Microservices 101: From DevOps to Docker and beyond

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MSP Computer Measurement Group, Feb 2016
microservices
Minimizing **risk**, maximizing **agility**

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<th>2013 (n=1,540)</th>
<th>2014 (n=2,041)</th>
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Source: 451 Research custom surveys
The need for speed

63% want more

Source: 451 DevOps study, Q3 2014; n=237
Technology adoption is increasingly bottom-up.
Stakeholder Decision Making Authority

Source: 451/Microsoft Hosting + Cloud Study 2015
The new stack?

An infinite array of possible stacks.
DevOps: Putting IT into high gear
Agile, truly tip to tail

Business to customer
3 pillars of DevOps

Culture

Automation

Measurement
Culture: Tear down all the silos
Automation: Pets vs Cattle
Automation: Infrastructure as code
Knight Capital and the $460 million bug
Continuous delivery

Source: continuousautomation.com
Source: Don Reinertsen, The Principles of Product Development Flow
Where are we **today**?

- **Highly Manual**: 10.0%
- **Manual with Limited Automation Tools**: 54.7%
- **Automated with Manual Exception Handling**: 27.9%
- **Policy Based Automation and Orchestration**: 6.8%
- **Other**: 0.7%

**n = 843**

Source: 451 VotE Cloud, Q3 2015
Measurement: #monitoringsucks/monitoringlove
Who is **doing** DevOps?

Google, Amazon, Netflix, Etsy, Spotify, Twitter, Facebook ...
CSC, IBM, CA, SAP, HP, Microsoft, Red Hat ...
GE Capital, Nationwide, BNP Paribas, BNY Mellon, World Bank, Paychex, Intuit ...
The Gap, Nordstrom, Macy’s, Williams-Sonoma, Target ...
General Motors, Northrop Grumman, LEGO, Bosche ...
UK Government, US Department of Homeland Security ...
Kansas State University...

**Who else?**
Can **Large** Orgs Be High Performers?

Yes.

But orgs with 10,000+ employees 40% less likely to be high performing vs. 500 employee orgs...

Source: Puppet Labs 2014 State Of DevOps
Enter **containers**: The future of virtualization
Automation, agility, empathy

VAGRANT

Docker
Container-native OSs

CoreOS

Nano Server

Snappy Ubuntu

PHOTON™
Developers love Docker
Docker is not just a toy

Prod in Q3 2015:

- Discovery and Evaluation: 31.5% (56.1%)
- Running Trials/Pilot Projects: 10.2% (10.7%)
- In Test and Development Environment: 8.4% (3.9%)
- Initial Implementation of Production Applications: 9.4% (4.2%)
- Broad Implementation of Production Applications: 4.7% (2.1%)
- No Plans: 35.8% (22.9%)

Source: 451 VotE Cloud, 2015; Q1 n=991; Q3 n=960
Today, early adopters. Tomorrow, the **majority**.

- We are early adopters on the leading edge: 12.0%
- We are pragmatic about new technology, but will act sooner rather than later: 41.4%
- We are conservative about new technology and take a wait and see approach: 37.1%
- We are skeptical and are usually late to the game: 9.5%

Source: 451 VotE Cloud, Q3 2015; n=935
Fragmentation drives **microservices** — enabled by containers
Loosely coupled services

“The only communication allowed [at Amazon] is via service interface calls over the network.”

– Steve Yegge, Google, Oct 2011, paraphrasing Jeff Bezos memo

https://plus.google.com/+/RipRowan/posts/eVeouesvaVX
Loosely coupled teams

“One of the biggest changes is that we no longer have an official ‘architecture’ team. Instead, we have made ‘architecture’ an ‘ingredient’ on each of our teams.”

– Lauri Apple, Gilt Groupe, 14 Nov 2014
The foundation of microservices

Amazon EC2 Container Service
Monitoring remains a challenge

• Scale
• Complexity & flow
• Transience
• Bottlenecks / queue depth
• How to respond to self-healing issues?
Open-source tools emerging (proprietary too)

spigo / simianviz

Zipkin
Real-world example #1

Infrastructure operating cost – a very important KPI

AWS User Group UK 2014

http://www.slideshare.net/nathariel/scaling-microservices-architecture-on-aws
Hailo architecture
Hailo architecture
Hailo architecture
“Our infrastructure is decomposed into a large number of very simple pieces of software – each of which is independently deployed and monitored, and can be easily reasoned about.”

– Matt Heath, Hailo, 9 Mar 2015
Complexity is the new normal
Real-world example #2: REA (realestate.com.au)

Microservices is a long term strategy.

– Evan Bottcher, ThoughtWorks/REA, 9 Dec 2014

“We relied on [our open-source library] Pacts, some manual tests, and then made sure there was very good monitoring in production.”

– Beth Skurrie, REA consultant, 10 Nov 2014
Real-world example #3: Ctrip (Chinese travel site)

http://www.slideshare.net/yang75108/micro-service-architecture-c-trip-v11
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![MicroService Framework at Ctrip](http://www.slideshare.net/yang75108/micro-service-architecture-c-trip-v11)
Real-world example #3: Ctrip (Chinese travel site)

Key MicroService Infrastructure

- Service
  - Service framework, gateway, registry
- **Monitoring**
  - Logging, tracing, metrics
- Deployment
  - TEST/UAT/PROD environments
  - CI/CD
- Push common concerns to technical infrastructure

http://www.slideshare.net/yang75108/micro-service-architecture-c-trip-v11
Minimizing risk, maximizing agility

Architecture: Microservices, composable monitoring
Code: Continuous integration, feature flags
Servers: Continuous delivery, infrastructure as code
Services: Rolling updates, resilience engineering
Product: Continuous deployment, restricted audience
How? DevOps (Culture, Automation, Measurement)

What? Microservices

Why? Survival
Thank you!

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