



**Banking on Innovation & DevOps**

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## Past:

- PhD in Semiconductor Physics
- Over 20 years of IT experience as Developer, Architect, System Engineer
- Experience in Retail, Healthcare and Finance industries



# Relative to our peers, we are a start-up



*“Every single person in the US had the same credit card.*

*It made absolutely no sense.”*

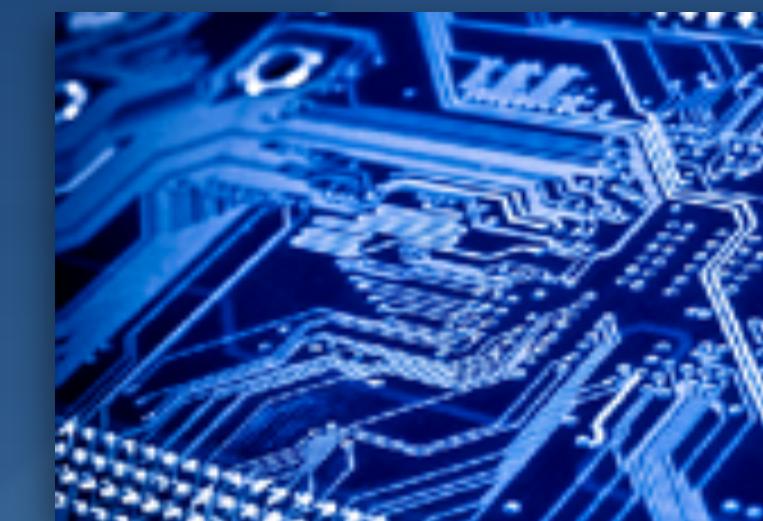
Rich Fairbank  
Capital One Founder & CEO



# Information Based Strategy (IBS)



+



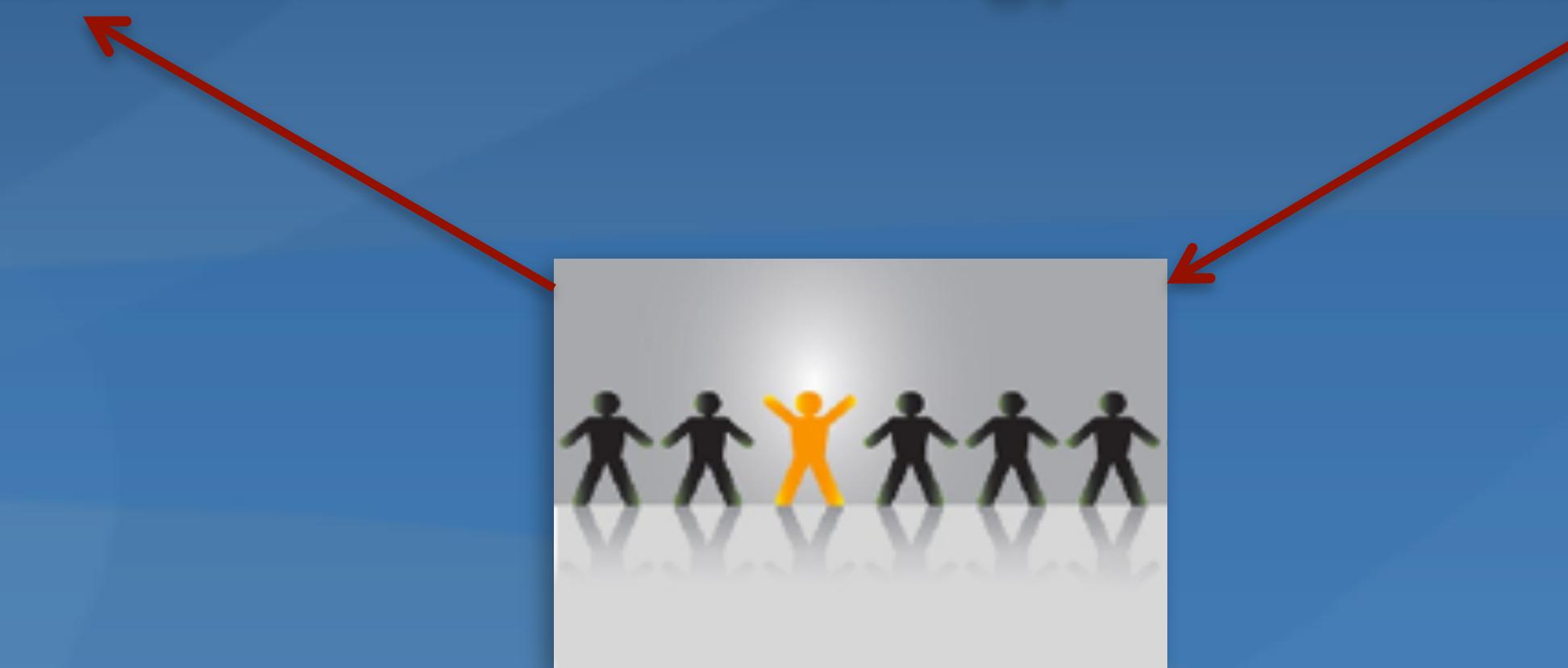
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Data

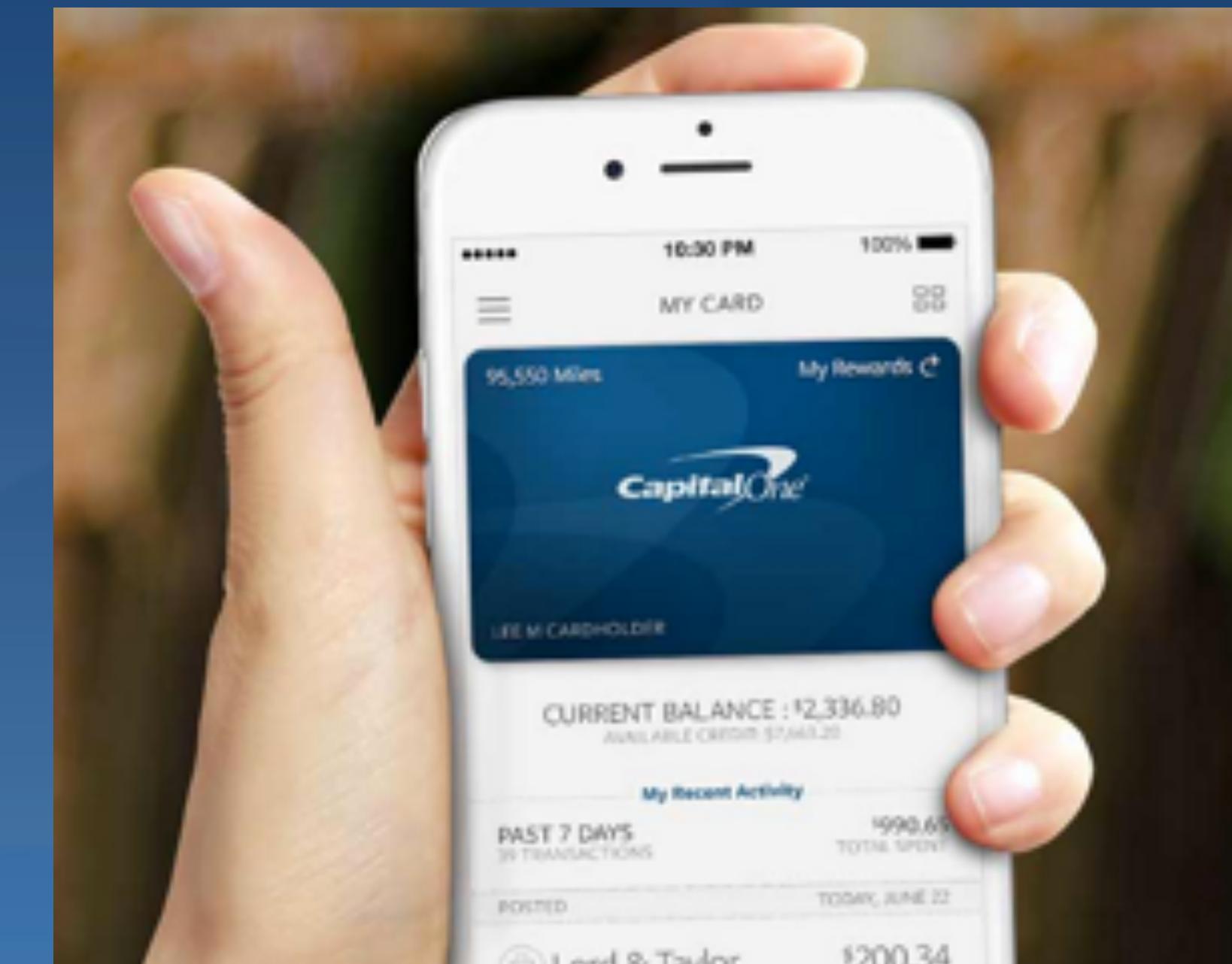
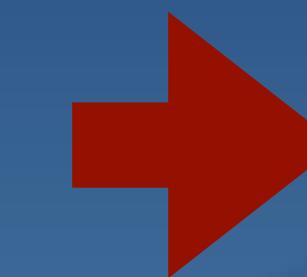
Technology

Data Science

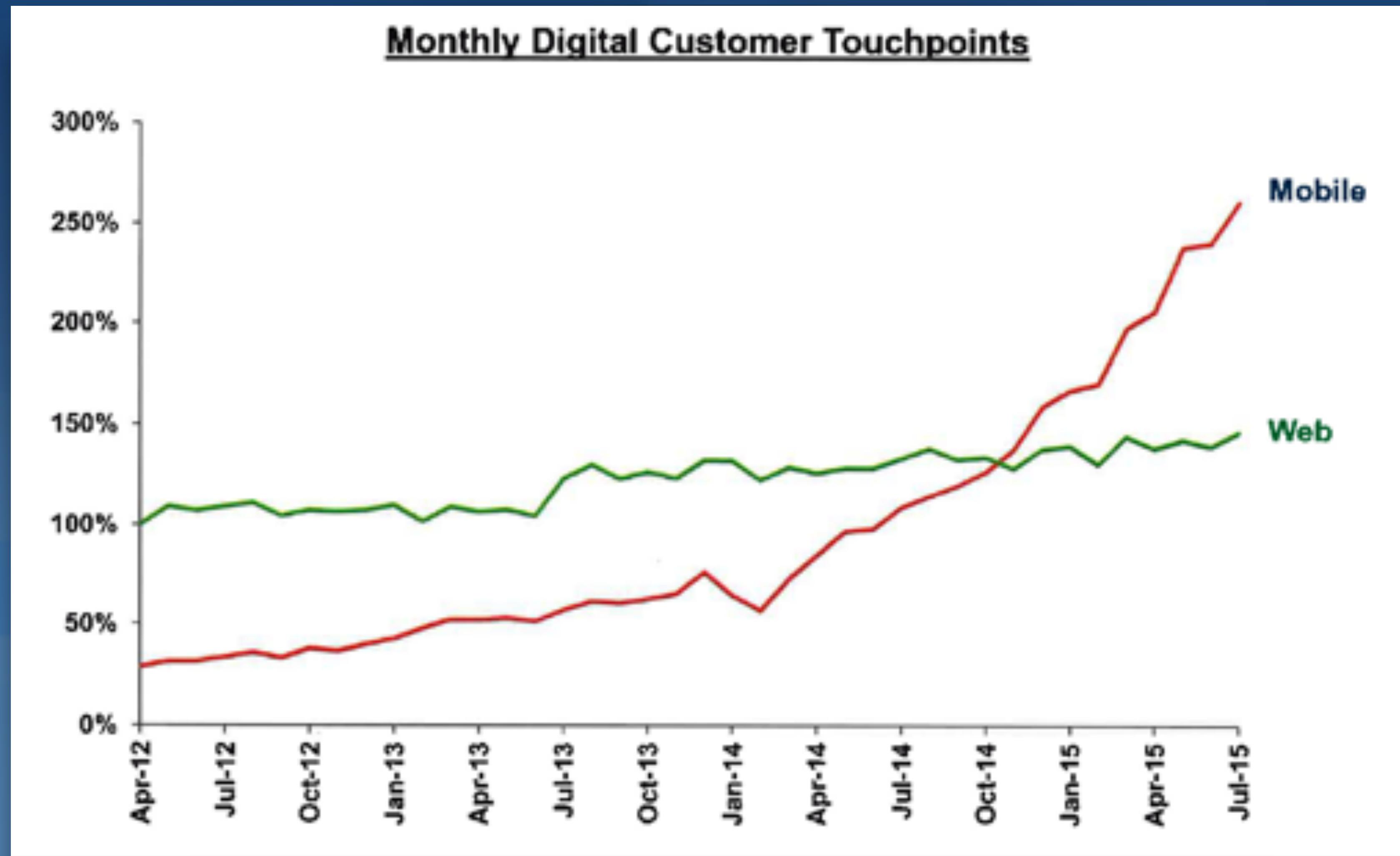


Test & Learn

# The Digital Revolution



# Mobile First



*"Ultimately the winners in banking will have the capabilities of a world-class software company."*

Rich Fairbank  
Capital One Founder & CEO

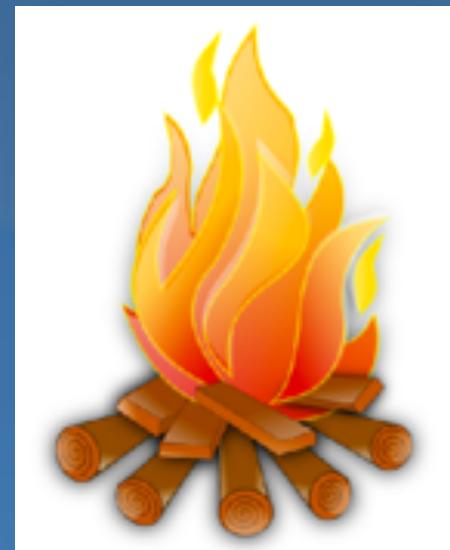
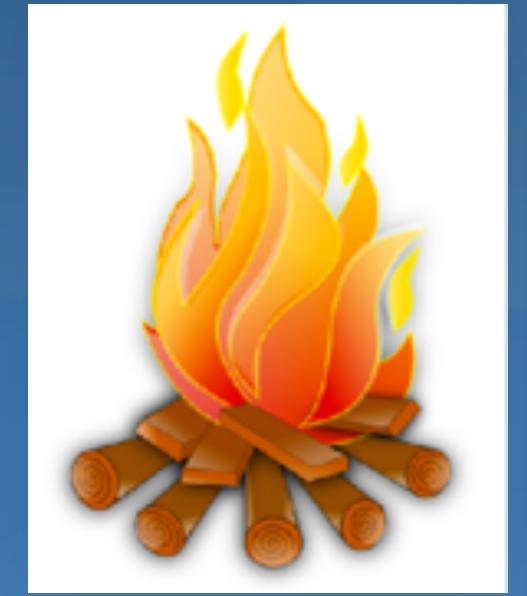
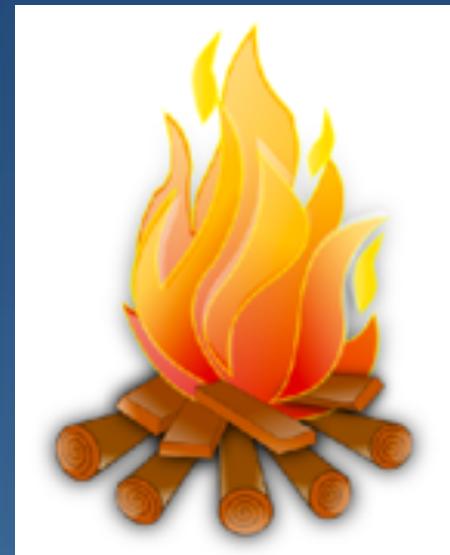
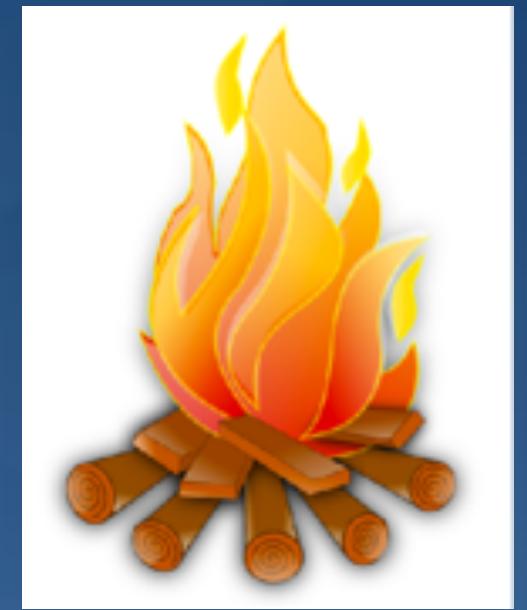
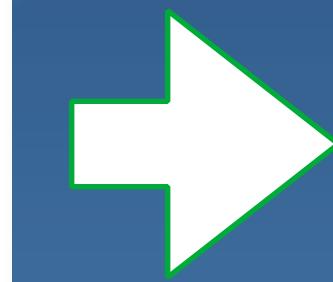
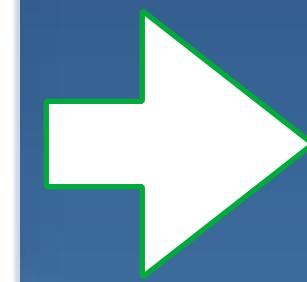
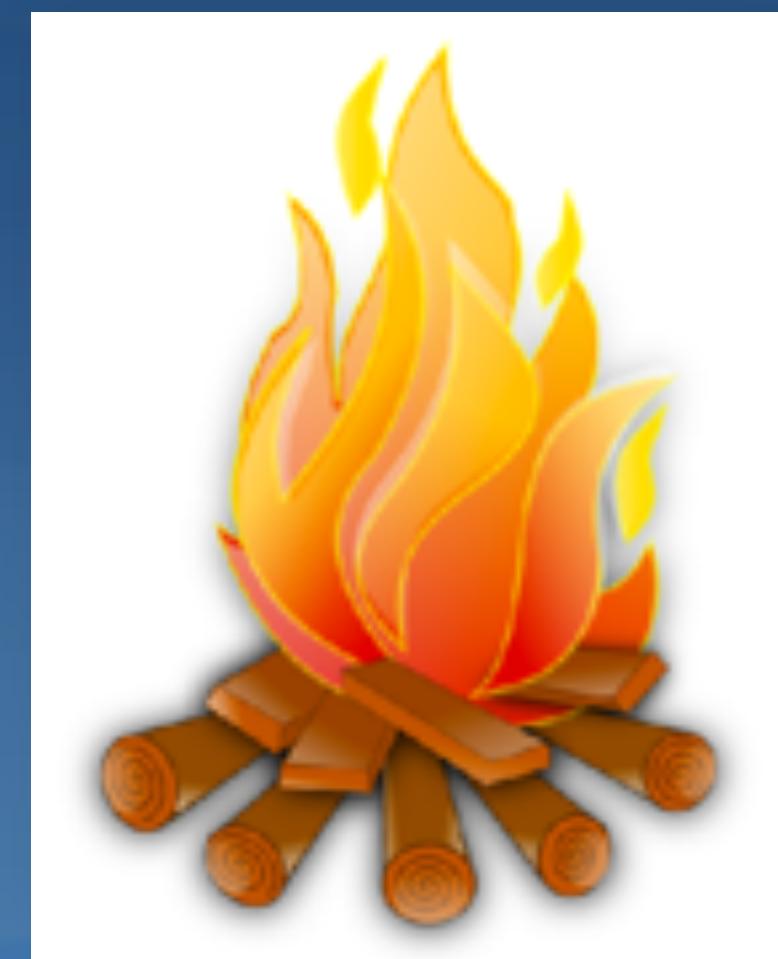


## About Four Years Ago...

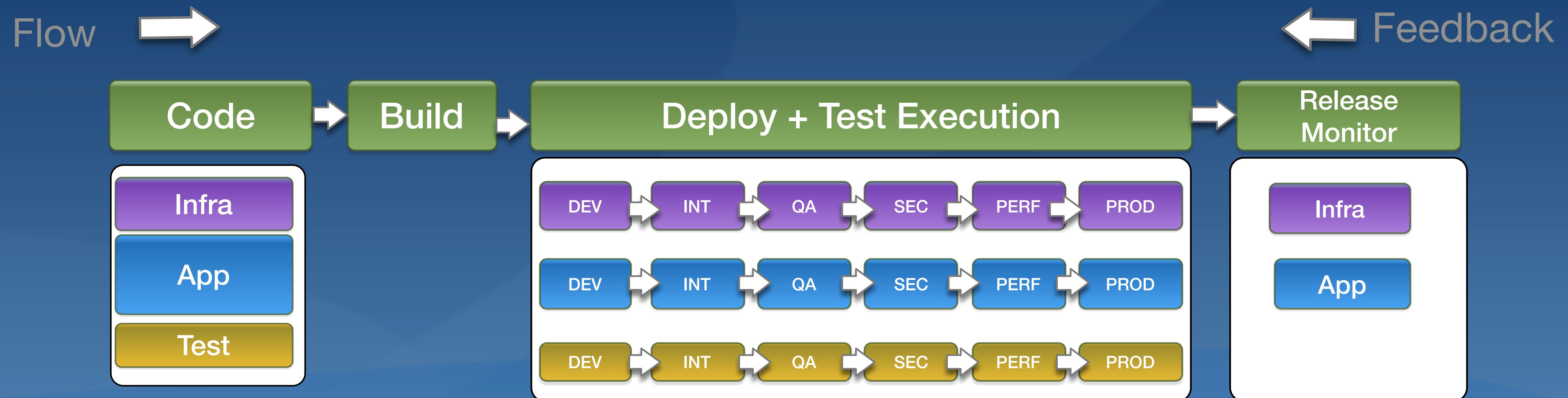
- Mostly outsourced
- Waterfall
- Quarterly Releases
- Manual Processes
- Change Orders



# Seed of “DevOps”







# Building a server in a Data Center

- Steps = 62
- Days = 60
- Cost = \$25k
- Pain = @#\$%^&\*
- Opportunity cost = ?????

# PUBLIC CLOUD



# NEXT GENERATION INFRASTRUCTURE





Tracking health of your software delivery pipeline

<http://github.com/capitalone/Hygieia>



## Feature

Scopes VersionOne - Scrum/IT  
SPRINT: SPRINT 15, ... A DAY

82    17    5

TOTAL    WIP    DONE

## FEATURES IN PROGRESS

Multiple Business Types	45
Tech Debt	17
Google Type Ahead	8
Web Analytics and Customer Feed... 6	

## Code Repo

## COMMITS PER DAY

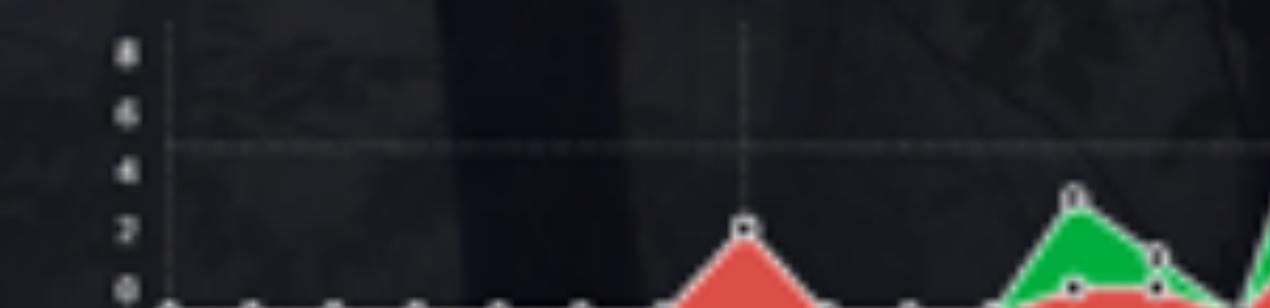


## SUMMARY

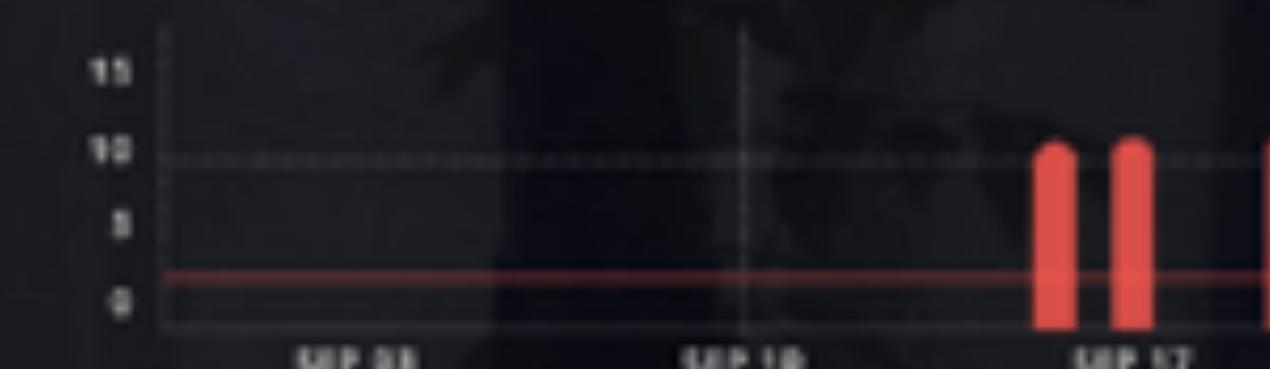
TOTAL COMMITS	31	141	175
CONTRIBUTORS	13	26	27
TODAY	LAST 7 DAYS	LAST 14 DAYS	

## Build

## BUILD PER DAY



## AVERAGE BUILD DURATION



## 3 hr ago

## LATEST BUILDS

● 17	3 hr ago	<a href="#">View</a>
✓ 16	3 hr ago	<a href="#">View</a>
● 15	3 hr ago	<a href="#">View</a>
● 14	3 hr ago	<a href="#">View</a>
✓ 13	3 hr ago	<a href="#">View</a>

## 3 hr ago

## Monitor

## DEPENDENT SERVICES

✓ Chef Platform: Chef 11 KDC

## Deploy

## 4 hr ago

● DEV1 6 hr ago 3 ↑ 0 ↓

✓ DEV2 Aug 23 3 ↑ 0 ↓

✓ DEV3 12h ago 3 ↑ 0 ↓

● DEV4 Jul 29 3 ↑ 0 ↓

● DEV5 5h ago 3 ↑ 0 ↓

● DEV6 6h ago 3 ↑ 0 ↓

● DEV7 Aug 23 3 ↑ 0 ↓

● DEV8 Sep 1 3 ↑ 0 ↓

✓ DEV9 3d ago 3 ↑ 0 ↓

✓ DEV10 2d ago 3 ↑ 0 ↓

✓ DEV11 3d ago 3 ↑ 0 ↓

● DEV12 Apr 23 6 ↑ 0 ↓

● DEV13 Apr 23 6 ↑ 0 ↓

● DEV14 Apr 23 6 ↑ 0 ↓

● DEV15 Apr 23 6 ↑ 0 ↓

✓ DEV17 Aug 6 2 ↑ 0 ↓

● QAD-Team1 Jul 32 3 ↑ 0 ↓

● QAD-Team2 3d ago 3 ↑ 0 ↓

## Quality

## STATIC ANALYSIS

Blocker	1
Critical	183
Major	3,334
Issues	22,253

## VERSION 1510.07 SNAPSHOT

90.6% RULES COMPLIANCE  
198d TECHNICAL DEBT  
CODE COVERAGE

## UNIT TESTS

SUCCESS	100.0%
Failures	0
Errors	0
Tests	3,287

## SECURITY ANALYSIS

Blocker	-
Critical	-
Major	-
Issues	-

## FUNCTIONAL TESTS





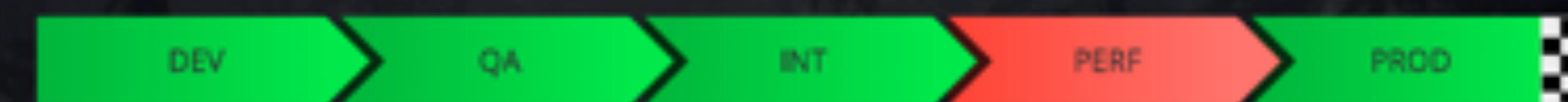
## NSB dash

Widget

Pipeline

## Delivery Pipeline

3d ago ⓘ



	DEV	QA	INT	PERF	PROD
nsb-app	1510.07-SNAPSHOT 12h ago	1510.06-SNAPSHOT... 3d ago	1508.09-SNAPSHOT... Aug 6	1508.05-SNAPSHOT... Jul 29	150916.03 3d ago
nsb-client	1507.02-SNAPSHOT... Jun 11	1507.02-SNAPSHOT... Jun 29		1506.04 May 28	150618.01-SNAPS... Jun 16
nsb-client2	1510.01-SNAPSHOT... 12h ago	1510.01-SNAPSHOT... 3d ago	1508.06-SNAPSHOT... Aug 6	1510.01-SNAPSHOT... 2d ago	1509.18-13 3d ago



### Instance Age

ID	AGE	TYPE	IMAGE	DISK I/O (KB)	N/W I/O (KB)	VPC
i-56638bf5	0	m3.medium	ami-4906bf22	0.0/0.0	3,678.7/96.7	
i-df6fe060	0	t2.micro	ami-2f60bc44	0.0/0.0	0.0/0.0	vpc-f2428a97
i-8d4ec132	0	t2.micro	ami-2f60bc44	0.0/0.0	0.0/0.0	
i-c36c8460	0	t2.micro	ami-2f60bc44	0.0/0.0	0.0/0.0	
i-e649a145	0	t2.micro	ami-2f60bc44	0.0/0.0	0.0/0.0	

### CPU Utilization

ID	CPU	TYPE	IMAGE	DISK I/O (KB)	N/W I/O (KB)	VPC
i-df6fe060	100.00%	t2.micro	ami-2f60bc44	0.0/0.0	0.0/0.0	vpc-f2428a97
i-c2c4c269	75.40%	m3.large	ami-3b45b250	0.0/0.0	145.5/223.5	vpc-f2428a97
i-8bd71b2b	57.54%	m3.large	ami-3b45b250	0.0/0.0	218.9/318.6	vpc-f2428a97
i-877a0224	50.05%	t2.micro	ami-2f60bc44	0.0/0.0	0.0/0.0	
i-8d4ec132	58.73%	t2.micro	ami-2f60bc44	0.0/0.0	0.0/0.0	
i-c36c8460	52.25%	t2.micro	ami-2f60bc44	0.0/0.0	0.0/0.0	

### Encryption Status List

ID	ENC	TYPE	IMAGE	DISK I/O (KB)	N/W I/O (KB)	VPC
i-039181a0	✓	t2.small	ami-e9b8c48c	0.0/0.0	8.0/97.8	vpc-f2428a97
i-5af8cef1	✗	✓	m3.medium	ami-2f60bc44	0.0/0.0	0.0/0.0
i-de8a237e	✓	✓	m3.medium	ami-0f86e96a	0.0/0.0	105,613.2/1,232.6
i-cf57bf6c	✓	✓	m3.medium	ami-4906bf22	0.0/0.0	vpc-f2428a97
i-831c9d3c	✓	✓	m3.large	ami-4906bf22	0.0/0.0	11.7/95.2
i-59a5e8f5	✓	✓	m3.medium	ami-3b45b250	0.0/0.0	16.7/102.3
i-63ce70dc	✓	✓	m3.medium	ami-4906bf22	0.0/0.0	vpc-f2428a97

# More to come...

- Analytics Garage
- Push Button Developers Environment

<http://capitalone.io>

# Our Open Source Contributions

This block displays a screenshot of a GitHub repository page. The page shows contributions to several projects:

- boto / botocore
- chef / knife-ec2
- nicklockwood / iCarousel
- DozerMapper / dozer
- PyGitHub / PyGitHub



**SWAGGER**

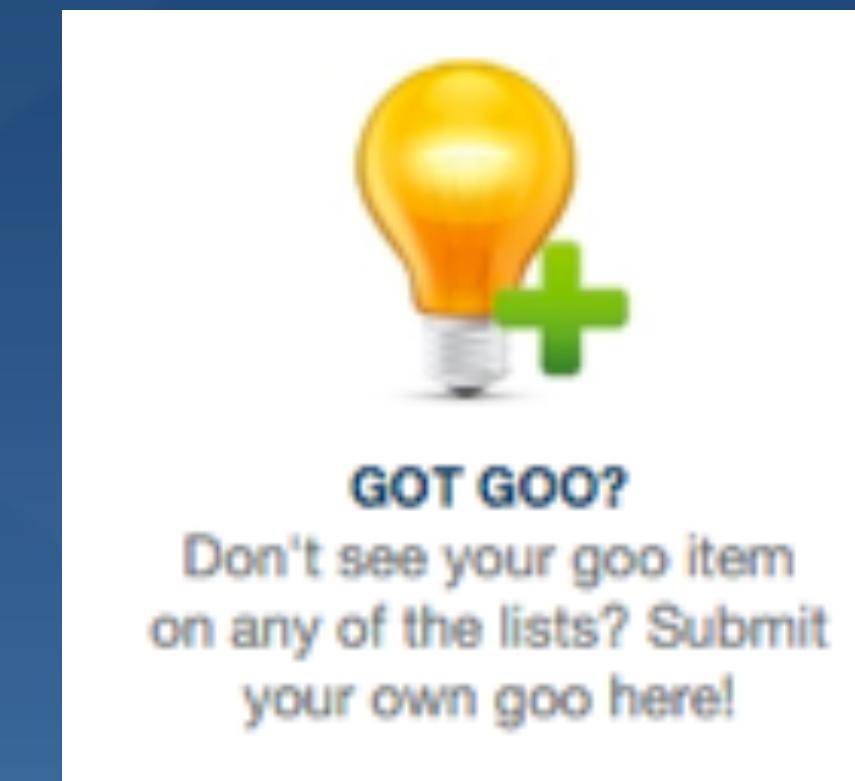
# Why are we Open Sourcing our tools?

- It is the right thing to do
- Culture of Continuous Experimentation and Learning
- Open Sourcing makes it better
- We found it inevitable to do DevOpsSec the right way

# Where are we now

Code Commit	Random	→	100s /day
Integration	1/ month	→	15 mins
Deployment	Manual	→	Automated
QA, Perf	1/ month	→	4 / day
Prod Release	monthly/ quarterly	→	1 / sprint
Unit Test	?	→	~90% +

# How do we scale



**pulse**

DEPARTMENTS ▾ APPS ▾ RESOURCES ▾

HOME 41 CONTENT PEOPLE PLACES GROUPS ▾

A screenshot of a company intranet homepage. The header features the word "pulse" in a red, lowercase, sans-serif font. Below the header is a dark blue navigation bar with white text. The "HOME" button is highlighted with a red badge containing the number "41". Other menu items include "CONTENT", "PEOPLE", "PLACES", and "GROUPS" which has a dropdown arrow.



Questions Tags Users Badges Unanswered

Ask Question

## Tags

popular name

Questions are grouped by tags. Using the right tags makes it easier for others to find and answer your question.

Type to find tags:

entdevops × 888	hudson × 95	adobeanalytics × 63	rest × 45	proxy × 32
eapi × 867	jumpbox × 95	sitecatalyst × 62	swagger × 45	windows × 31
aws × 787	hadoop × 89	sonar × 61	chassis-devops × 43	spark × 30
eapi-framework × 730	eapi-testing × 54	cloudformation × 60	eapi-governance × 41	security × 30
jenkins × 414	eapi-system-team × 63	ruby × 60	docker × 41	mongodb × 30
upf × 279	ciod × 63	python × 59	sinwatch × 40	git × 29
nexus × 221	hive × 63	api × 58	inspicio × 40	access × 29
udeploy × 199	eapi-resource × 79	developer-portal × 57	aws-ec2 × 39	teradata × 29
openupf × 138	oss × 73	spring × 53	email × 37	bigdata × 28
maven × 135	mobility × 72	audit × 51	hots × 37	dsd-automation × 28
chef × 126	meta × 71	svn × 50	mac × 35	native × 28
github × 124	ec2 × 71	eapi-publishing × 49	javamap × 33	hazelcast × 27
tomcat × 109	auditing × 68	dsd × 49	s3 × 33	ssl × 27
chassis × 95	java × 66	data-registry × 46	yoshi × 33	public-cloud × 26

1 2 3 4 5 ... 22 next

# Our First ever Software Engineering Conference



2 days

1,200+ attendees

13 Learning Tracks

28 Tech Expo Booths

52 Sessions

0 Vendor



## Risk Management & Innovation

Dispelling the Myths and Driving our Future

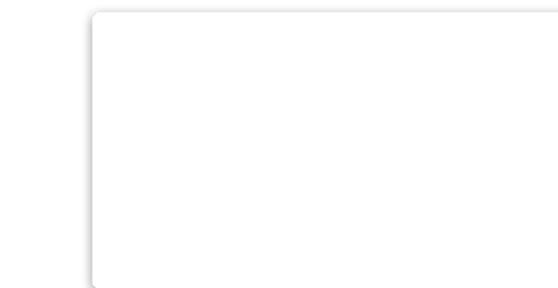
# We hear you:

- Need to push code more quickly & efficiently while managing risk
- Need to understand the risk requirements earlier rather than later
- Need to have a single point of human contact to help you through the risk processes
- Need to have risk processes that work with your SDLC





**Wait...innovation in risk? Hell yeah.**



**PLUG**  
Into Risk 17

