

AWS

S U M M I T

DevOps at Amazon: A Look at Our Tools and Processes

Steffen Grunwald, Solutions Architect, AWS

18. May 2017



15 years

2/3 IT budget

77% CEOs

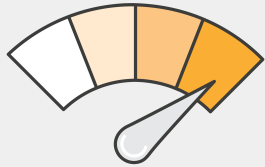
Responding requires a new model



Focus on differentiating your company

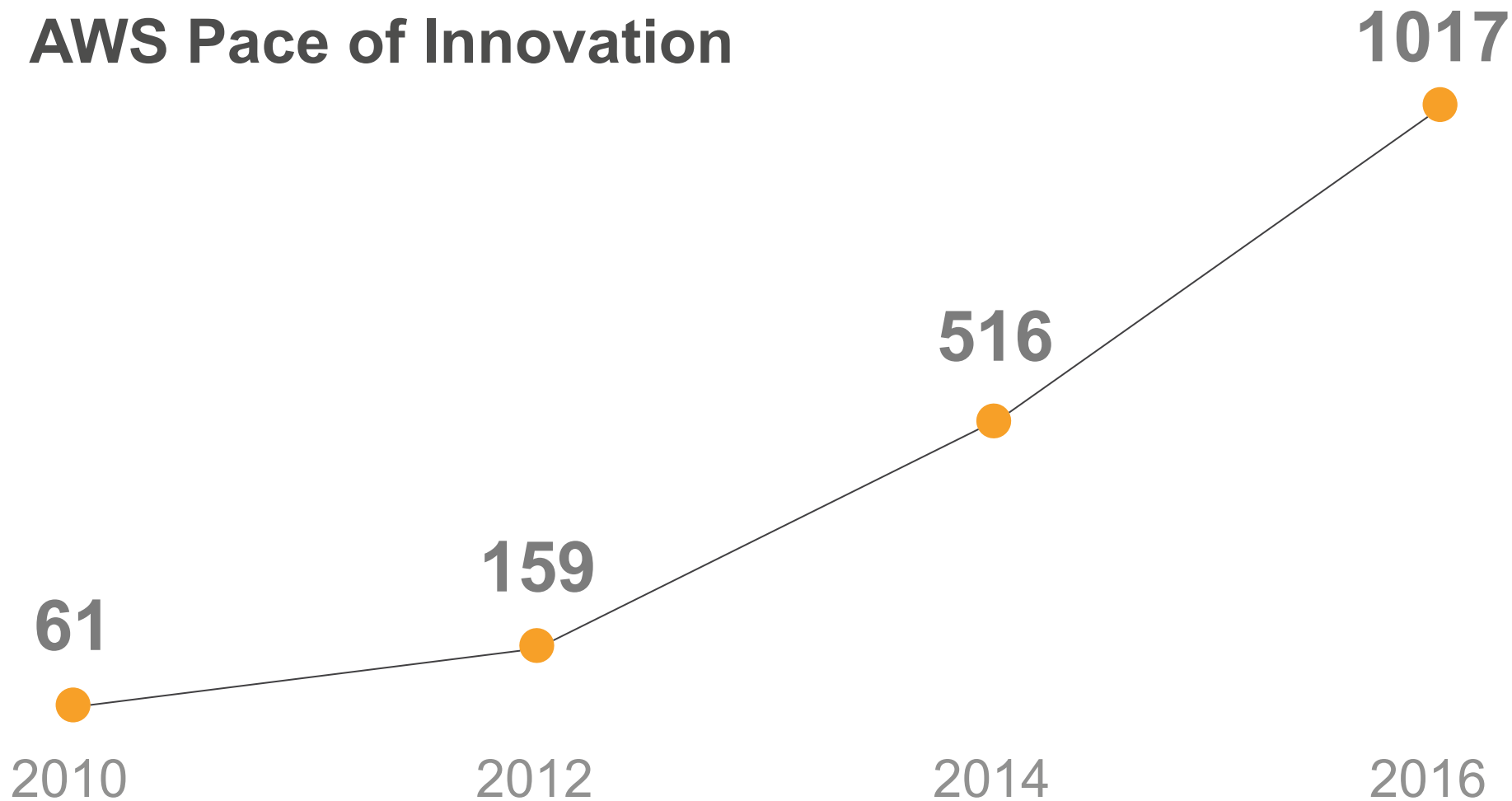


Reduce risk

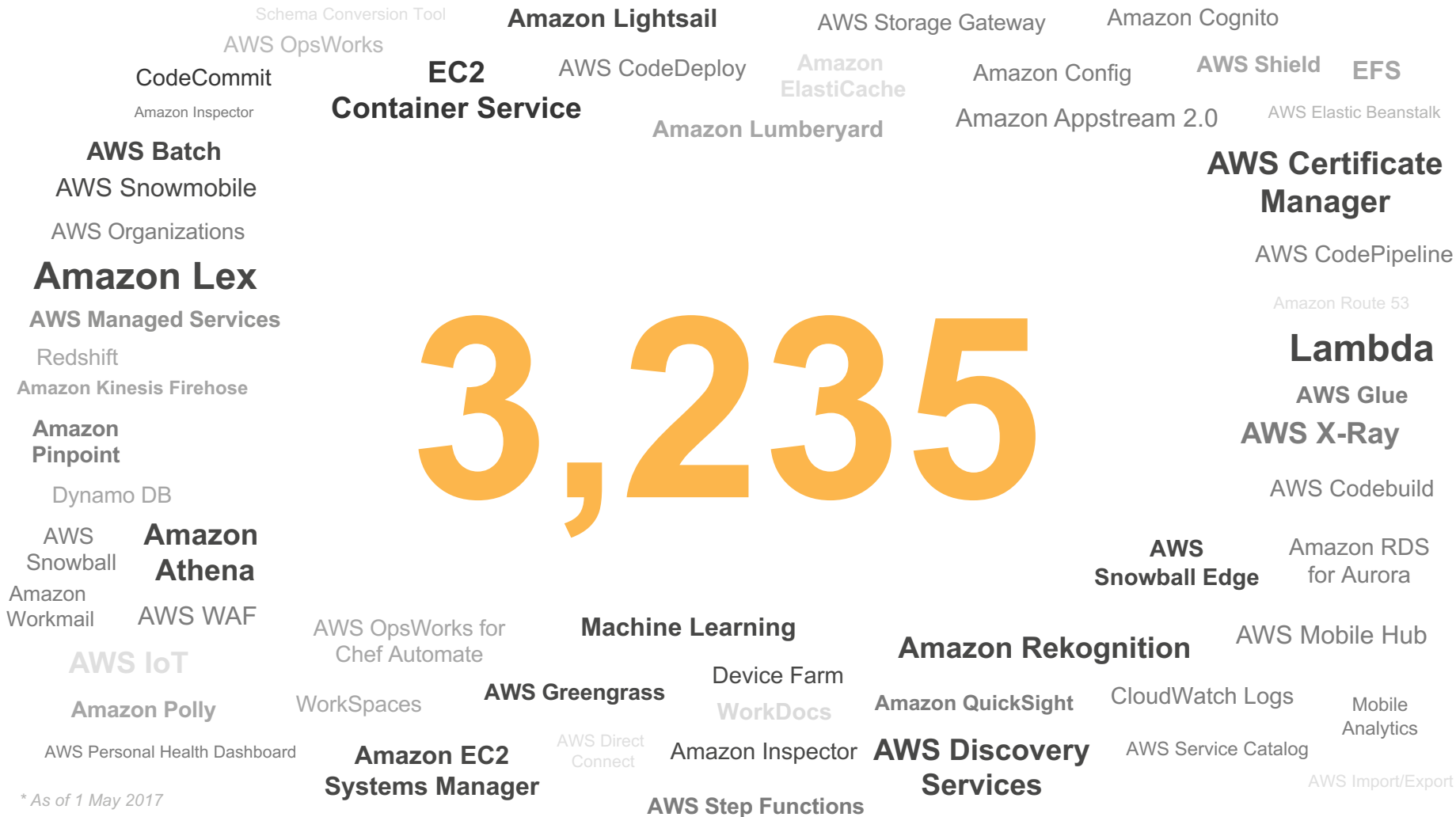


Innovate at start-up like speed

AWS Pace of Innovation



3,235



* As of 1 May 2017

But **innovation** is **hard**...

...how can companies build an effective innovation system and an environment that will foster and **support human creativity** and **drive technological progress**?

$$f(\text{innovation}) = (\text{culture} * \text{structure})^{\text{tooling}}$$

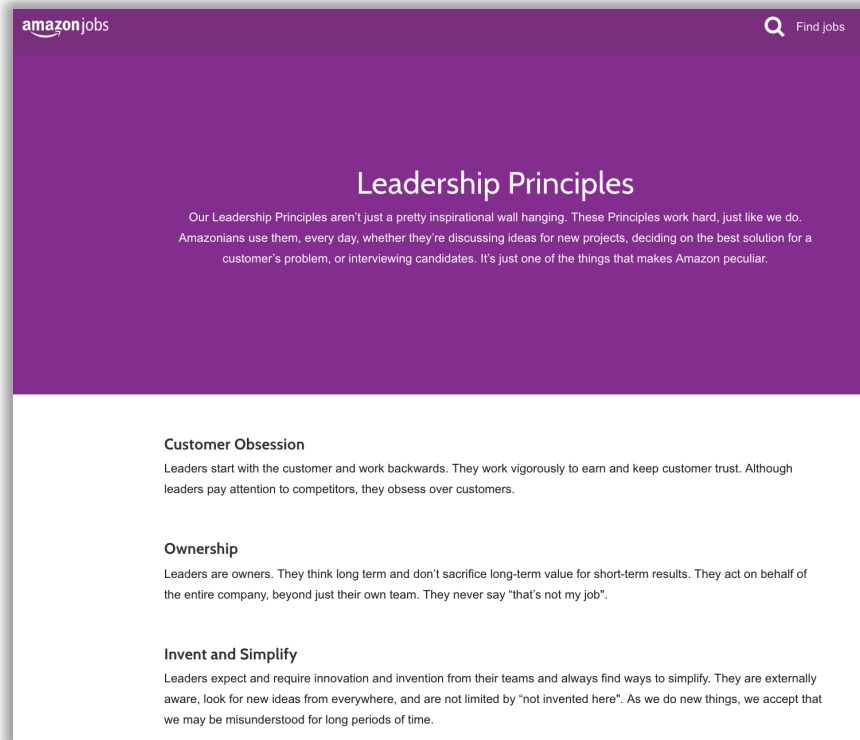
(Innovation is the product of culture and structure with the power of tooling)

$$f(\text{innovation}) = (\text{culture} * \text{structure})^{\text{tooling}}$$

Innovation requires **culture** that fosters **invention**.

Culture is the **principal component**
in **velocity of innovation**.

Amazon leadership principles

A screenshot of the Amazon Leadership Principles page. The page has a purple header with the 'amazon jobs' logo on the left and a search icon with the text 'Find jobs' on the right. The main content area is white and features the title 'Leadership Principles' in a large, bold font. Below the title is a paragraph of text explaining that the principles are not just inspirational but are used daily by Amazonians. The page lists three principles: Customer Obsession, Ownership, and Invent and Simplify, each with a brief description.

amazon jobs Find jobs

Leadership Principles

Our Leadership Principles aren't just a pretty inspirational wall hanging. These Principles work hard, just like we do. Amazonians use them, every day, whether they're discussing ideas for new projects, deciding on the best solution for a customer's problem, or interviewing candidates. It's just one of the things that makes Amazon peculiar.

Customer Obsession

Leaders start with the customer and work backwards. They work vigorously to earn and keep customer trust. Although leaders pay attention to competitors, they obsess over customers.

Ownership

Leaders are owners. They think long term and don't sacrifice long-term value for short-term results. They act on behalf of the entire company, beyond just their own team. They never say "that's not my job".

Invent and Simplify

Leaders expect and require innovation and invention from their teams and always find ways to simplify. They are externally aware, look for new ideas from everywhere, and are not limited by "not invented here". As we do new things, we accept that we may be misunderstood for long periods of time.

<https://www.amazon.jobs/principles>

**A company of builders...
builders come to build.**

“Invention requires **two things**: the ability to **try a lot of experiments**, and not having to live with the collateral damage of **failed experiments**”



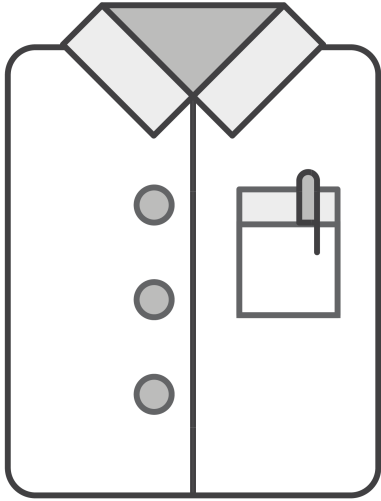
Andy Jassy, CEO, Amazon Web Services

$$f(\text{innovation}) = (\text{culture} * \text{structure}) \text{ tooling}$$

Good intentions are never enough, you
must build **structure** and create
innovation fostering habits.

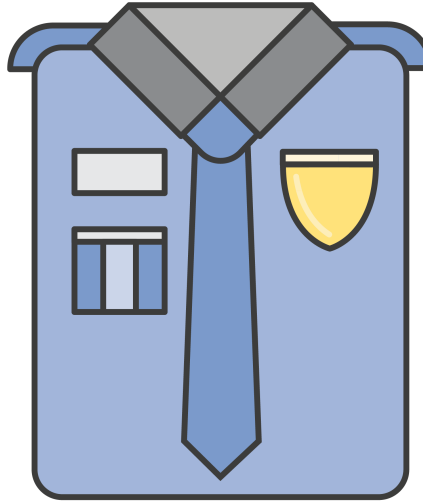
**We measure performance of our
processes, improve it and
remove bottlenecks.**

A world of conflicting priorities



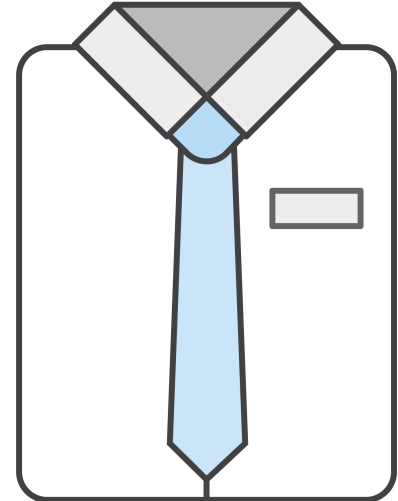
Developers

*Paid to
change*



Security

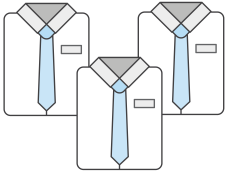
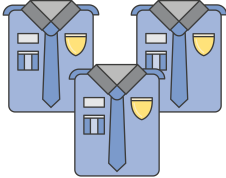
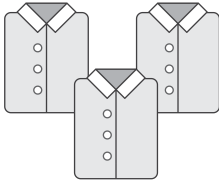
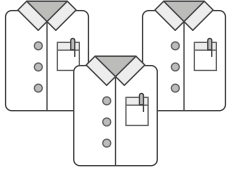
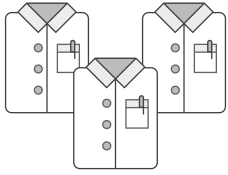
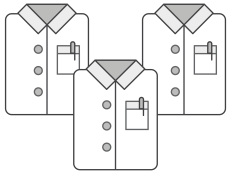
*Paid to prevent
risk*



Operations

*Paid to ensure
stability*

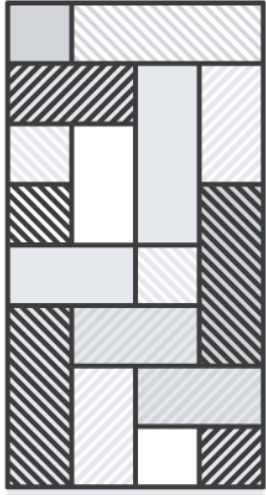
...and of bottlenecks



Avoid future firefighting by including others early and by investing time to paying back technical debt.

Development transformation at Amazon: 2001-2009

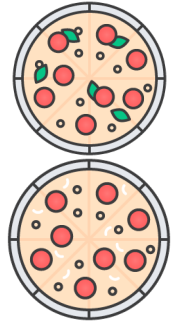
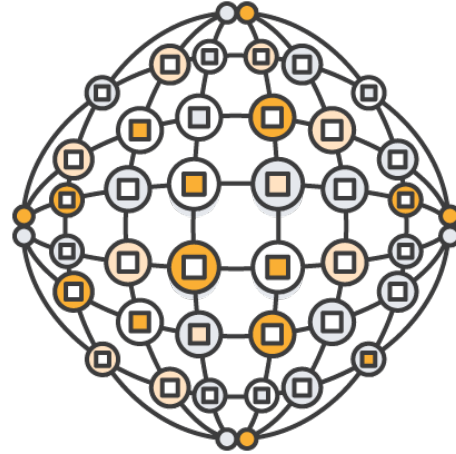
2001



2006



2009





“If the development team is frequently called in the middle of the night, automation is the likely outcome. If operations is frequently called, the usual reaction is to grow the operations team.”

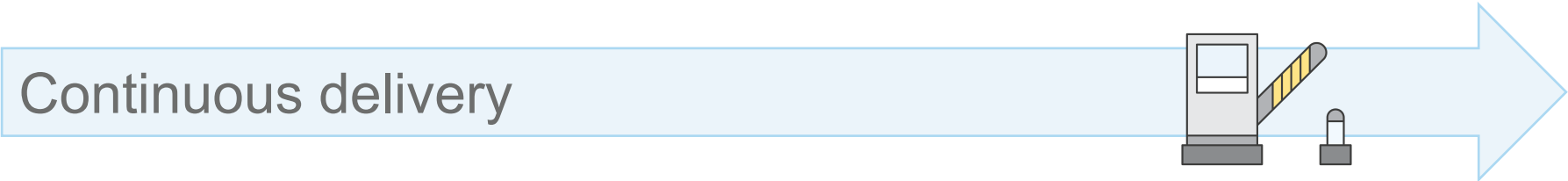
While all teams are autonomous, they are defined and driven by the cultural DNA (Leadership Principles) at every step.

Strive for **continuous deployment**.
Use **metrics and tooling** to gain trust.

Continuous integration



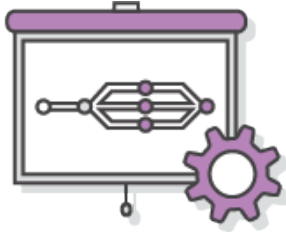
Continuous delivery



Continuous deployment



Continuous Deployment Benefits



Automate the software release process



Improve developer productivity



Find and address bugs quickly



Deliver updates faster

$$f(\text{innovation}) = (\text{culture} * \text{structure}) \text{ tooling}$$

**Tooling should be decentralised,
encouraging self service.**

**It should promote best practices
without being restrictive.**

It should be **technology agnostic.**

It should be **the path of least resistance.**



Pipelines

Continuous Delivery

From check-in to
production

CI/CD + Release
Automation

>90% of Amazon
teams



12 years young

Rolling Deployments
(zero downtime)

Health Checking

Versioned Artifacts &
Rollbacks

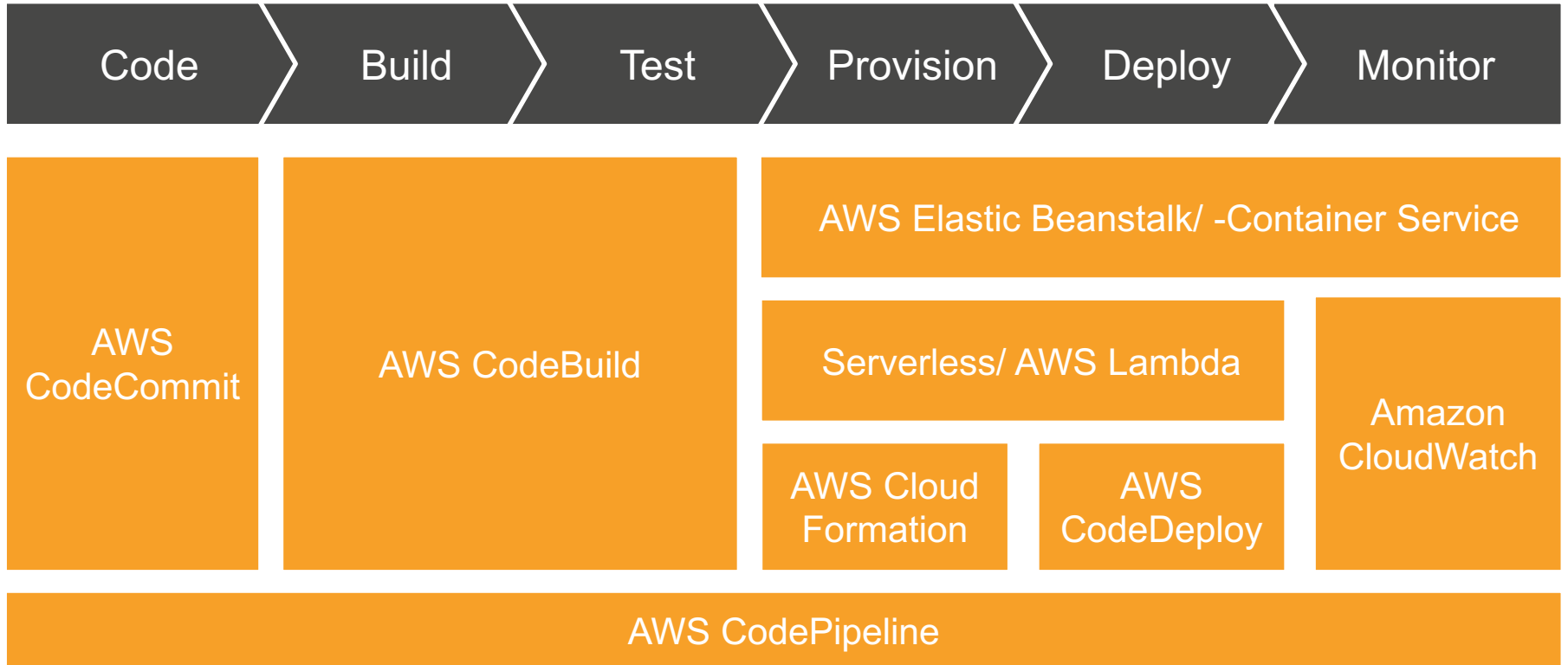
**Thousands of teams +
Microservices architectures +
Multiple environments +
Continuous delivery?**

= 50 million deployments a year

**From epic feature releases
to many tiny releases.**

**AWS services help you
do the same.**

Deployment, Administration & Monitoring



**AWS CodeStar: Everything you need
to **Develop, Build, and Deploy**
applications on AWS.**

AWS CodeStar Project Templates



Ruby on Rails



Web application



AWS Elastic Beanstalk
(runs in a managed application environment)



Ruby on Rails



Web application



Amazon EC2
(runs on virtual servers that you manage)



Java Spring



Web application



AWS Elastic Beanstalk
(runs in a managed application environment)



Java Spring



Web application



Amazon EC2
(runs on virtual servers that you manage)

Demo Time!

$$f(\text{innovation}) = (\text{culture} * \text{structure})^{\text{tooling}}$$

Turn **your innovative idea** into reality. Start by spinning up all you need with **AWS CodeStar**.