WEBINAR

IoT Observability:

Enabling Real-time MQTT Message Tracking Across an IoT Environment

Hosted By HIVEMQ

Speakers

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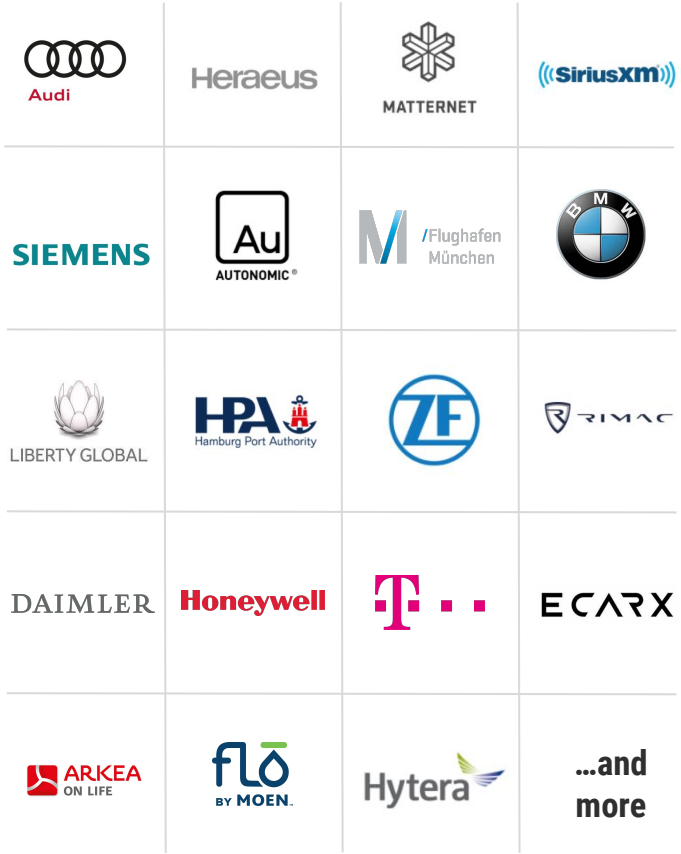
Introduction to HiveMQ

- A global company founded in 2012 and headquartered in Landshut, Germany.
- HiveMQ helps **move data to and from connected devices** in an **efficient**, **fast** and **reliable** manner
- **130+ customers** with production IoT applications

Our Customers...

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



Key Industries

Technology Leadership

- MQTT Technical Committee
- MQTT-SN Technical Committee

- Sparkplug Workgroup Steering Committee
- Sparkplug Specification Committee

- Eclipse IoT Working Group

Observability for IoT

The Internet of Things is HUGE

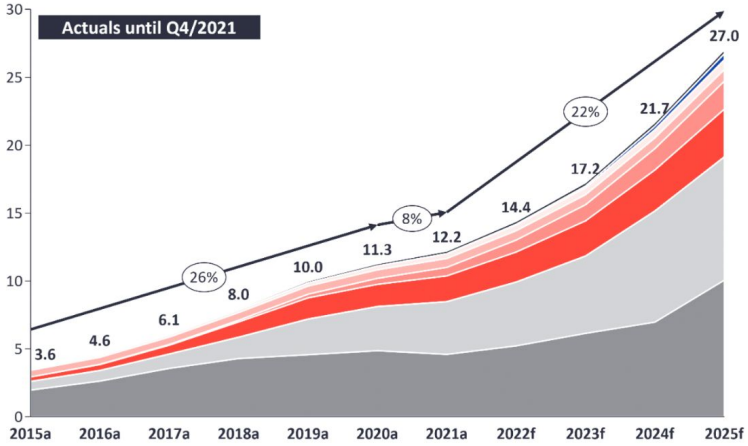
IOT ANALYTICS

May 2022

Your Global IoT Market Research Partner

Global IoT Market Forecast [in billion connected IoT devices]

Number of global active IoT Connections (installed base) in Bn



CONNECTIVITY TYPE	CAGR 20-21	CAGR 21-25
Wireless Neighborhood Area Networks (WNAN)	17%	11%
5G IoT	-	159%
Other	22%	20%
Wired IoT	4%	7%
LPWA	42%	34%
Legacy Cellular (2G/3G/4G)	16%	17%
Wireless Local Area Networks (WLAN)	19%	24%
Wireless Personal Area Networks (WPAN)	-6%	22%

XX% = CAGR

Note: IoT Connections do not include any computers, laptops, fixed phones, cellphones or tablets. Counted are active nodes/devices or gateways that concentrate the end-sensors, not every sensor/actuator. Simple one-directional communications technology not considered (e.g., RFID, NFC). Wired includes Ethernet and Fieldbuses (e.g., connected industrial PLCs or I/O modules); Cellular includes 2G, 3G, 4G; LPWAN includes unlicensed and licensed low-power networks; WPAN includes Bluetooth, Zigbee, Z-Wave or similar; WLAN includes Wi-fi and related protocols; WNAN includes non-short range mesh, such as Wi-SUN; Other includes satellite and unclassified proprietary networks with any range.

Source: IoT Analytics Research 2022. We welcome republishing of images but ask for source citation with a link to the original post and company website.

IoT Observability Challenges Are Unique

- Distributed applications at massive scale
- Network of black boxes
- Operate over unreliable networks
- Too much data for conventional tools

Originally featured in:
https://www.oreilly.com/library/view/distributed-tracing-in/9781492056621/preface01.html

How an Observable System Helps Your Business

- Enhance customer experience and support by minimizing resolution time.
- Find opportunities to make your IoT applications more productive and resilient.
- Unlock value from your APM investments by deeper engagement with the MQTT broker.

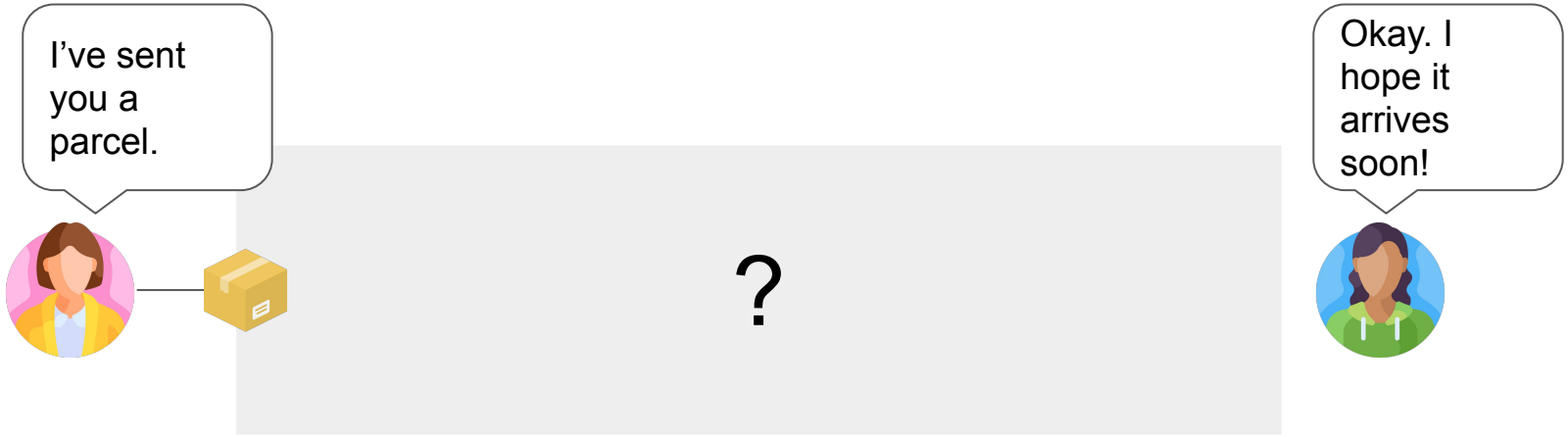
3 Pillars of an Observable System

- Metrics
  - HiveMQ offers 1500+ Metrics
- Logs
  - Human and Machine Readable logs
- Tracing
  - Trace Recordings
  - Distributed Tracing

What is Distributed Tracing?

- Distributed Tracing is a way to trace events through multiple, complex systems.
- It allows high-level overview of a request's journey without needing someone to dive into individual systems.
- This is important because customers have problems where it's difficult to know where to start, e.g. a connected car opening taking 3-5 seconds. Where to start in the very complex architecture?

Analogy: How sending a parcel used to work

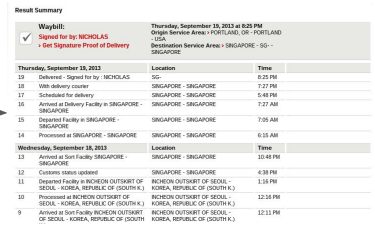


Now: Tracking a parcel

I've created a parcel with tracking ID **12345678**

'K.

Think about it like: Tracking a parcel



I have the parcel with tracking ID **12345678**

Think about it like: Tracking a parcel

My car broke down!

Uh-oh.

Think about it like: Tracking a parcel

Think about it like: Tracking a parcel

Result Summary

Waybill:
Signed for by: NICHOLAS
› Get Signature Proof of Delivery

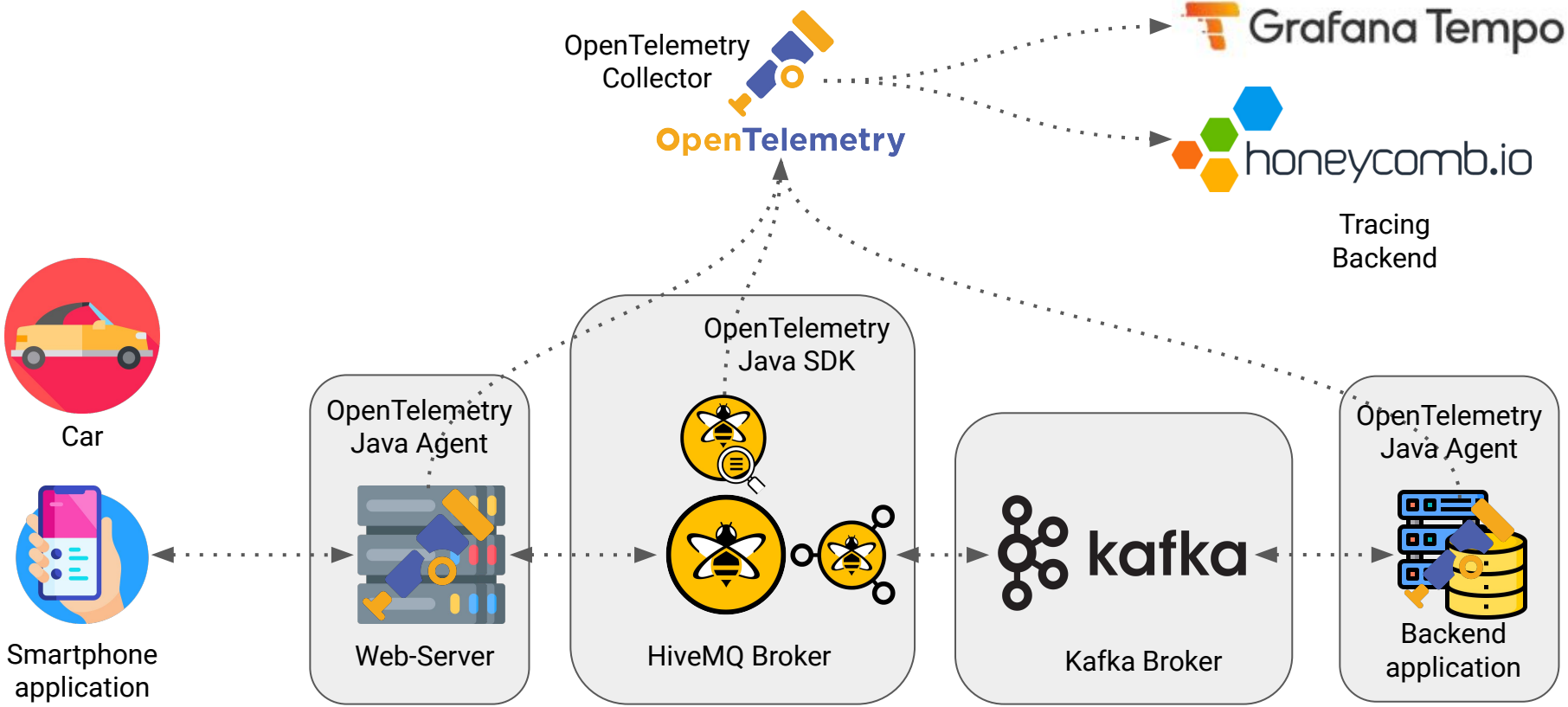
Thursday, September 19, 2013 at 8:25 PM
Origin Service Area: › PORTLAND, OR - PORTLAND - USA
Destination Service Area: › SINGAPORE - SG- - SINGAPORE

Thursday, September 19, 2013		Location	Time
19	Delivered - Signed for by : NICHOLAS	SG-	8:25 PM
18	With delivery courier	SINGAPORE - SINGAPORE	7:27 PM
17	Scheduled for delivery	SINGAPORE - SINGAPORE	5:48 PM
16	Arrived at Delivery Facility in SINGAPORE - SINGAPORE	SINGAPORE - SINGAPORE	7:27 AM
15	Departed Facility in SINGAPORE - SINGAPORE	SINGAPORE - SINGAPORE	7:05 AM
14	Processed at SINGAPORE - SINGAPORE	SINGAPORE - SINGAPORE	6:15 AM
Wednesday, September 18, 2013		**Location**	**Time**
13	Arrived at Sort Facility SINGAPORE - SINGAPORE	SINGAPORE - SINGAPORE	10:48 PM
12	Customs status updated	SINGAPORE - SINGAPORE	4:38 PM
11	Departed Facility in INCHEON OUTSKIRT OF SEOUL - KOREA, REPUBLIC OF (SOUTH K.)	INCHEON OUTSKIRT OF SEOUL - KOREA, REPUBLIC OF (SOUTH K.)	1:16 PM
10	Processed at INCHEON OUTSKIRT OF SEOUL - KOREA, REPUBLIC OF (SOUTH K.)	INCHEON OUTSKIRT OF SEOUL - KOREA, REPUBLIC OF (SOUTH K.)	12:16 PM
9	Arrived at Sort Facility INCHEON OUTSKIRT OF SEOUL - KOREA, REPUBLIC OF (SOUTH	INCHEON OUTSKIRT OF SEOUL - KOREA, REPUBLIC OF (SOUTH K.)	12:11 PM

What is Distributed Tracing then?

Shipment Tracking	Distributed Tracing
Tracking report	Trace
Tracking ID / number	Trace ID
Stop-over	Span
Name of the stop-over	Span ID
Shipment label	Trace context

What is Distributed Tracing then?



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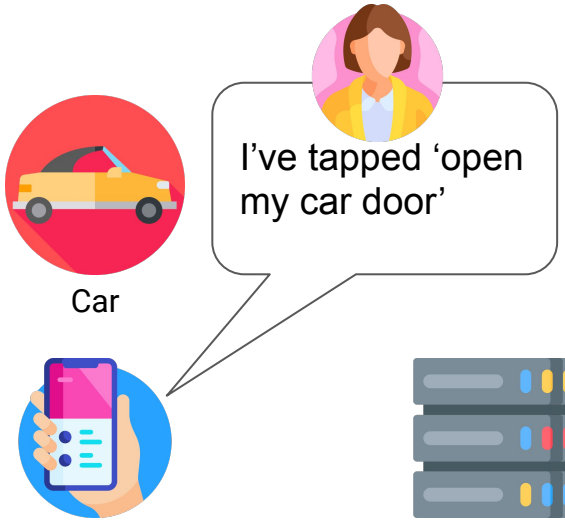
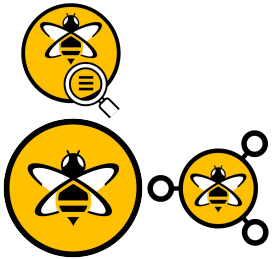


OpenTelemetry

Grafana Tempo

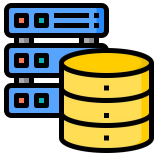
honeycomb.io



HiveMQ Broker

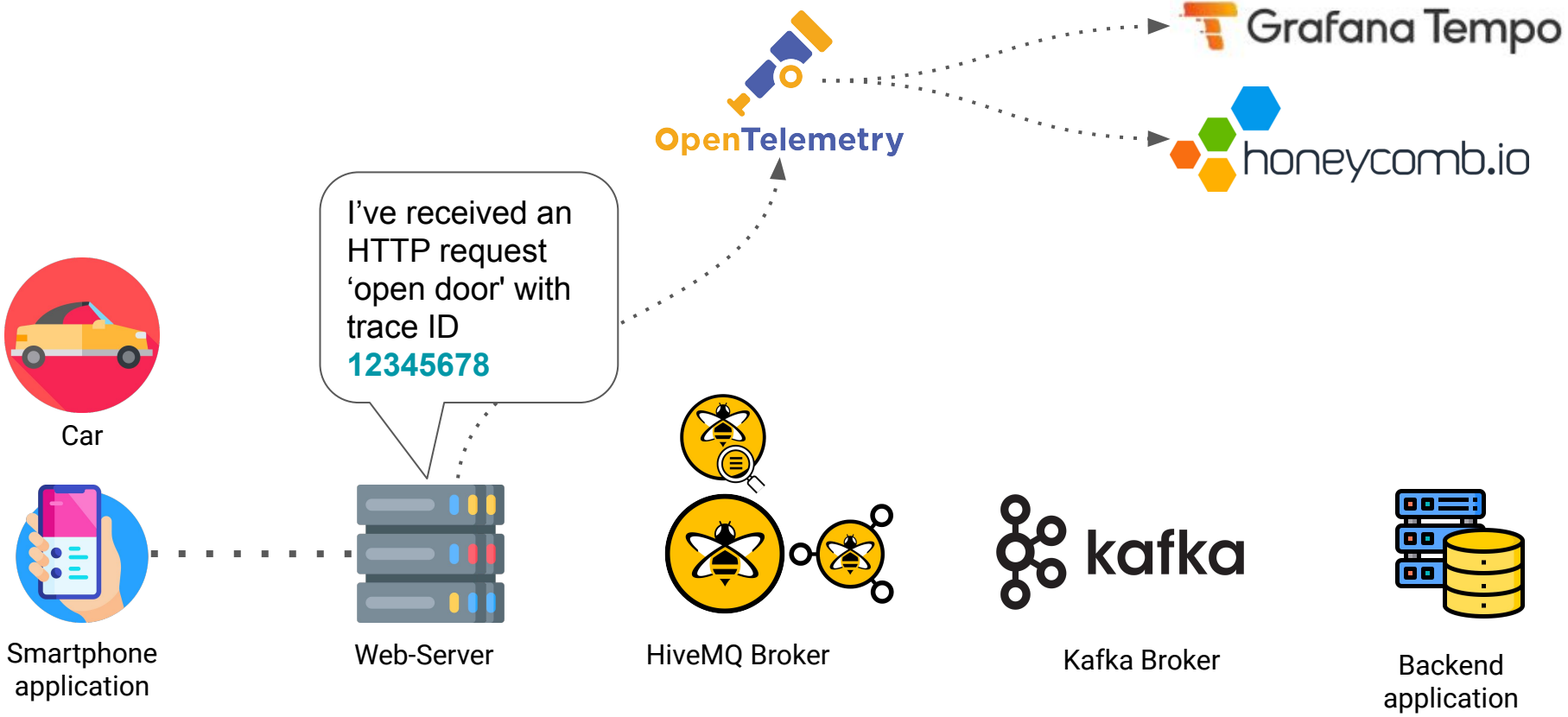
kafka

Kafka Broker



Backend application

What is Distributed Tracing then?



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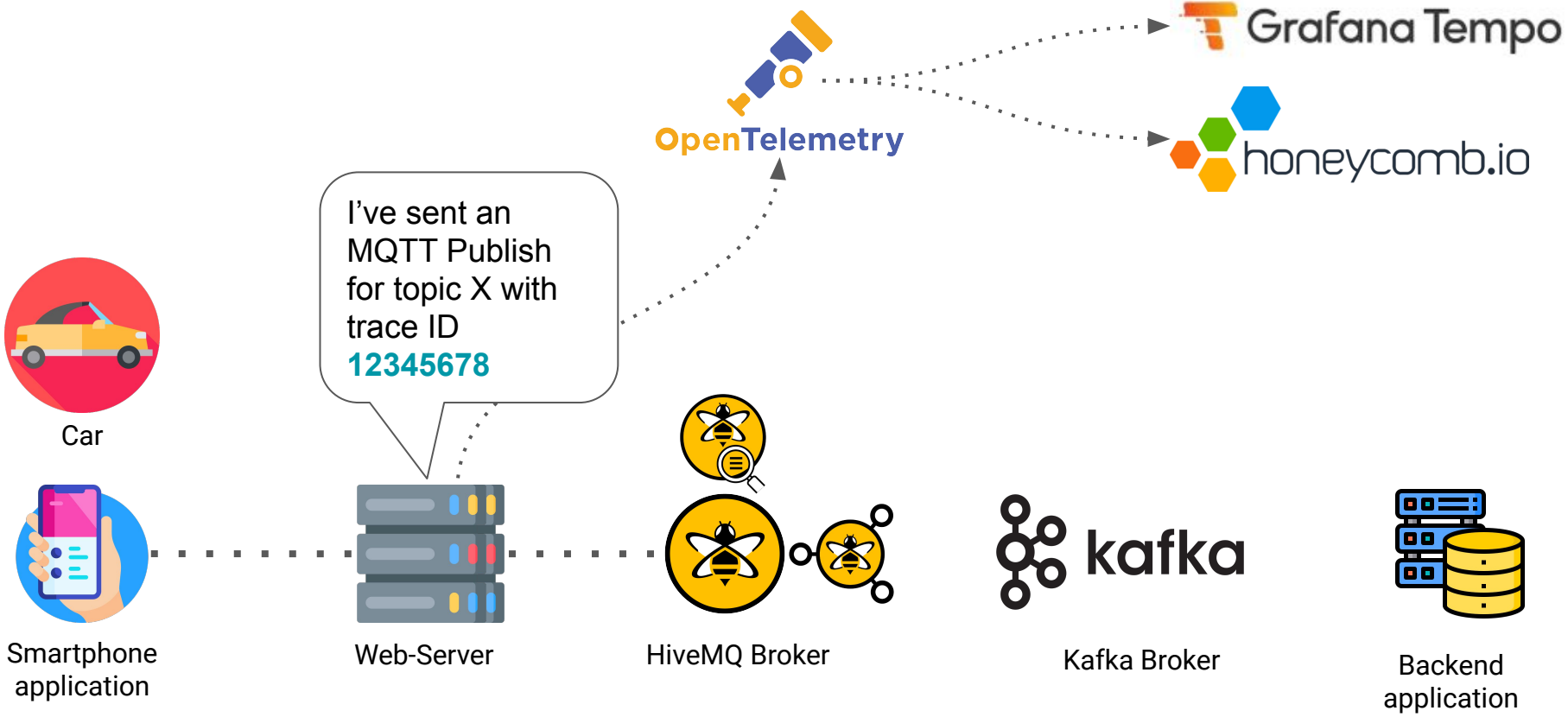

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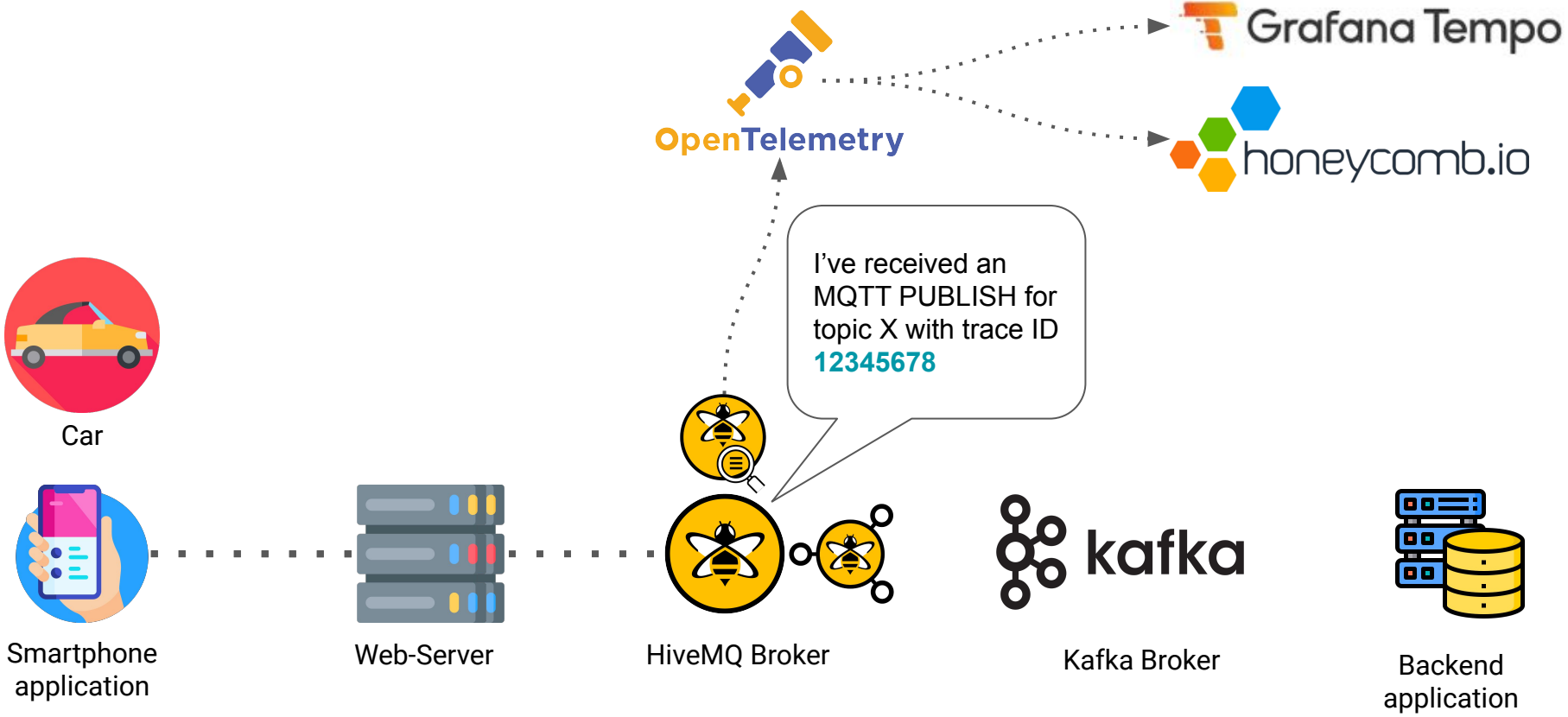

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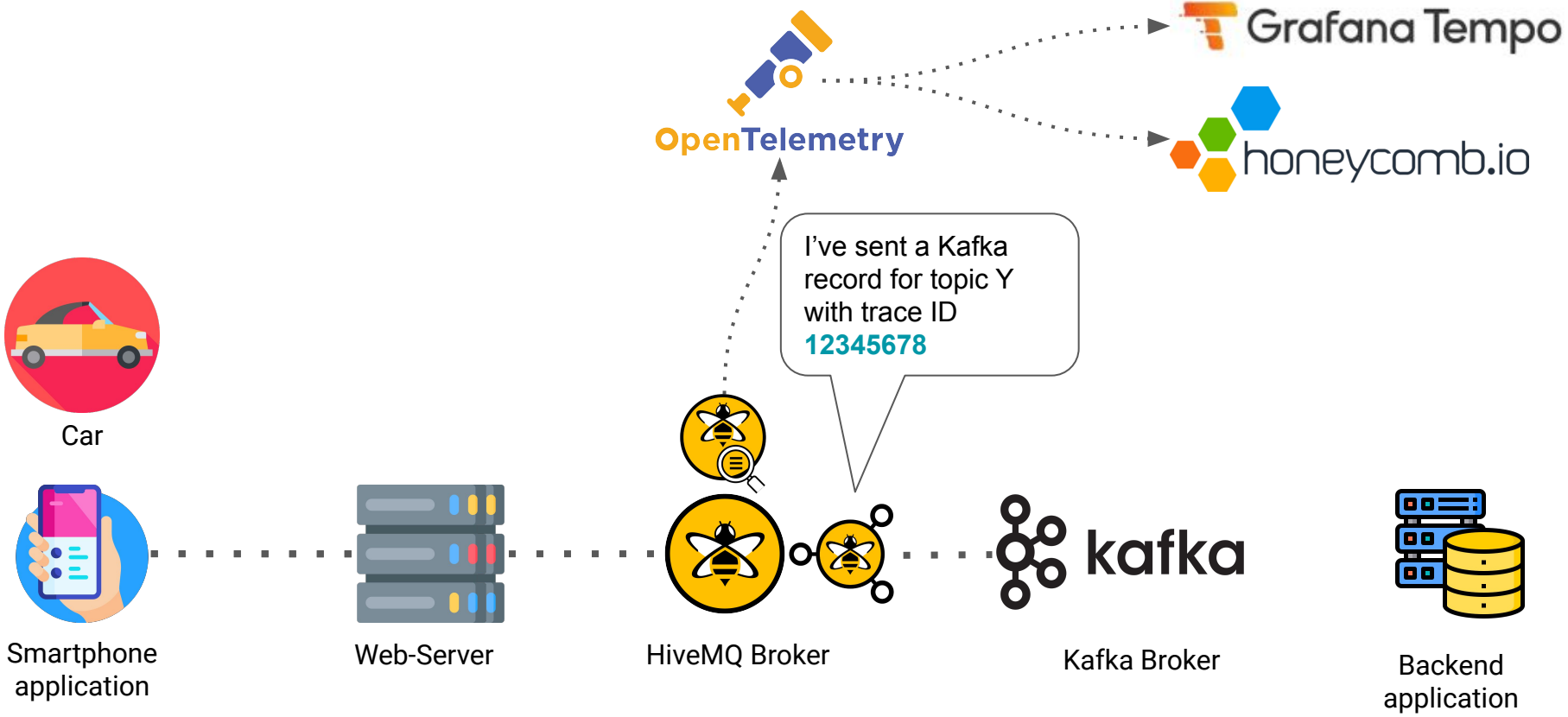

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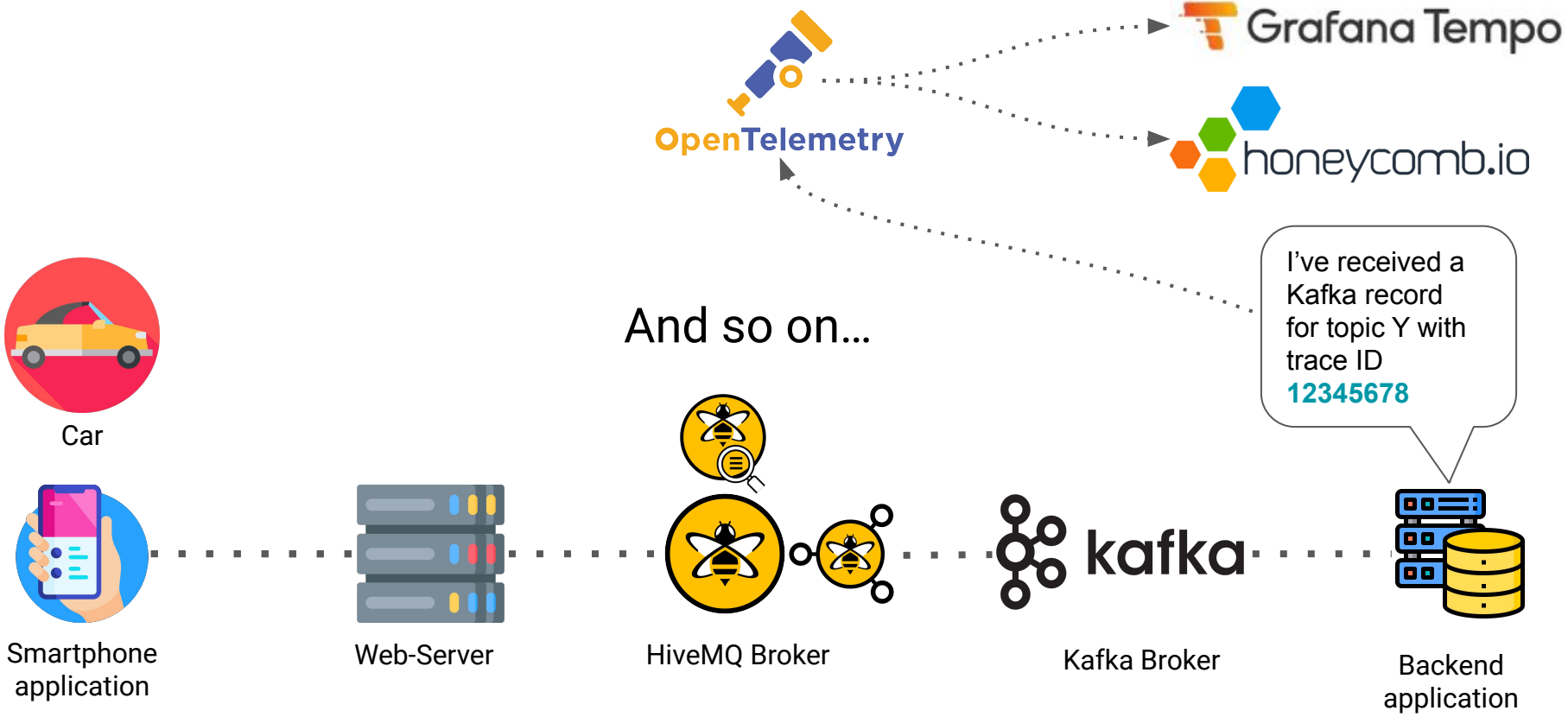
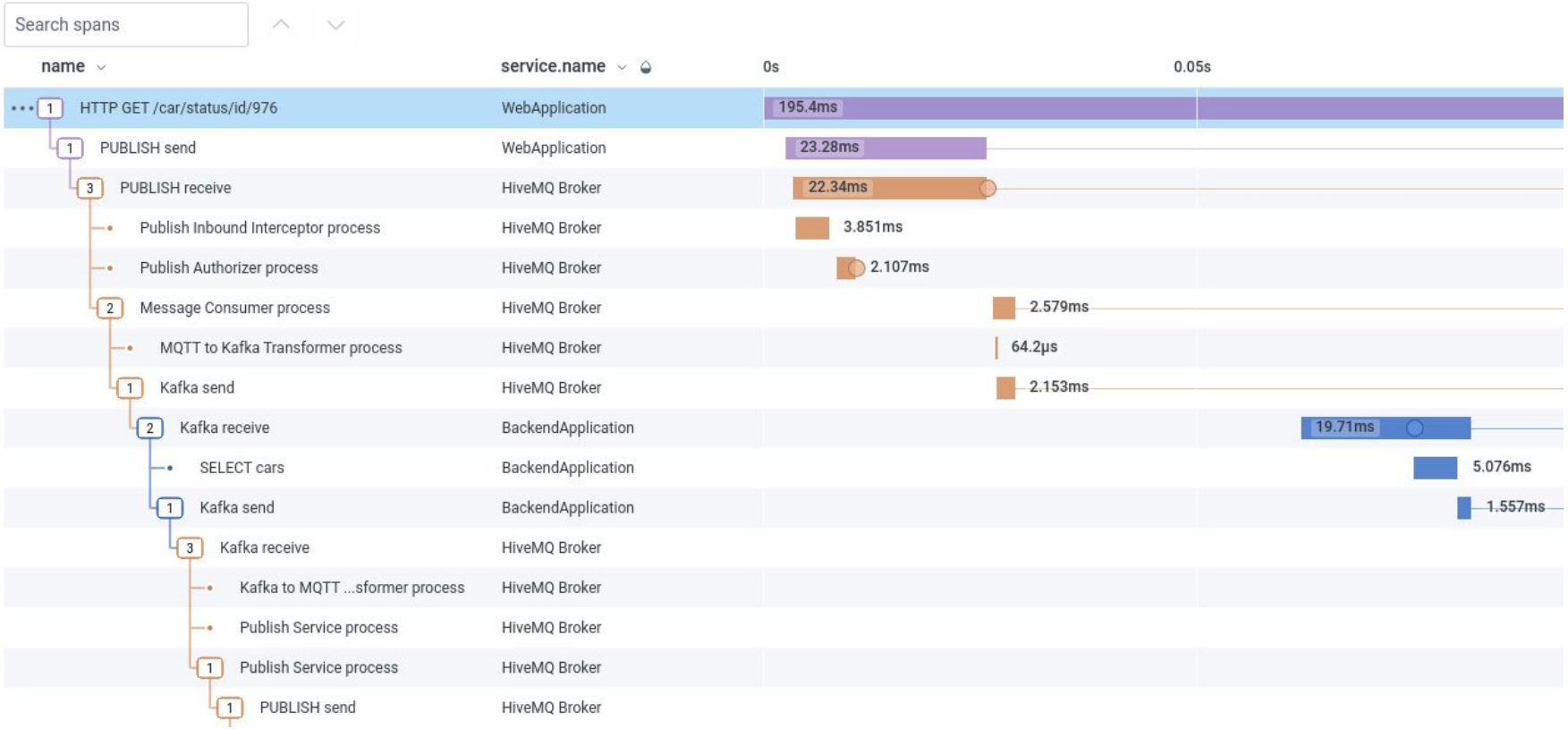
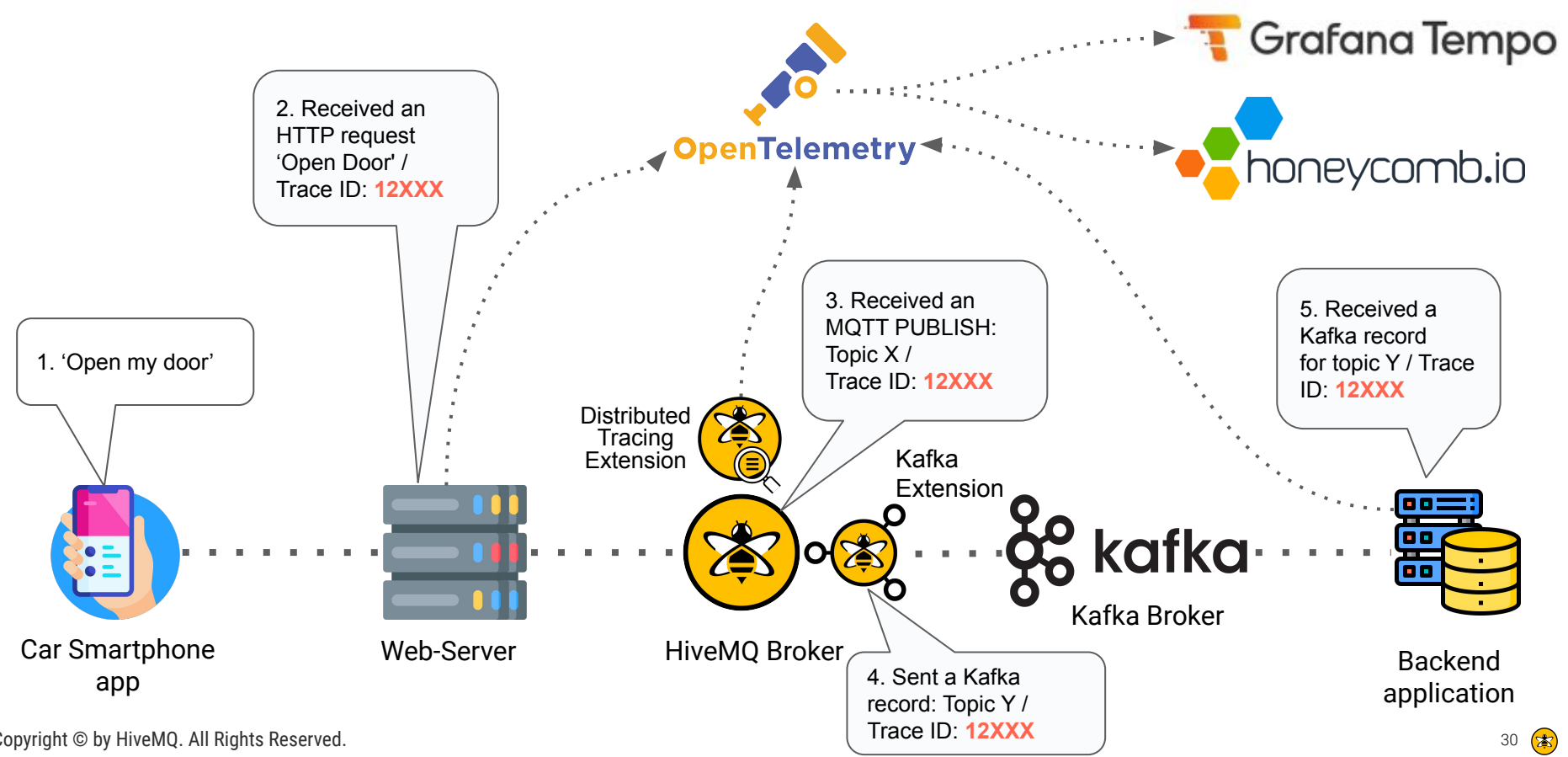


End Result (Honeycomb)



IoT Observability — In 5 Easy Steps



Live Demo

ANY QUESTIONS?

Next Steps

New to MQTT? [Get the MQTT Essentials e-Book]

Get started with HiveMQ today: [https://www.hivemq.com/downloads/]

THANK YOU

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