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# DevOps

Bridging the Gap Between Development and Delivery

Peter Karaganis



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# About Me

- Sr. Enterprise Architect - Six Flags
- Coding professionally since 1995
- Industry Experience:
  - Entertainment
    - Amusement Park
    - Media
  - Printing
  - Aerospace
  - Consulting
  - Office Products
- I am...
  - A Pragmatist
  - Passionate...
    - About Innovation
    - About Technology
    - About Improving Processes
    - About Solving Problems
    - About Seeing My Code Make a Difference
  - A Browncoat



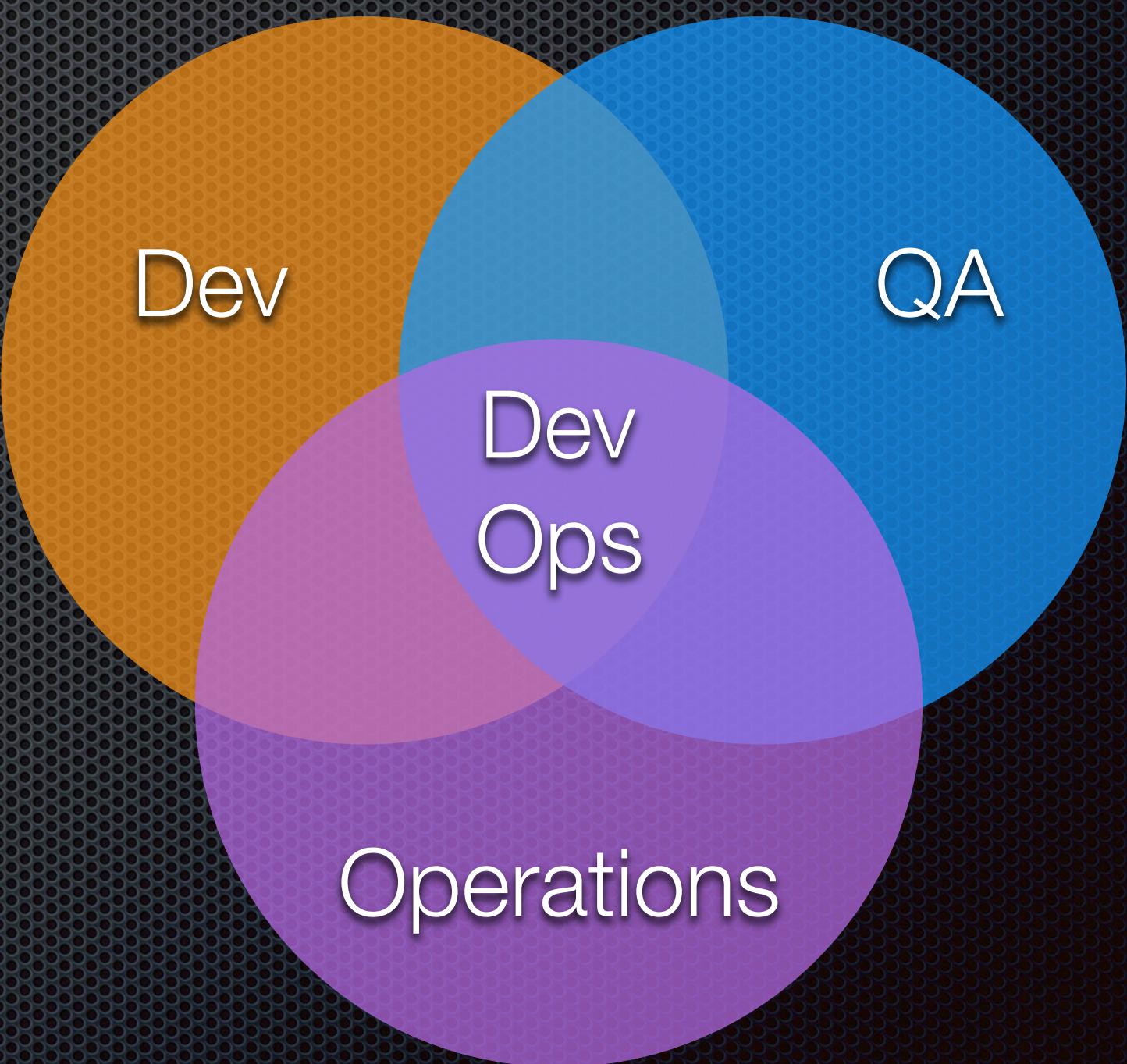
Peter Karaganis



# What is DevOps?

“DevOps is all about working together in more open and efficient ways so teams can collaborate better and ship better performing code.” - New Relic

“DevOps is an approach based on lean and agile principles in which business owners and the development, operations, and quality assurance departments collaborate to deliver software in a continuous manner that enables the business to more quickly seize market opportunities and reduce the time to include customer feedback.” - Sanjeev Sharma & Bernie Coyne



# The Good ol' Days (or were they)

- “I don’t always test my code, but when I do, I test in production.”
- Deployments were infrequent
- Few 3rd Party Integrations
- Local Development (developers all at one location)
- Weak Security (simple username and password)



# The Case For DevOps

## Technical:

- Faster delivery
- More automation
- Less human error
- Better testing
- Not only for the cloud

## Business:

- More time for adding value
- More stable releases
- Reduced deployment costs
- Better user satisfaction



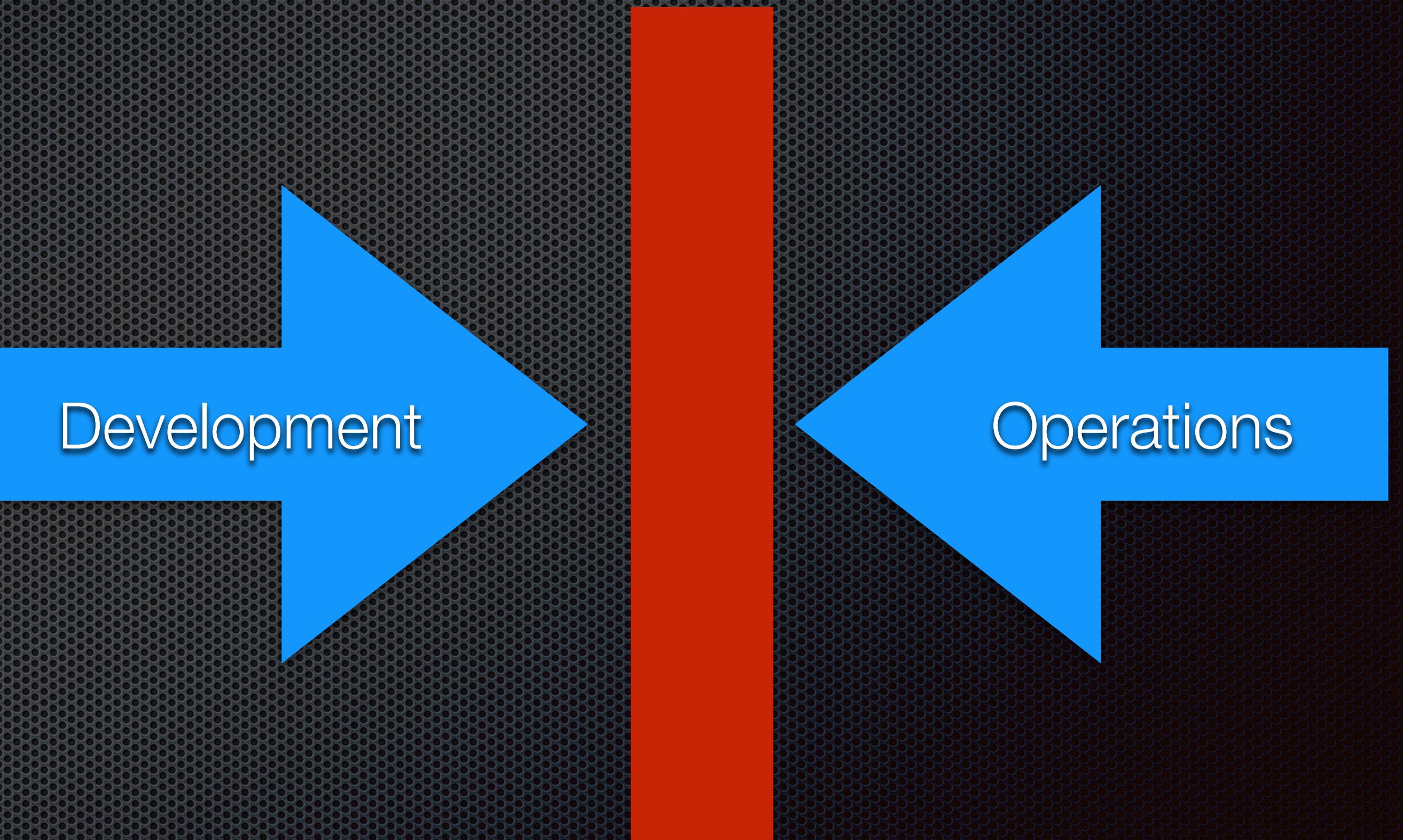
“In most organizations, Dev and Ops have misaligned goals. Dev is measured by the number of new features. Ops is measured by 100% uptime. Question: What’s the best way to get 100% uptime? Answer: Don’t introduce any new features or make any changes.”

*–The Best Lines From DevOps Days*



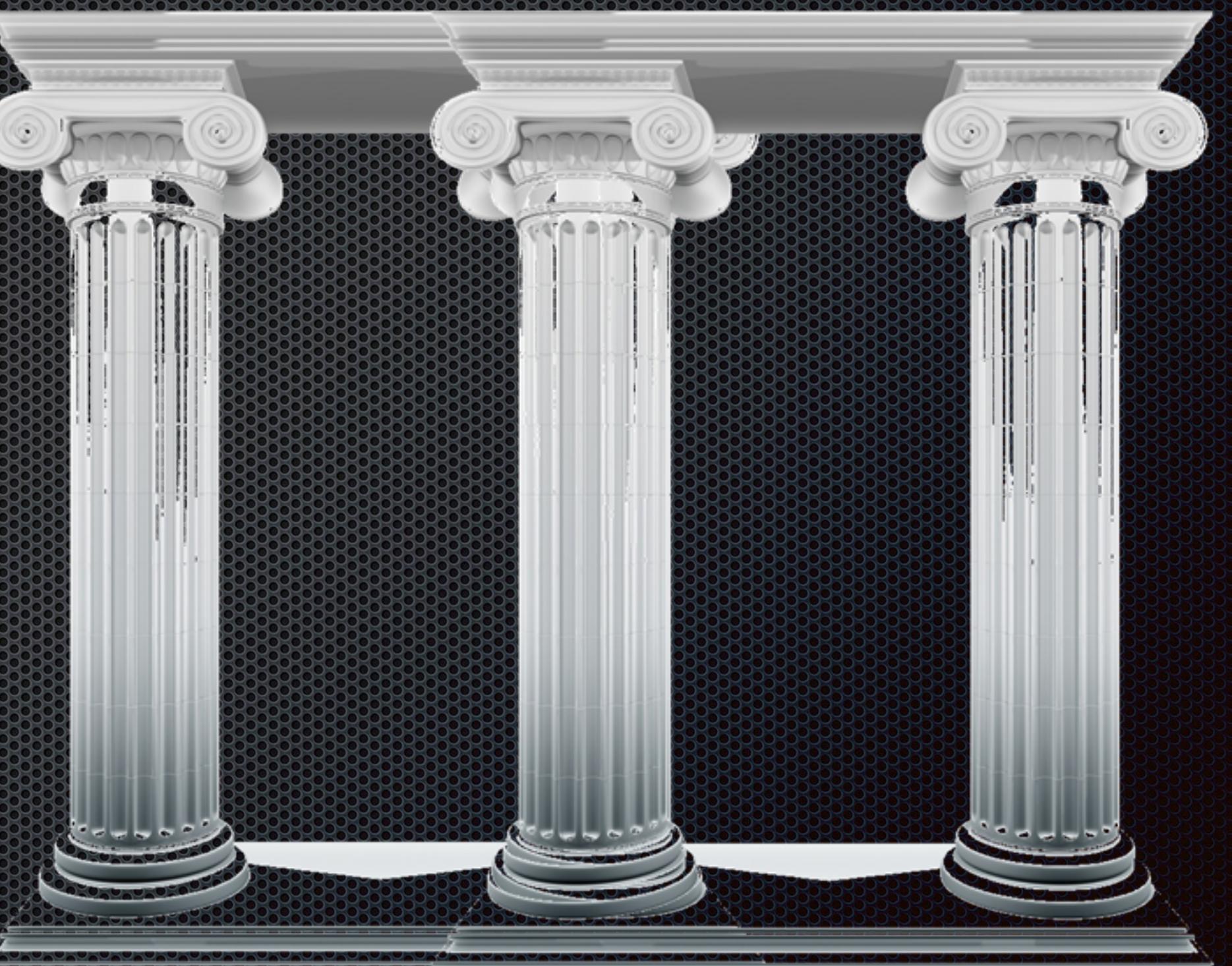
# The Dev-Ops Barrier

- Dev is tasked with adding value through new features
- Operations is tasked with maintaining 100% Uptime
- These are two principles are at odds with each other



# Key Tenets of DevOps

- Pragmatic problem solving
- Automate, automate, automate
- Avoid silos
- Develop trust between groups

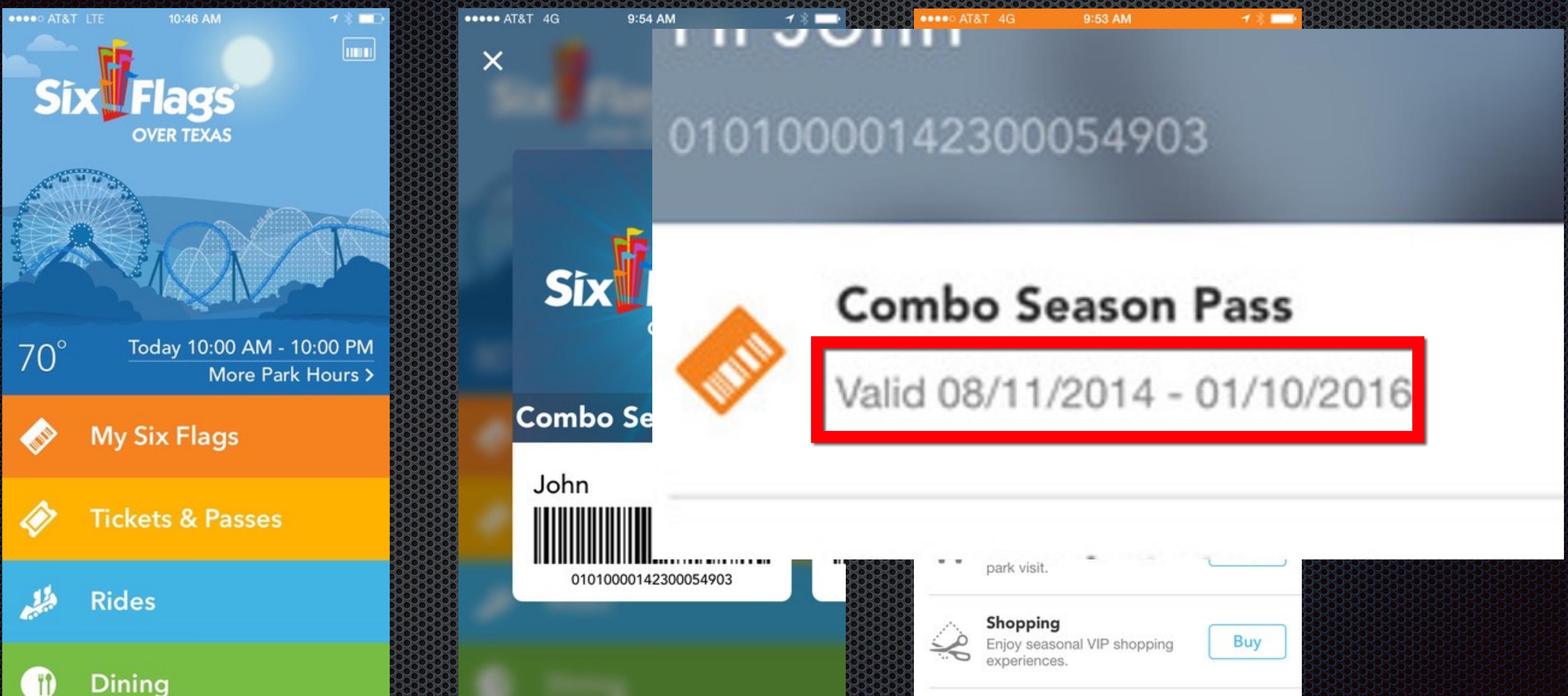


# Pragmatic Problem Solving

- Identify Issues
- Should I solve the issue at all?
  - What *can* I solve with code?
  - What *should* I solve with code?
- Alternative Solutions:
  - Communication
  - Documentation

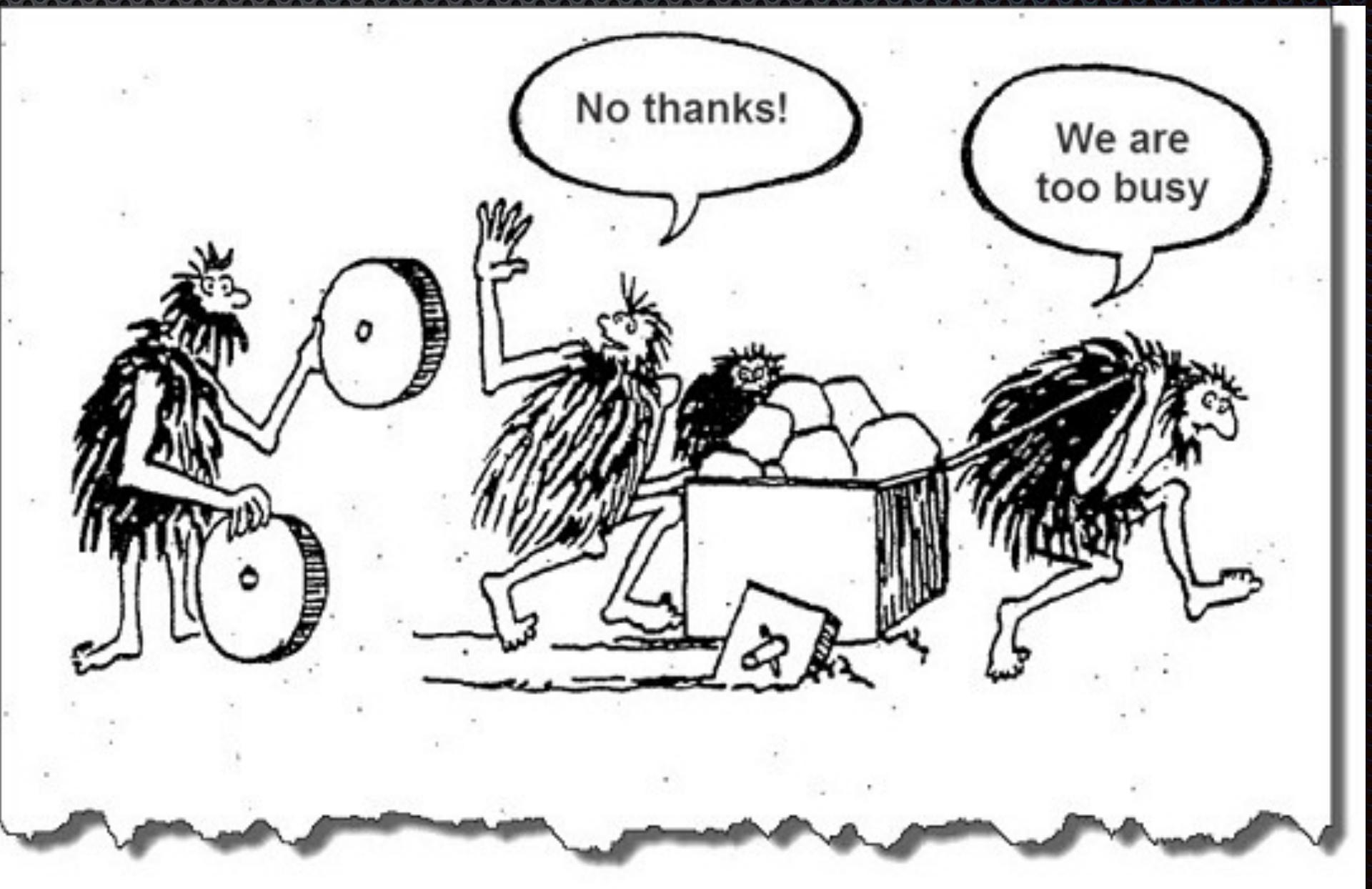


# Pragmatic Problem Solving - Example



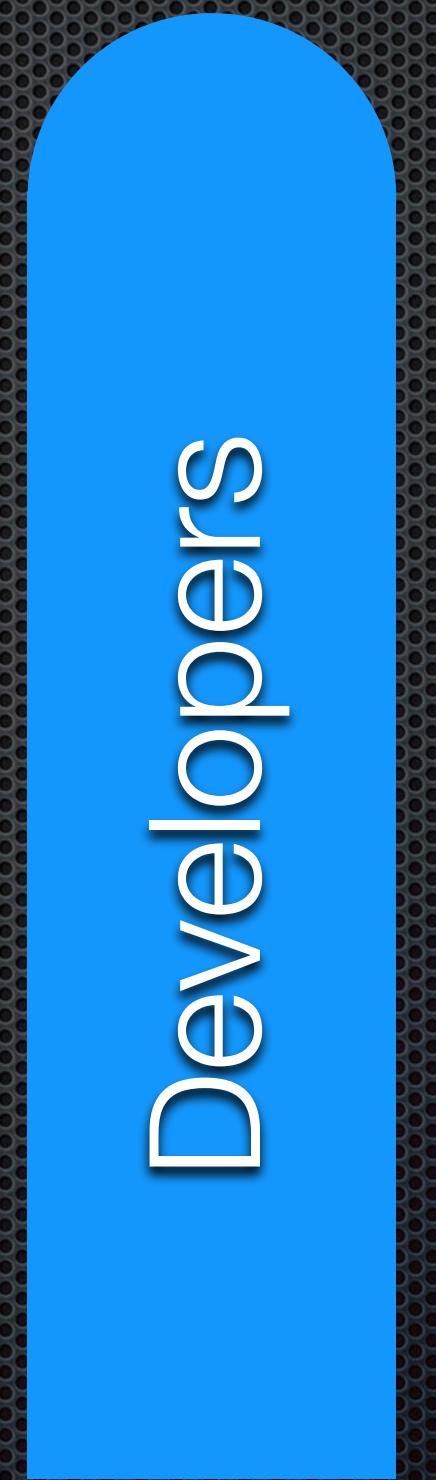
# Automate, Automate, Automate

- Reduces human error
- Creates time
- Repeatability leads to stability
- Understand it **before** you automate it
- If you can't validate it, you can't automate it
- Test beyond the happy path



# Avoid Silos

- Don't communicate **only** through tickets
- “Developers can learn a lot from operations, and operations can learn a lot from developers.” - Paul Duvall, CTO, Stelligent
- Create cross-functional teams



# Develop Trust Between Groups

- Don't gossip
- Don't throw stones
- Open (non-emotional) communication is essential
- Accept responsibility
- Management buy-in is critical

“Lack of trust in an organization is really expensive. You can't villainize others if you know their kids.”

- *The Best Lines From DevOps Days*



DevOps @



# About Six Flags

- Worlds largest regional them park company
- 18 Parks across the United States, Canada, and Mexico
- \$1.1 Billion in Revenue as of 2014
- 2014 InformationWeek Elite 100



"We pride ourselves on innovation at every level, from our record-breaking rides and attractions to business solutions that create efficient, seamless park operations. Our leadership role in information technology serves as a strategic and brand differentiator for our company"

*– Jim Reid-Anderson, Chairman, President, and CEO, Six Flags Entertainment Company*

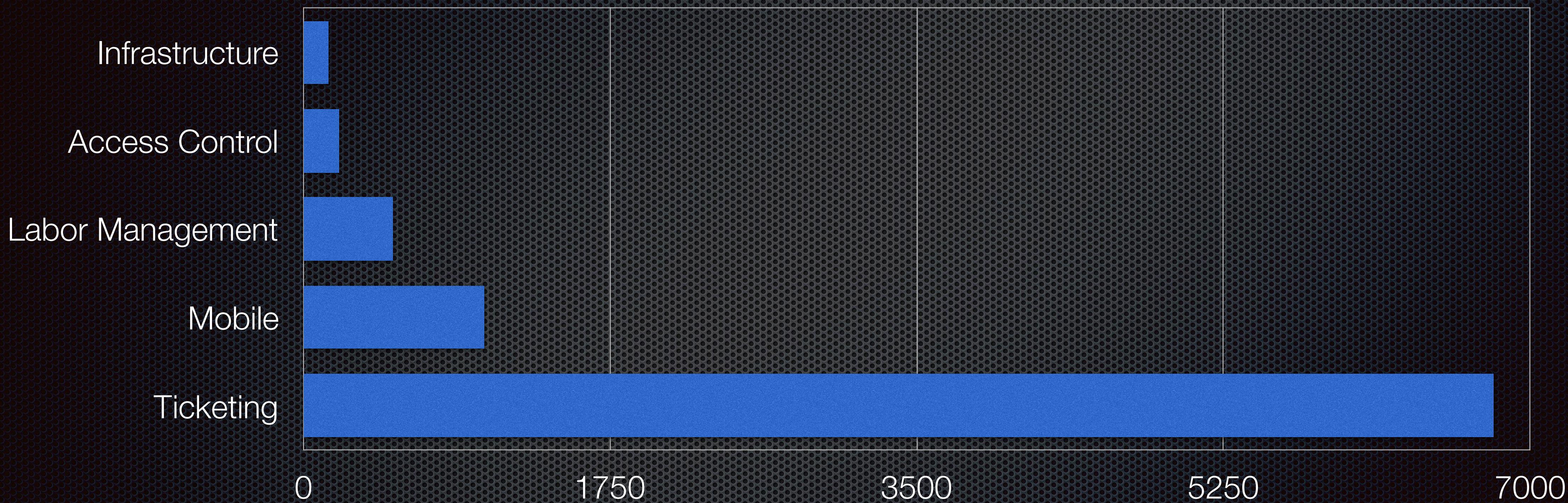


# Technology Stack (not exhaustive)

- .NET Framework
- .NET Compact Framework
- MSMQ
- WCF
- WPF
- Web API
- SOAP
- Entity Framework
- Windows CE
- Telerik
- Octopus Deploy
- Slack
- Coverity
- Bitbucket
- Jira
- TFS
- Team City
- Resharper
- Runscope
- Swagger
- VM Ware
- Net App
- Android
- iOS



# Six Flags - Core Project Sizes



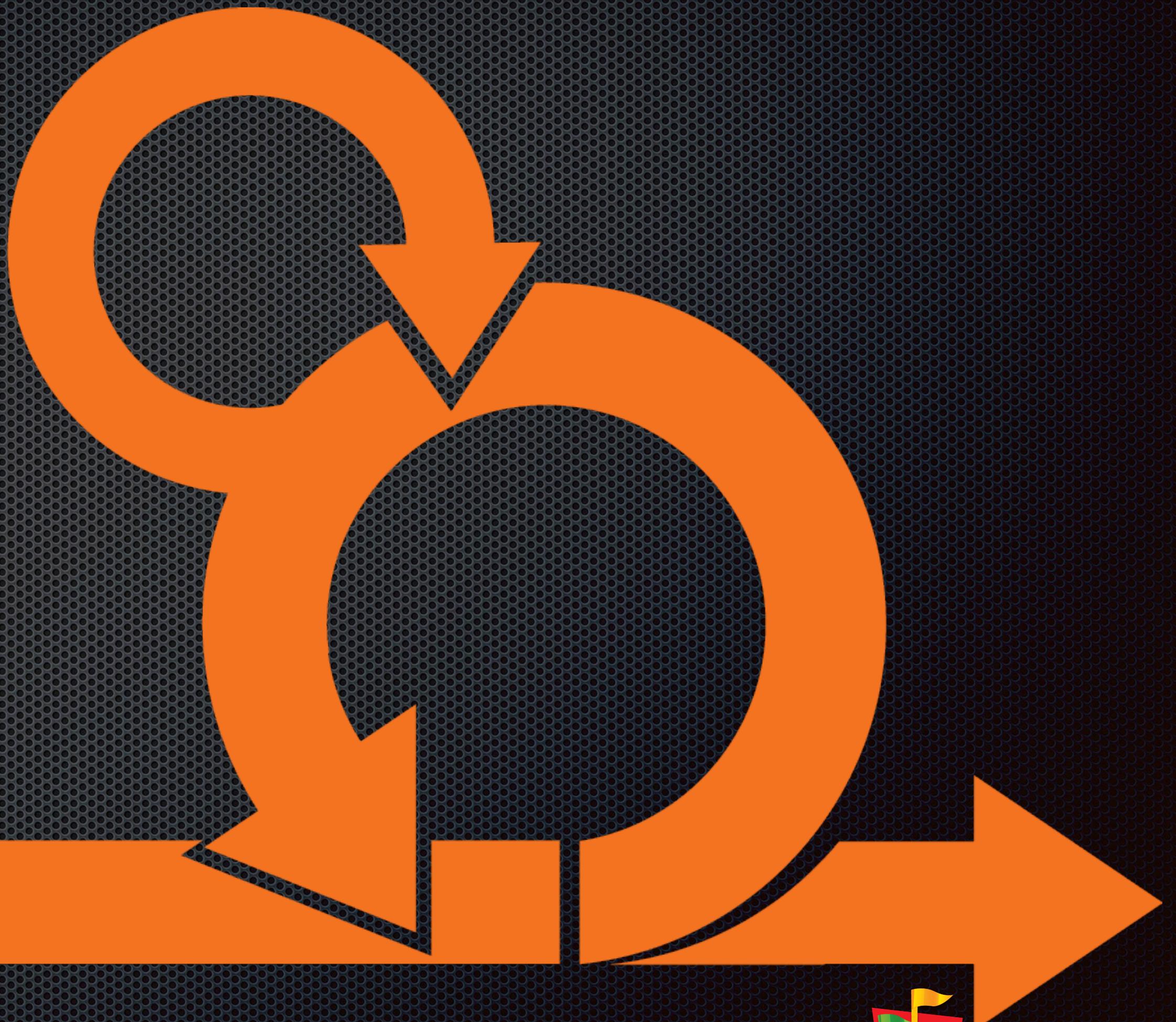
# Deployment Barriers

- PCI Compliance - Tier 1
- SOX
- Year-Round Park Operations
- Complex Environment
  - No Inter-Park Communication (All inter-park messaging proxies through Data Center)
  - Global Ticketing
- Service Oriented Architecture
- 3rd Party Vendor Integrations
  - Front Gate
  - E-Commerce
  - Point of sale
  - Mobile Devices
  - Disaster Recovery

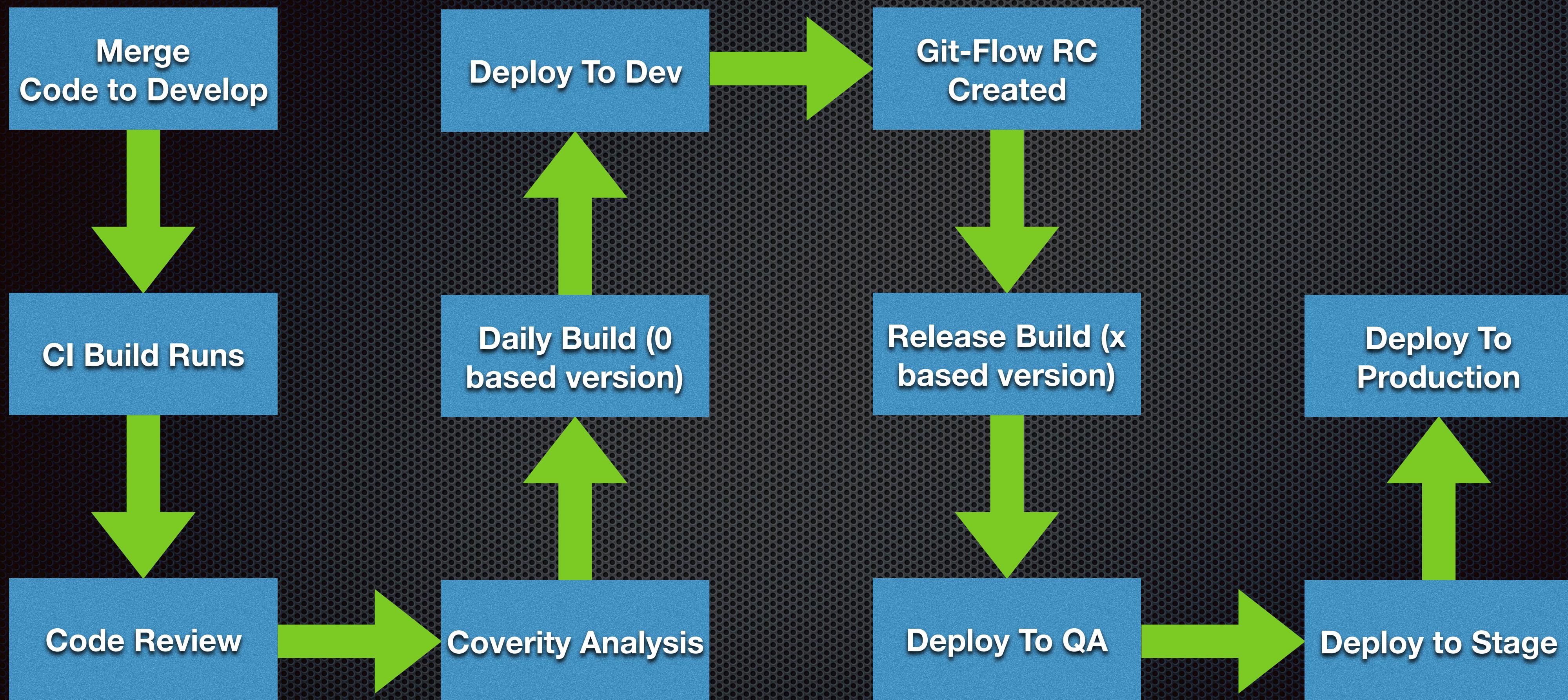


# Our Methodology

- Scrum
- 2-Week Sprint
- Weekly Backlog Grooming
- Daily Standup
- Combined Team Demo / Retrospective
- Early Stakeholder Feedback



# Development Flow



# Development Flow

The screenshot displays a software development interface with a navigation bar at the top and two main sections below.

**Top Navigation:**

- DB.POS.SFProc.Migrations
- Ticketing.DBs.Migrations
- Six Flags Mobile

**Mobile API Section:**

- CI Builds
- Coverity Analysis
- Daily Builds
  - develop
  - #0.0.0.49-264...4044078d3667 (highlighted with a red box)
  - Tests passed
- Release Build

**Bottom Section:**

- Benefits
- CI Builds
  - release/2.2
  - develop
- Coverity Analysis

**Build History (Right Side):**

Status	Count	Last Run	Run Options
Successful	24	2 days ago (4m:20s)	Idle, Run ...
Successful	6	Idle	Run ...
Successful	4	Idle	Run ...
Pending	5	5 days ago (4m:05s)	Idle, Run ...
Successful	4	2 months ago (4m:52s)	Idle, Run ...



# Development Flow

Data API	0.0.0.120 January 27th 2016	0.0.0.90 December 9th 2015		
DB POS Freedom	1.0.3.6 December 15th 2015	1.0.3.6 January 25th 2016	1.0.2.3 October 29th 2015	1.0.2.3 November 10th 2015
DB POS SFProc	2.0.2.0 November 3rd 2015	2.0.2.0 January 25th 2016	2.0.2.0 November 3rd 2015	2.0.0.1 November 10th 2015
Dining	<b>Member Rate Change</b> 0.0.0.40 September 28th 2015			
GFM	2.25.0.2 November 16th 2015			
Member Rate Change	0.0.0.40 September 28th 2015	2.25.0.2 November 16th 2015	2.25.0.2 October 19th 2015	2.25.0.1 October 12th 2015
Point Of Sale UI	0.0.1.103 January 27th 2016	0.0.1.89 January 25th 2016		
PrintService Server	2.18.0.16426 March 26th 2015	2.18.0.16426 March 26th 2015	2.18.0.16426 April 8th 2015	2.18.0.16426 April 13th 2015



# Automation Protection

Mobile API > Process

 Mobile API

[Create release](#)

Overview

**Process**

Variables

Releases

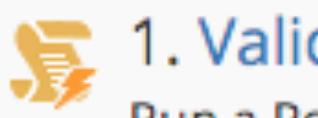
Settings

Mobile	Development	QA	UAT	Production
Mobile API	<span style="color: green;">✓</span> 0.0.0.49 January 25th 2016	<span style="color: green;">✓</span> 0.0.0.38 January 25th 2016	<span style="color: green;">✓</span> 3.3.4.44 January 8th 2016	<span style="color: green;">✓</span> 3.3.4.44 January 8th 2016

Ticketing	Development	QA	UAT	Production
App Support	<span style="color: green;">✓</span> 0.0.0.5 September 23rd 2015	<span style="color: green;">✓</span> 1.4.1.2 November 16th 2015	<span style="color: green;">✓</span> 1.4.1.2 September 24th 2015	<span style="color: green;">✓</span> 1.4.0.16550 July 9th 2015

## Deployment process



### 1. Validate Release Eligibility

Run a PowerShell script across machines in roles: BuildServer

Only in: UAT Production



### 2. IIS Application - Create

Run a PowerShell script across machines in roles: DMZ



### 3. Install API

Deploy NuGet package **Api.SixFlags.Mobile** from **Octopus Server (built-in)** to machines in roles: DMZ



### 4. API Application Pool

Run a PowerShell script across machines in roles: DMZ



# Code Review

Open TD-CR-6: Add api to retrieve POS Location

Review revisions: beb1472 → 9194330

GetPosLocation.cs Ticketing.Databases/SixFlags.Data.ProductManagement.Api +33 Side-by-side diff View

```
1 + using SixFlags.MediatR;
2 +
3 + namespace Six
4 + {
5 +     public class GetPosLocation : IRequest<GetPosLocationResponse>
6 +     {
7 +         public void Validate()
8 +         {
9 +             public override int GetHashCode()
10 +             {
11 +                 int result = 23;
12 +                 result = result * 31 ^ StoreNumber;
13 +                 result = result * 31 ^ LocationNumber;
14 +                 return result;
15 +             }
16 +         }
17 +     }
18 + }
```

 Peter Karaganis  
More of a curiosity than anything else, but how did you arrive at this algorithm?

 Peter Karaganis  
More of a curiosity than anything else, but how did you arrive at this algorithm?  
✓ Resolved Edit Delete

 Craig Neuwirt  
In a nutshell,

In a nutshell, multiplying by small primes helps reduce collisions. For few # of items, it's better to use a prime number.



# Tooling

 TeamCity BOT 19:03 new message

Succeeded - Databases :: Ticketing.DBs.Migrations :: Coverity Analysis #fa07b7ae5261771105d781f90717d50f2d2e0ab9-2

**Coverity Analysis**  
Agent: Special Agent .NET 002  
Elapsed: 2m:39s

**Commits**  
353f5e7d52 :: pkaraganis :: TeamCity change in 'Databases :: Ticketing.DBs.Migrations' project: triggers of 'Coverity Analysis' build configuration were updated  
fa07b7ae52 :: kesimmons :: 17956 - Added the translated messages

9d0106a3c7 :: pkaraganis :: TeamCity change in '<Root project>' project: triggers of 'Coverity C# Build Template' build template were updated  
dd847269aa :: pkaraganis :: TeamCity change in '<Root project>' project: parameters of 'Coverity C# Build Template' build template were updated

**Changes By**  
kesimmons, pkaraganis

 TeamCity BOT 19:19

Succeeded - Ticketing :: Point of Sale UI :: Coverity Analysis #9e0fe7409d71ddfaf906590e41454e0200b656e9-2

**Coverity Analysis**  
Agent: Special Agent .NET 001  
Elapsed: 18m:36s

**Commits**  
9e0fe7409d :: michael.dudley :: Adding a logger to the javascript  
9c3492a442 :: michael.dudley :: Adding a Logger endpoint

**Changes By**  
michael.dudley



# What we do well

- High-quality code
- Involve stakeholders early
- Emphasize training
- Embrace innovation (pragmatically)
- Truly understand business requirements



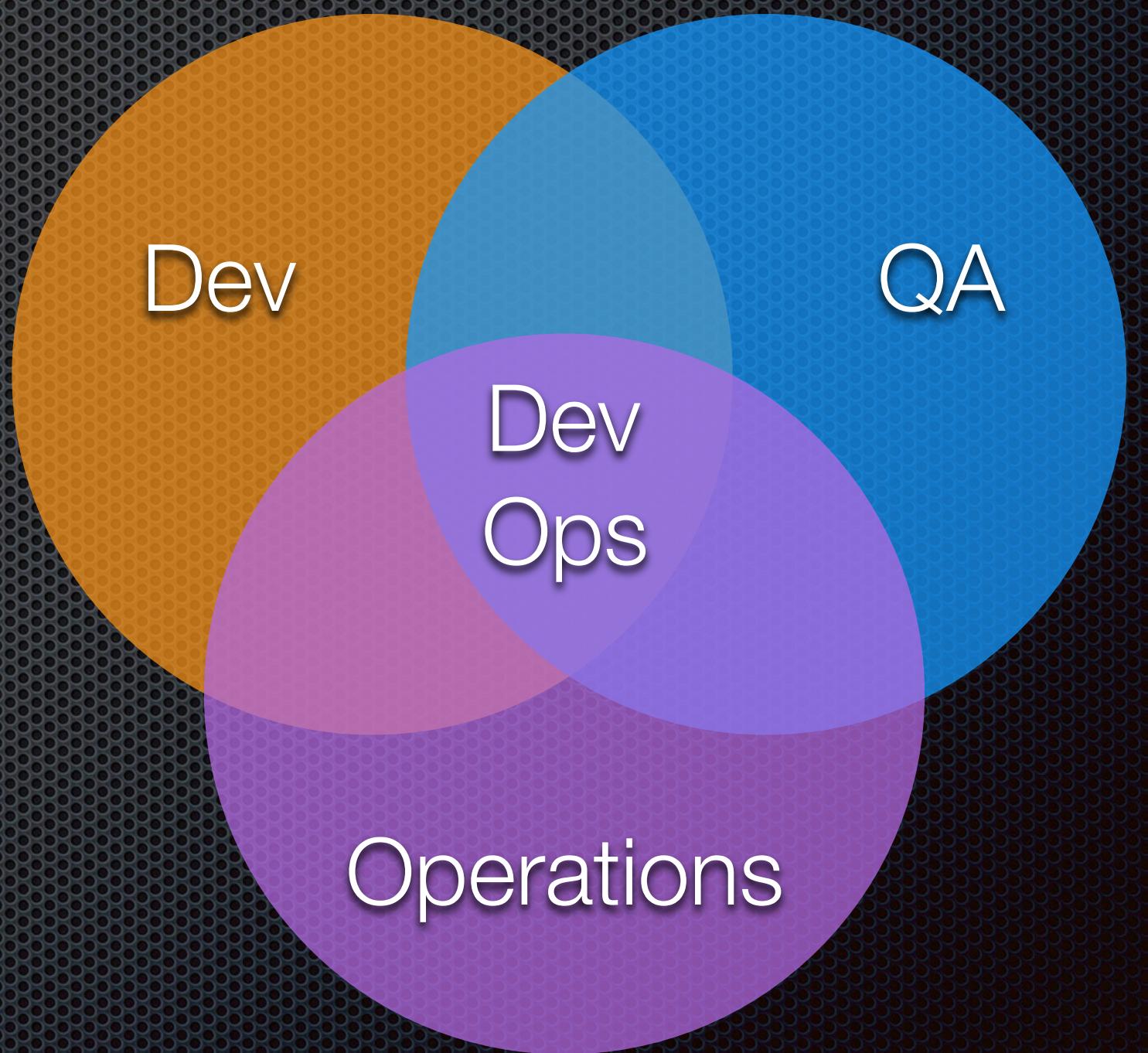
# Areas for Improvement

- Better communication
- More frequent releases
- More frequent environment refresh
- Better test automation
- Improved cohesion with NetOps



# Conclusion

- Plan -> Do -> Check -> Act
- Be pragmatic
- Build inter-departmental trust
- Automate as much as you can
- Avoid failure, but embrace it
- Constantly evaluate
- Surround yourself with excellence



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# Thank You!

Peter Karaganis

