



# Capital One Shifts Left

# About Me



## Past:

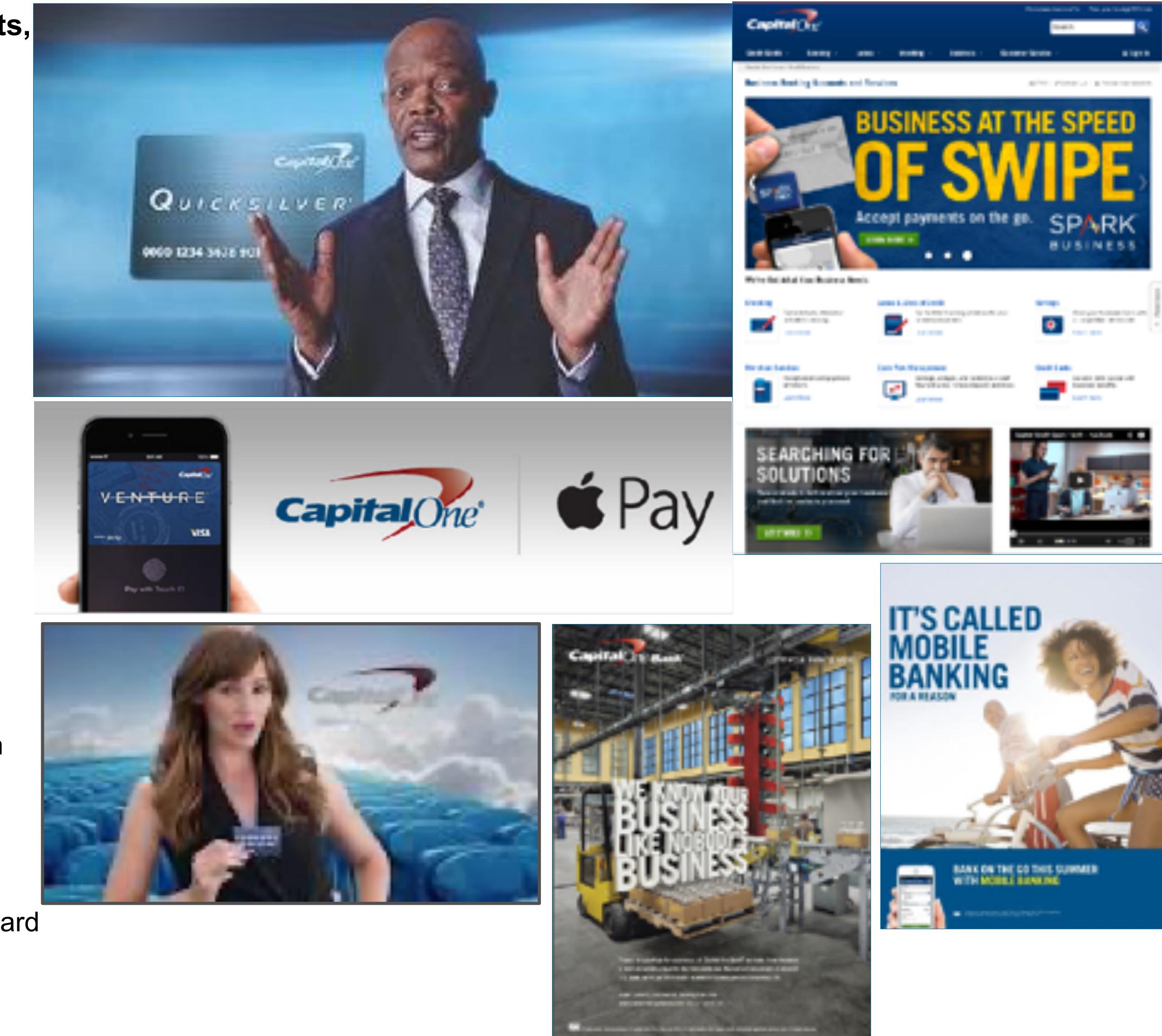
- PhD in Semiconductor Physics
- Over 15 years of IT experience as Developer, Architect, System Engineer
- Experience in Retail, Healthcare and Finance industries

## Current:

- DevOps strategy for the Enterprise
- Architecture for Mobile Wallet initiatives

# Capital One at a glance

- **A leading diversified bank with \$298.3 billion in assets, \$198.5 billion in loans and \$205.9 billion in deposits**
  - 7<sup>th</sup> largest bank based on U.S. deposits<sup>1</sup>
  - 5<sup>th</sup> largest retail depository institution in metro New York<sup>2</sup>
  - Largest consumer and commercial banking institution headquartered in the Washington, DC region
  - 4<sup>th</sup> largest credit card issuer in the U.S.<sup>3</sup>
  - The 3<sup>rd</sup> largest issuer of small business Visas and MasterCards in the U.S.<sup>4</sup>
  - The 3<sup>rd</sup> largest independent auto loan originator<sup>5</sup>
  - Largest US direct bank<sup>6</sup>
- **Major operations in 15 U.S. cities, Canada, U.K.**
- **More than 65 million customer accounts and 44,000 associates**
- **A FORTUNE 500 Company - #124**
- **Numerous recent awards including:**
  - Named to 100 Best Companies to Work For by *FORTUNE* Magazine
  - Listed in Top 50 Companies for Diversity by *Diversity Inc.*
  - No. 2 on 2014 *Information Week* Elite 100
  - Received J.D. Power & Associates Call Center Certification
  - *Fortune* Top Companies for Leaders
  - Named to *Working Mother's* 100 Best Companies list & Best Companies for Hourly Workers
  - Ranked #7 on *Military Times'* 2014 "Best for Vets"
  - 2014 Secretary of Defense Employer Support Freedom Award recipient



1) Domestic deposits ranking as of Q1'14

2) Source: FDIC, June 2013, deposits capped at \$1B per branch

3) Company-reported domestic credit card Outstanding, Q2'14, American Express and Charge Cards

4) Source: Nilson Report, Q4'12

5) Source: JD Power, Q2'14 YTD

6) FDIC, company reports as of Q1'14

# Capital One IT Structure

- **Shared Technology Services**
  - Enterprise Architecture
  - Information Security
  - Digital Channels
  - API Platform
  - Platform Engineering and Services



# TECH

- **LOB Centric IT Organizations**
  - Architecture
  - Development
  - Quality Services
  - Operations



## Agile Continuous Improvement Practice

Integrated Solutions ★ Agile-Lean Experience ★ Continuous Improvement

- Software Development follows Agile methodology across all Line of Businesses
- Kanban is used where applicable
- 500+ Agile Teams
- We embraced Scaled Agile Framework (SAFe)

## About three years ago...

- Manual Build, Test, Deployment
- Ticket based, on demand
- Unreliable builds, unknown dependencies
- Security scan/testing just before production release
- Complex process

## The Problem to solve

**Deliver High Quality Working Software Faster**



## The Problem to solve

- Across LOBs, Shared Services and 3rd Parties
- Tested end-to-end
- All dependencies are satisfied

## Deliver High Quality Working Software Faster

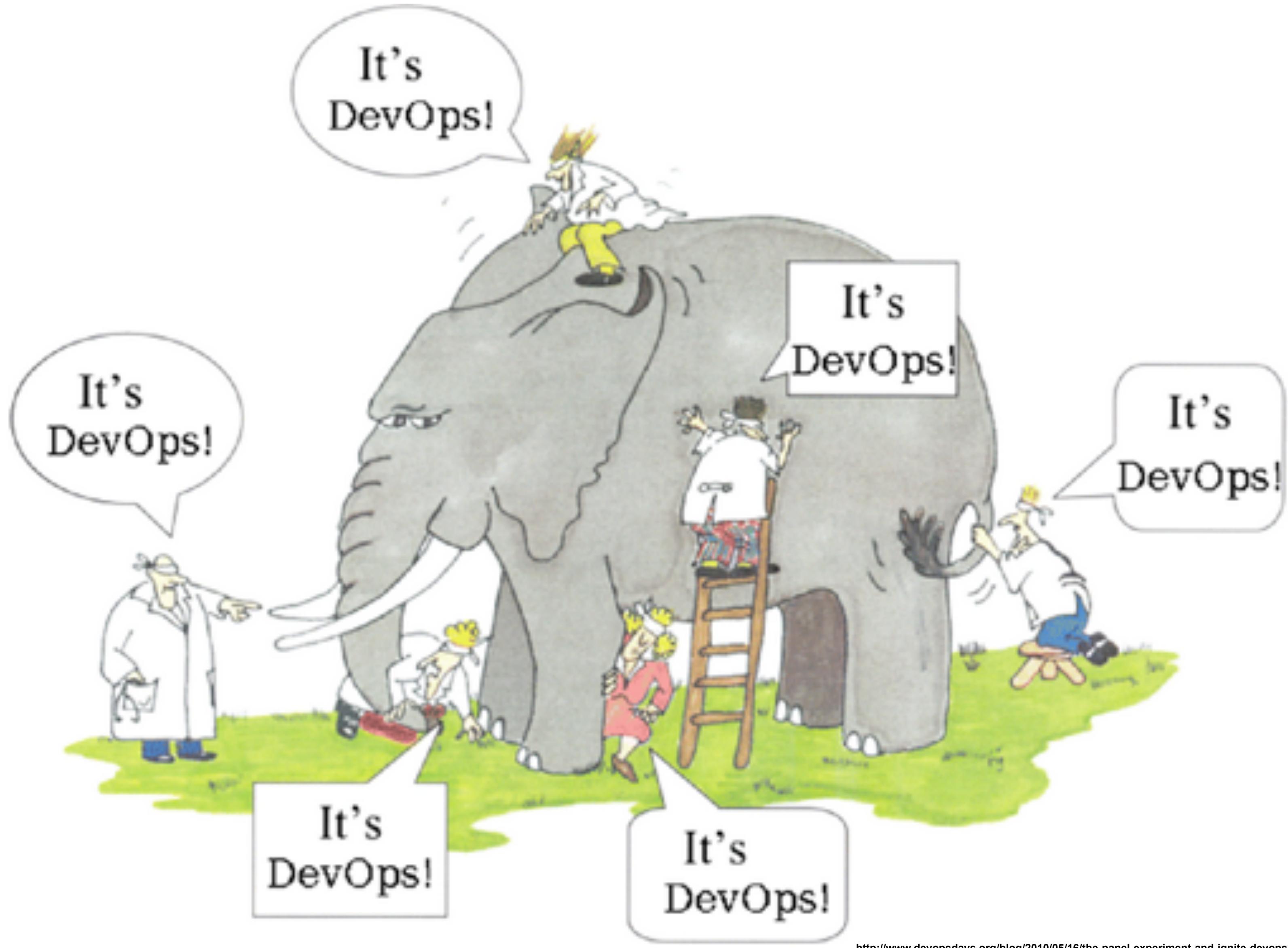
- No security flaws
- No legal flaws
- Minimum defects
- All levels of testing done
- Code reviewed and source controlled
- Testing of application, configuration, scripts etc.

- Every successful build to DEV Env
- Multiple times a day to INT Environment
- At least once a day to QA Environment
- Multiple times a week to PERF Environment
- End of a sprint to PROD



# DevOps

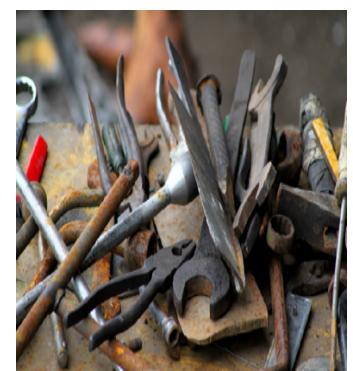
# What is DevOps?



<http://www.devopsdays.org/blog/2010/05/16/the-panel-experiment-and-ignite-devops/>

# Tools





# Tools

# New Tools



Tools  
New Tools

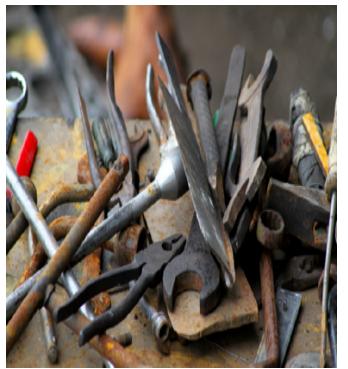
**Automation**



TERM WORKING  
SKILLS INDIVIDUAL  
KNOWLEDGE THAT IMPORTANT  
LEARNING SECTION BASED LARGE  
COLLABORATION UNITED MEDIA  
MANAGEMENT ARE GROUPS WORK PROJECT PROJECT  
HARDWARE STANDARDS PARTNERS MODERN THE COMPLEX  
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INFORMATION ECONOMIC COMMUNICATION INDUSTRY  
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# COLLABORATION

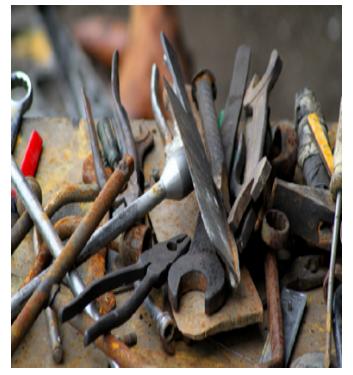
Tools  
New Tools  
Automation  
**Collaboration**



Tools  
New Tools  
Automation  
Collaboration  
**Culture Change**



Tools  
New Tools  
Automation  
Collaboration  
Culture Change  
**Security?**



Tools  
New Tools  
Automation  
Collaboration  
Culture Change  
Security?  
**Compliance?**

~~Hugs~~ available ~ One size fits all  
**DevOps**





**some one lied to you!**

**one size**

**does not fit all!!!**

# My Favorite Movie: Escape to Victory — 1981



# BYOD

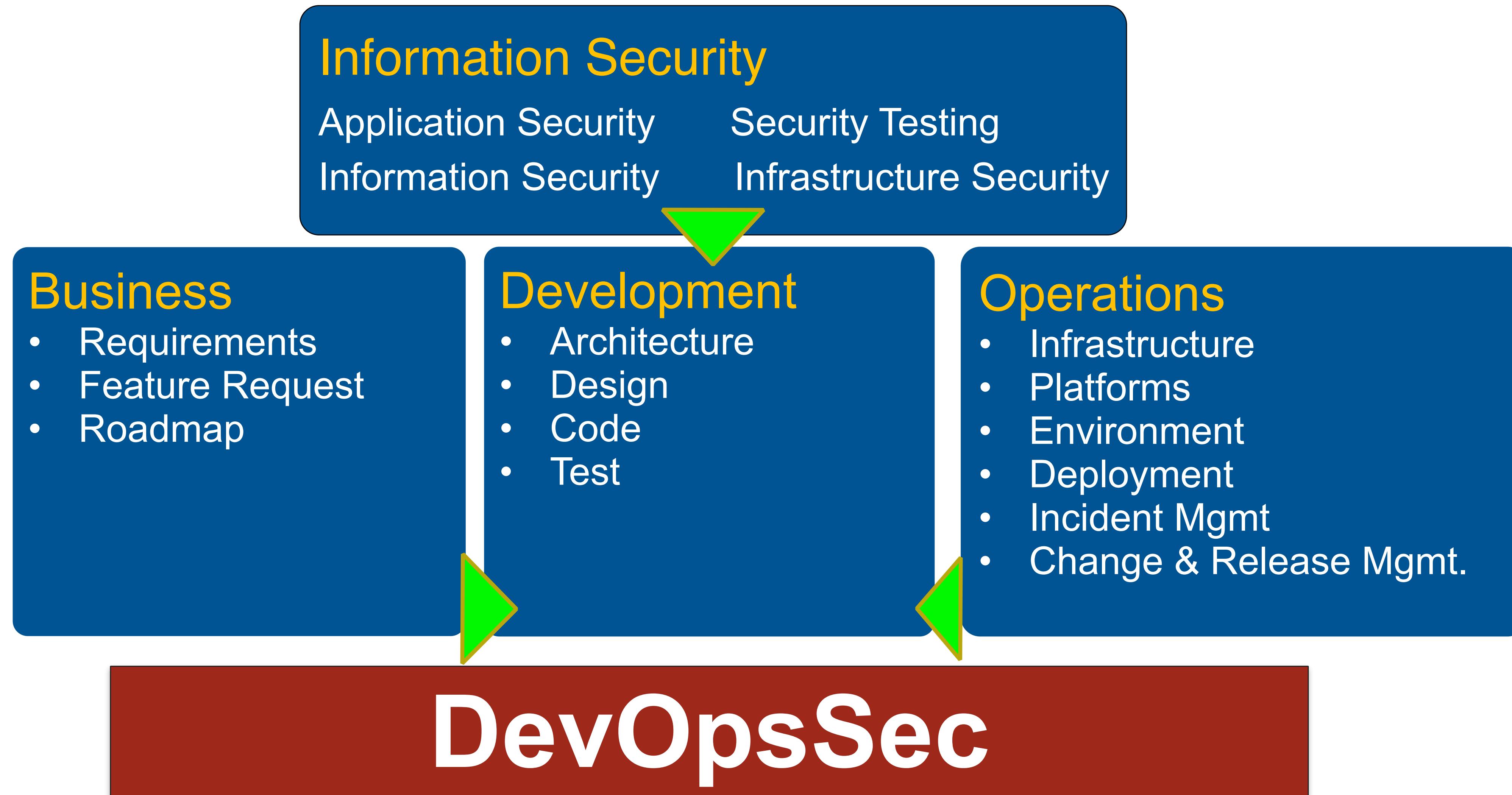


Confidential

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# Build Your Own DevOps

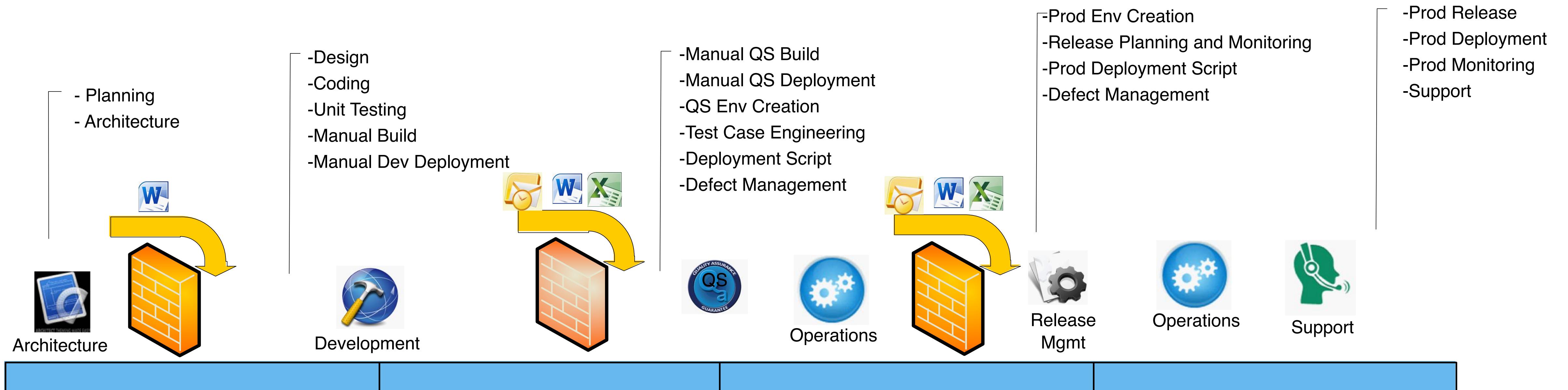
# Capital One's Understanding of Agile and DevOps: Get closer to Development



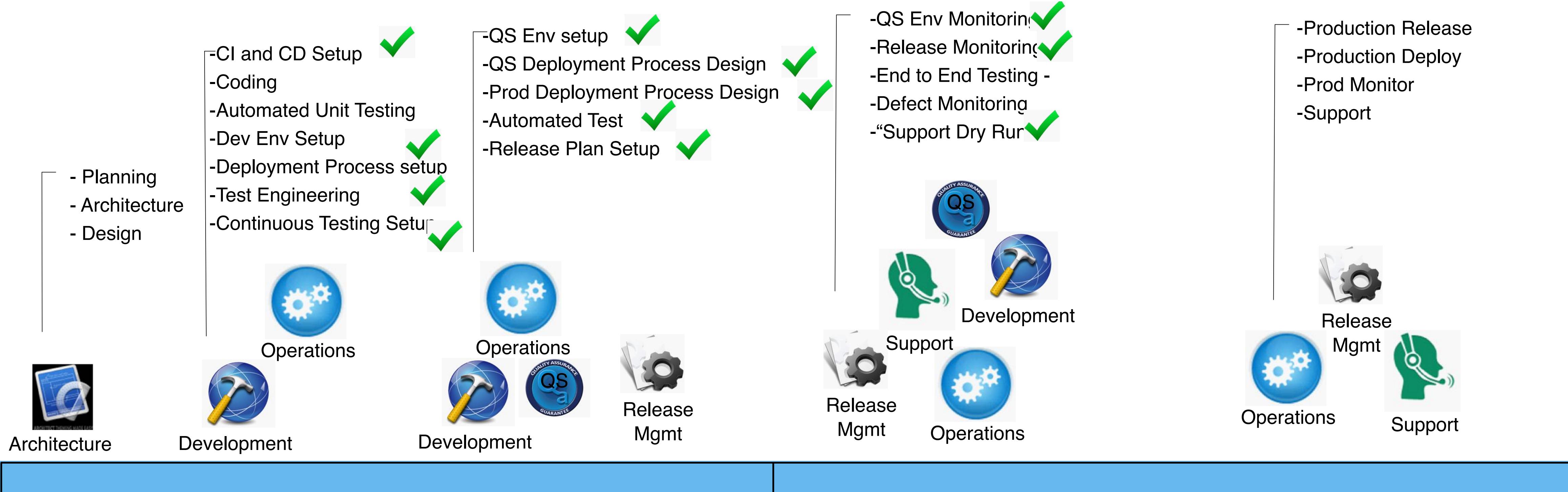
# Capital One's DevOps Strategy is based on three pillars



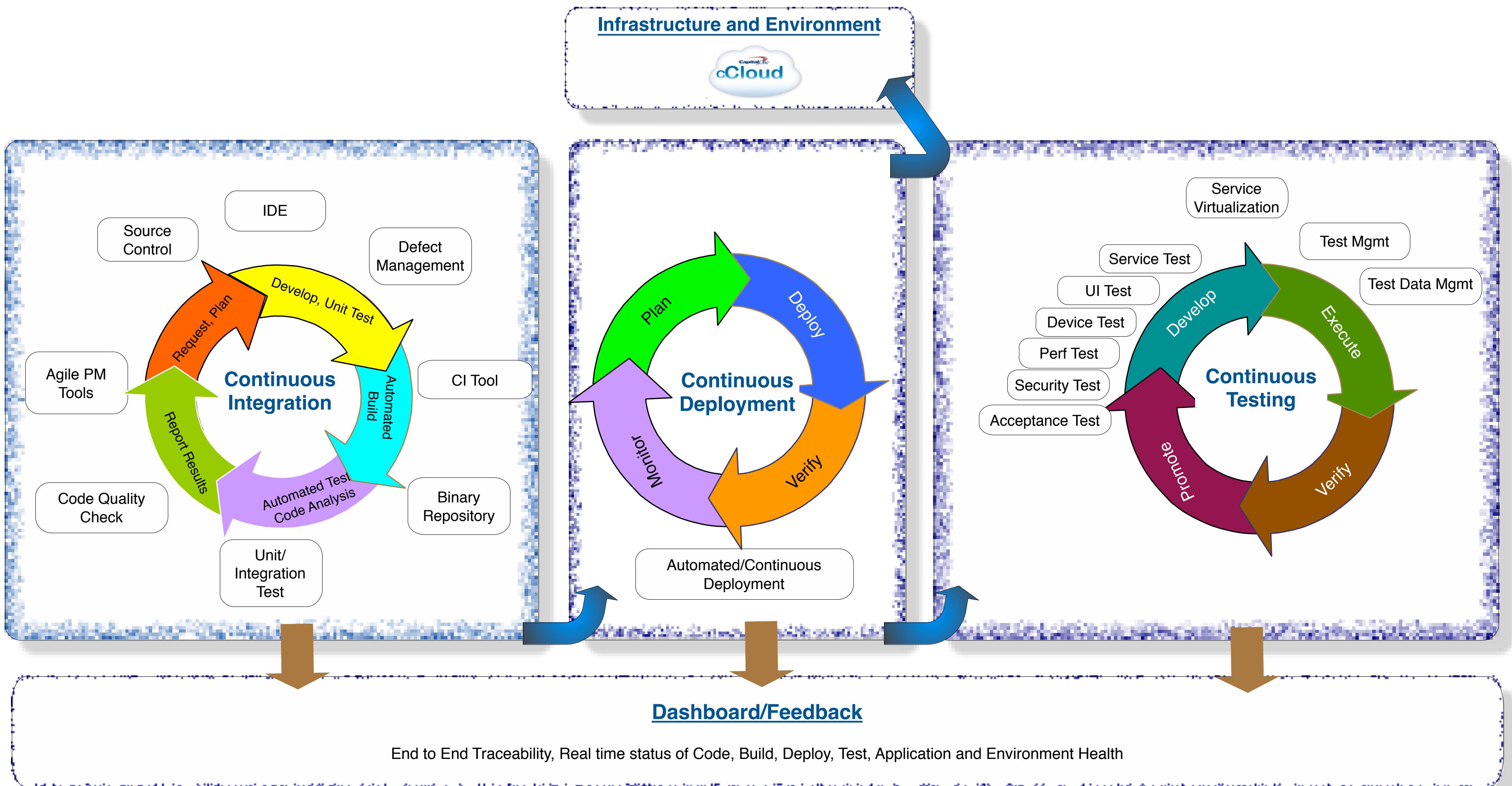
# Before Shift-Left



# After Shift-Left...



# Automate Everything



# Dashboard Everything



# DevOps Across The Enterprise

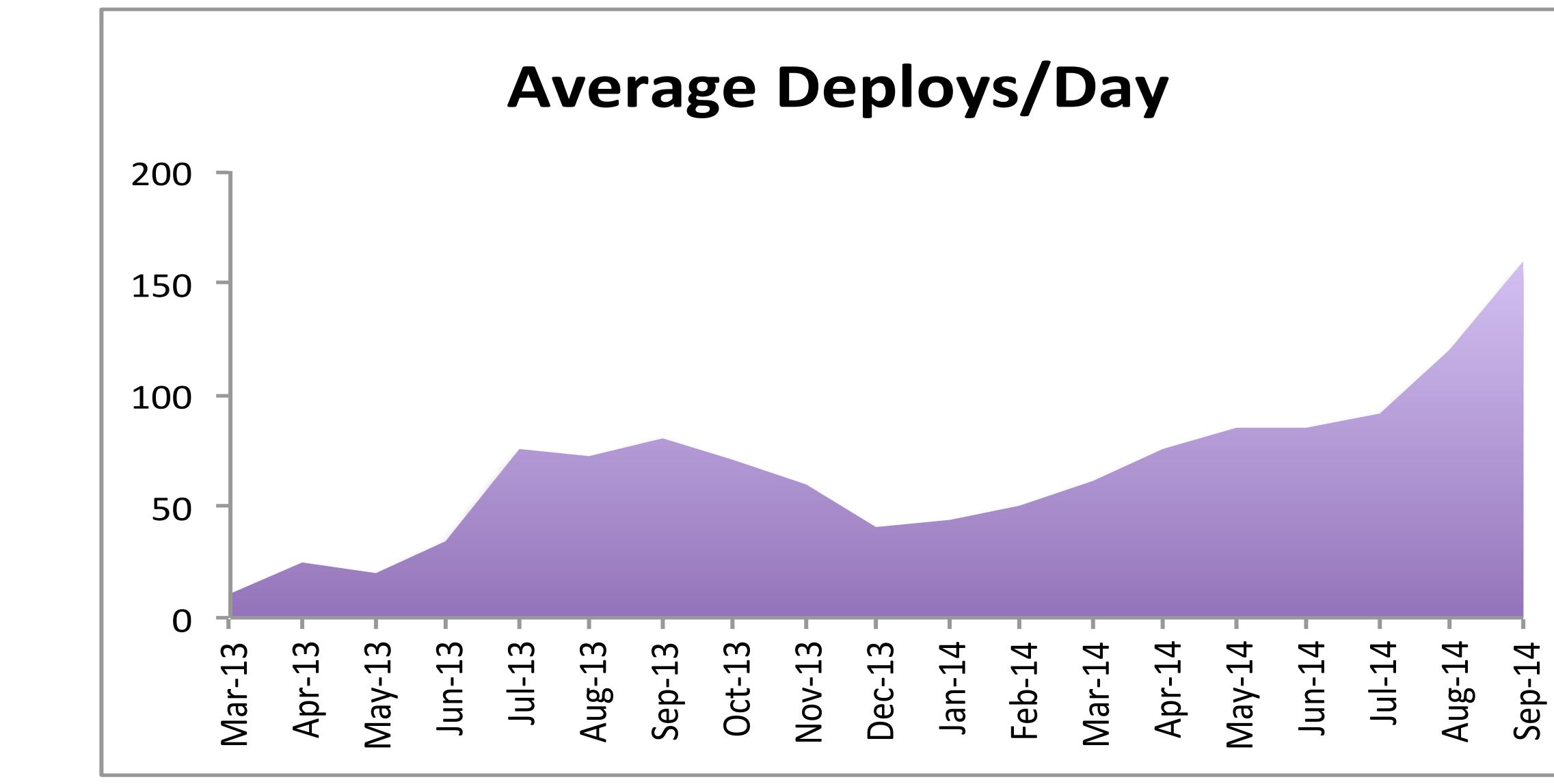
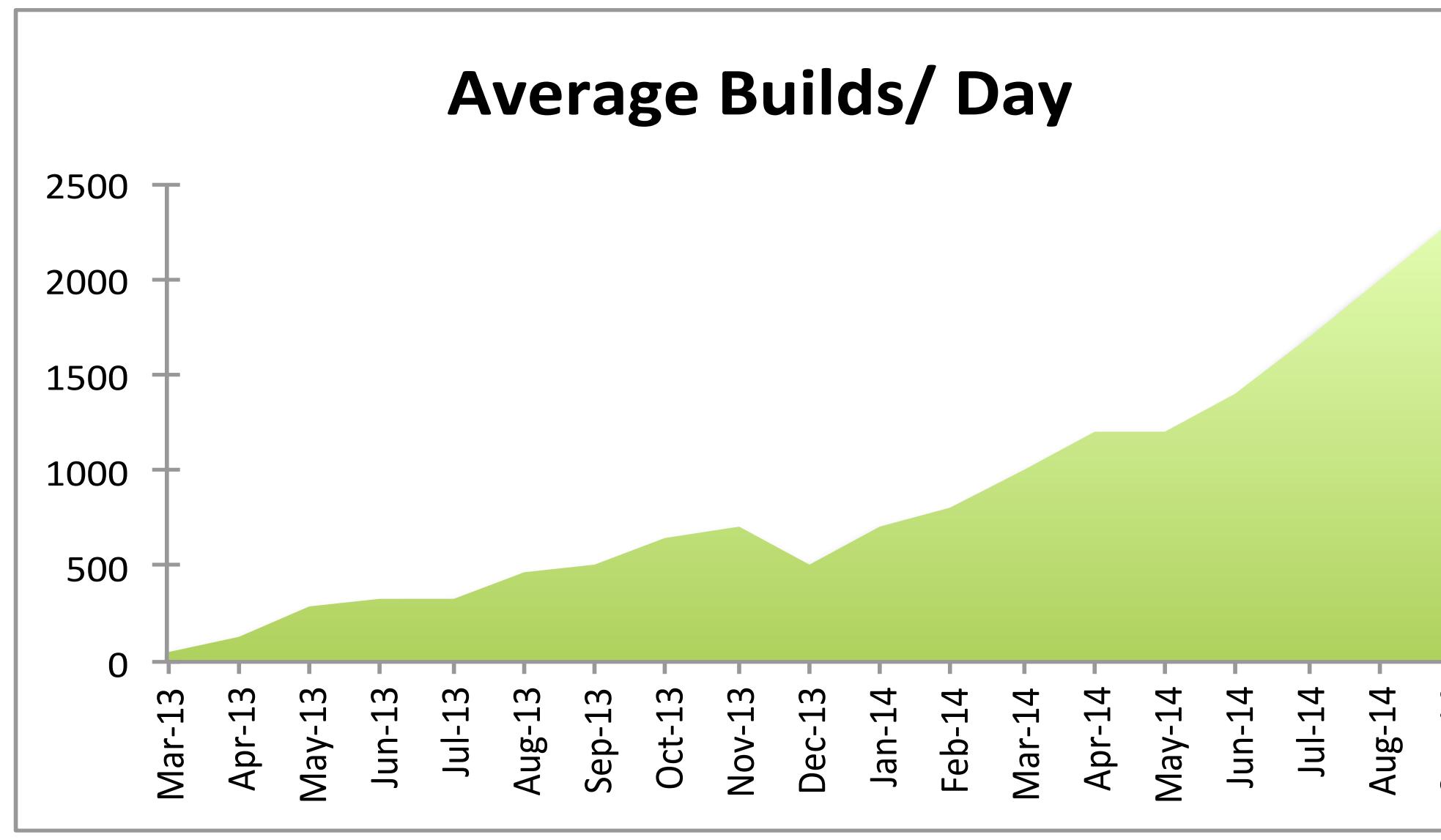
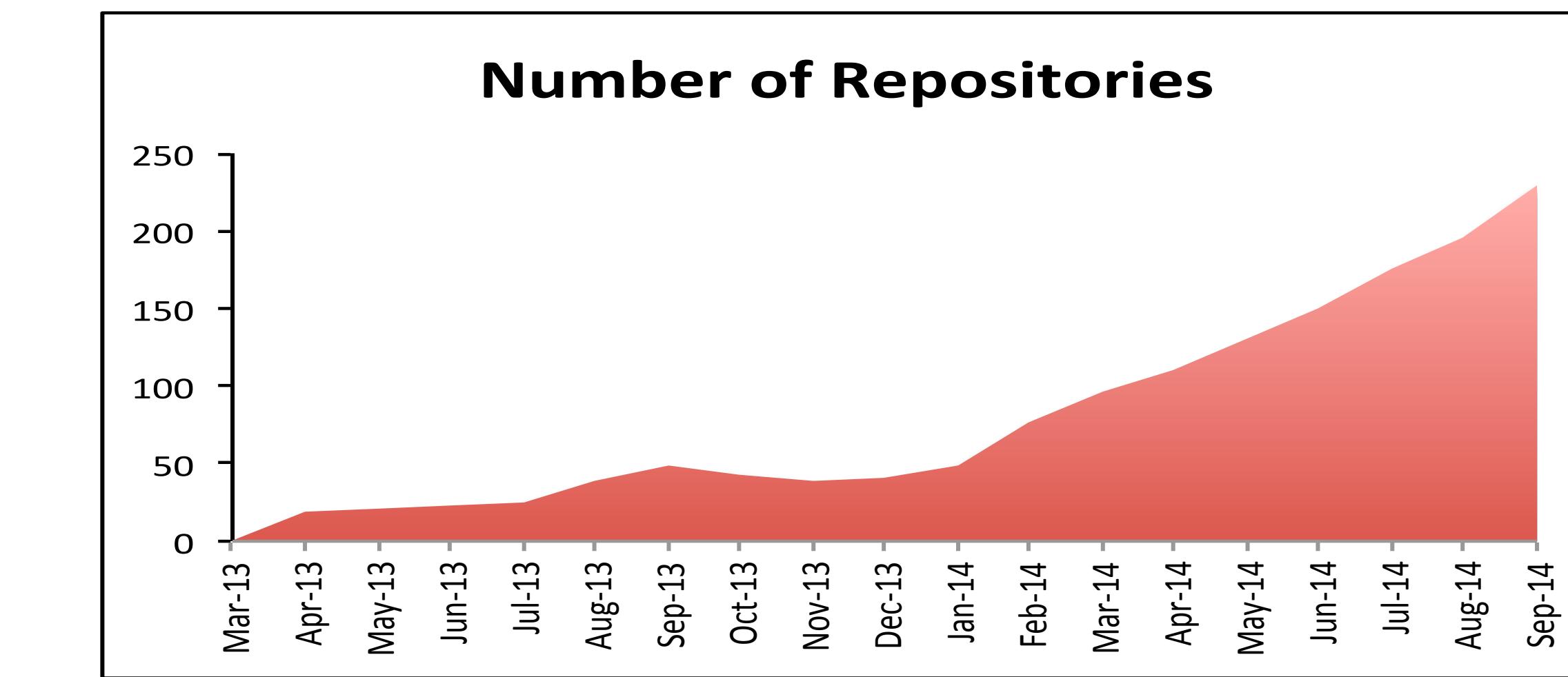
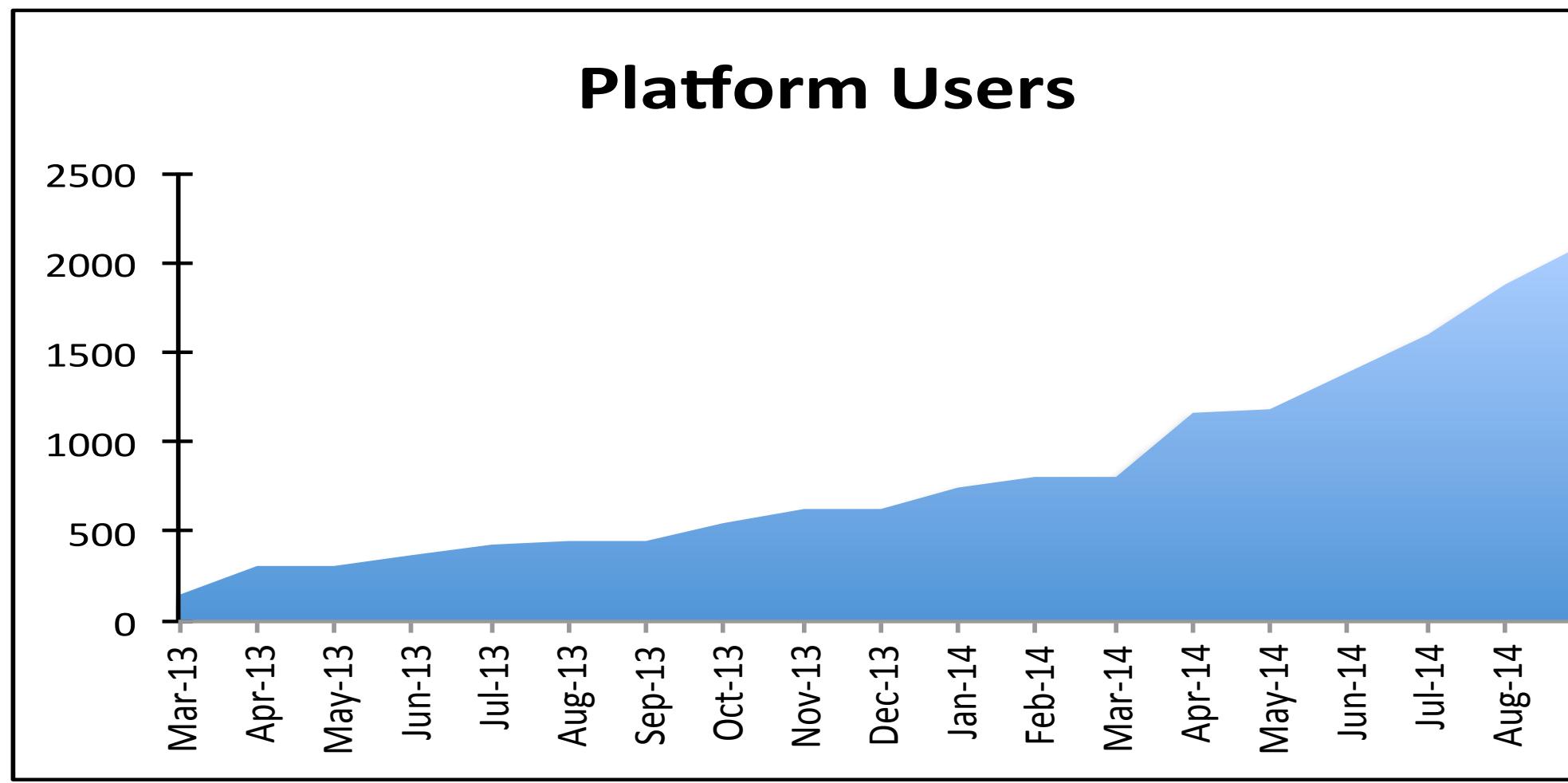
- DevOps is a part of Enterprise Resiliency Strategy.
- DevOps tool chain maintained and supported as Enterprise Shared Services.
- All LOBs use Enterprise DevOps Shared Services.
- LOBs and their project teams have trained SMEs around DevOps tooling and practices.
- A thriving online Community of Practice - drive adoption, participation and innovation.

# DevOps @Capital One: Current State

- Thousands of developers and engineers use these tools on a day to day basis.
- Thousands of automated builds per day though Continuous Integration pipeline
  - Before: Day(s) for each manual build
  - After: Few minutes. With automated code analysis and unit test run
- Hundreds of Automated Deployments across thousands of servers (Dev, QA and Production) per day
  - Before: Hours or Even a Day
  - After: Few minutes
- Average time between Code Check-in and QA Deployment reduced from Days to Minutes



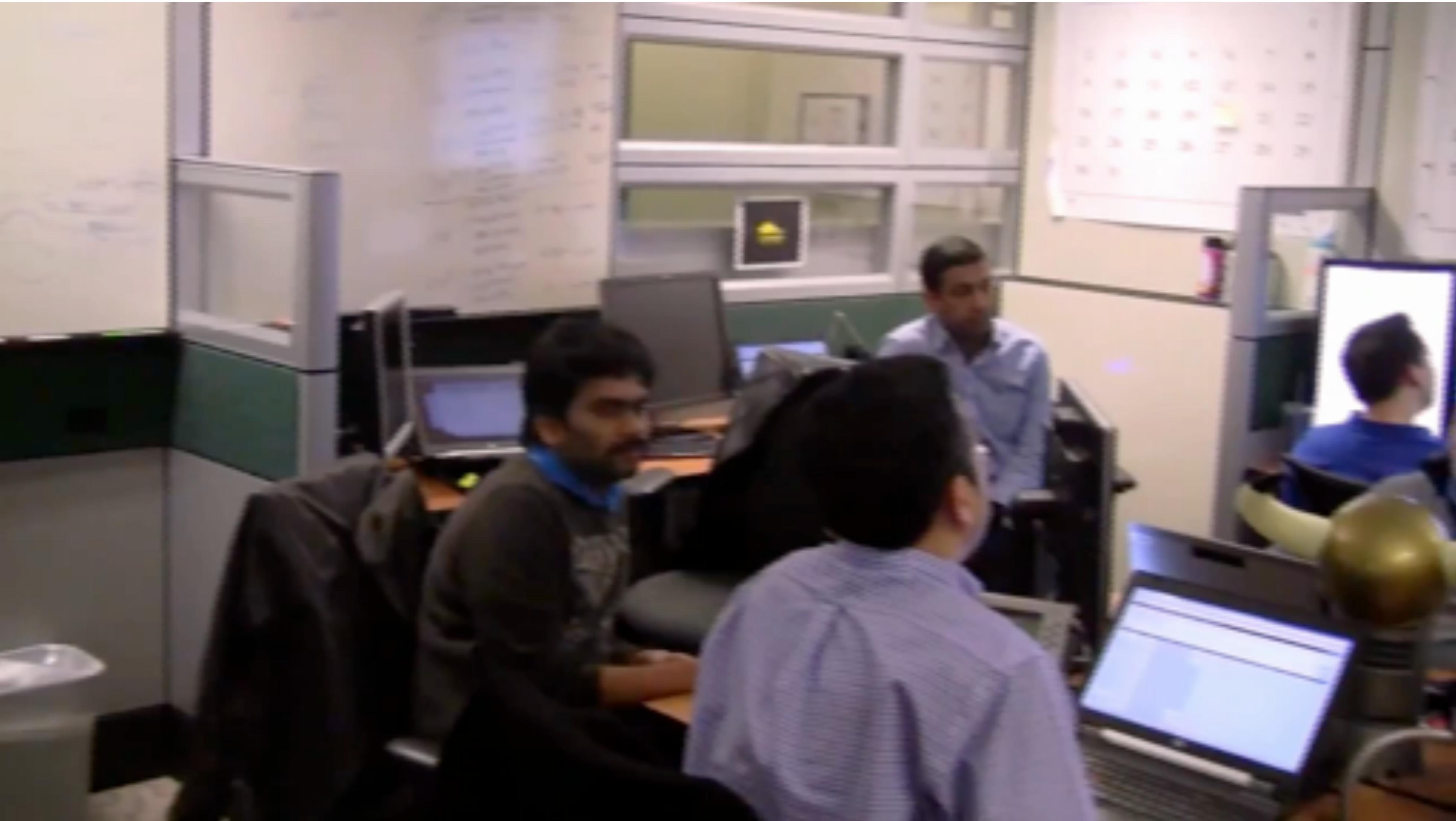
# Growth Rate



# DevOps Across The Enterprise

- **Java and J2EE**
- **Mobile (Android, iOS)**
- **.NET**
- **JavaScript**
- **Ruby, Perl, Python, R etc.**
- **Non-MainFrame Databases**

# Innovation drives DevOps



# DevOps @Capital One: Current Focus

- **DevOps Dashboard**
- **Release Management and Automation**
- **Mainframe and Batch Platforms**
- **Test Automation for Legacy Applications**

## Our Goal and Current Challenge

Release Automation

Approvals

Audit

Regulatory Compliance

?