Switching horses midstream: the challenge of migrating 150+ services to Kubernetes

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Banks

Barclays CEO fined in whistleblowing probes

Jes Staley to keep job after seeking to uncover source of allegations against colleague

- Govt appoints Credit Suisse banker to manage RBS stake ahead of sale
- AMP chief quits amid allegations group overcharged clients
- China's bad loan bank shares tumble after chairman investigated

UK politics & policy

The roots of Windrush scandal: ‘They saw enemies everywhere’
The FT’s Content platform
This is what it really looks like…
Why *did* we migrate to k8s?
Mid 2015: a hand-rolled container stack
Spend your innovation tokens wisely
~80% reduction in EC2 costs
Many fewer steps to start running a new service in production
But: supportability of an in-house platform is a challenge
Choose boring technology

http://mcfunley.com/choose-boring-technology

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By late 2016, tools were maturing
https://medium.com/wardleymaps

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The FT is not a cluster orchestration company

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Late 2016: Consider the alternatives

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Metrics for success:

- amount of time spent keeping cluster healthy
- number of sarcastic comments on slack
Opted for kubernetes

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Which orchestrator are you using in *production*? Please RT!

#containers #docker #Kubernetes #mesos #hashicorp

- 25%  Docker Swarm
- 61%  Kubernetes
- 10%  Mesos / Marathon
- 4%  Nomad

367 votes • Final results
Using leading edge technologies requires you to be comfortable with change
Shouldn’t be (too) scared about making the wrong decision

http://uk.businessinsider.com/jeff-bezos-on-type-1-and-type-2-decisions-2016-4

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Switching horses midstream
At the start of this migration we had 150 services
Lots of other work going on at the same time

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Complications of running in parallel
We had well over 2000 code releases while running at least part of the stack in parallel

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Decisions, decisions, decisions…

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Separate branches vs if/else in code

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Separate deployment mechanisms vs a single deployment mechanism
Risk-based approach to testing
Doing anything 150 times takes time
Changes per service weren’t *that* big
Migrating from systemd service files to helm charts

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Integrating the service into a templated jenkins pipeline
Good to get everyone involved - “Helm days”
Discovered a lot of ‘broken’ things

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Services that hadn’t been built for a long time
A standard that isn’t enforced may will not be complied with:

- healthcheck timeouts

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- /__gtg endpoints

```yaml
livenessProbe:
tcpSocket:
  port: 8080
initialDelaySeconds: 5
readinessProbe:
  httpGet:
    path: "/__gtg"
    port: 8080
initialDelaySeconds: 15
periodSeconds: 30
```
Making sure a service will recover if k8s moves it elsewhere
Easy to get sucked into making things better
Would have been better if…
We’d swarmed on the work
The longer you run in parallel, the more overhead for releasing code changes
and the higher the costs
Not just AWS costs either

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Going live
Doing the migration

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The results
A more stable platform
Something where we can learn from others

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Reduction in hosting and support costs

3 Year Total Cost of Ownership

- Old stack
- Amazon ECS
- Kubernetes
- VM per service
- Heroku

- Orange: Hosting
- Red: Support
- Blue: Migration
Thank you!

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