Transforming Product Development with the Cloud

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Head of Enterprise Strategy, AWS

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Joined AWS in 2017

12-years @ Edmunds.com
CIO/COO/CDO

Nuance Communications

SV Startups

Econ @ UCLA

Enterprise Strategy Team at AWS

accenture

Capital One

edmunds

U.S. Citizenship and Immigration Services

Coca-Cola

experian

aws

Motivators?

Hitting roadblocks trying to drive change

Best practices review

Development practices need a refresh

Reduce cost of failure and experimentation

What we'll cover:

Modern product development toolkit

Achieving organizational flow

How the cloud is changing product development

aws

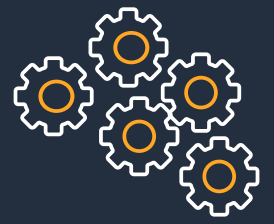
Methods and Principles of Modern Product Development

Design Thinking

Interface to customer and feedback loop

Agile Teaming

The organizational glue that keeps release cycle moving continuously

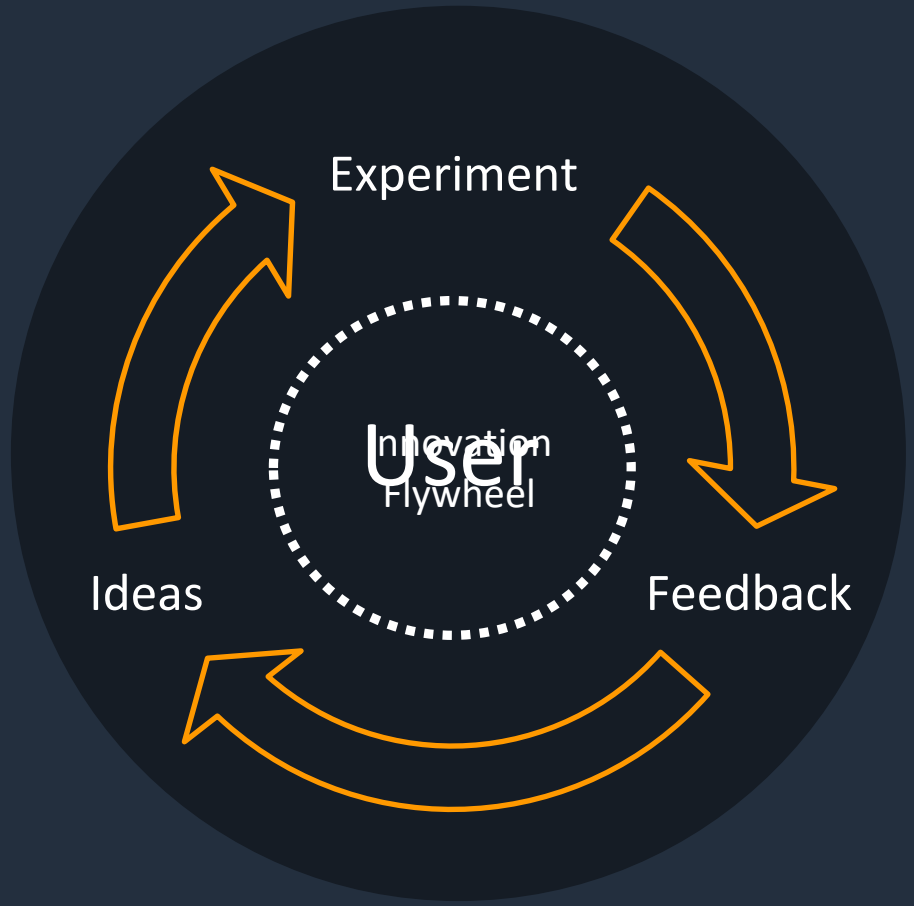


DevOps

Interface for getting stuff built and released

Design Thinking is just…

User Centered Design



Practical Principles: Design Thinking

User Centered Design

Bring the outside in

Pinpoint the pain point

Radical ideas, real impact

Build to learn

1. First gain empathy
2. Then frame the problems
3. Now you can ideate
4. Run simple, fast, frugal tests

Agile Teaming

Focus: respond quickly to feedback

Agile Principle

Learning over following a plan

SCRUM

Continuously groomed backlog

No changes to work plan made during sprint

Product increment: must be completed, integrated and tested

Each agile framework has a way of bringing feedback into its workstream

Agile Teaming

Focus: respond quickly to feedback

Agile Principle

Learning over following a plan

XP—Extreme Programming

Emphasizes technical excellence as a way to remain agile

Pair programming and code reviews are common methods

Frequent checkpoints—allows for constant feedback on customer requirements

Each Agile framework has a way of bringing feedback into its workstream

Agile Teaming

Focus: respond quickly to feedback

Agile Principle

Learning over following a plan

KANBAN

Finish task and pull forward next work item

Uses work-in-progress (WIP) limits and cycle-time to manage flow of new development

Adapted from Toyota Production System

Each Agile framework has a way of bringing feedback into its workstream

Practical Principles: Agile

Use release maps

Two pizza team model

Power of the demo

Find your Agile center

1. Rip the band-aid off, but have mercy
2. Keeping it real…and small
3. Show something every sprint
4. Trap: Agile by the book

DevOps

Focus: promote and enable fast feedback

DevOps Principles

Automate all things

If it hurts, you should do it as often as possible

DevOps

Focus: promote and enable fast feedback

DevOps Principles

Automate all things

Eliminate handoffs

If it hurts, you should do it as often as possible

No more hot potato between Dev, QA, and Ops

DevOps

Focus: promote and enable fast feedback

DevOps Principles

Automate all things

Eliminate handoffs

Establish guardrails

If it hurts, you should do it as often as possible

No more hot potato between Dev, QA, and Ops

Integrated security (DevSecOps), not infosec toll gates

DevOps

Focus: promote and enable fast feedback

DevOps Principles

Automate all things

Eliminate handoffs

Establish guardrails

All of these reduce cycle time and allow builders to focus on product, quickly deploying and collecting feedback

DevOps

Companies that practice CI/CD ship code faster, and with more confidence

5x
Lower change failure rate

440x
Faster from commit to deploy

46x
More frequent deployments

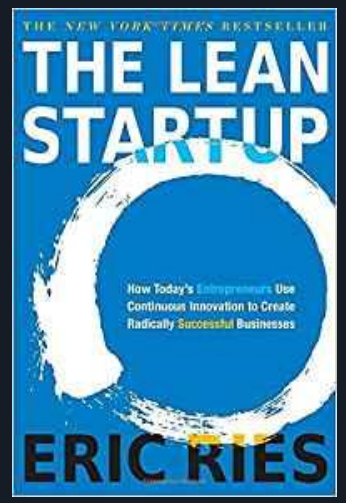
44%
More time spent on new features & code

Source: Puppet 2017 State of DevOps Report

Putting the Pieces Together: Finding Organizational Flow

MVP

Minimum Viable Product: What is the smallest thing you can test to prove the unproven parts of your idea



Start with value hypothesis and growth hypothesis

Run small experiments to see if there is both value and demand

Bias towards many small tests vs. larger, extended ones

Persevere or pivot early based on results

"One accurate measurement is worth more than a thousand expert opinions."
—Admiral Grace Hopper

Project Teams or Product Teams

Methods to manage your product/technology portfolio

PROJECT

Pre-defined requirements, scope, and schedule

Deliver what was planned

Measured by output

PRODUCT

Continuous Development

Customer defines roadmap

Measured by output and outcomes

Project Teams or Product Teams

Methods to manage your product/technology portfolio

PROJEC

Pre-defined requ
scope, and sch

Deliver what was

Measured by

BUSINESS OBJECTIVE

Maximize a strategic KPI

Types of KPIs: Reduce churn, increase conversion

Measured by outcomes

RODUCT

ous Development

r defines roadmap

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d outcomes

Typical Release Testing

Most Tests Occur Late In Process

Continuous Testing

Always Be Testing

Concept

Hypothesis
A/B
MVP

Development

Functional
Acceptance
Performance
Security/compliance

Production

Prod testing
Chaos engineering
User testing feedback

Deployment

Functional
Acceptance
Performance
Security/compliance
Canary

How Amazon Achieves Flow

Working backwards
From the customer

Two pizza teams
Run what you build

Microservices
Speed and agility

Working backwards from the customer

Write the Press Release: Think big and focus on the customer need

Write the FAQ: Customer and internal stakeholder

Define the user interaction and write the manual

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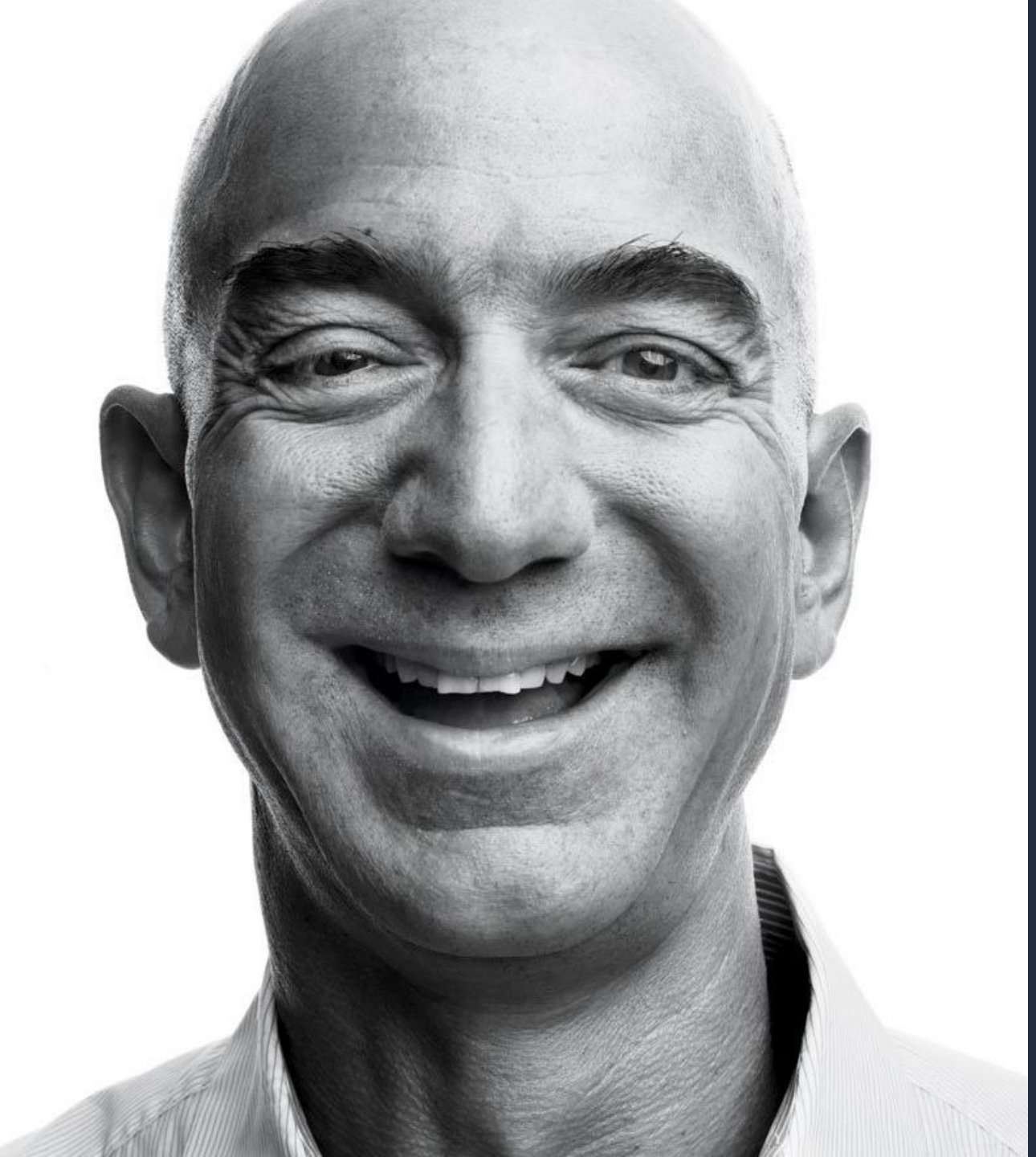


> Most companies write the software, they get it all working, and then they throw it over the wall to the marketing department, saying ‘here is what we built, go write the press release.’ That process is the one that’s actually backwards.

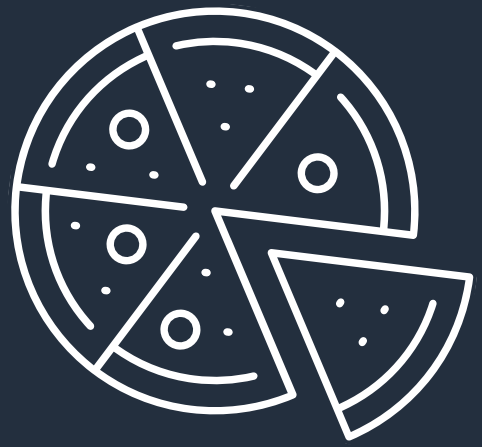
Jeff Bezos

Founder and Chief Executive Officer

Amazon.com, Inc.

aws

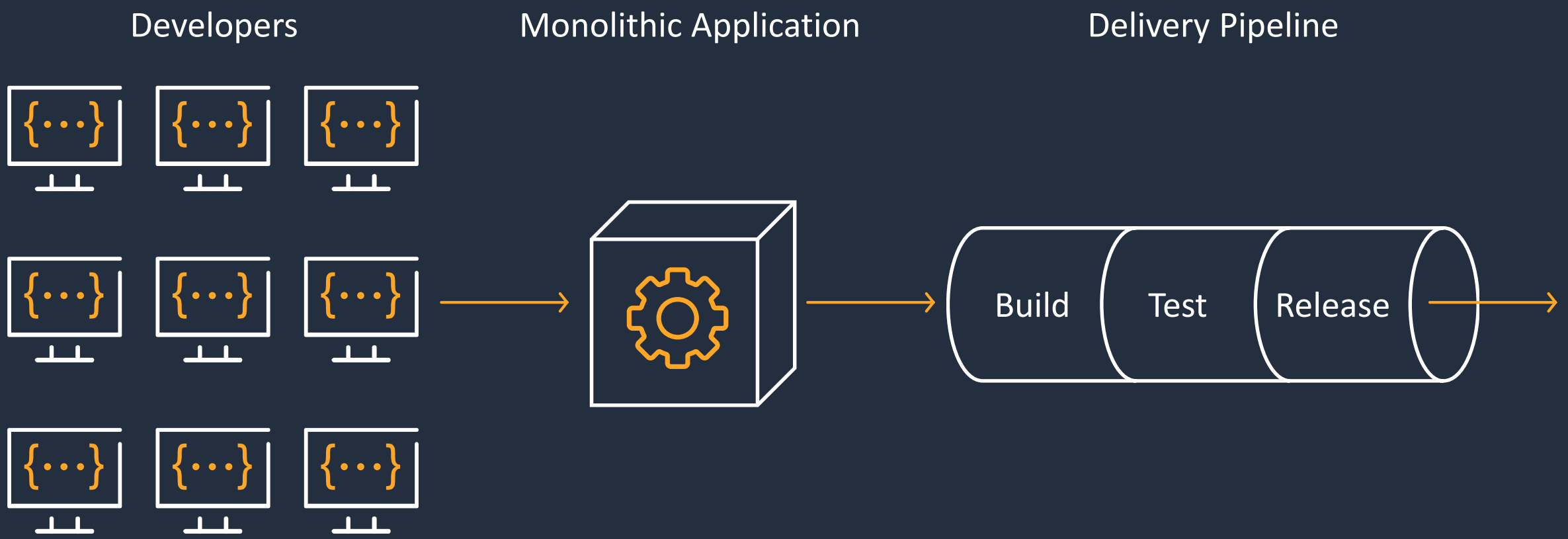
Amazon Achieves Speed and Agility with **Two-Pizza Teams**



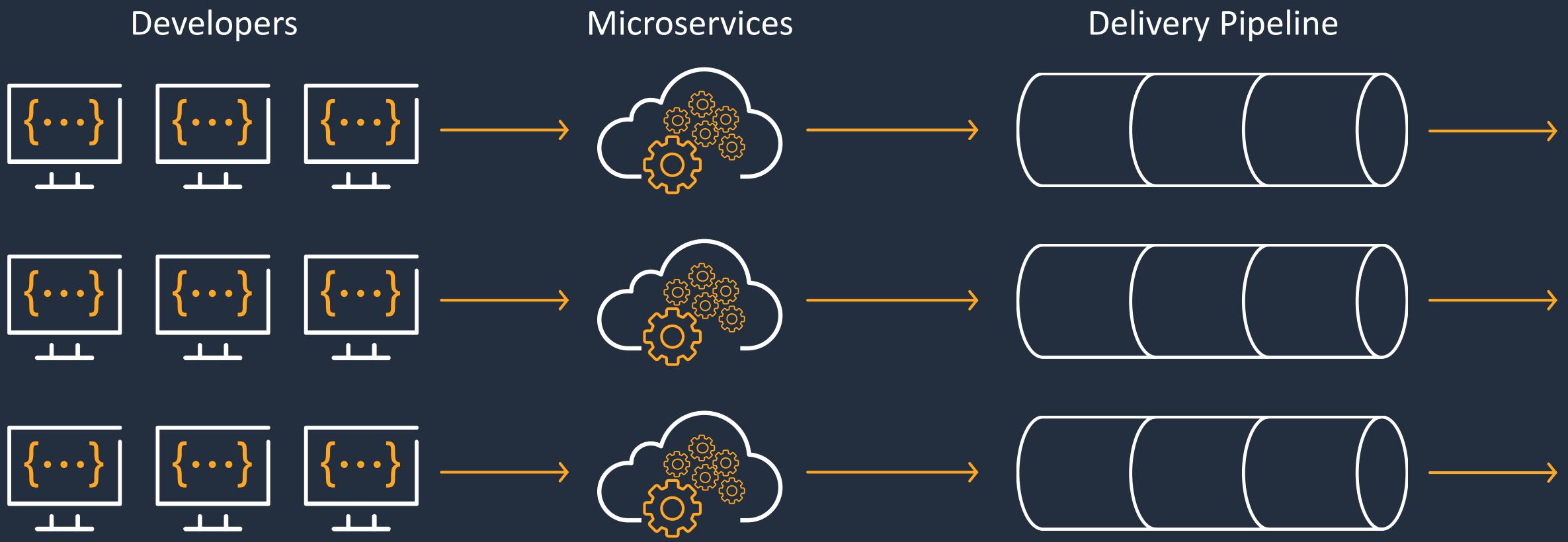
Small, decentralized teams are nimble

Own/run what you build

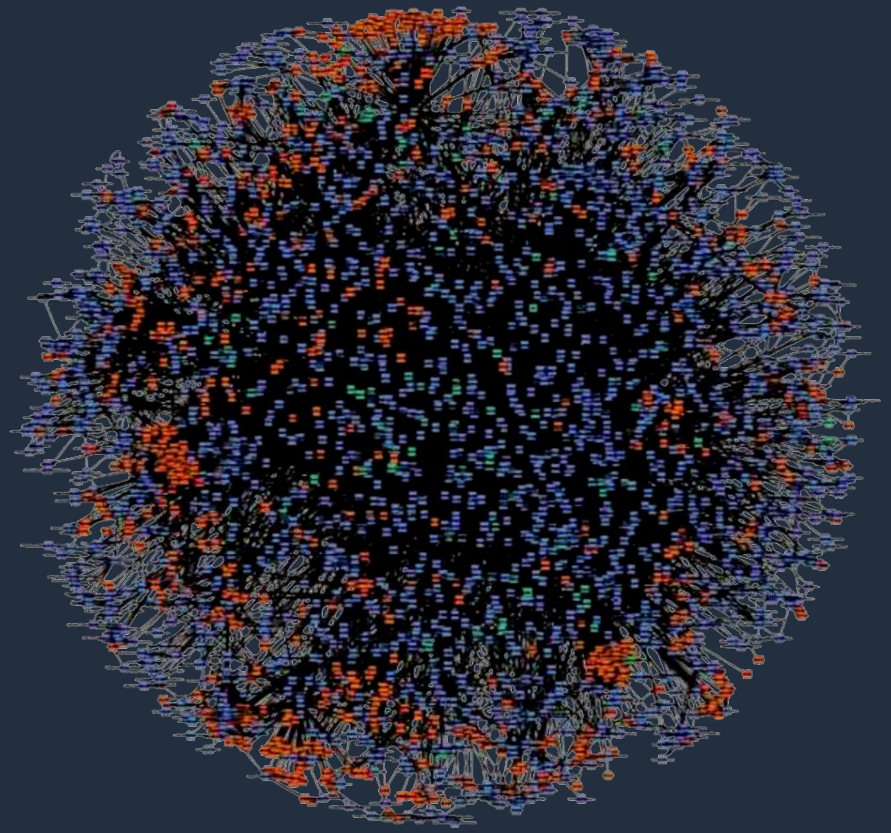
Monoliths: Slow and Rigid



Microservices: Speed and Agility



Microservices Principles



Single purpose

http://

API-based

Highly-decoupled

Impact of Cloud on Product Development

Reducing cost of failure

Rapid adoption of new capabilities

Quickly scaling winning ideas

Reducing Time-to-Market for New Ideas

Agero created the MileUp app and used crash prediction models to speed up emergency response

Reducing cost of experiment

Cloud enables quick testing of unproven concepts

Quick time to market: 8 weeks from conception to production

Continuous scale: seamlessly ramps up to peak traffic of 22k Concurrent Requests

Event driven architecture maximizes resource efficiency

Devote More Resources to Customer Value

Mapbox adds location services to any application with mapping, navigation, and location search SDKs

Reducing cost of new development

Cloud reduces undifferentiated infrastructure focus

Productivity: Allowed developers to focus more on runtime functionality and less on infrastructure management

Cleaner separation of logging, metrics and security infrastructure from application code base

Cost: Spot instances and containers cut EC2 cost in half

Cloud Native Architectures

Accelerates adoption and innovation of new capabilities

Rapid adoption of new capabilities

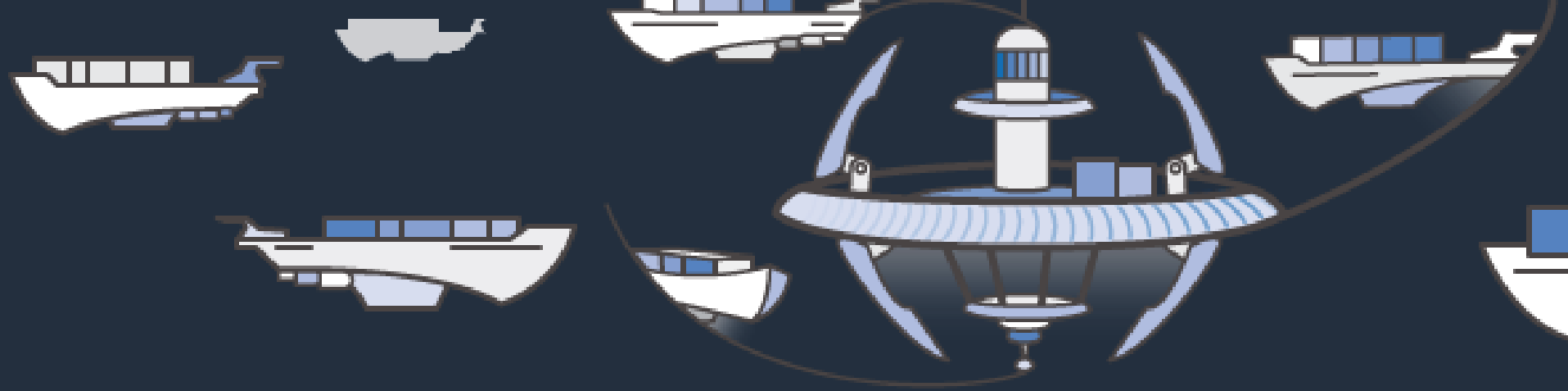
Rekognition use case: automated footage tagging

API access to advanced service capabilities

Built in three weeks

Index against 99,000 people

Saving 9,000 hours a year in labor



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App Container Failure Prediction

Outcomes:
*Improved user experience
*95% reduction in on-call

Bad State Predictor Model

Indicates which containers should be removed before failure

App and system logs used to train model

Developed by cloud team with no ML/DL experience

Enterprises Are Achieving Massive Scale with Cloud Native Architectures

THOMSON REUTERS

processes
4,000 requests
per second

Processes
half a trillion
validations of
stock trades daily

HEARST

reduced the time
to ingest and
process data
for its analytics
pipeline by **97%**

vevo

can handle
spikes of **80x**
normal traffic

Triggers **1.2 billion**
Lambda requests
each month

Develop New Ideas Without Limits

CLEMSON UNIVERSITY

Natural language processing on **1.1 million concurrent vCPUs** using EC2 spot instances

edico genome

FPGA World Record Genome Analysis

Quickly scaling winning ideas

Cloud enables the massive scaling of big ideas

Immediate access to programmable hardware-acceleration using FPGAs at cloud scale

Utilized AWS Batch to provision and orchestrate compute jobs across 1,000 Amazon EC2 F1 instances

Compute infrastructure cost to analyze genome reduced to staggeringly low ~$3 per whole human genome

aws

FICO Achieving Massive Scale Not Massive Cost

FICO Decision Management Suite (DMS) runs on the AWS serverless architecture

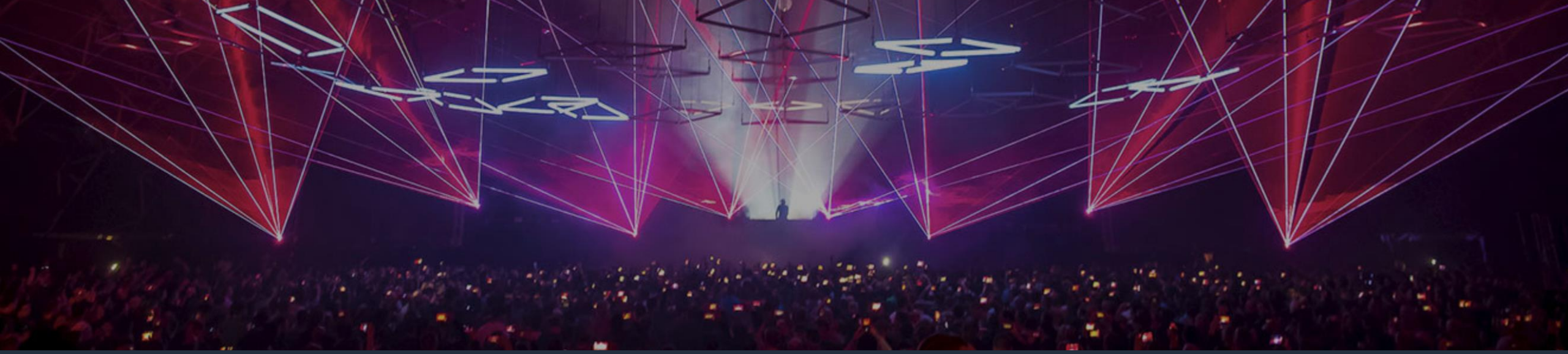
Quickly scaling winning ideas

Serverless enables quick and agile product development

>95% decrease in overall deployment and operational costs

Scales up or down for variation in customer request volume

Migrating tasks to Lambda took only a few weeks



re:INVENT 2018

Las Vegas

November 26 – 30, 2018

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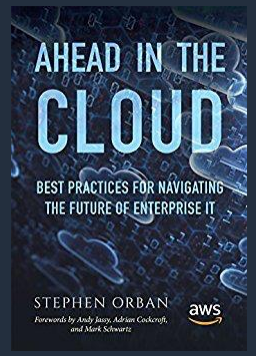
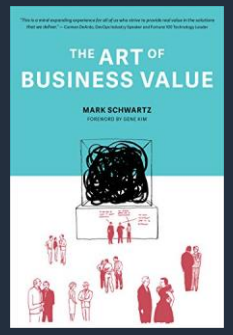
Thank You!

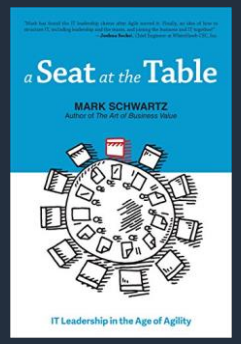
More learning and best practices:



Ahead in the Cloud
Stephen Orban



The Art of Business Value
Mark Schwartz



A Seat at the Table
Mark Schwartz

Enterprise Strategy Blog
https://aws.amazon.com/blogs/enterprise-strategy