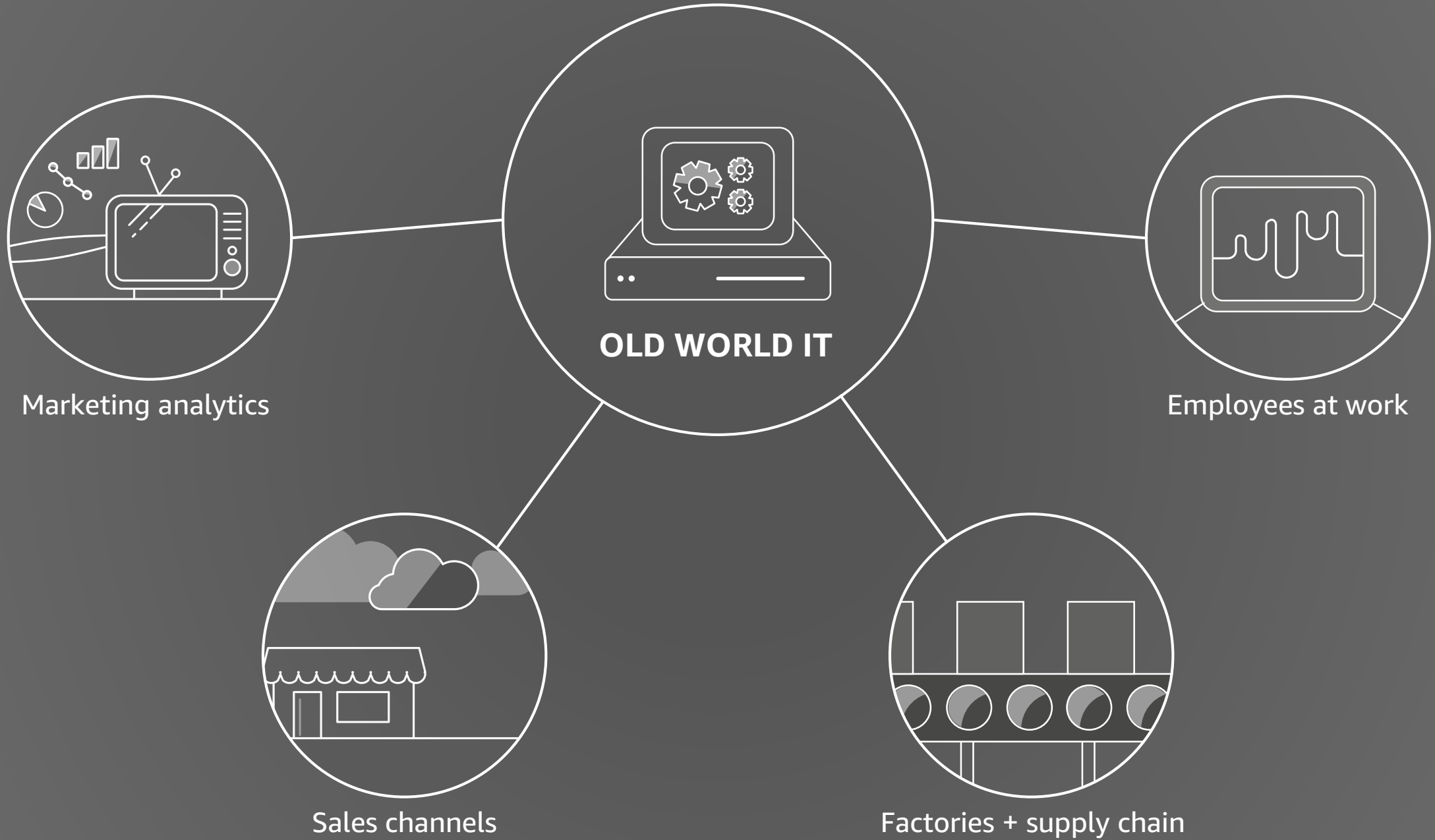


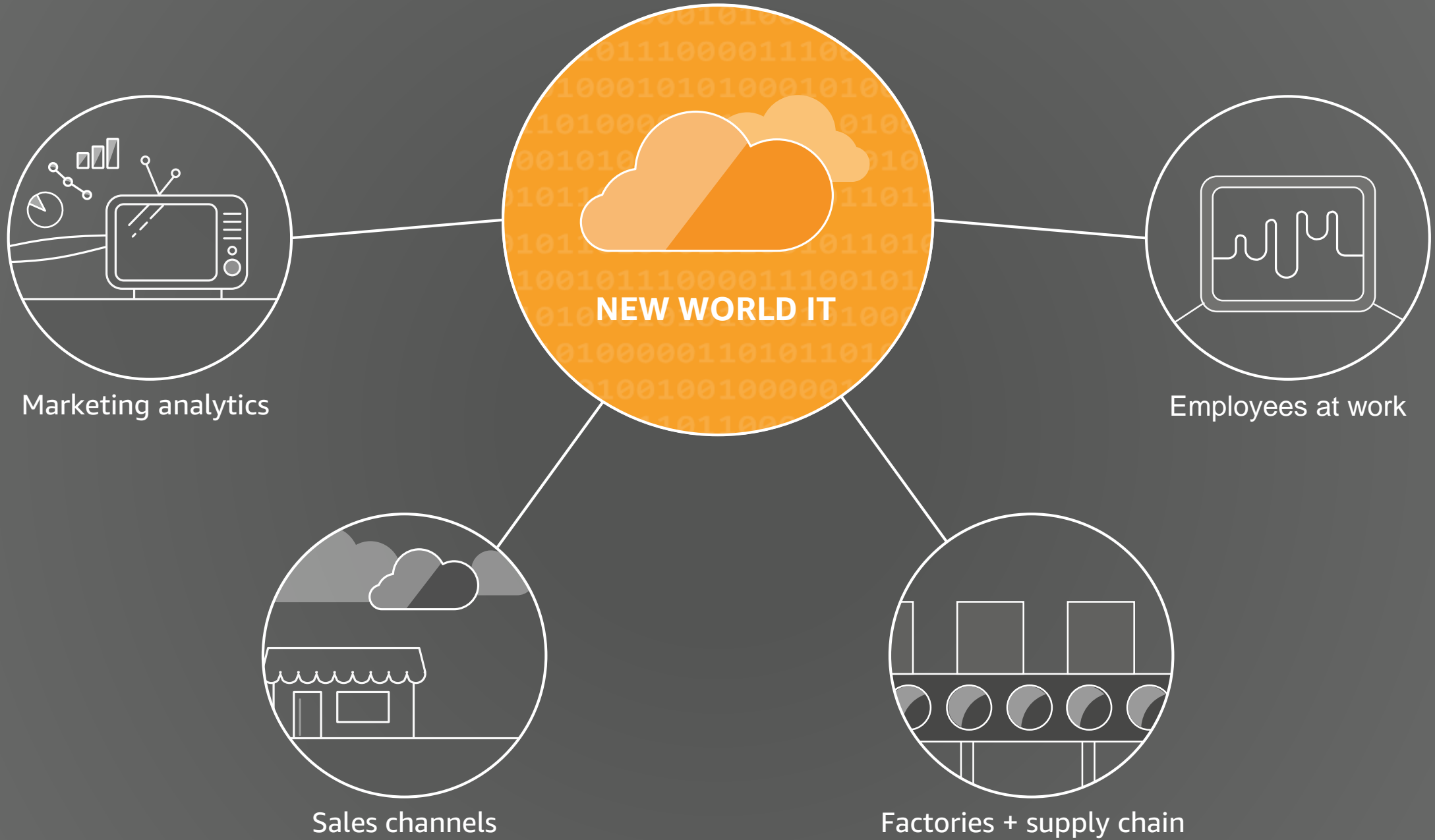


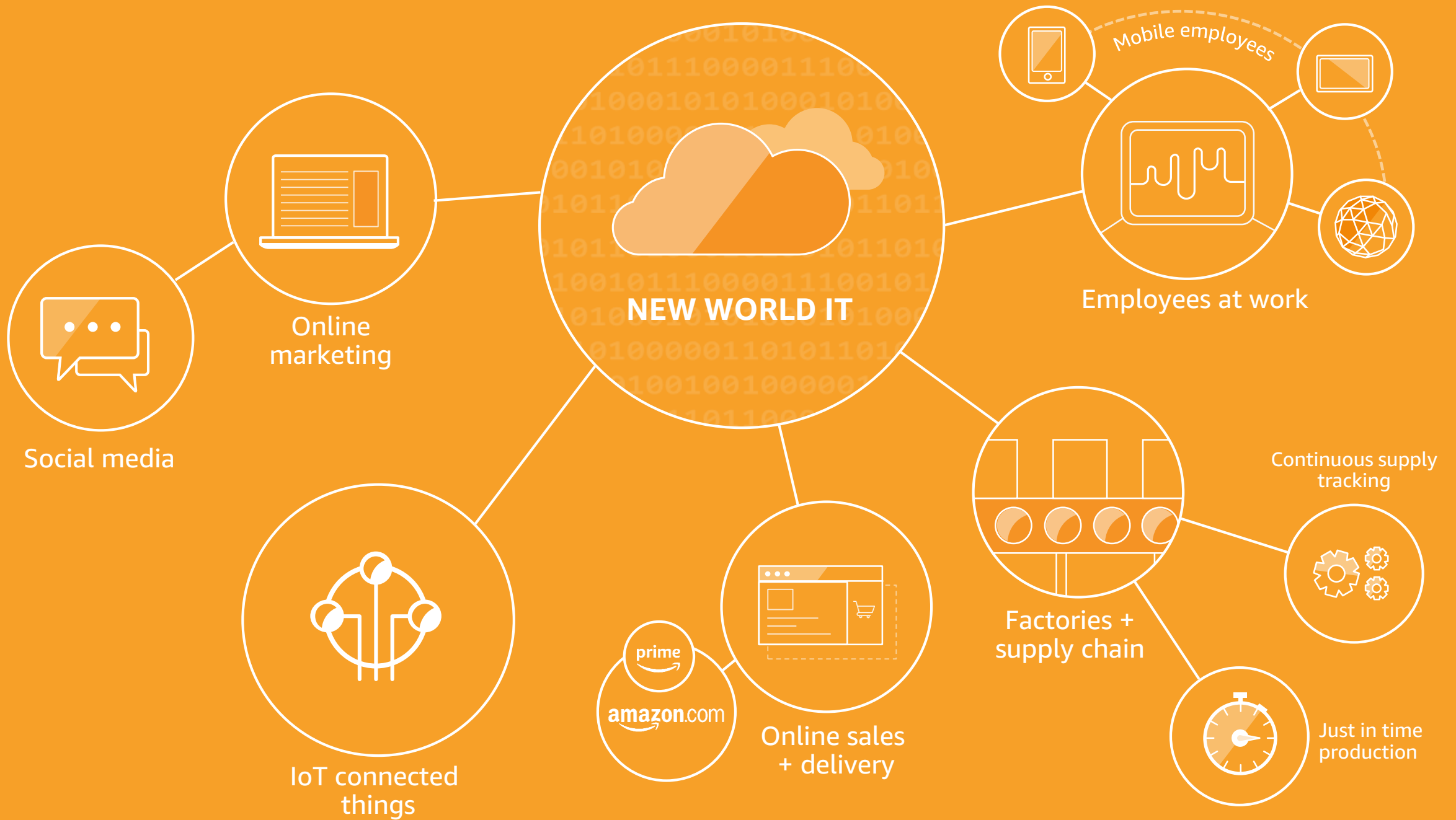
# AWS: Unblocking Innovation for Digital Transformation

**Nicolas Vautier**

Head of Solutions Architecture, Taiwan







## New Needs

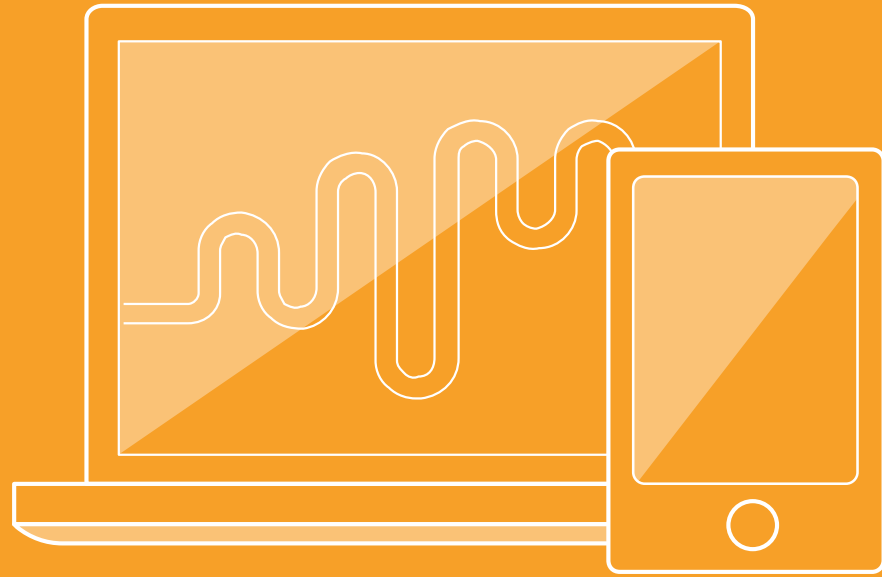
Personalization

Customer tracking

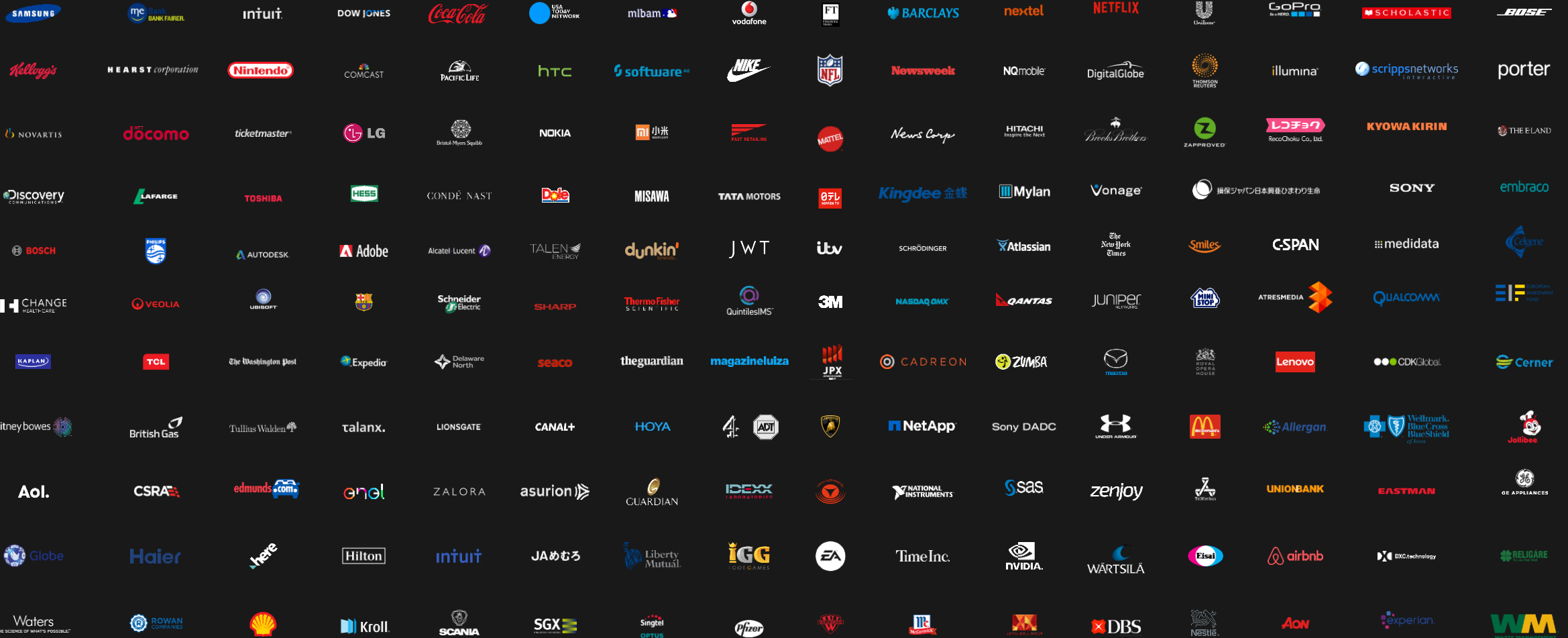
New channels direct to customer

More things, more scale, rapid change

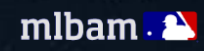
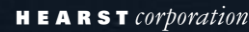
# AWS: Unblocking Innovation for Digital Transformation with Enterprise Customers



# AWS Enterprise Customers



# Digital Transformation Is Key To Survival For Enterprises





# Blockers for Innovation

Culture



Leadership  
Systems and  
Feedback

Skills



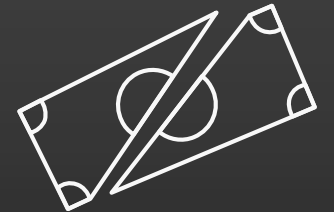
Training and  
Compensation

Organization



Move from  
Projects  
to Product  
Teams

Finance



Capex  
Versus  
Opex



# Leadership Systems and Feedback

Centralized decision making

Lack of trust

Inflexible policies and processes

# Blockers for Innovation

Culture



Leadership  
Systems and  
Feedback

Skills



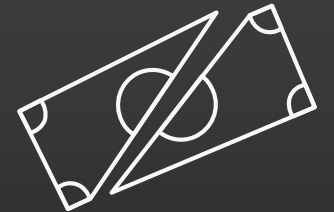
Training and  
Compensation

Organization



Move from  
Projects  
to Product  
Teams

Finance



Capex  
Versus  
Opex



# Training and Compensation

Train existing staff on cloud tech

Fund pathfinder teams

Be prepared to shift pay structure around

# Blockers for Innovation

Culture



Leadership  
Systems and  
Feedback

Skills



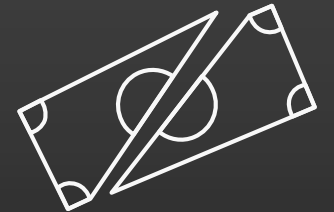
Training and  
Compensation

Organization



Move from  
Projects  
to Product  
Teams

Finance



Capex  
Versus  
Opex



# Move from Projects to Product Teams

Long term product ownership

Continuous delivery

DevOps and “run what you wrote”

Reduce tech-debt and lock-in

# Blockers for Innovation

Culture



Leadership  
Systems and  
Feedback

Skills



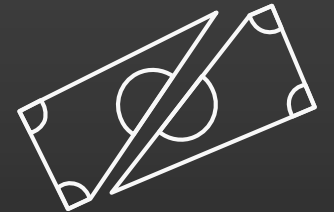
Training and  
Compensation

Organization

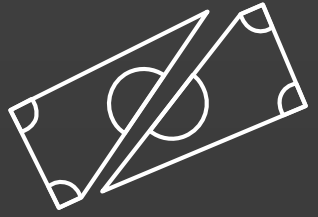


Move from  
Projects  
to Product  
Teams

Finance



Capex  
Versus  
Opex



# Capex Versus Opex

Datacenter to Cloud

Understand the impact

Plan ahead, don't surprise the CFO



# Pathway for Digital Transformation

Speed



Scale



Strategic



Time to  
Value



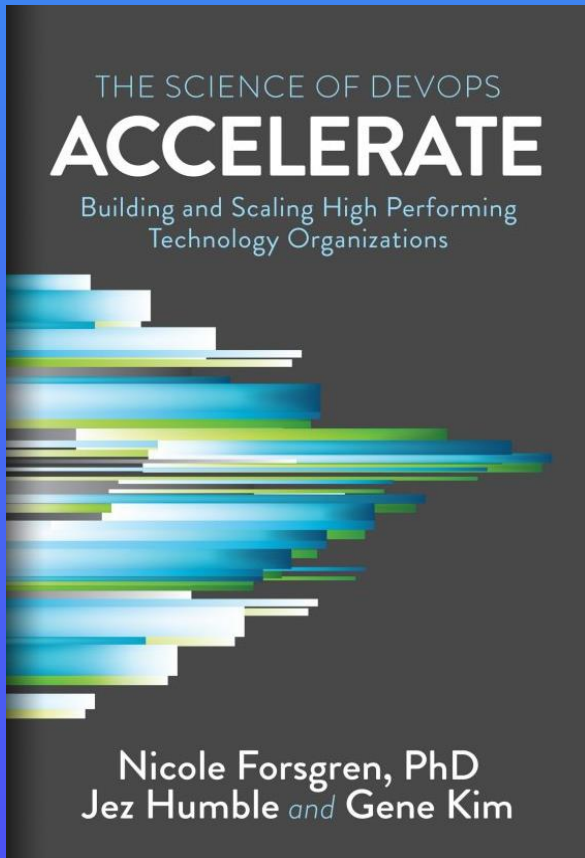
Distributed  
Optimized  
Capacity



Critical Workloads  
Datacenter  
Replacement



# Time to Value



The fast companies are **440x** faster than the slow

---

*We found that, compared to low performers, high performers have:*

- 46 times more frequent code deployments*
- 440 times faster lead time from commit to deploy*
- 170 times faster mean time to recover from downtime*
- 5.0 times lower change failure rate (1/5 as likely for a change to fail)*

---

Months  Hours

<https://itrevolution.com/book/accelerate/>

# Pathway for Digital Transformation

Speed



Scale



Strategic



Time to  
Value



Distributed  
Optimized  
Capacity



Critical Workloads  
Datacenter  
Replacement



# Distributed Optimized Capacity

Highly Scaled

Distributed for Availability

Cost Optimized High Utilization

Cloud Native Architecture

# Cloud Native Architecture



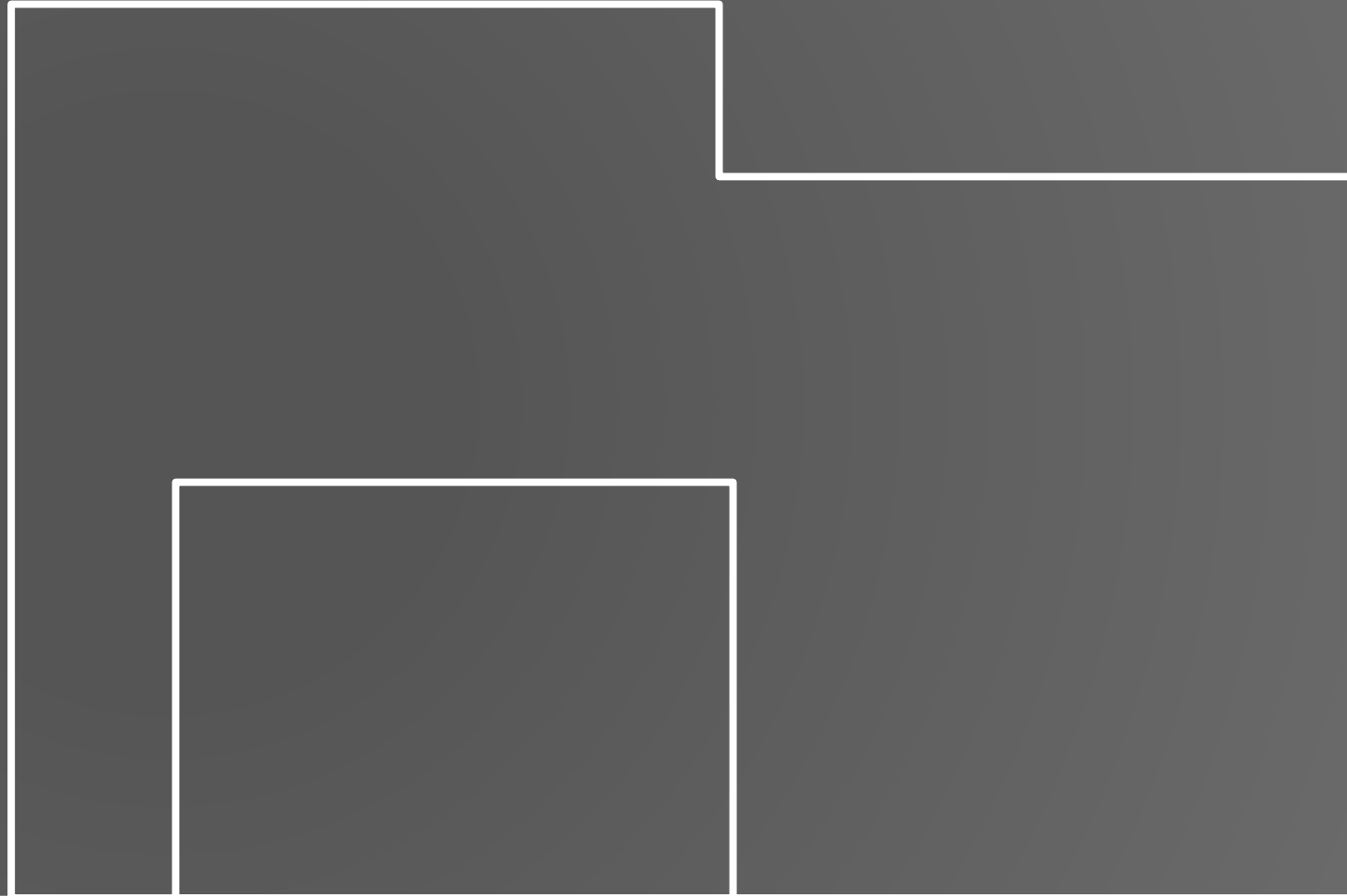
**Principles and Practices**

# Datacenter Native Architecture



**DATACENTER**

**Datacenter Native  
Architecture**  
Lives for years

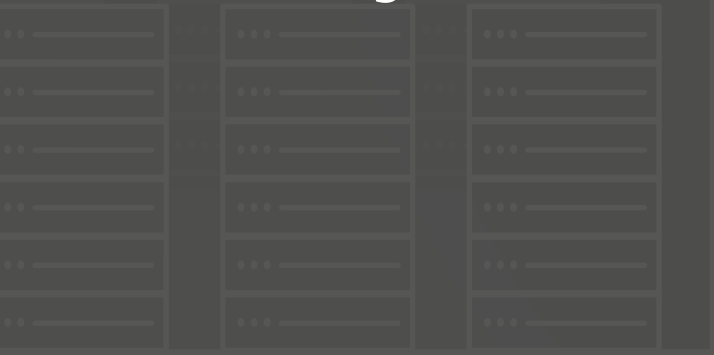


**DATACENTER**

# Cloud Migration

Pay as you go

**Pay up front and  
depreciate over  
three years**



DATACENTER



**Pay a month later  
for the number of  
seconds used**

Applications and data



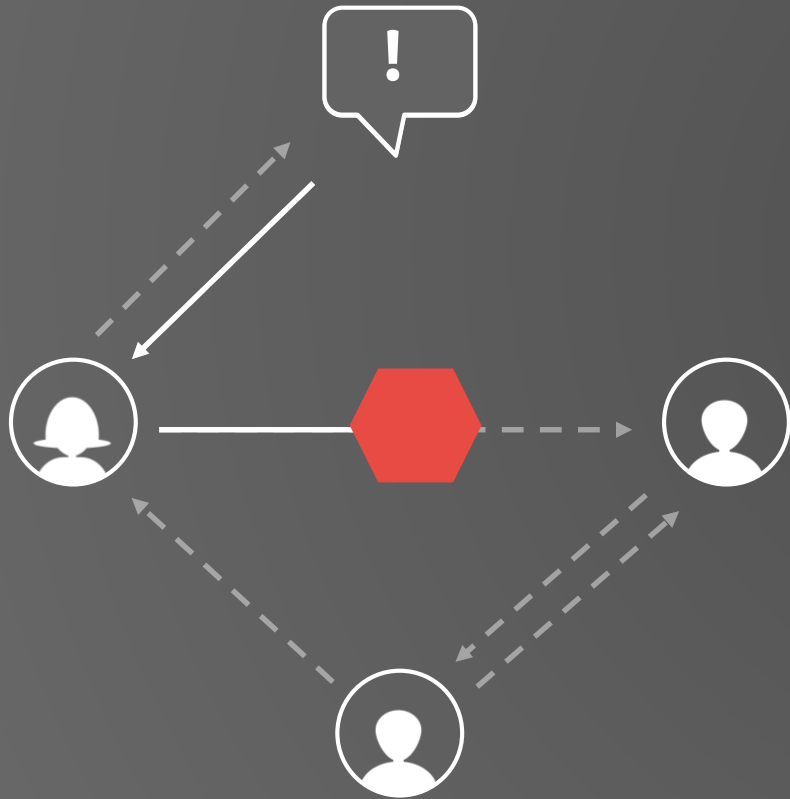


## **Cloud Native Principle**

Pay for what you used last month

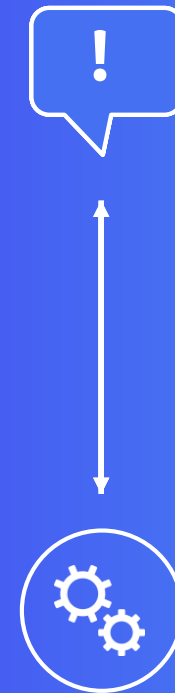
Not what you guess you will  
need next year

**File tickets and  
wait for every step**



**VS**

**Self service,  
on-demand, no delays**



File tickets and  
wait for every step

**Deploy by filing a  
ticket and waiting  
weeks or months**

vs

Self service,  
on-demand, no delays

**Deploy by making an  
API call self service  
within minutes**



## **Cloud Native Principle**

Self service, API driven, automated

Move from request tickets at every step to a tracking ticket that records what happened



## **Cloud Native Principle**

Instant globally distributed  
deployments and data by default

# Elasticity



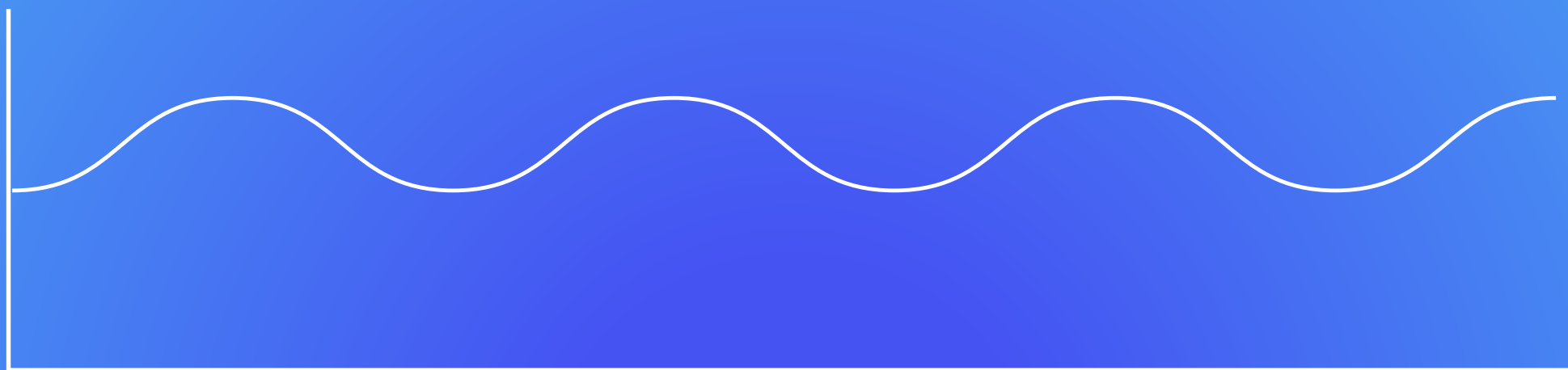
**DATACENTER**

Hard to get over 10% utilization—  
need extra capacity in case of peak

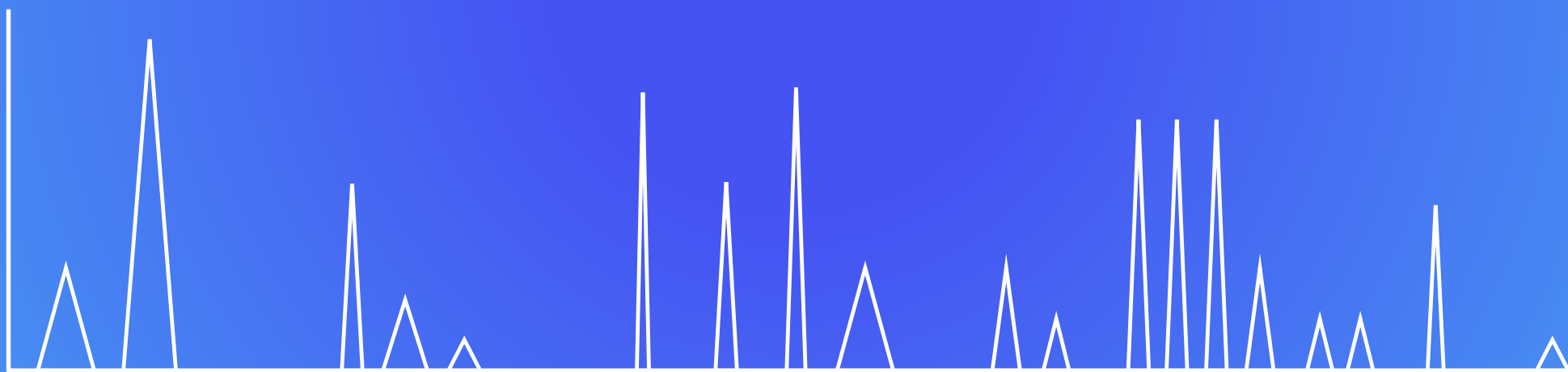


**CLOUD**

Target over 40% utilization—  
no capacity overload issues



**Autoscaling** for predictable heavy workloads



**Serverless** for spiky workloads with idle periods



## Cloud Native Principle

Turn it off when it's idle

Many times higher utilization

Huge cost savings

Avoids capacity overloads





# Cloud Native Principle

Modern DevOps

Automated builds

Ephemeral instances, containers, and functions

Blue-Green deployments



# Cloud Native Principles

**In Summary ...** Pay as you go, afterwards

Self service—no waiting

Globally distributed by default

Cross-zone/region availability models

High utilization—turn idle resources off

Immutable code deployments

# Pathway for Digital Transformation

Speed



Scale



Strategic



Time to  
Value



Distributed  
Optimized  
Capacity



Critical Workloads  
Datacenter  
Replacement



# Critical Workloads Datacenter Replacement

Core Banking

Industrial Control Systems

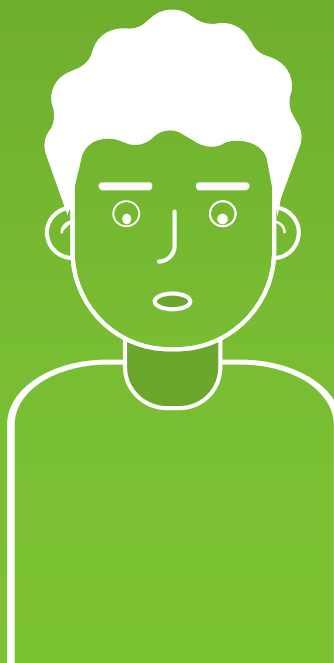
Transport

Healthcare



How do you know if you  
have a good architecture  
for critical systems?

**Ask some  
awkward questions...**



**What should  
your system  
do when  
something  
fails?**



Stop?



Carry on with reduced  
functionality?



**Do you have  
a backup  
datacenter?**

How often do you  
failover apps to it?

How often do you failover the  
**whole datacenter** at once?

“Availability Theater”



## A fairy tale...

Once upon a time, in theory, if everything works perfectly, we have a plan to survive

the crisis we thought of in advance

# How did that work out?



---

Forgot to renew domain name...

SaaS vendor

---

Didn't update security certificate and it expired...

Entertainment site

---

Datacenter flooded in hurricane Sandy...

Finance company, Jersey City

---

Whoops!

**YOU, tomorrow**

---

**“You can’t legislate against failure, focus on fast detection and response.”**

**—Chris Pinkham**

# “Everything fails all the time.”

—Werner Vogels,  
CTO, Amazon



**“EVERYTHING FAILS ALL THE TIME. WE LOSE WHOLE  
DATACENTERS! THOSE THINGS HAPPEN.”**

**- WERNER VOGELS, AMAZON CTO**



**What is  
supposed to  
happen when  
part of the  
system fails?**

**How is it  
supposed to  
recover after  
the failure  
goes away?**

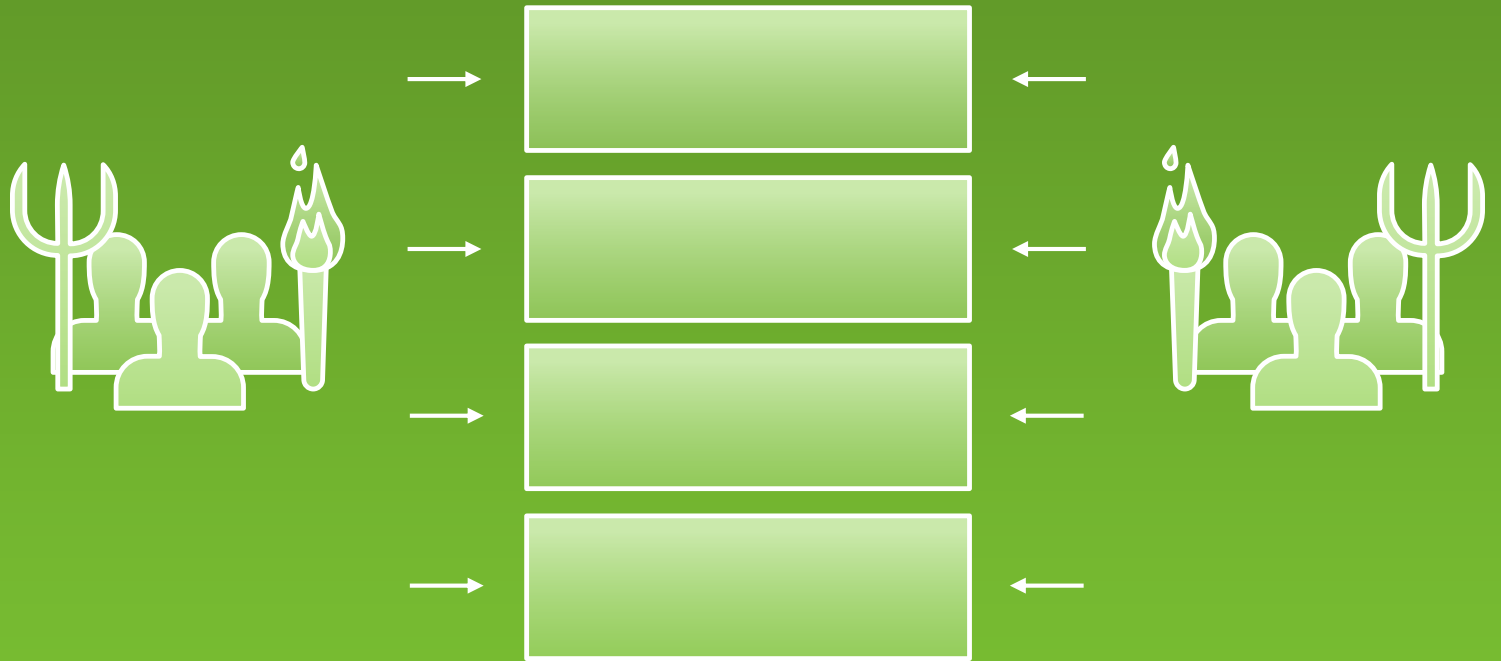
# Chaos Architecture



**A Cloud Native  
Availability Model**

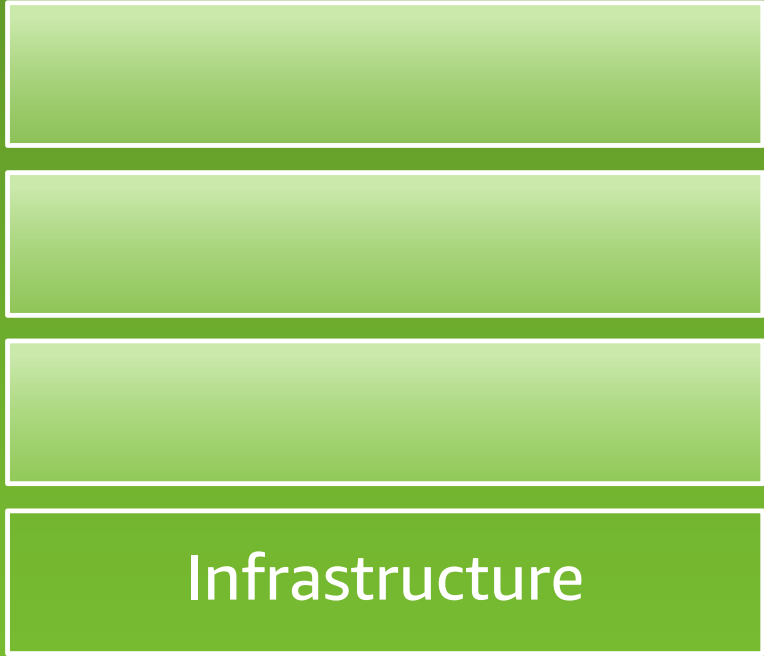
# Chaos Architecture

Four layers  
Two teams  
An attitude









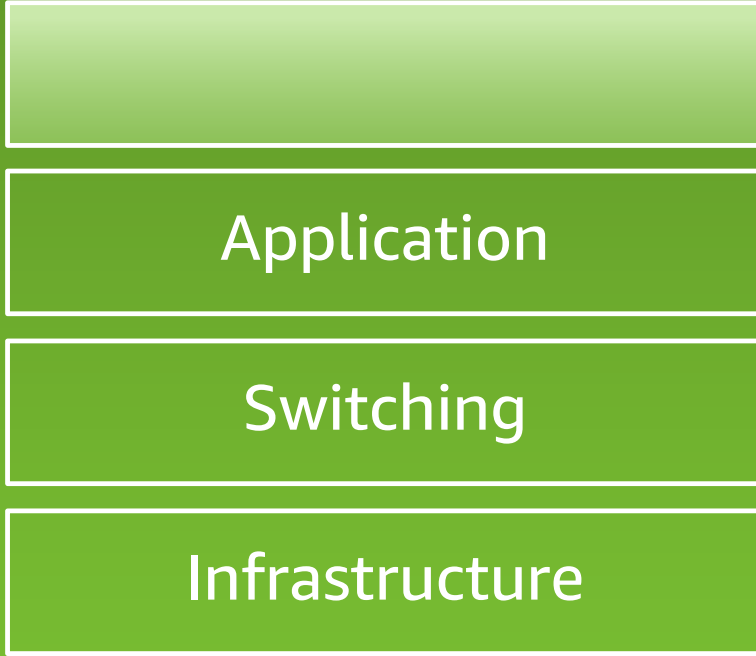




Switching

Infrastructure

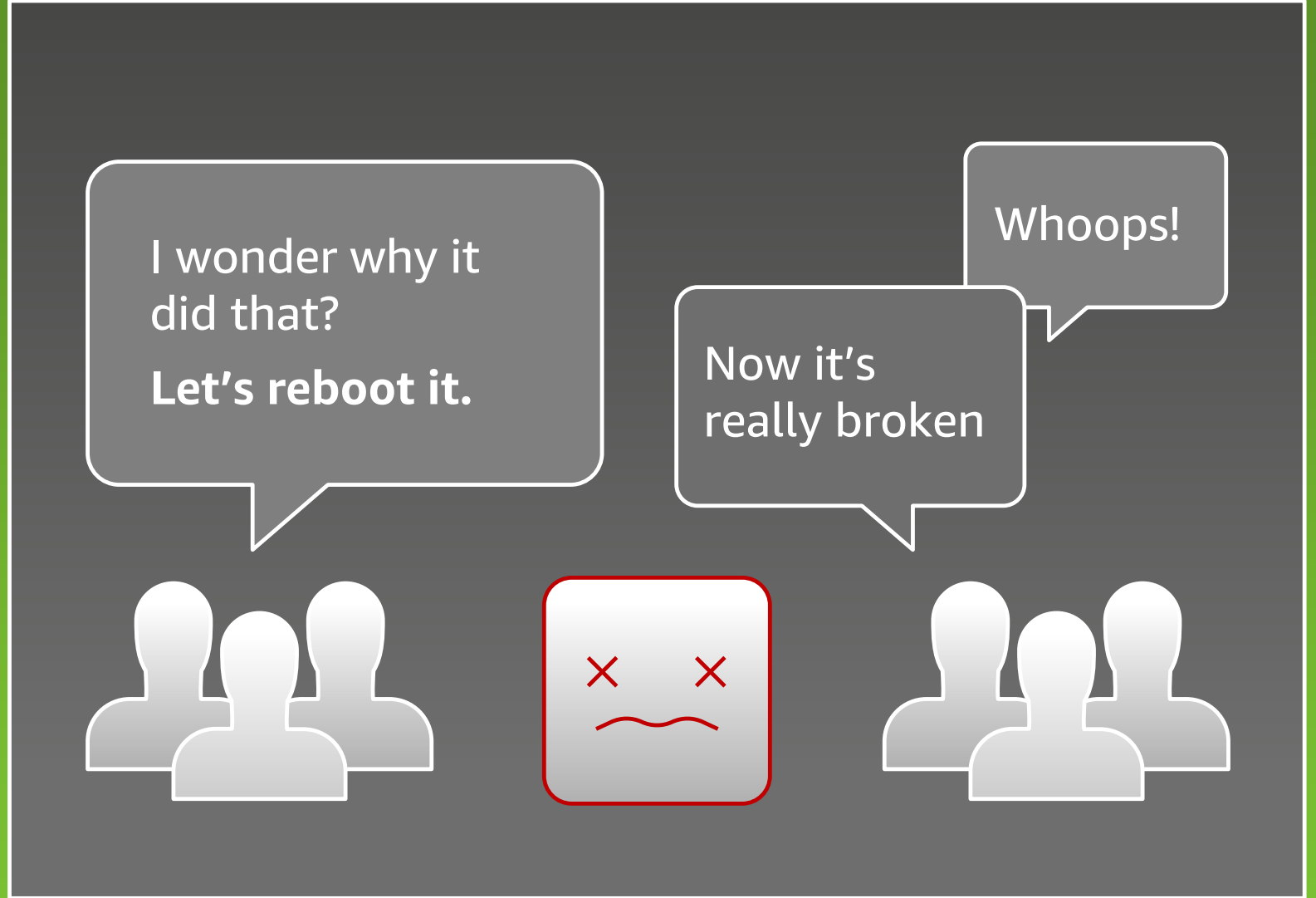






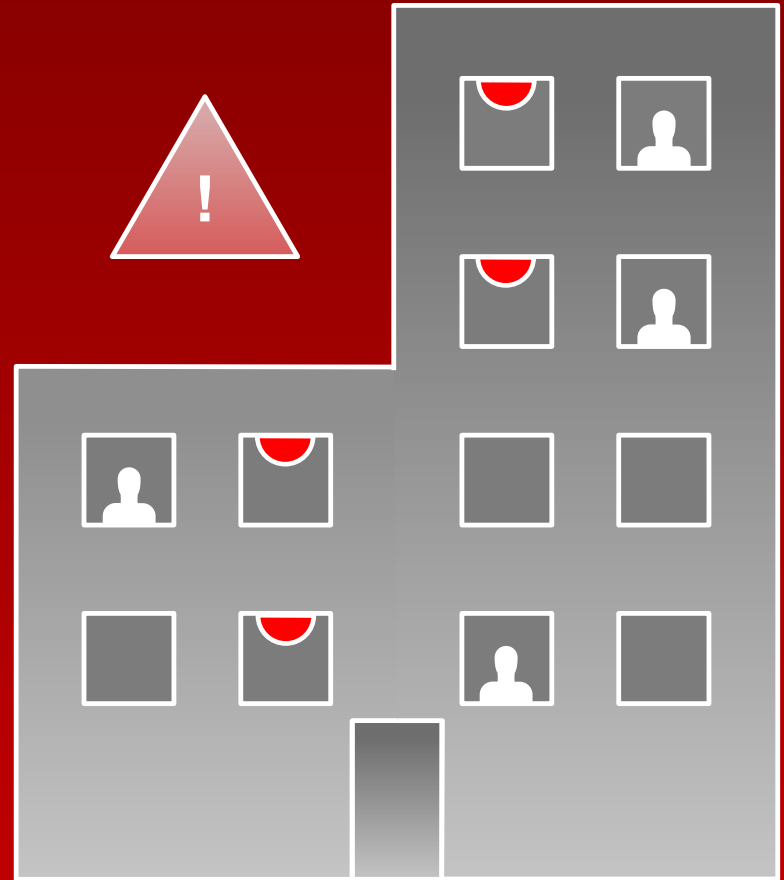
# People

Unexpected application behavior often causes people to intervene and make the situation worse



# People Training

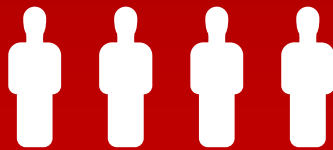
A fire drill is a boring routine where we make everyone take the stairs and assemble in the parking lot





# People Training

Fire drills save lives in  
the event of a real fire,  
because people are  
trained how to react



# Who runs the “fire drill” for I.T.?

People

Application

Switching

Infrastructure



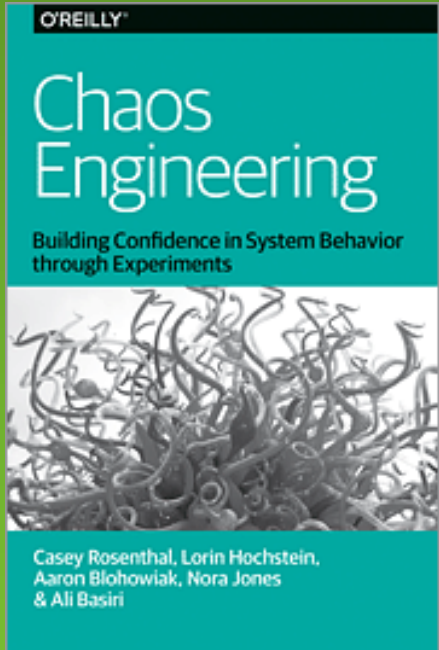
Chaos  
Engineering  
Team

People

Application

Switching

Infrastructure



Chaos  
Engineering  
Team

People

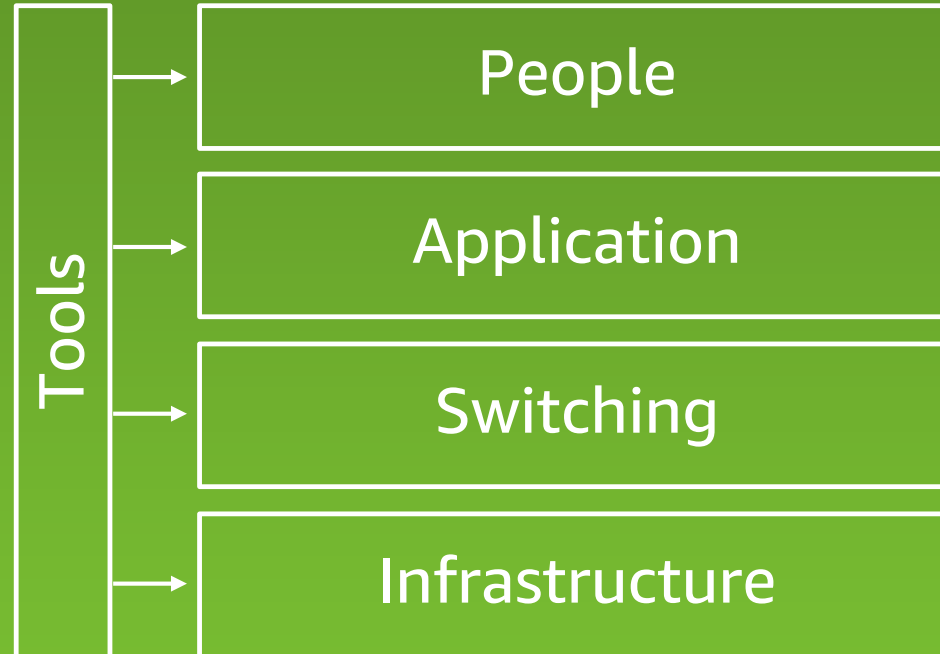
Application

Switching

Infrastructure



Chaos  
Engineering  
Team





Chaos  
Engineering  
Team

## Tools

Game days

Simian Army

chaostoolkit

ChAP



Gremlin

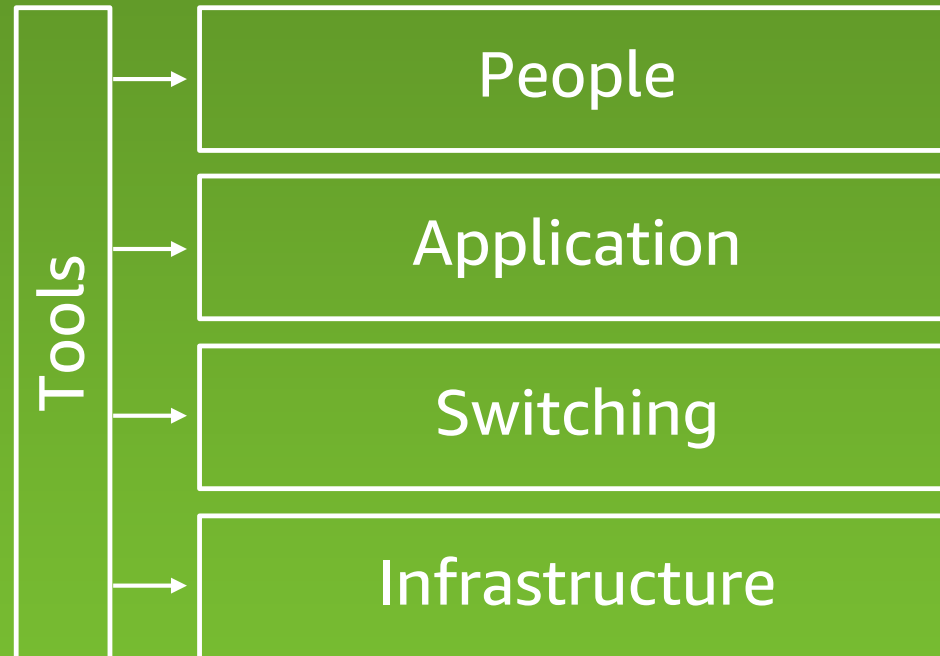


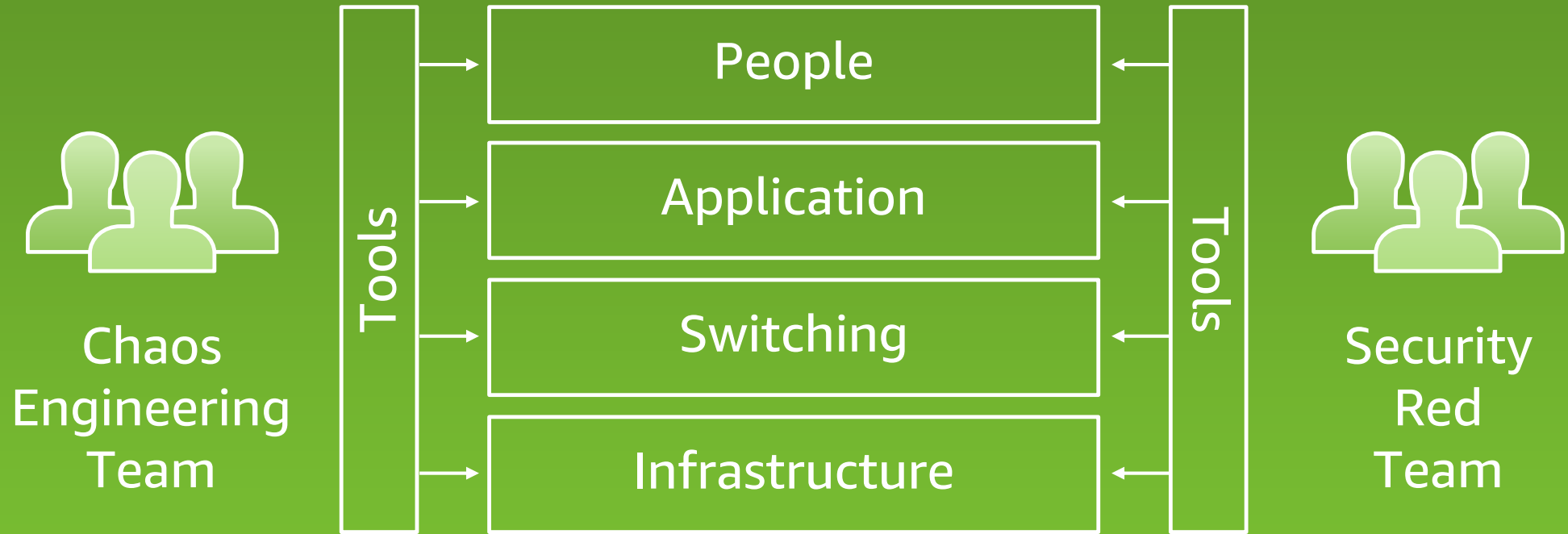
People

Application

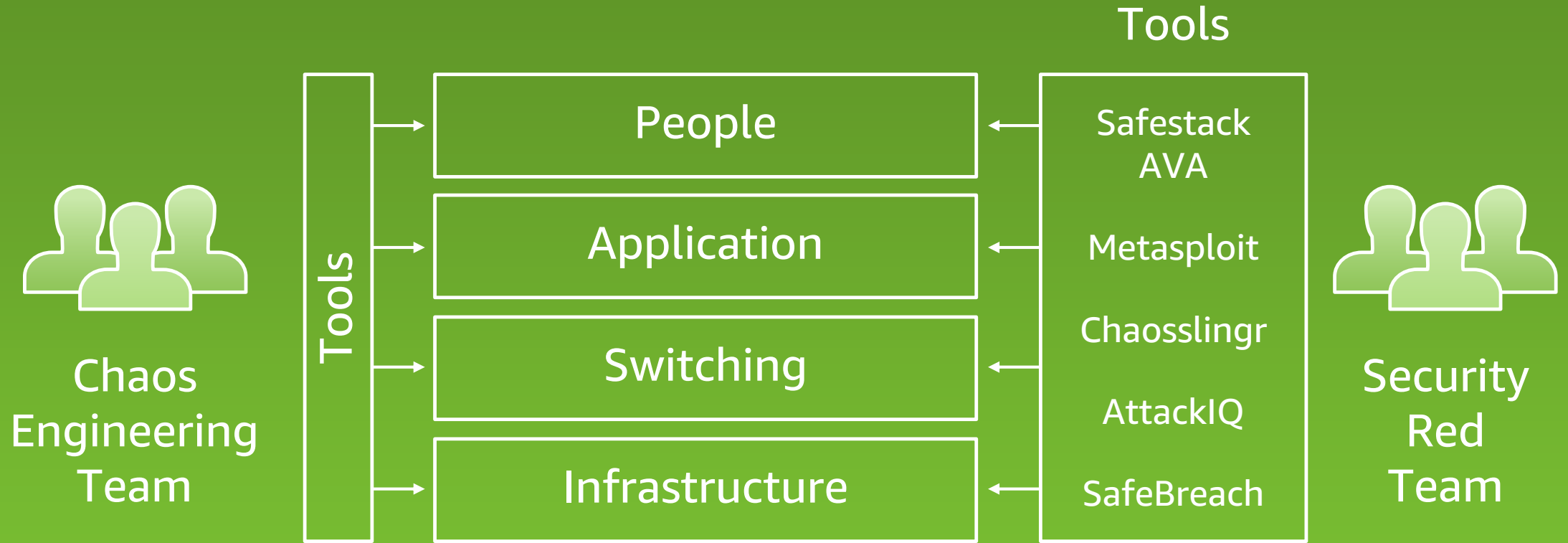
Switching

Infrastructure









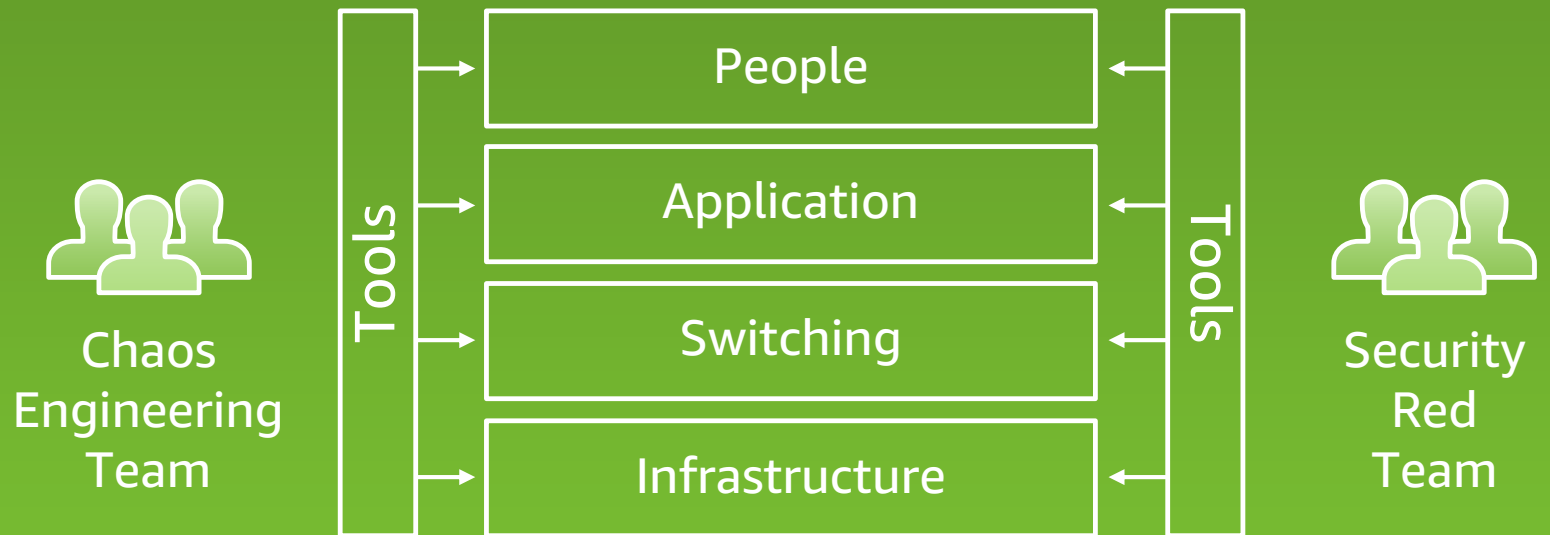
# Chaos Architecture

Four layers

Two teams

An attitude—

**Break it to prove it's resilient**



# Failures are a system problem— lack of safety margin

Not something with a root cause  
of component or human error





# Hypothesis testing

We think we have safety margin in this dimension, let's carefully test to be sure

In production

Without causing an issue

**Experienced Staff**

**Robust Applications**

**Dependable Switching Fabric**

**Redundant Service Foundation**

# Pathway for Digital Transformation

Speed



Scale



Strategic



Time to  
Value



Distributed  
Optimized  
Capacity



Critical Workloads  
Datacenter  
Replacement

Thank you!

Thank you!  
Wait there is more!





# How does Amazon Innovate?

**Nicolas Vautier**

Head of Solutions Architecture, Taiwan

---

“We want to be a large company that’s also an invention machine. We want to combine the extraordinary customer-serving capabilities that are enabled by size with the speed of movement, nimbleness, and risk-acceptance mentality normally associated with entrepreneurial startups.”

Jeff Bezos  
CEO, Amazon

---

# Amazon's **innovation** approach



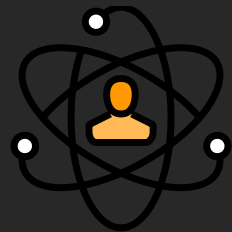
## **Mechanisms**

**Encoded behaviors that facilitate innovative thinking**



## **Architecture**

**Structure that supports rapid growth and change**



## **Culture**

**Customer obsession, hire builders, let them build, support them with a belief system**



## **Organization**

**Small, empowered teams that own what they create**

# Amazon's **innovation** approach



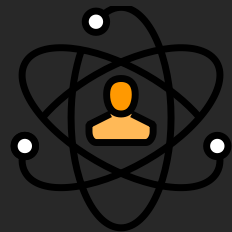
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# Working backwards— PR and FAQs

Work backwards  
from the customer

**Press release**

**FAQ**

**User manual**

## Press release

AWS Announces AWS IQ

September 30, 2019 at 1:41 PM EDT

*New service makes it easier and faster for customers to connect and collaborate with AWS-Certified third party experts*

SEATTLE--(BUSINESS WIRE)--Sep. 30, 2019-- Today, Amazon Web Services Inc., an Amazon.com company (NASDAQ: AMZN), announced the general availability of AWS IQ, a new service that helps customers quickly find, engage, and do business with AWS-Certified third party experts for on-demand project work. AWS IQ offers the tools and workspace for more secure collaboration, streamlined project tracking, and integrated billing. To get started, customers simply log into AWS IQ and describe their project needs in a few sentences. They can then chat with experts to clarify details of the project, compare proposals, review expert profiles, and select the expert that best fits their needs. There are no upfront commitments required to use AWS IQ, and customers pay for completed project milestones through their existing AWS account. To get started with AWS IQ, visit <http://aws.amazon.com/iq>.

# Amazon's **innovation** approach



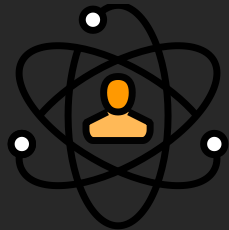
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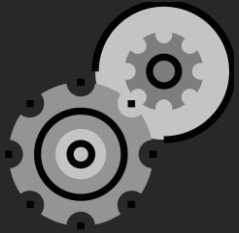
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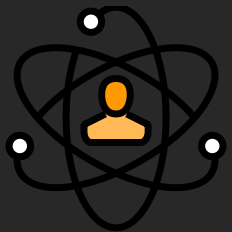
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## Architecture

Structure that supports rapid growth and change



## Culture

**Customer obsession,  
hire builders, let them build,  
support them with a belief  
system**



## Organization

Small, empowered teams that own what they create



# Amazon innovation equation—culture

“We will make **bold rather than timid** investment decisions where we see a sufficient probability of gaining market leadership advantages. Some of these investments will pay off, others will not, and we will have **learned another valuable lesson in either case.**”

Jeff Bezos  
2013 shareholder letter



**At Amazon, we hire builders and let them build**

# Amazon's **innovation** approach



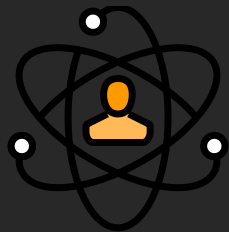
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# Amazon's **innovation** approach



## Mechanisms

Encoded behaviors that facilitate innovative thinking



## Architecture

Structure that supports rapid growth and change



## Culture

Customer obsession, hire builders, let them build, support them with a belief system



## Organization

Small, empowered teams that own what they create



Two-pizza teams

Full ownership

Full accountability

DevOps

Focused innovation



# Amazon's **innovation** approach



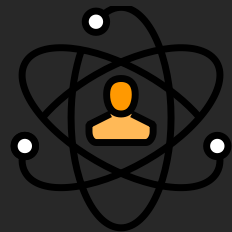
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Customer obsession, hire builders, let them build, support them with a belief system



## Organization

Small, empowered teams that own what they create



# Architecture

“We are creating powerful self-service platforms that allow thousands of people to boldly experiment and accomplish things that would otherwise be impossible or impractical.”

*Jeff Bezos*



# Amazon's **innovation** approach



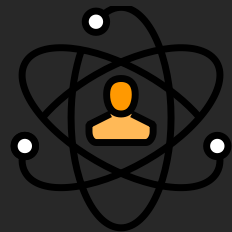
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1994	m	Founded
1995	m	Amazon.com
1998	m	CDs and DVDs
2006	m	AWS
2007	m	Kindle
2011	m	Video
2012	m	Groceries
2014	m	Alexa/Echo
2015	m	Bookstores
2017	m	Go

The right side of the image features a photograph of a woman with curly hair, wearing a light-colored jacket over a white top, shopping in an Amazon Go store. She is holding a brown paper bag filled with groceries, including a salad and a sandwich. The background shows shelves stocked with various items. Overlaid on the image is the 'amazon go' logo in white, with the word 'amazon' in a standard font and 'go' in a larger, bolder font. Below the logo, the text 'No Lines. No Checkout. (No, Seriously.)' is written in a white, sans-serif font.

amazon go

No Lines.  
No Checkout.  
(No, Seriously.)

# Thank you! (for real)

Nico Vautier

[nvautier@amazon.com](mailto:nvautier@amazon.com)

<https://www.linkedin.com/in/nicolasvautier/>

