Running Docker clusters on AWS

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amazon web services

The problem

Given a certain amount of processing power and memory,

how can we best manage an arbitrary number of apps running in Docker containers?

http://tidalseven.com

Docker on Amazon Web Services

Amazon EC2 Container Service (ECS)

- https://aws.amazon.com/ecs/
- Launched in 04/2015
- Available in eu-west-1 & eu-central-1
- No additional charge

Amazon EC2 Container Registry (ECR)

- https://aws.amazon.com/ecr/
- Launched in 12/2015
- Available in eu-west-1
- Free tier: 500MB / month for a year
- $0.10 / GB / month + outgoing traffic

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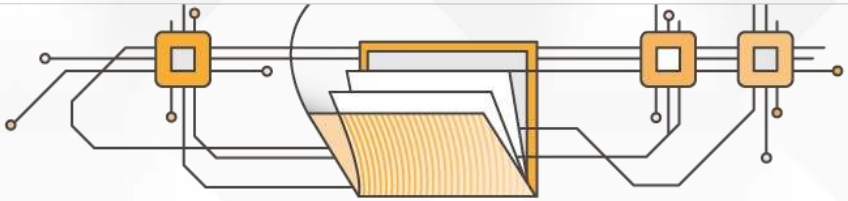
Breaking news ;)



Amazon Elastic File System (EFS)

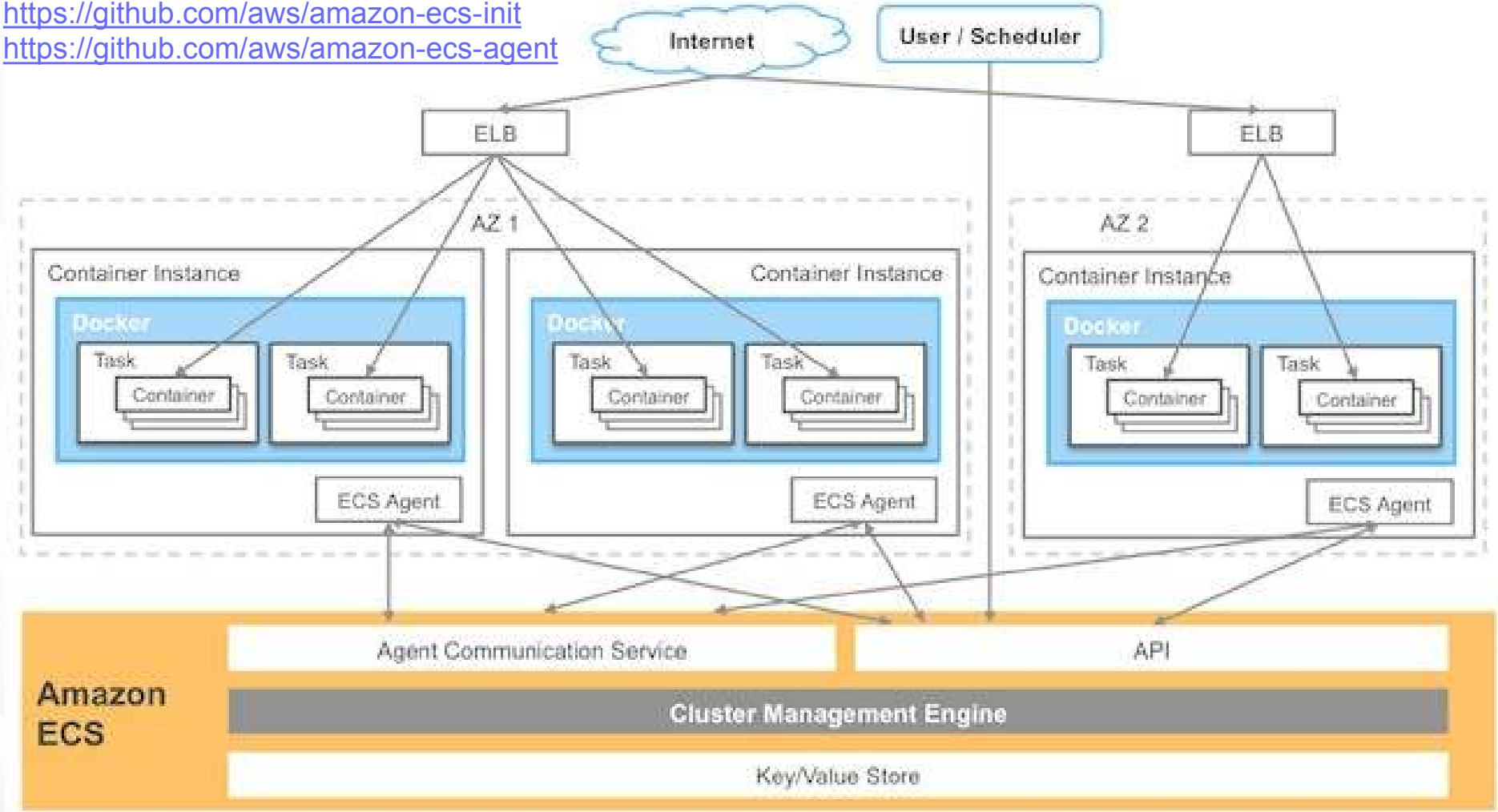
- https://aws.amazon.com/efs/
- Launched today!
- NFSv4.1 server mountable by EC2 instances
- Allows shared storage for EC2 instances (Docker volumes anyone?)
- Scales capacity automatically and instantly as you add or remove files
- Fully managed service

- Available in eu-west-1 : $0.33 / GB / month

AWS Partners

https://aws.amazon.com/fr/containers/partners/

https://github.com/aws/amazon-ecs-init
https://github.com/aws/amazon-ecs-agent



http://www.allthingsdistributed.com/2015/07/under-the-hood-of-the-amazon-ec2-container-service.html

Case study: Coursera

https://www.youtube.com/watch?v=a45J6xAGUvA

Coursera deliver Massive Open Online Courses (14 million students, 1000+ courses). Their platform runs a large number of batch jobs, notably to grade programming assignments. Grading jobs need to run in near-real time while preventing execution of untrusted code inside the Coursera platform.

After trying out some other Docker solutions, Coursera have picked Amazon ECS and have even written their own scheduler.

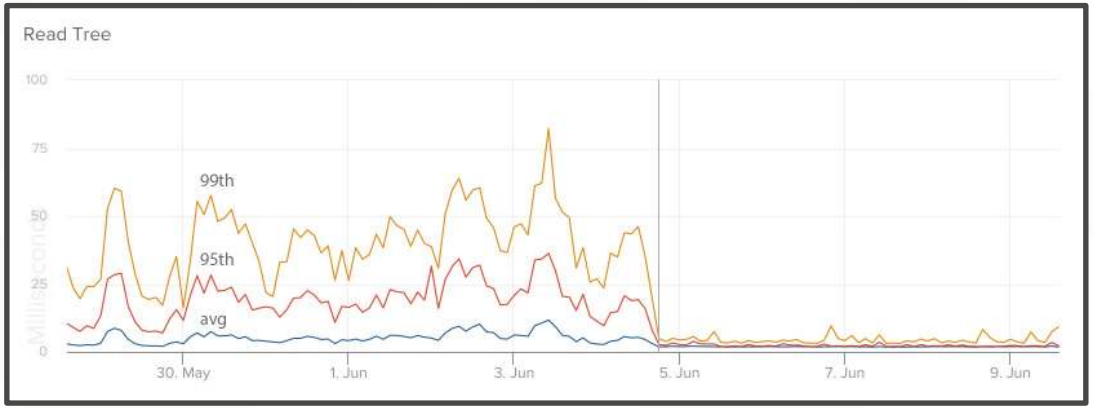
"*Amazon ECS enabled Coursera to focus on releasing new software rather than spending time managing clusters*" - Frank Chen, Software Engineer

Case study: Remind

https://www.youtube.com/watch?v=8zbbQkszP04

Messaging platform for teachers, parents and students (35M users, 2.5B messages, 50% of U.S. public schools)

Micro-service platform deployed on Heroku, migrated to Amazon ECS (36 nodes in Q4'15)



"*Moving to Amazon ECS significantly improved our service performance*" Jason Fischl, VP of Engineering

Case study: Hailo

https://aws.amazon.com/fr/solutions/case-studies/hailo/

Hailo allows people to hail licensed taxis directly to their location (over 60,000 drivers and more than a million passengers).

Over the past few years, Hailo has evolved from a monolithic application running in one AWS region to a microservice-based architecture running across multiple regions.

Hailo decided to schedule containers based on service priority and other runtime metrics atop an elastic resource pool. They chose Amazon ECS as the cluster manager because it is a managed service that can easily enforce task state and fully exposes the cluster state via API calls. This allowed Hailo to build a custom scheduler with logic that met their specific application needs.

Case study: Segment

https://aws.amazon.com/fr/solutions/case-studies/segment/

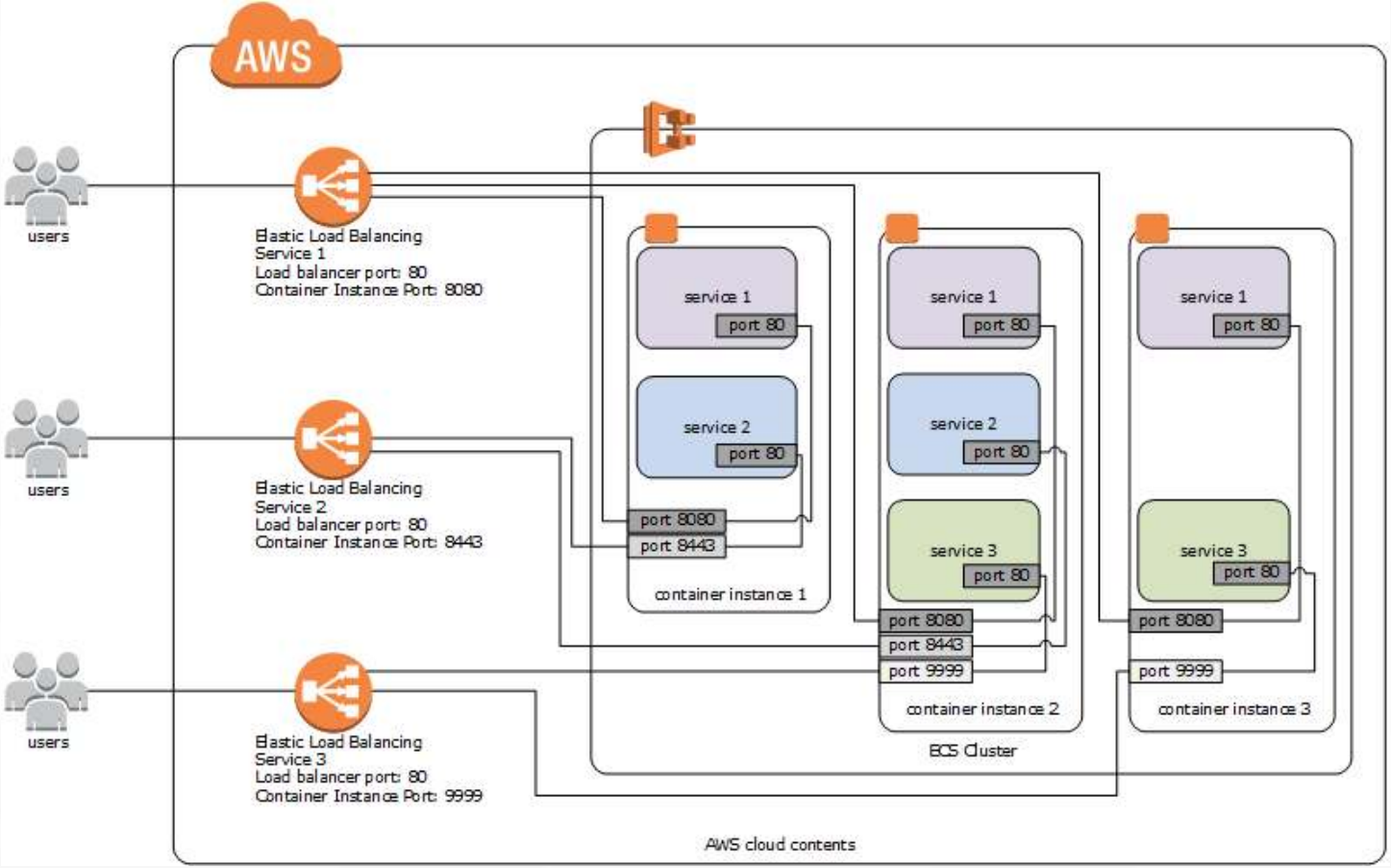
Segment provides a service used by businesses to collect customer data for later use in analytics and marketing.

Segment moved to Docker for a better configuration management and needed a way to manage and schedule containers at scale.

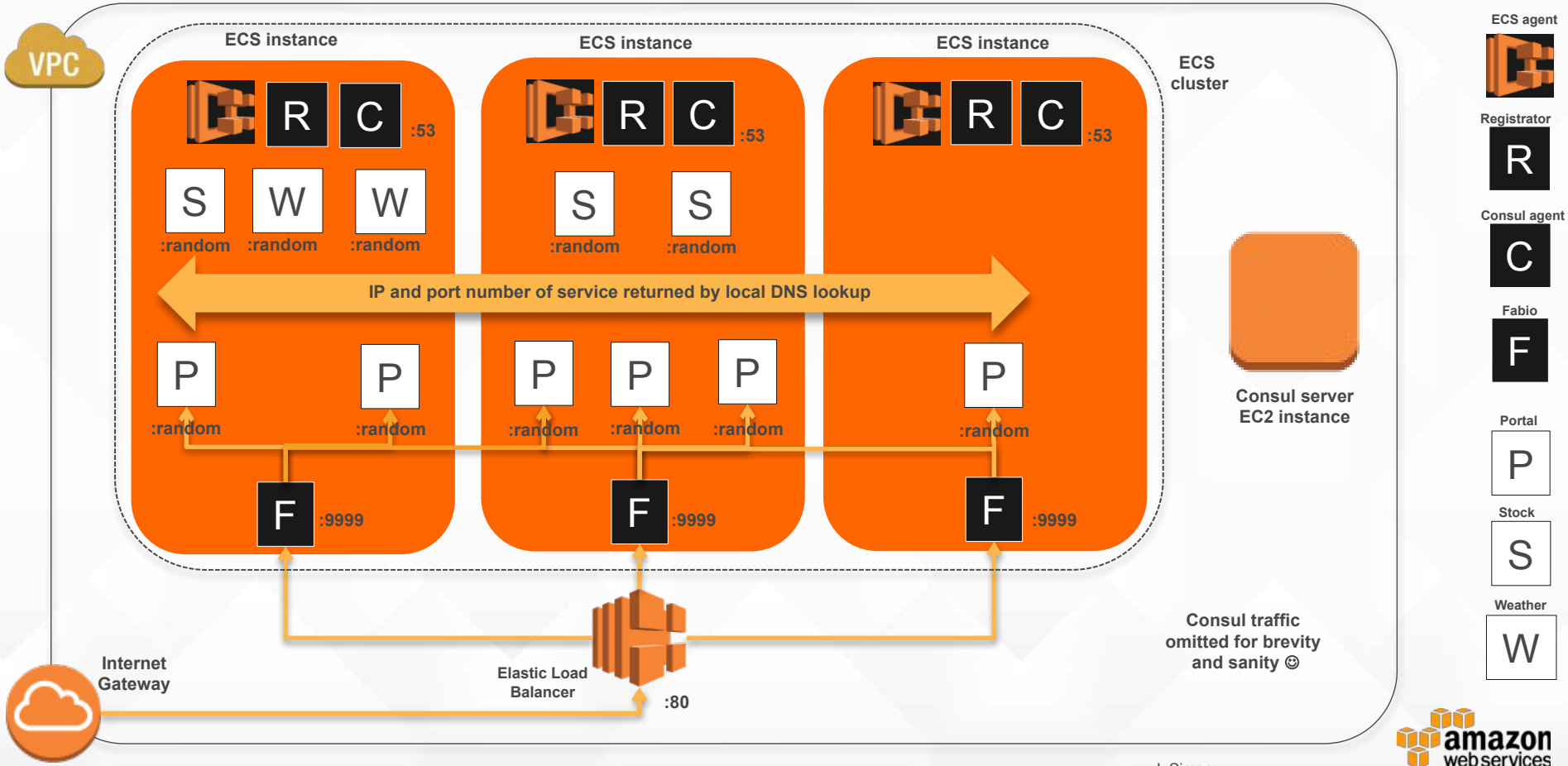
Different services such as API, CDN, and App are deployed on different Amazon ECS clusters. Each service registers to an ELB and Amazon Route 53 points a local entry at each ELB. Services can communicate with each other through DNS.

"*Switching to Amazon ECS has greatly simplified running a service without needing to worry about provisioning or availability*"
Calvin French-Owen, Cofounder and CTO

Load balancing services on fixed ports



Load balancing services on random ports



Further reading

Tech articles by Werner Vogels, CTO, Amazon.com

http://www.allthingsdistributed.com/2014/11/amazon-ec2-container-service.html

http://www.allthingsdistributed.com/2015/04/state-management-and-scheduling-with-ecs.html

http://www.allthingsdistributed.com/2015/07/under-the-hood-of-the-amazon-ec2-container-service.html

Amazon ECS videos @ AWS re:Invent 2015

Amazon ECS: Distributed Applications at Scale
https://www.youtube.com/watch?v=eun8CqGqdk8

Turbocharge Your Deployment Pipeline with Containers https://www.youtube.com/watch?v=o4w8opVCI-Q

From Local Docker Development to Production Deployments https://www.youtube.com/watch?v=7CZFpHUPqXw

Thank you!

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