

The road to containerization



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October 1, 2018

What is this about?

► About me

- DevOps engineer @ GAT since 2016
- IT professional since 2011
- First time event speaker



What is this about?

- ▶ About me
 - DevOps engineer @ GAT since 2016
 - IT professional since 2011
 - First time event speaker
- ▶ About this presentation
 - Quick introduction
 - Technology stack
 - The migration and what went wrong



What is this about?

- ▶ About me
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 - First time event speaker
- ▶ About this presentation
 - Quick introduction
 - Technology stack
 - The migration and what went wrong
- ▶ Things are moving fast!



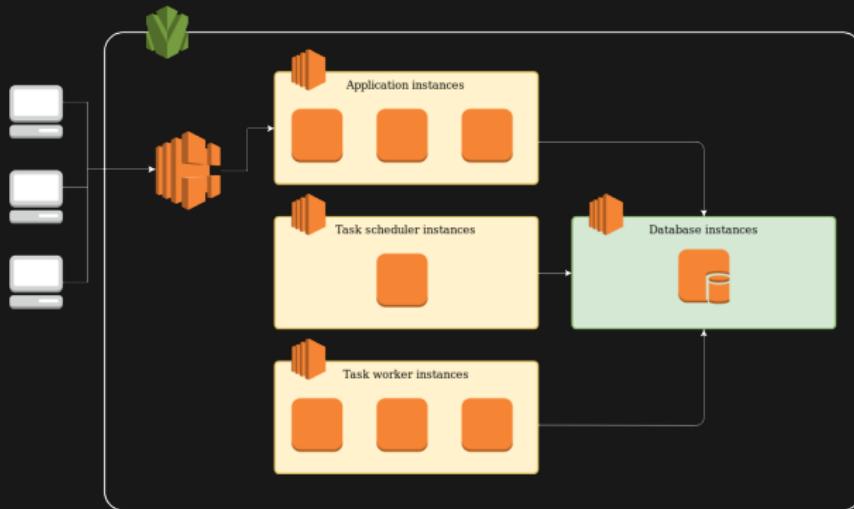


Ancient history



GAT infrastructure

The year is 2016



GAT infrastructure

Pain points explained

- ▶ Long deployment times



GAT infrastructure

Pain points explained

- ▶ Long deployment times
- ▶ Uncertainty of success



GAT infrastructure

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- ▶ Deployments caused downtime



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- ▶ High cost
- ▶ Not automated



Gat infrastructure

What next?

- ▶ Improve existing infrastructure
 - Vendor lock-in



Gat infrastructure

What next?

- ▶ Improve existing infrastructure
 - Vendor lock-in
- ▶ Move to containers
 - Save money
 - Lessen configuration complexity
 - Play with shiny new tools



The container landscape



Docker



- ▶ Container platform
- ▶ Lightweight VMs
- ▶ Packaging format
 - Reproducible deployments



Kubernetes



- ▶ Container orchestration
- ▶ Service discovery
- ▶ Persistent storage
- ▶ High availability



Helm



- ▶ Package manager
- ▶ Configuration management
 - Provides templates
- ▶ Deployment management



Migrating to Kubernetes



Moving to Kubernetes on GKE

Why there?

- ▶ Automated cluster deployment



Moving to Kubernetes on GKE

Why there?

- ▶ Automated cluster deployment
- ▶ Management by Google



Moving to Kubernetes on GKE

Why there?

- ▶ Automated cluster deployment
- ▶ Management by Google
- ▶ Built in goodies:
 - Integrated authentication
 - Centralized logging
 - Cluster monitoring
 - Container registry



Moving to Kubernetes on GKE

The journey

- ▶ Docker images for applications



Moving to Kubernetes on GKE

The journey

- ▶ Docker images for applications
- ▶ CI pipeline modification



Moving to Kubernetes on GKE

The journey

- ▶ Docker images for applications
- ▶ CI pipeline modification
- ▶ Helm instead of Chef
 - Change configuration generation



Moving to Kubernetes on GKE

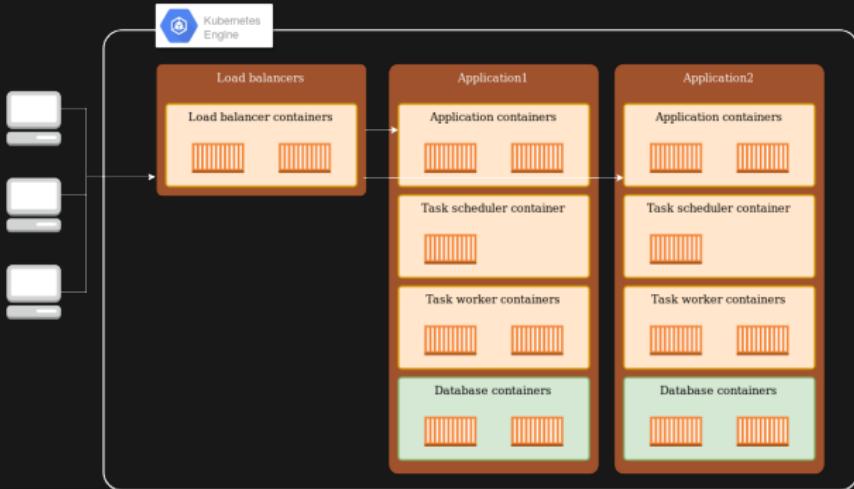
The journey

- ▶ Docker images for applications
- ▶ CI pipeline modification
- ▶ Helm instead of Chef
 - Change configuration generation
- ▶ Moving apps one by one



Moving to Kubernetes on GKE

The end result



Moving to Kubernetes on GKE

Pain points revisited

- ▶ Long deployment times
 - Down from 15 minutes to 1-2 minutes



Moving to Kubernetes on GKE

Pain points revisited

- ▶ Long deployment times
 - Down from 15 minutes to 1-2 minutes
- ▶ Uncertainty of success
 - Using Docker as packaging worked



Moving to Kubernetes on GKE

Pain points revisited

- ▶ **Long deployment times**
 - Down from 15 minutes to 1-2 minutes
- ▶ **Uncertainty of success**
 - Using Docker as packaging worked
- ▶ **Deployments caused downtime**
 - No downtime deployments



Moving to Kubernetes on GKE

Pain points revisited

- ▶ **Long deployment times**
 - Down from 15 minutes to 1-2 minutes
- ▶ **Uncertainty of success**
 - Using Docker as packaging worked
- ▶ **Deployments caused downtime**
 - No downtime deployments
- ▶ **High cost**
 - Lowered



Moving to Kubernetes on GKE

Pain points revisited

- ▶ **Long deployment times**
 - Down from 15 minutes to 1-2 minutes
- ▶ **Uncertainty of success**
 - Using Docker as packaging worked
- ▶ **Deployments caused downtime**
 - No downtime deployments
- ▶ **High cost**
 - Lowered
- ▶ **Not automated**
 - Automated (after some time)



Whoops!



Moving to Kubernetes on GKE

No happy end

- ▶ Bugs!
 - Nodes crashing
 - Networking problems



Moving to Kubernetes on GKE

No happy end

- ▶ Bugs!
 - Nodes crashing
 - Networking problems
- ▶ Bad support



Moving to Kubernetes on GKE

No happy end

- ▶ **Bugs!**
 - Nodes crashing
 - Networking problems
- ▶ **Bad support**
- ▶ **Management by Google**
 - No way of accessing the API master machine



Moving to Kubernetes on GKE

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- ▶ **Bugs!**
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 - No way of accessing the API master machine
- ▶ **Inflexible configuration**
 - Not possible to turn on alpha features



Moving to Kubernetes on GKE

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- ▶ **Bugs!**
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- ▶ **Bad support**
- ▶ **Management by Google**
 - No way of accessing the API master machine
- ▶ **Inflexible configuration**
 - Not possible to turn on alpha features
- ▶ **Waiting for security updates**



Migrating back to AWS



Moving to Kubernetes on AWS

Enter kops



- ▶ Cluster bootstrapping utility
- ▶ Lifecycle management
- ▶ Very flexible



Moving to Kubernetes on AWS

New challenges

- ▶ Missing parts

- Integrated authentication - **PKI**
- Centralized logging - **Graylog**
- Cluster monitoring - **Prometheus**



Moving to Kubernetes on AWS

New challenges

- ▶ Missing parts

- Integrated authentication - **PKI**
- Centralized logging - **Graylog**
- Cluster monitoring - **Prometheus**

- ▶ Moving stuff

- Container registry - **Amazon ECR**
- Load balancers behave differently
- Use EBS instead of Google disks
- Rewriting helper scripts



The end result



Moving to Kubernetes on AWS

Lessons learned

- ▶ Outsourcing service management gives a big head start



Moving to Kubernetes on AWS

Lessons learned

- ▶ Outsourcing service management gives a big head start
- ▶ Support is extremely important

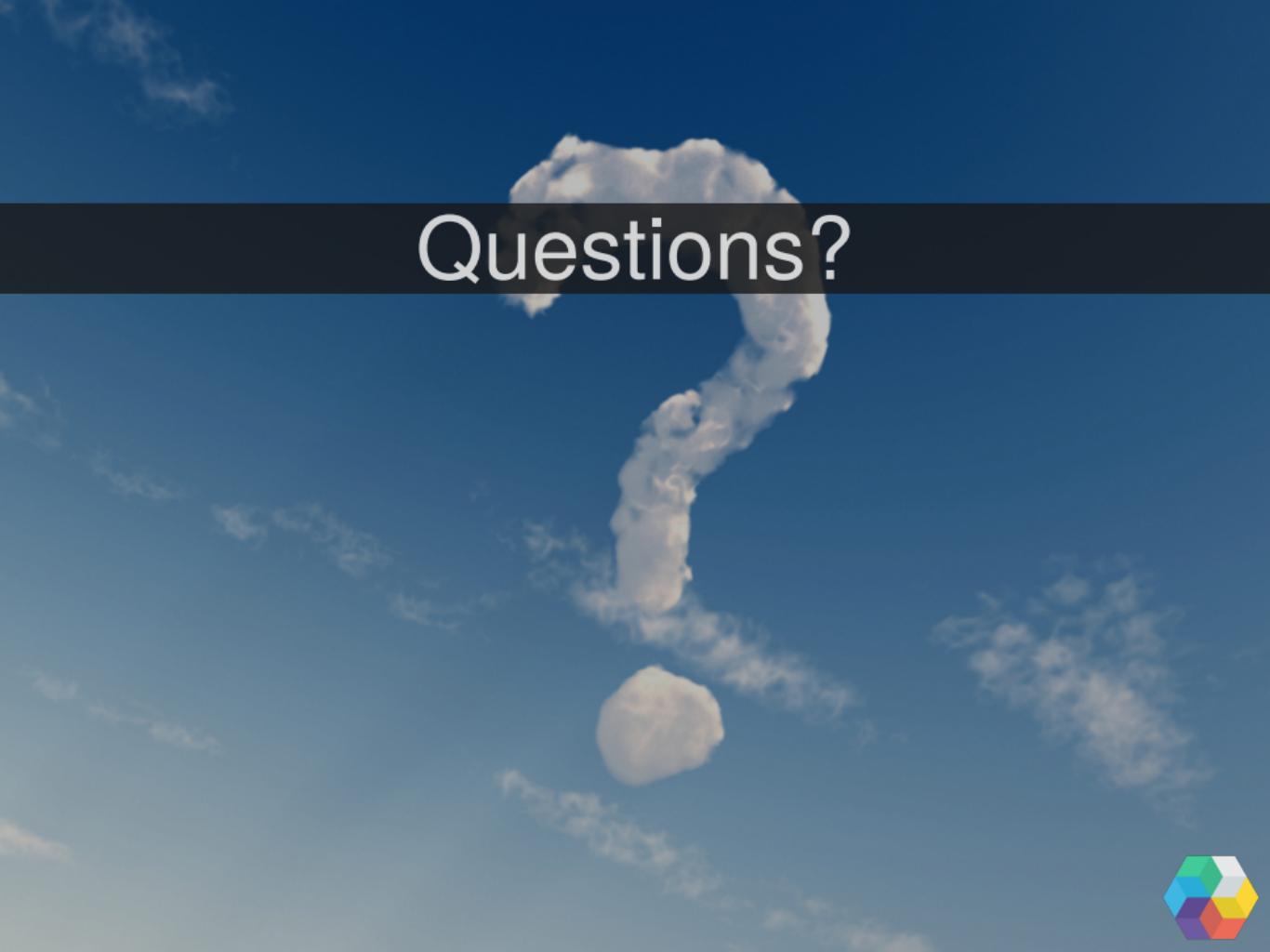


Moving to Kubernetes on AWS

Lessons learned

- ▶ Outsourcing service management gives a big head start
- ▶ Support is extremely important
- ▶ Cloud agnostic design can return very quickly





Questions?

