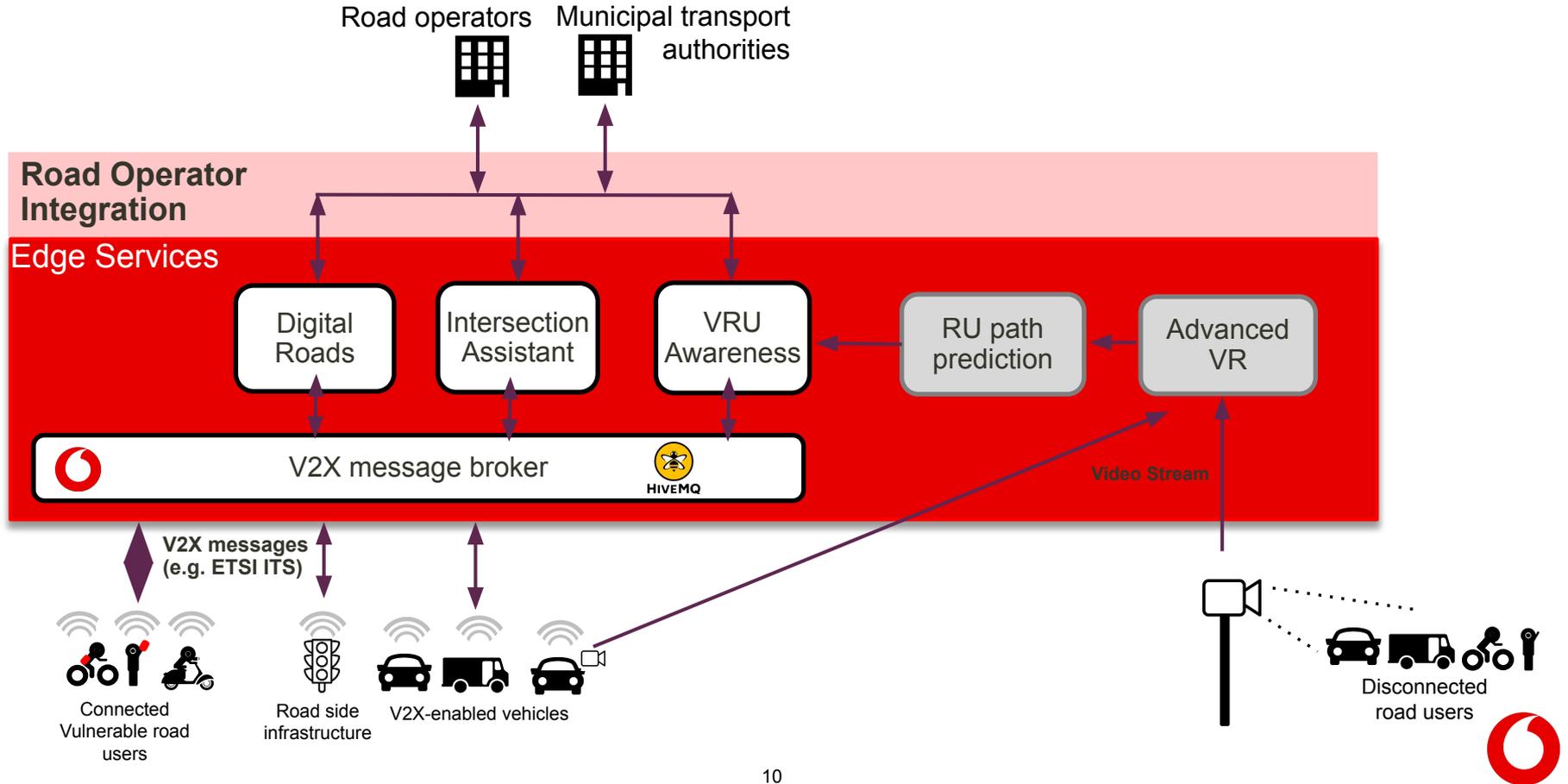
1-2ms

10ms

Implementing 5G new radio in selected areas, reducing by 10ms



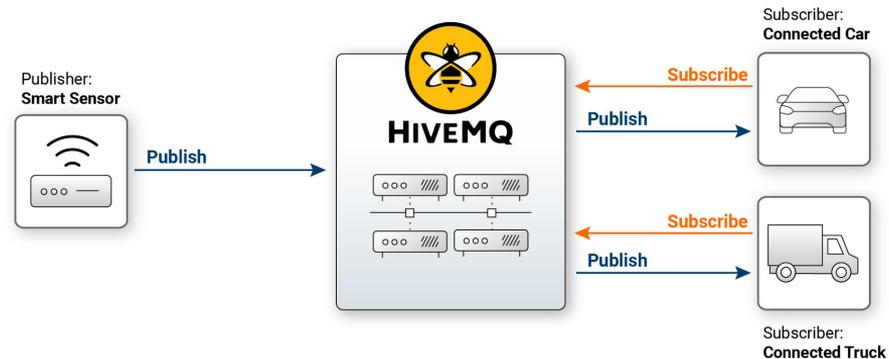
V2X Platform at the Edge



Why MQTT for V2X?

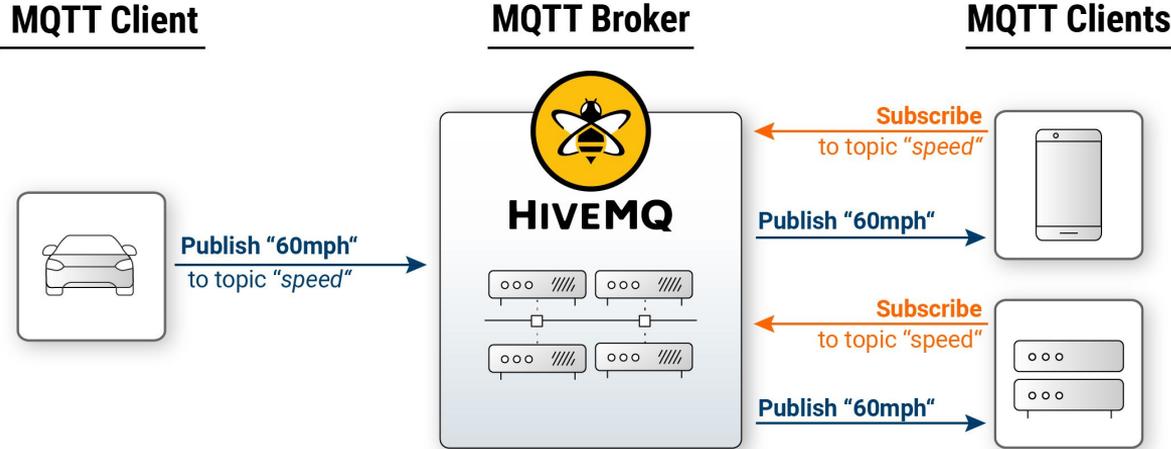


Introducing MQTT

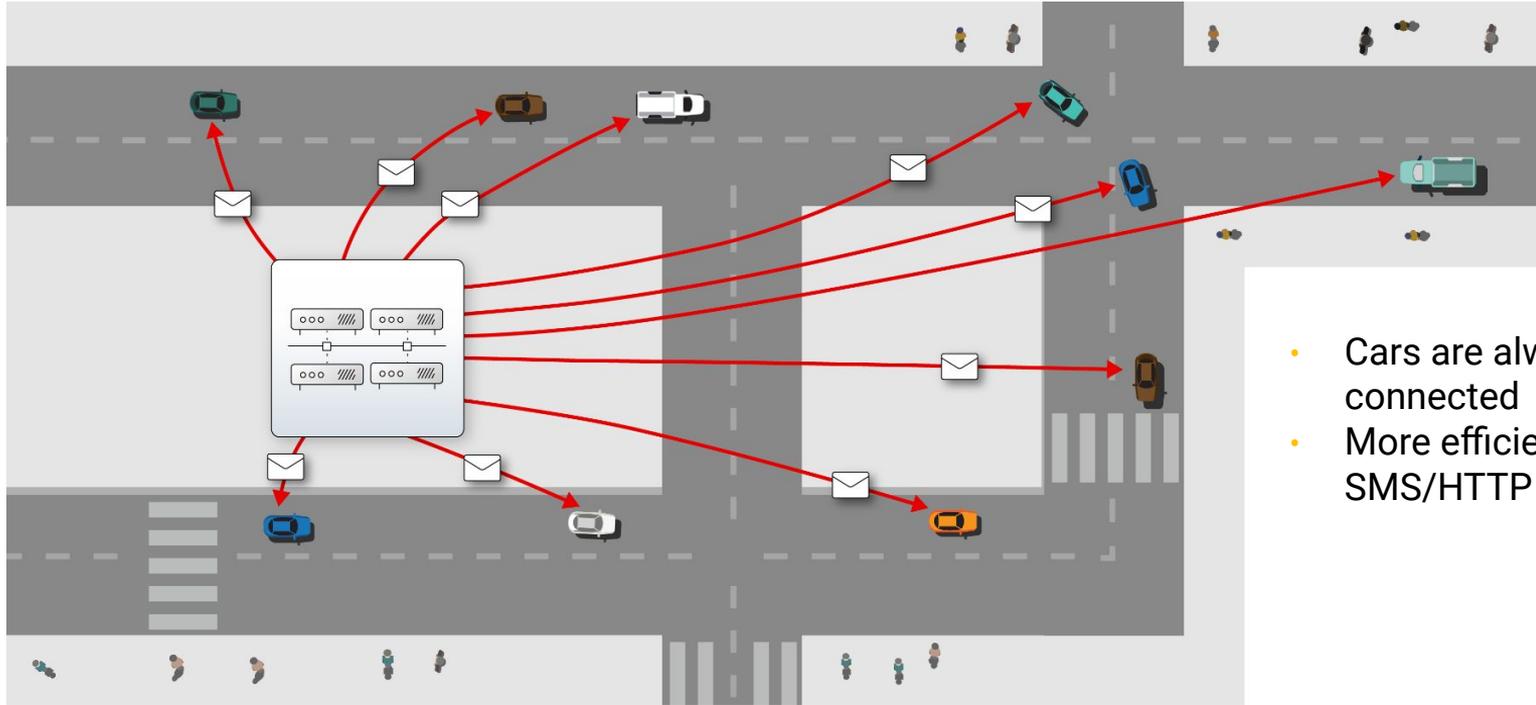


- IoT messaging protocol
- Publish/subscribe
- Minimal overhead for client and bandwidth
- Designed for reliable communications over unreliable channels
- Efficient bi-directional messaging
- 3 Quality of Service (QoS) levels

MQTT Publish / Subscribe Architecture



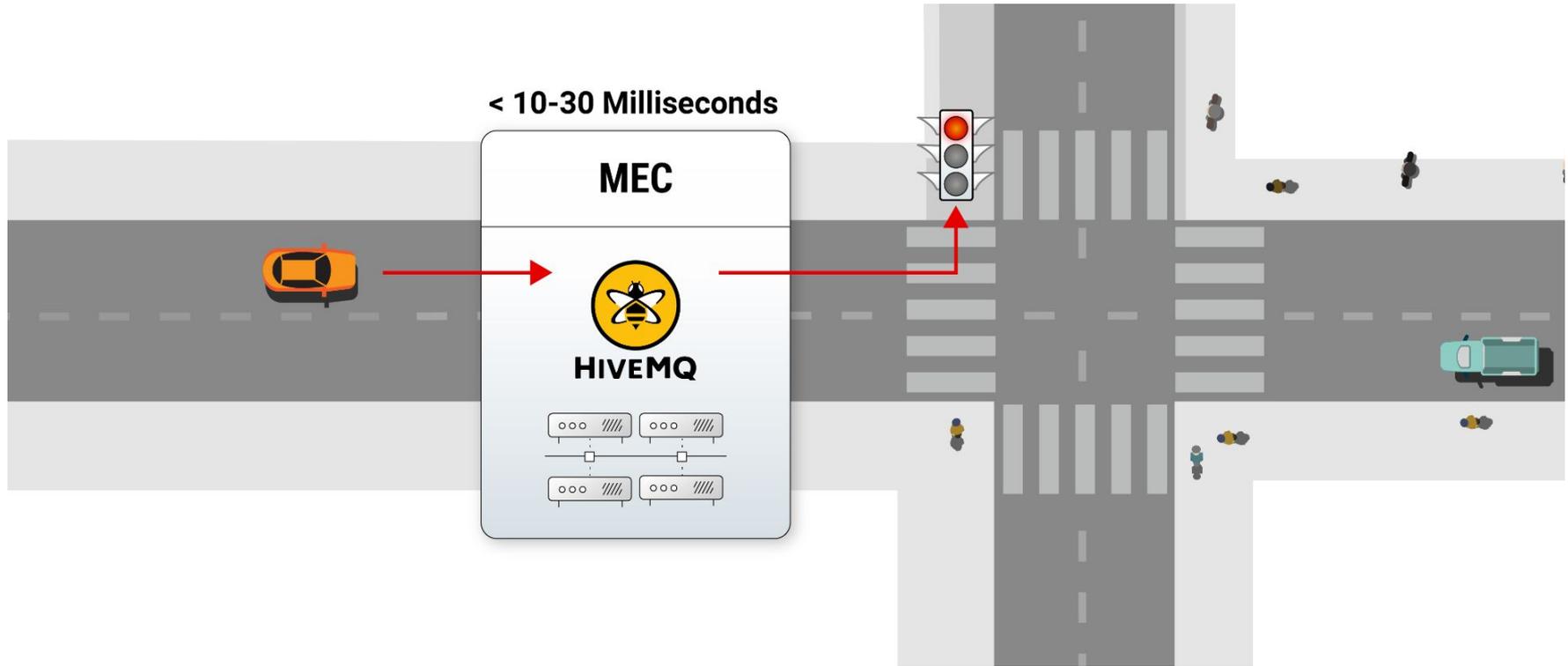
Always On



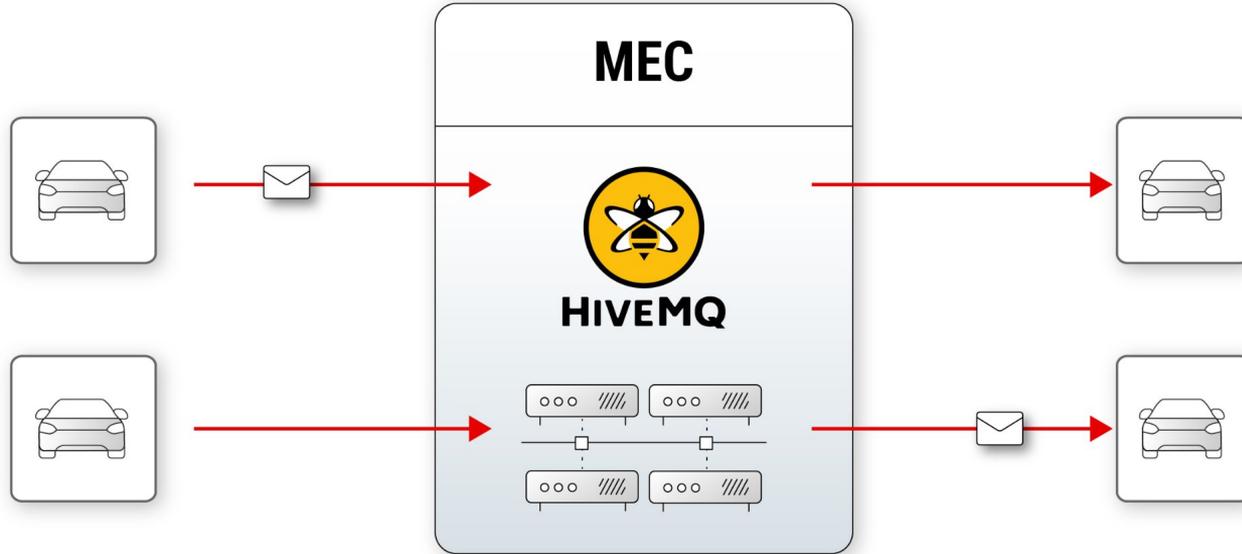
- Cars are always connected
- More efficient than SMS/HTTP



Low Latency

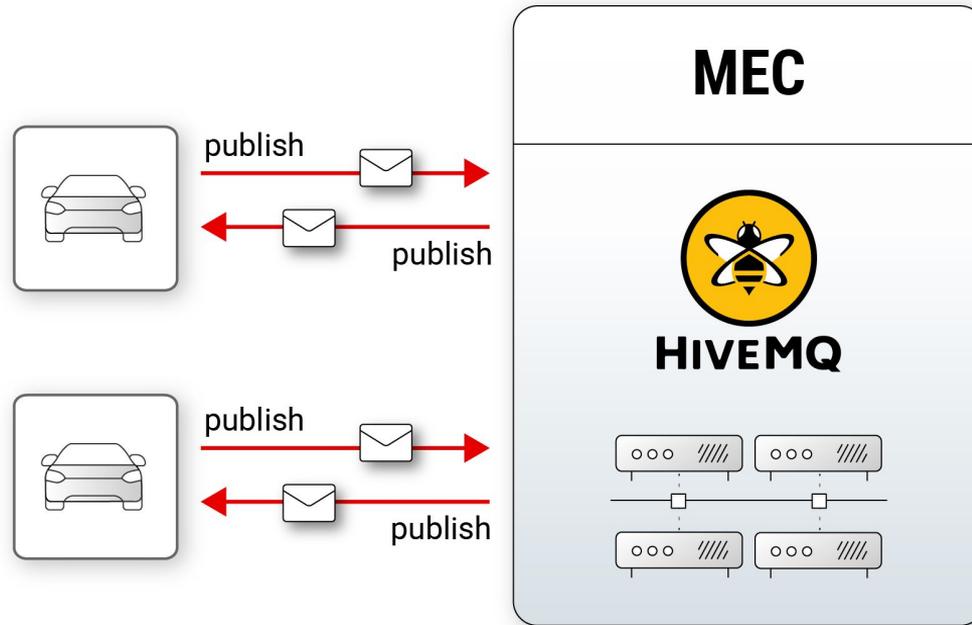


Push/Push

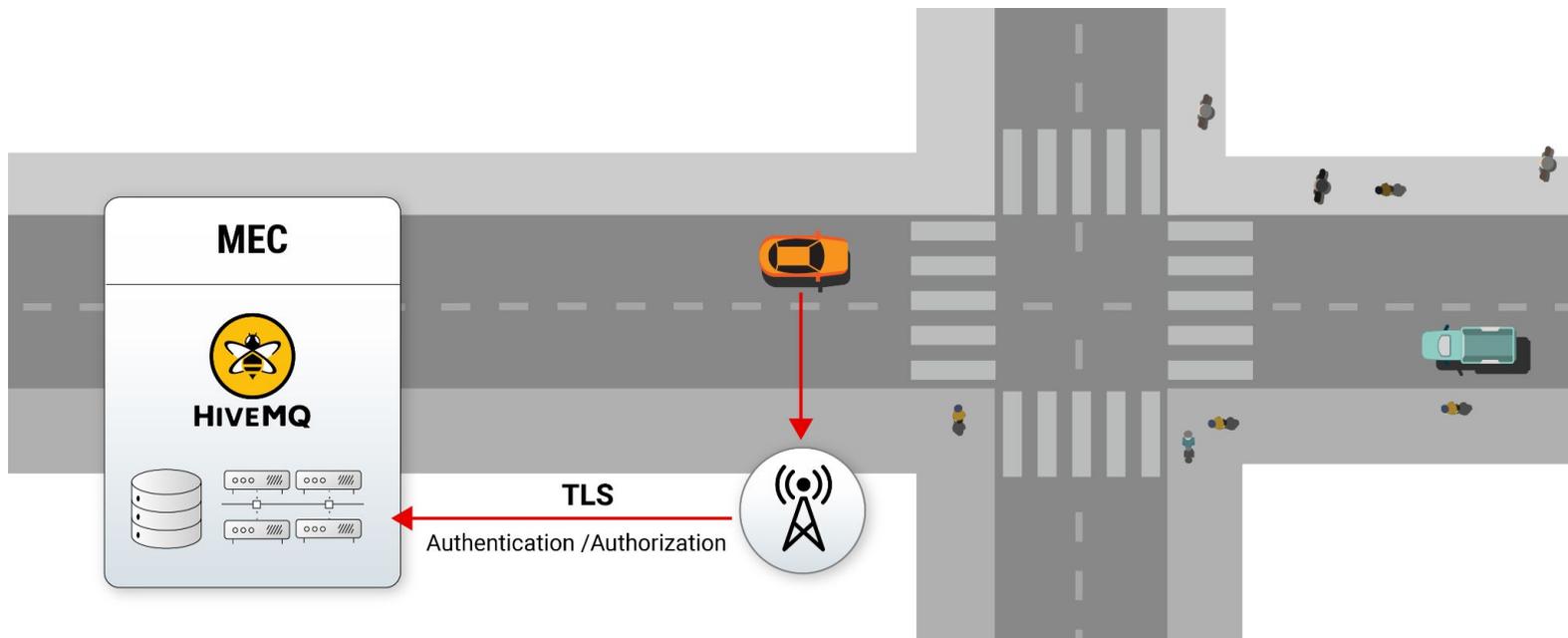


Instant Data connection between cars

Bidirectional



Security



- TLS communication between cars and infrastructure
- Authentication and Authorization at the MEC
 - Repository of authentication and authorization information

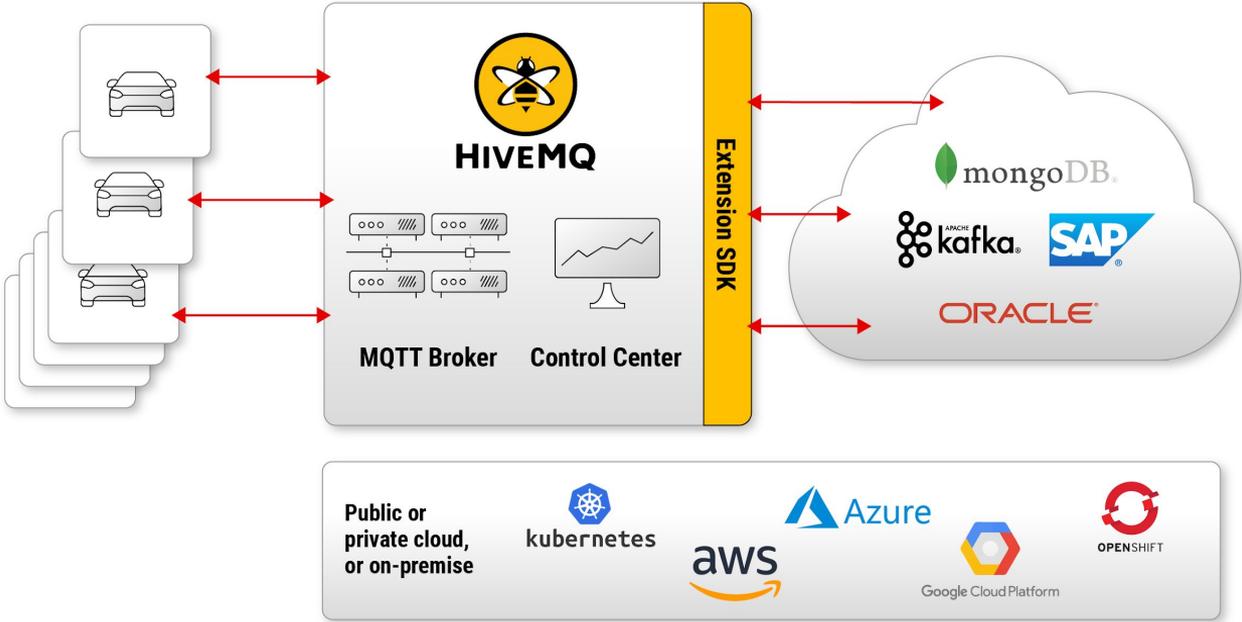


Enterprise MQTT Platform

MQTT Clients

HiveMQ Platform

Enterprise



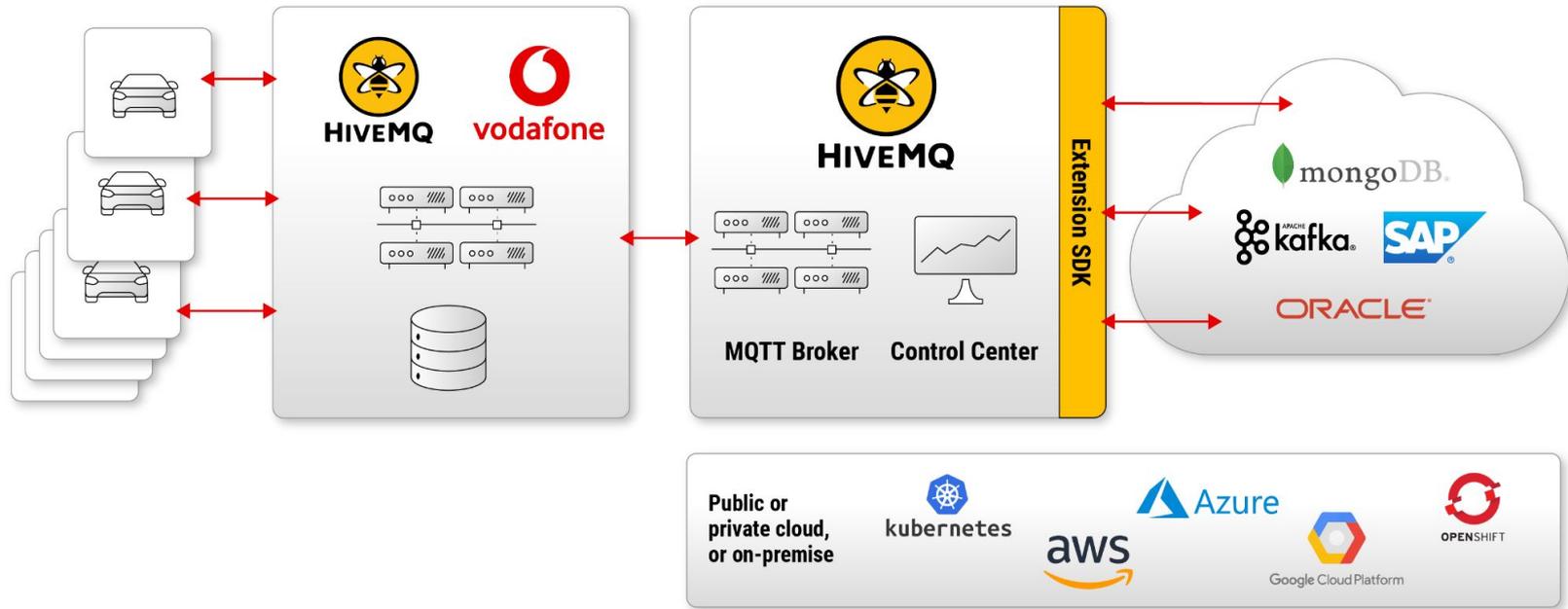
HiveMQ Platform for MEC

MQTT Clients

MEC

HiveMQ Platform

Enterprise





HIVEMQ

is unique



Scales to millions of devices



Implements business critical reliability



Support for high availability and always-on connections



In-depth observability and monitoring of connected devices



Integration of IoT data with enterprise services



Freedom to run anywhere

Next Steps



Rollout

The V2X platform hasn't been announced yet, please follow

<https://www.vodafone.com/business/home>

to see all Vodafone Business solutions or contact

Guido.Gehlen@vodafone.com

Resources



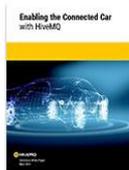
To learn about MQTT, get the **MQTT Essentials eBook**:

<https://www.hivemq.com/download-mqtt-ebook/>



To evaluate **HiveMQ MQTT broker**, visit:

<https://www.hivemq.com/downloads/>



To check how HiveMQ is helping automotive companies build **Connected Car Platforms**, visit:

<https://www.hivemq.com/solutions/iot/download-connected-car-whitepaper/>

THANK YOU

Contact Details

Dominik Obermaier

CTO and Co-Founder of HiveMQ

✉ dominik.obermaier@hivemq.com

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

Dr. Guido Gehlen

Head of Connected Mobility Technology, Vodafone

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