



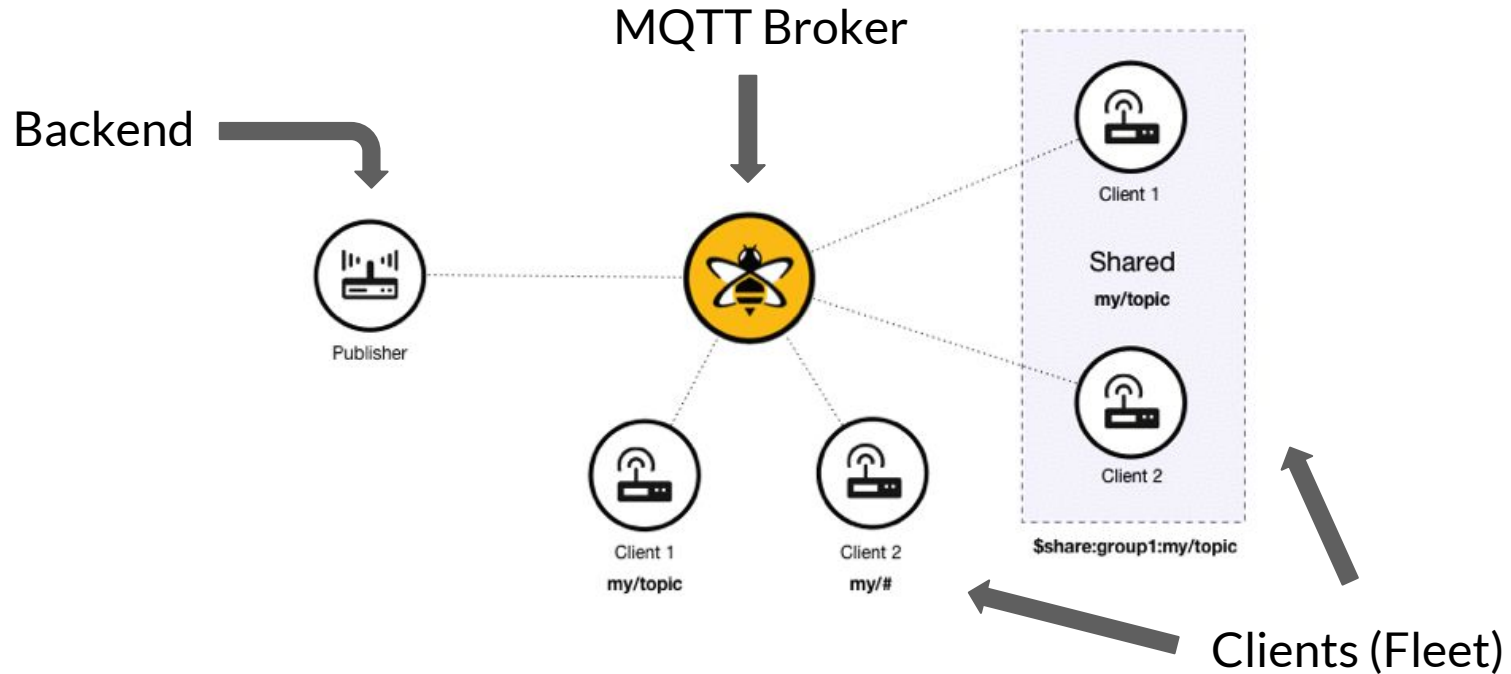
The journey of shifting the MQTT message broker HiveMQ to Kubernetes

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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

A scene from Disney's Aladdin. Aladdin is in the foreground, holding the magic lamp high with his right hand. He is wearing his signature red vest and white shirt. In the background, the Genie is visible, looking on with a surprised expression. The background is filled with a bokeh of blue and white lights, suggesting a night scene with fireworks or a magical atmosphere. A semi-transparent blue rectangle is overlaid on the image, containing the text "3 wishes ...".

3 wishes ...

Speed up deployment of HiveMQ clusters

Improve (cluster) fault tolerance

Automate full app lifecycle



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

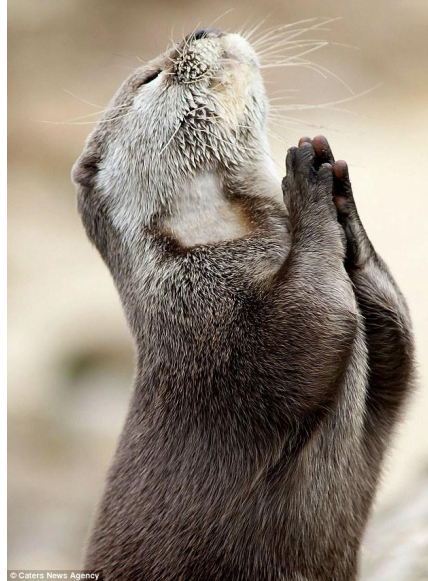


Hands on: Demo

Inovex

*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

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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