



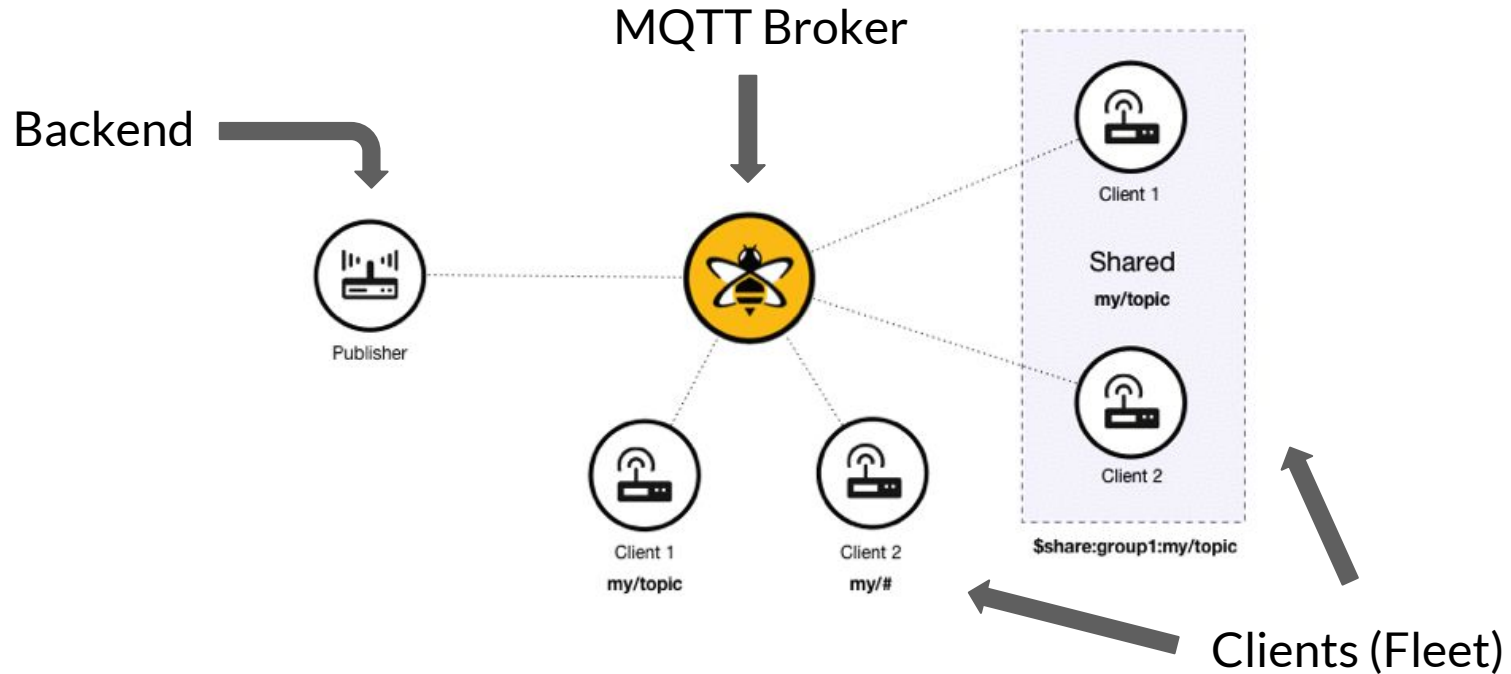
# The journey of shifting the MQTT message broker HiveMQ to Kubernetes

Arnold Bechtoldt



Background

# Use Case: Fleet Management



# Design Flaws

- MQTT clients are *everywhere*
- One *fat* pet (cluster)
- *Manual* MQTT broker deployment
- Painful up-scaling
- Antiqued configuration management



It's not great. Believe me. It's true.





Let's fix that.





REDDING MAATSCHAPPIJ

KNRM  
VLIELAND

BS-ZX-61





# The Plan



Docker!

**DOCKER**



**ALL THE THINGS**

memegenerator.net

**KUBERNETES**



**ALL THE THINGS**

memegenerator.net

Docker + Kubernetes!



# Kubernetes works best with an app that is ...

- Stateless
- Web-based (HTTP interfaces)
- Cloud-ready

# HiveMQ wasn't ...

- Stateless
- Web-based (HTTP interfaces)
- Cloud-ready



**END**



# Kubernetes because ...

- Already in use (for microservices)
- High flexibility
- A lot of knowledge and skills at inovex :-)
- Close collaboration with HiveMQ support
- *Easy is not an option!*





# Facing the Truth: Challenges

# Challenge: HiveMQ Cluster Discovery (1)

- Existing mechanisms not cloud-ready
- Kubernetes API integration was needed
- We've created a new HiveMQ plugin
- Final completion & open sourcing by dc-square



## Challenge: Loadbalancing Capabilities (2)

- Cloud's main *language* is HTTP
- MQTT works different
- TLS required
- Proxy protocol (v2) for authn & authz

## Challenge: Determining App Health/Readiness (3)

- Health: Is it working properly?
- Readiness: Is it ready for clients/traffic?
- No smooth way to find out
- Log event available only
- New HTTP interface in the pipeline (WIP)

## Challenge: Missing HiveMQ Application Insights (4)

- Kubernetes won't simplify your IT architecture
- Applications must be verbose (see 12factor app guide)
- Your containers *will die*
- Overall troubleshooting becomes more complicated
- Already work in progress

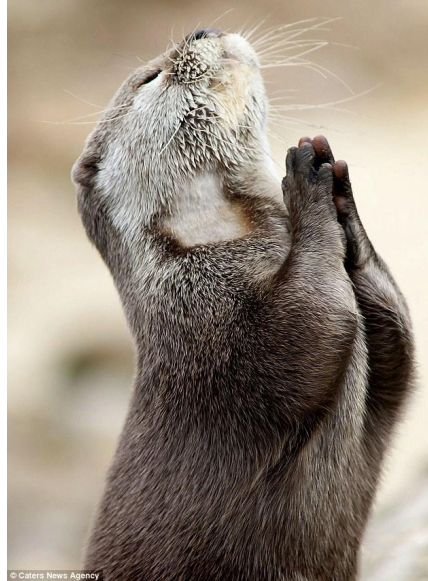




# Hands on: Demo

*Wir nutzen Technologien,  
um unsere Kunden glücklich zu machen.  
Und uns selbst.*

# Demo Time



You know what happens with **live demos**?  
Right, they always **fail**!

## Demo Time: Video!



[youtu.be/Ly\\_f221O6Fo](https://youtu.be/Ly_f221O6Fo)

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Feedback & Questions:  
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[arnold.bechtoldt@inovex.de](mailto:arnold.bechtoldt@inovex.de)

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[github.com/bechtoldt](https://github.com/bechtoldt)

[youtube.com/inovexGmbH](https://youtube.com/inovexGmbH)

[arbe.io](https://arbe.io)

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[github.com/krlng](https://github.com/krlng)

[twitter.com/nicokreiling](https://twitter.com/nicokreiling)



A large crowd of people, mostly men, are gathered at what appears to be a conference or trade show. They are wearing lanyards and some are looking towards the camera. A semi-transparent blue rectangular overlay is positioned in the center of the image, containing the text "Q&A" in white. The background is slightly blurred, emphasizing the people in the foreground.

Q&A