

# Azure Technical Briefing

## DevOps

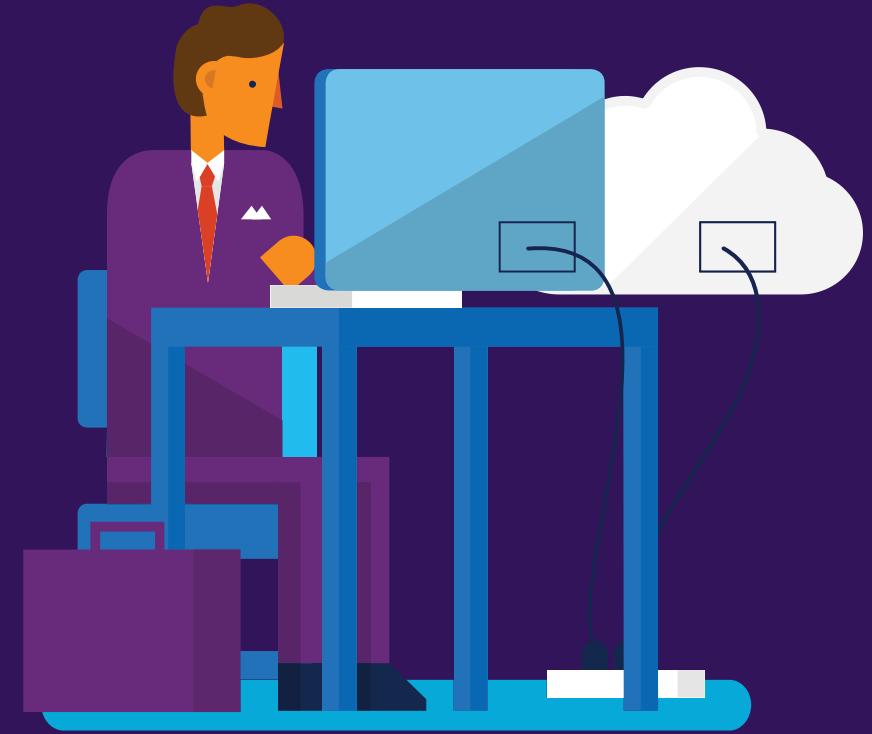
15<sup>th</sup> March 2018

Mike Ormond  
Gabriel Nepomuceno  
Ben Coleman  
Steve Harris  
  
Colin Beales  
Giles Davies



<http://aka.ms/azureevent>

#Azure  
#BuildWithAzure



<http://aka.ms/isveventsurvey>

# Agenda

Morning

**Welcome, Introduction, CI, CD**

Lunch around 12

**IaC, CaC, Testing, Containers**

Close around 4

No fire drills





# Membership

Take advantage of the massive investments Microsoft makes in helping you to skill up your workforce, accelerate your sales, and increase customer loyalty.

[About membership >](#)

Join MPN as a Network member, as entry level into the program  
<https://partner.microsoft.com/en-gb/membership>

Partnering with Microsoft pays off.

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# What is the Microsoft Action Pack?

Action Pack is an affordable yearly subscription to software, support, and benefits for businesses that want to begin, build, and grow their Microsoft practice in the cloud-first, mobile-first world. Click on this short video to see how you can start with Action Pack today.

[Subscribe now >](#)



## Action Pack moves your cloud business forward

Sell approximately two times more cloud volume than network members<sup>1</sup> when you utilize cloud benefits as an Action Pack partner. Run your business with speed and agility for £350 per year when you use a robust set of Microsoft software. Additional benefits:

- Use world-class developer tools to create applications and solutions for your customers on iOS, Android, Linux, and Windows
- Includes ten Windows 10 Enterprise (upgrade) licenses, three Visual Studio Professional licenses, and a no-cost Visual Studio Team Services account
- Get up to ten Office 365 (E3) seats, plus five seats of Enterprise Mobility Suite and Microsoft Dynamics CRM Online Professional<sup>2</sup>
- Receive US\$100 of Microsoft Azure credits per month

<sup>1</sup> This data is accurate as of December 15, 2015. We compared the average Office 365 cloud sales per partner in the previous 12 months between Action Pack partners and Network members that use Office 365 internal use rights.

<sup>2</sup> Action Pack partners initially receive five seats of Office 365. Partners will receive five additional seats when they sell at least 25 seats of Office 365 within the previous 12 months. Partners receive five seats of Microsoft Dynamics CRM Online when they sell at least 50 seats of Office 365 or five seats of Microsoft Dynamics CRM Online within the previous 12 months.

Let's get started...

# DevOps for Azure



<http://aka.ms/DevOpsAzure>



# Who Are We?



*Giles  
Davies*

Azure App Dev Technical Specialist  
*gidavies@microsoft.com*



*Colin  
Beales*

Azure App Dev Technical Specialist  
*colinb@microsoft.com*

# Agenda

- Continuous Integration
- Continuous Deployment
- Infrastructure as Code
- Configuration as Code
- Testing, Databases and Containers
- Monitoring

**"DevOps** is  
development  
and operations  
collaboration"

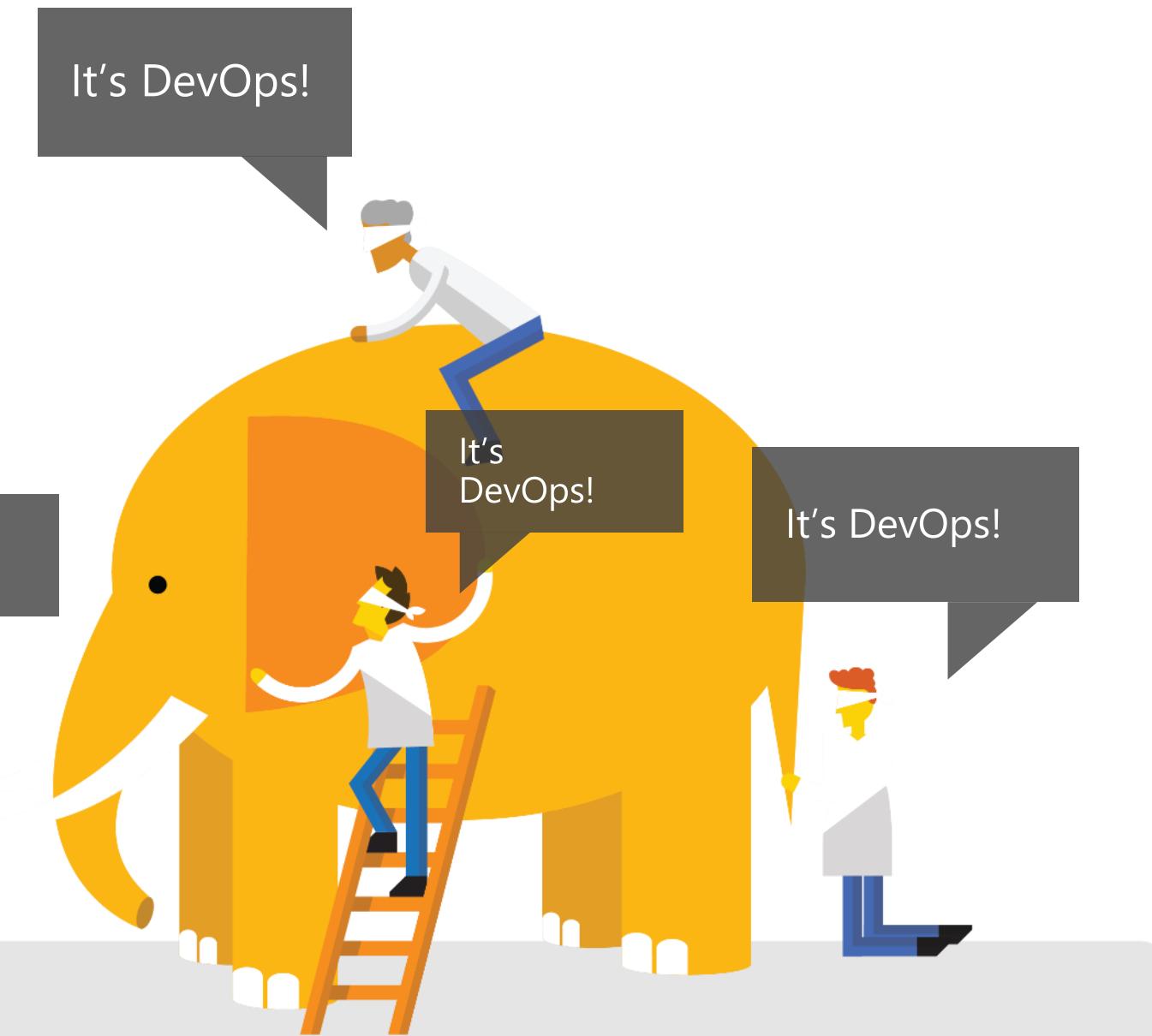
**"DevOps**  
is using  
automation"

**"DevOps**  
is small  
deployments"

**"DevOps** is  
treating your  
**infrastructure**  
as code"

**"DevOps**  
is feature  
**switches**"

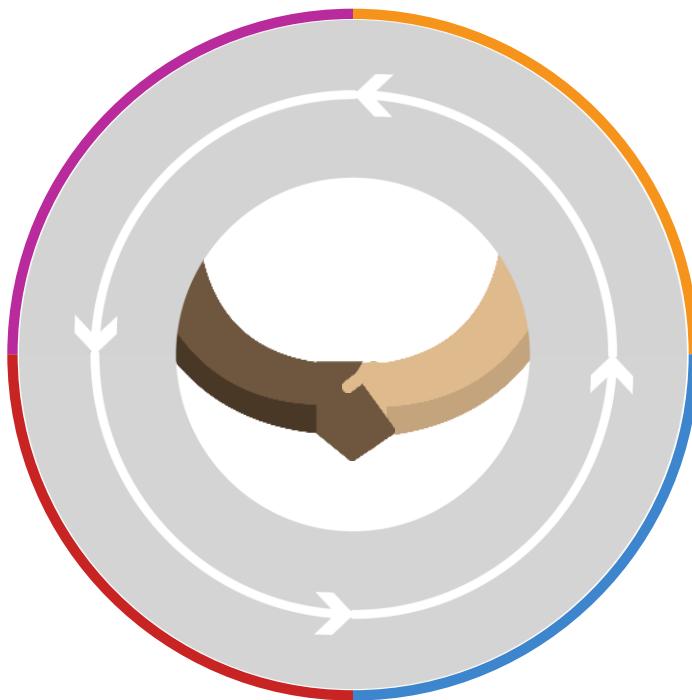
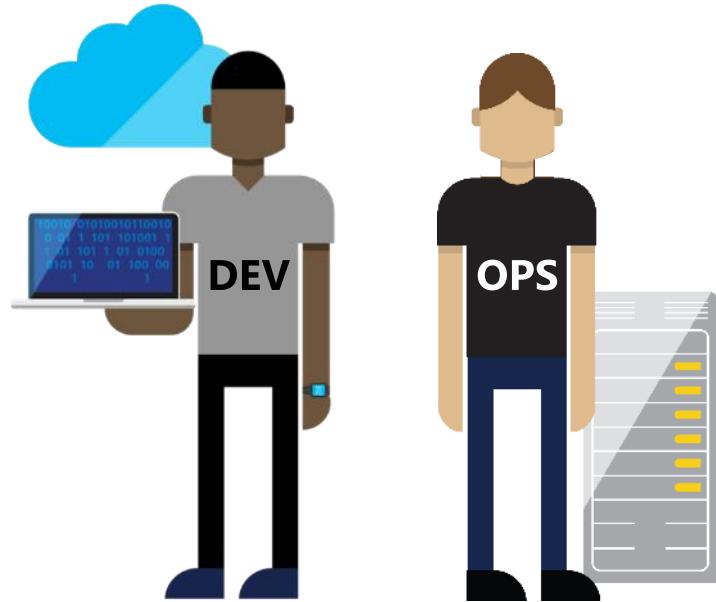
**"Kanban**  
for Ops?"



“DevOps is the union of people, process,  
and products to enable continuous  
delivery of value to our end users”

Donovan Brown – Principal Program Manager - DevOps, Microsoft.

# DevOps: the three stage conversation



**1** | People

**2** | Process

**3** | Products

# DevOps habits and practices

## PRACTICES

- Automated Testing
- Continuous Integration
- Continuous Deployment
- Release Management

**FLOW OF  
CUSTOMER VALUE**

**TEAM  
AUTONOMY & ENTERPRISE  
ALIGNMENT**

## PRACTICES

- Enterprise Agile
- Continuous Integration
- Continuous Deployment
- Release Management

## PRACTICES

- Usage Monitoring
- Telemetry Collection
- Testing in Production
- Stakeholder Feedback

**BACKLOG refined  
with LEARNING**

## PRACTICES

- Code Reviews
- Automated Testing
- Continuous Measurement

**EVIDENCE  
gathered in  
PRODUCTION**

## PRACTICES

- Testing in Production
- Usage Monitoring
- User Telemetry
- Stakeholder feedback
- Feature flags

**MANAGED  
TECHNICAL  
DEBT**

**PRODUCTION  
FIRST MINDSET**

## PRACTICES

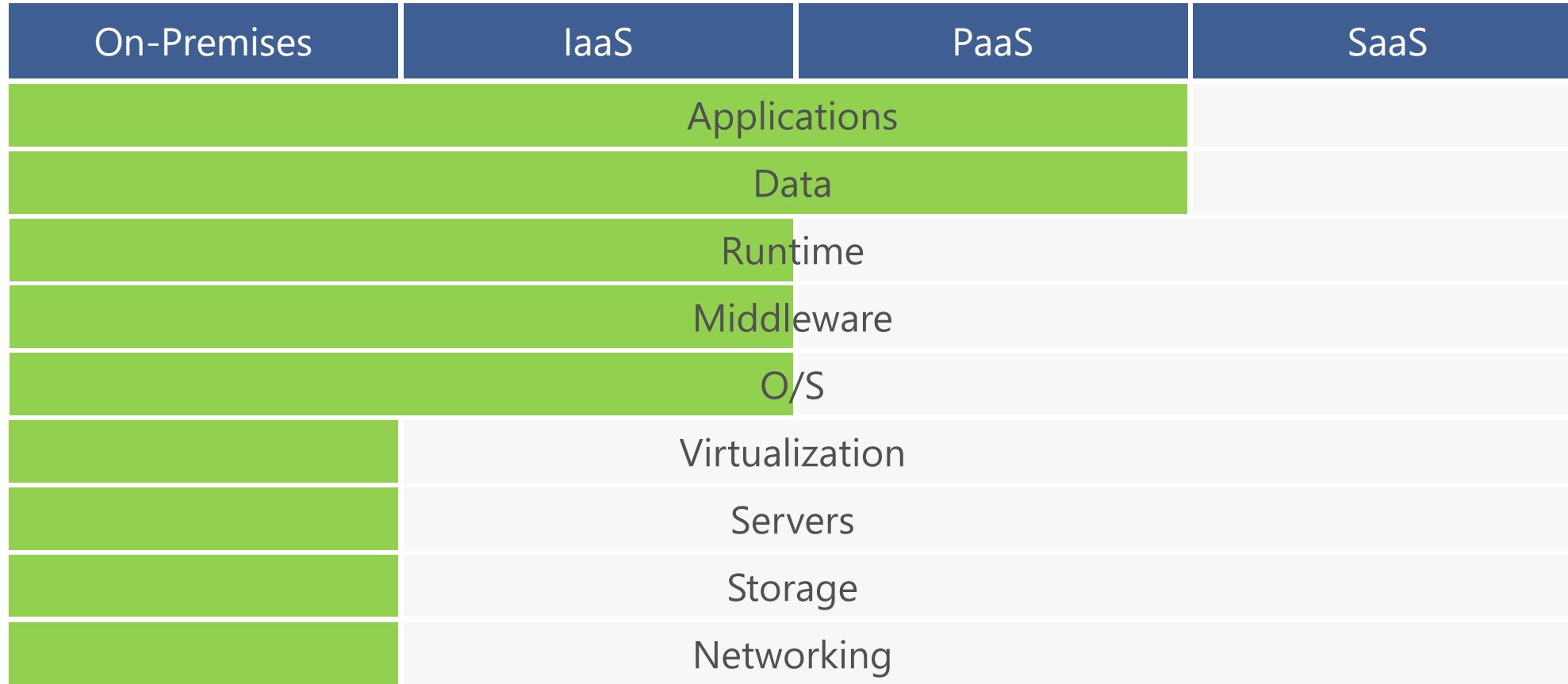
- Application Performance Management
- Infrastructure as Code
- Continuous Delivery
- Release Management
- Configuration Management
- Automated Recovery

## PRACTICES

- Application Performance Management
- Infrastructure as Code
- Continuous Deployment
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- Automated Recovery

**INFRASTRUCTURE  
is a  
FLEXIBLE RESOURCE**

# Computing Models

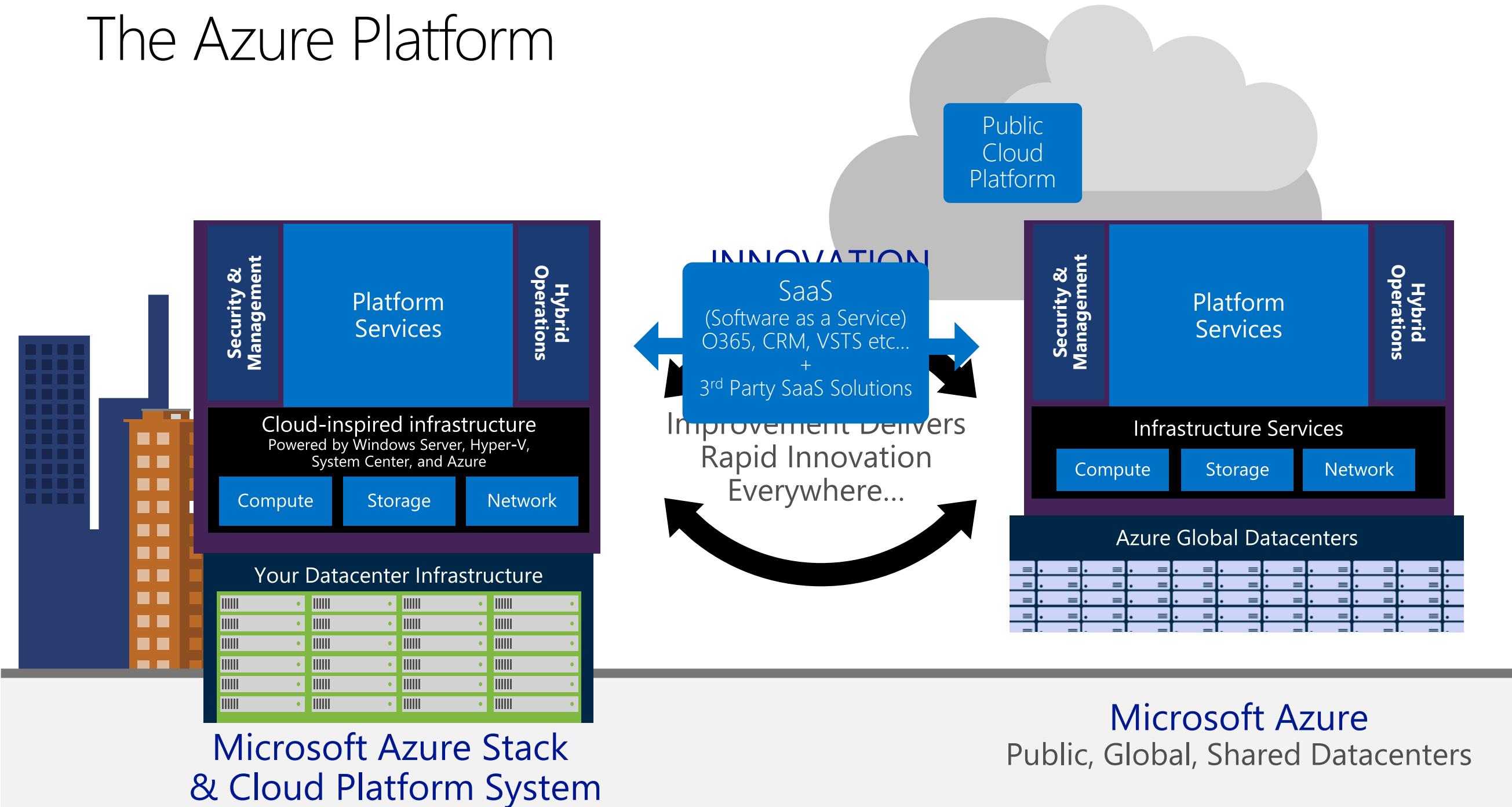


Customer



Microsoft

# The Azure Platform

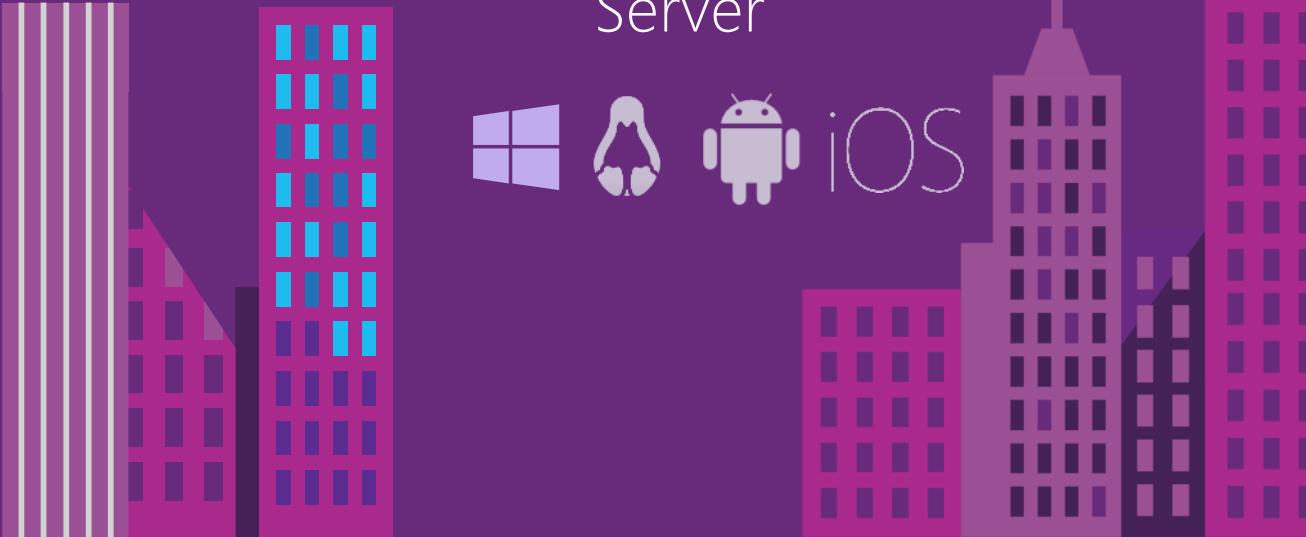




Visual Studio  
Team Services



Team Foundation  
Server



Plan & Track Work

Source Code Management

Package Management

Quality Management

Cross-platform Build

Continuous Deployment

Release Management

Feedback Management

Application Telemetry

Extend, Customize & Integrate

Demo:  
Setting up the tools



# DevOps for Azure Continuous Integration



# DevOps habits and practices

## PRACTICES

Automated Testing  
Continuous Integration  
Continuous Deployment  
Release Management



**TEAM AUTONOMY & ENTERPRISE ALIGNMENT**

## PRACTICES

Enterprise Agile  
Continuous Integration  
Continuous Deployment  
Release Management

## PRACTICES

Usage Monitoring  
Telemetry Collection  
Testing in Production  
Stakeholder Feedback

**BACKLOG refined with LEARNING**

**EVIDENCE gathered in PRODUCTION**

## PRACTICES

Testing in Production  
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## PRACTICES

Code Reviews  
Automated Testing  
Continuous Measurement

**MANAGED TECHNICAL DEBT**

## PRACTICES

Application Performance Management  
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## PRACTICES

Application Performance Management  
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Automated Recovery

**INFRASTRUCTURE is a FLEXIBLE RESOURCE**

# Why adopt Continuous Integration?

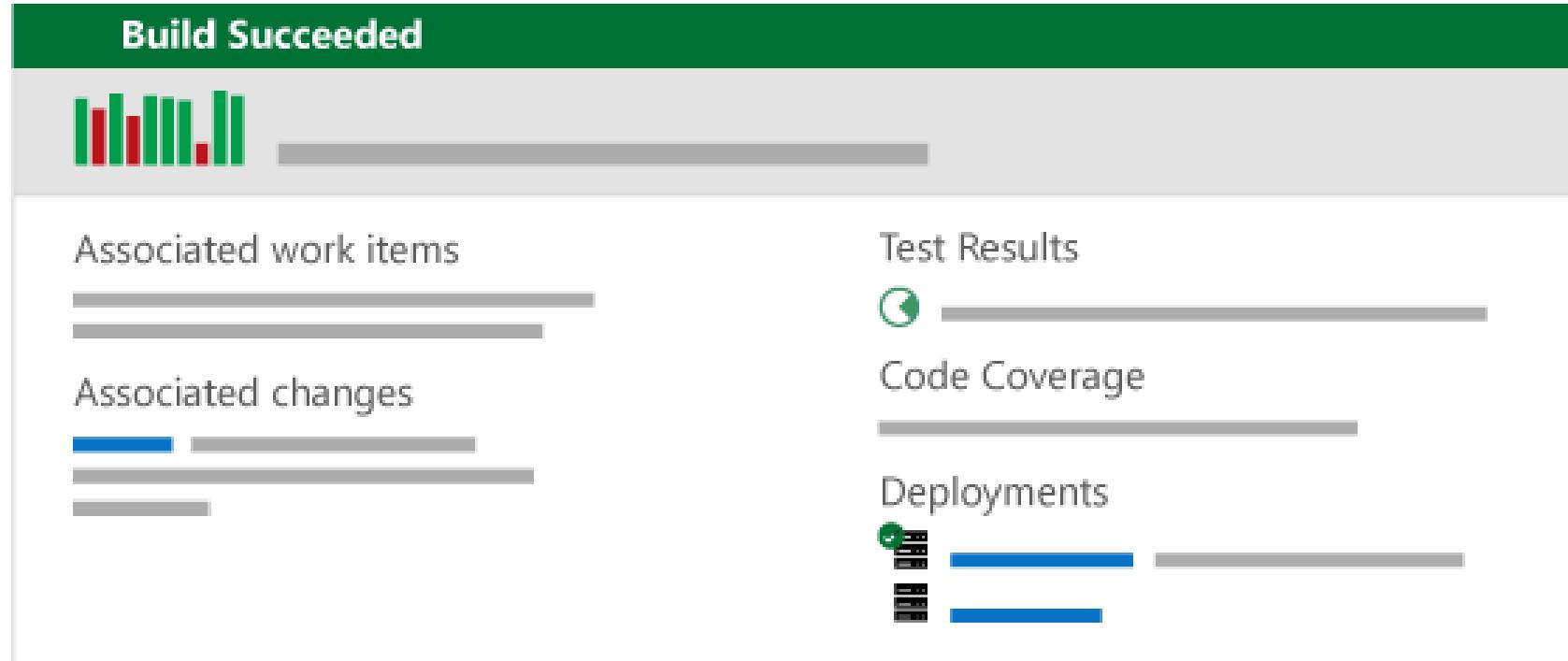
A close-up photograph of a man's face. He has a beard and mustache, and is wearing a white collared shirt. He appears to be in a state of stress or exhaustion, with his eyes half-closed and a weary expression. A thick, dark plume of smoke or steam rises from behind his head, partially obscuring his hair and neck, which adds to the overall sense of tension and pressure.

Avoid  
“integration  
hell”

## Benefits:

- Reduced risk
- Increased quality
- Increased confidence
- Clean builds

# Build Context



Understand what this build relates to across the project

# Build Agents

*Hosted* in the cloud

*Private* in the cloud or on premise

The screenshot shows the 'Queues' tab of the Visual Studio build agent configuration. A table lists agents by name, with one named 'Hosted Agent' checked as enabled. To the right, two sections are visible: 'USER CAPABILITIES' and 'SYSTEM CAPABILITIES'. The 'USER CAPABILITIES' section includes a link to add a capability. The 'SYSTEM CAPABILITIES' section lists several system properties.

Enabled	Name
<input checked="" type="checkbox"/>	Hosted Agent

**USER CAPABILITIES**  
Shows information about user-defined capabilities  
[+ Add capability](#)

**SYSTEM CAPABILITIES**  
Shows information about the capabilities provided

Agent.Name
Agent.Version
AndroidSDK
ant

Details and restrictions of hosted agents:

<https://www.visualstudio.com/docs/build/admin/agents/hosted-pool>

# Cross platform Builds



.NET Java Xcode

Windows	OS X	Linux
Ubuntu		
Ubuntu 14.04-x64		
Ubuntu 16.04-x64		
Red Hat		
Red Hat 7.2-x64		

**System pre-requisites**  
Configure your account  
Configure your account by following the steps outlined below.

**Download the agent**  
[Download](#)

## Cross platform Agents

Demo:

# Continuous Integration

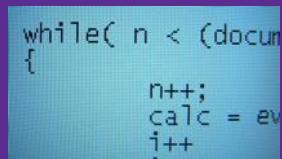


# DevOps for Azure Release Management



# Build and Release Pipelines

Build



Code



Dependency Management



Build



Unit Test



Package



Artifact Store



Dev



Provision



Deploy



Test



QA



Provision



Deploy



Ops



Provision



Deploy



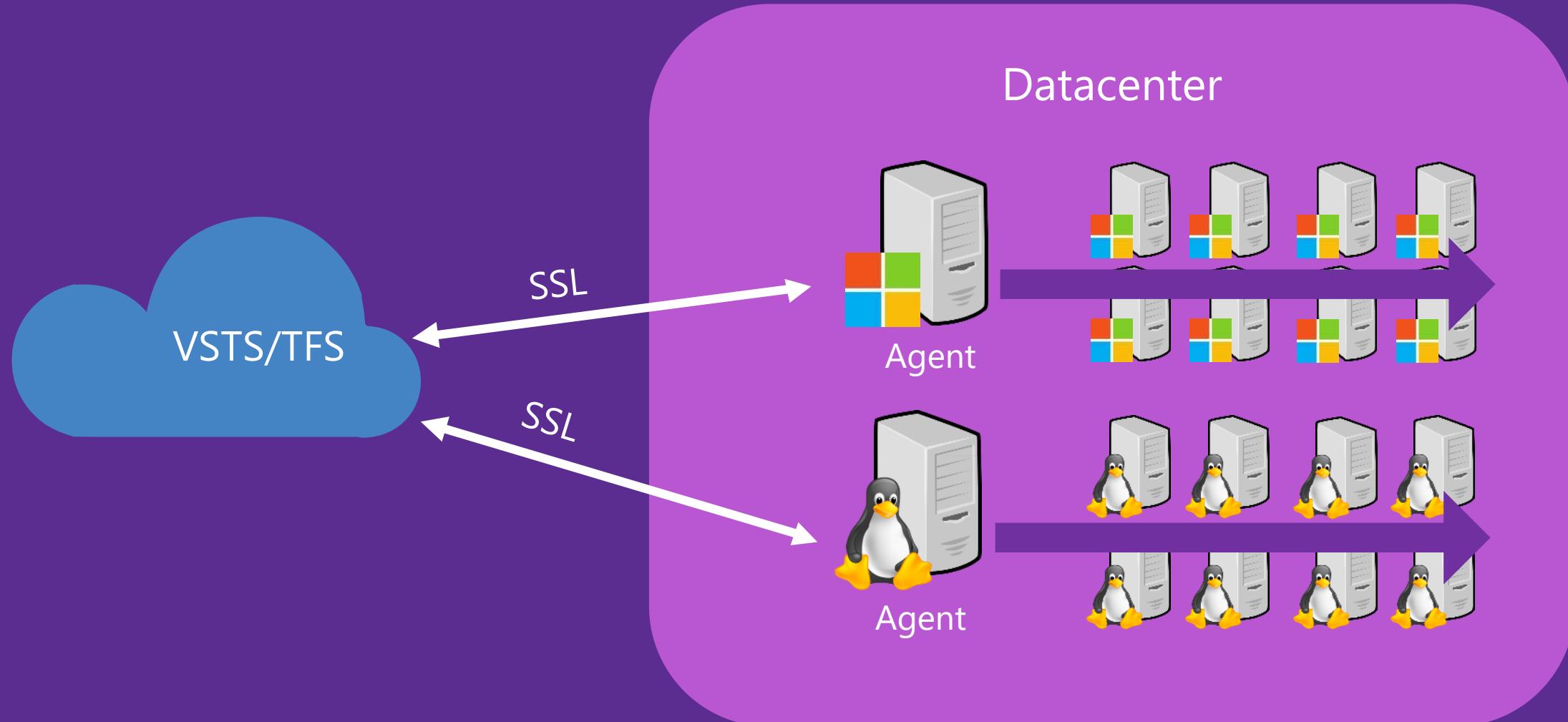
Load Test

Demo:

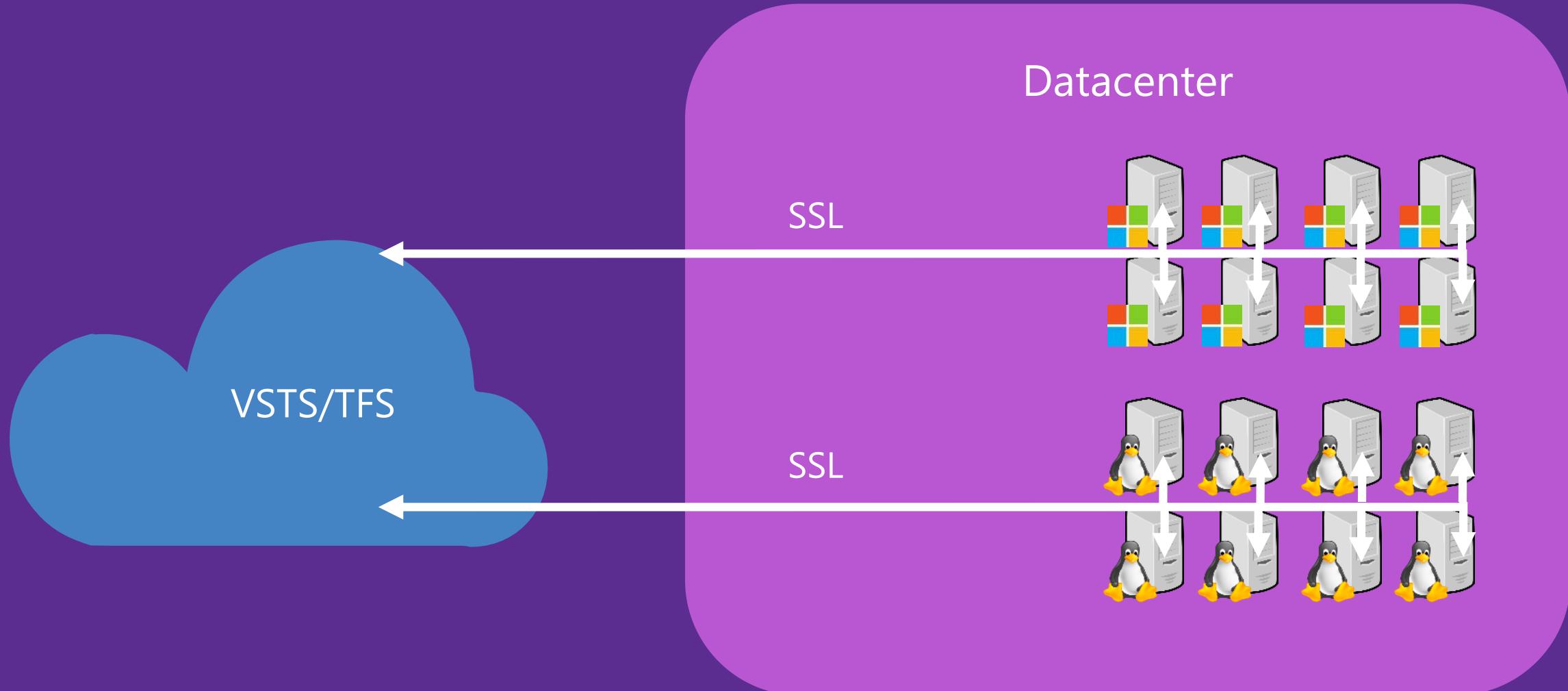
# Release Management



# By-proxy Deployment



# IaaS Deployment (Deployment Groups)



# DevOps for Azure Infrastructure as Code with Azure Resource Manager templates



# DevOps habits and practices

## PRACTICES

- Automated Testing
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## PRACTICES

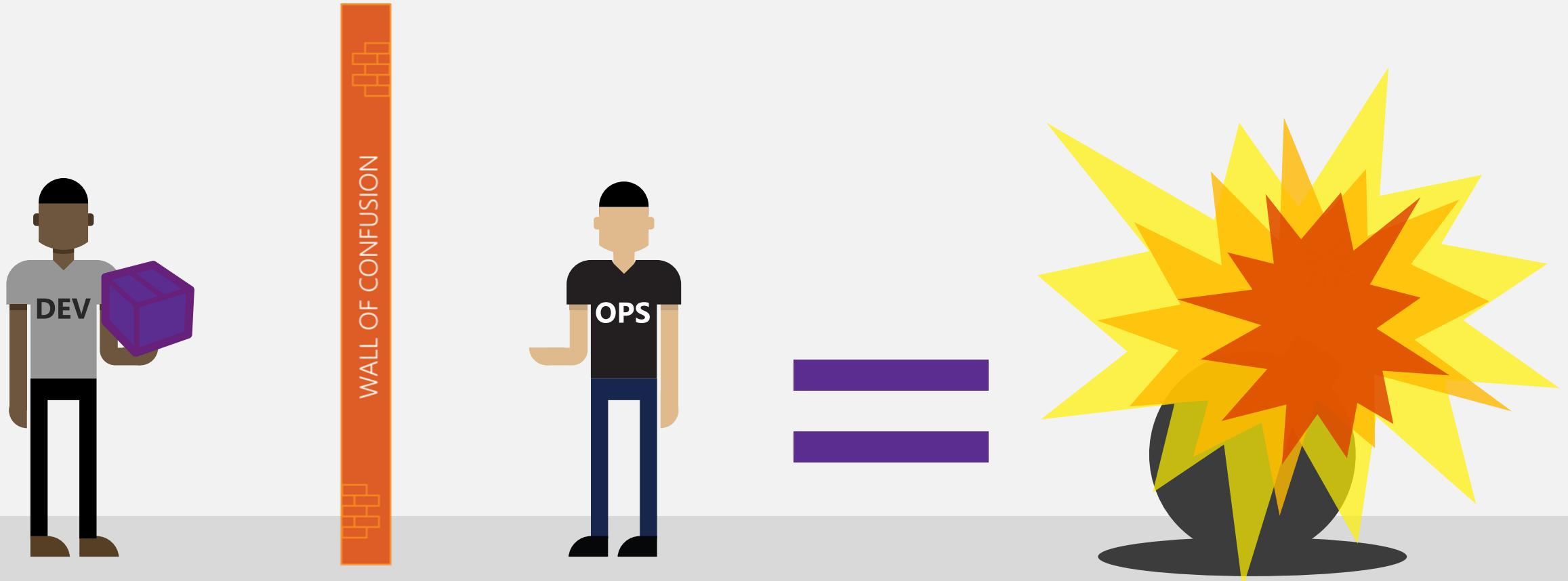
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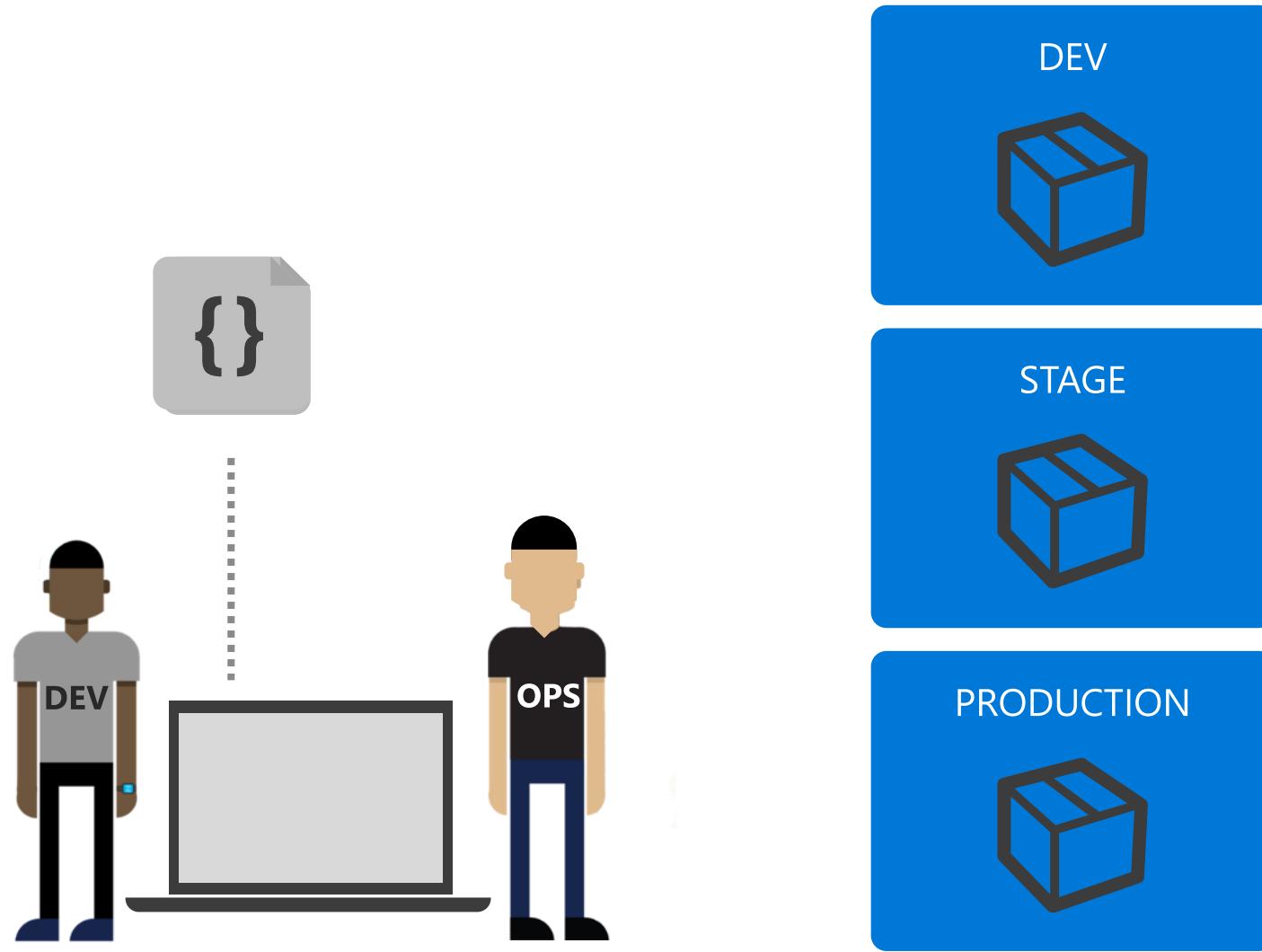
# Traditional Development and Operations



# Infrastructure as Code:

Treat infrastructure (machines, networks, configuration) in the same way as code

# Infrastructure as Code



# IaaC Benefits

Consistency

Include infrastructure in release pipeline

Source control

Infrastructure on demand

# Azure Resource Manager Template:

A JSON file that defines one or more resources, and their dependencies, to deploy to a resource group.

<https://azure.microsoft.com/en-gb/documentation/articles/resource-group-overview/>

Demo:

# Continuous Deployment with ARM



# ARM Resources

## Quickstart Templates

<https://azure.microsoft.com/en-us/documentation/templates/>

<https://github.com/Azure/azure-quickstart-templates>

## ARMViz

<http://armviz.io/designer>

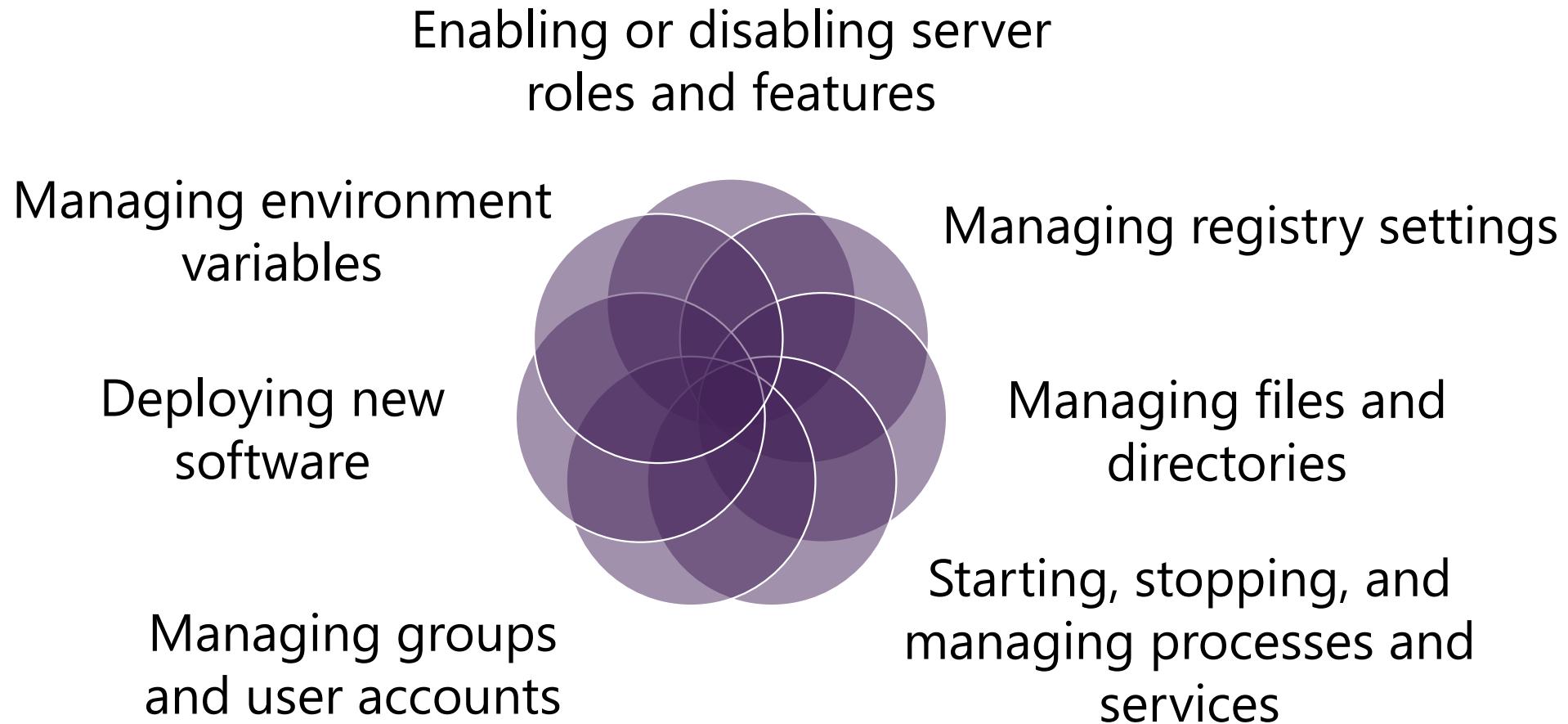
## Visual Studio Code ARM extension

<https://marketplace.visualstudio.com/items?itemName=msazurermttools.azure-vm-tools>

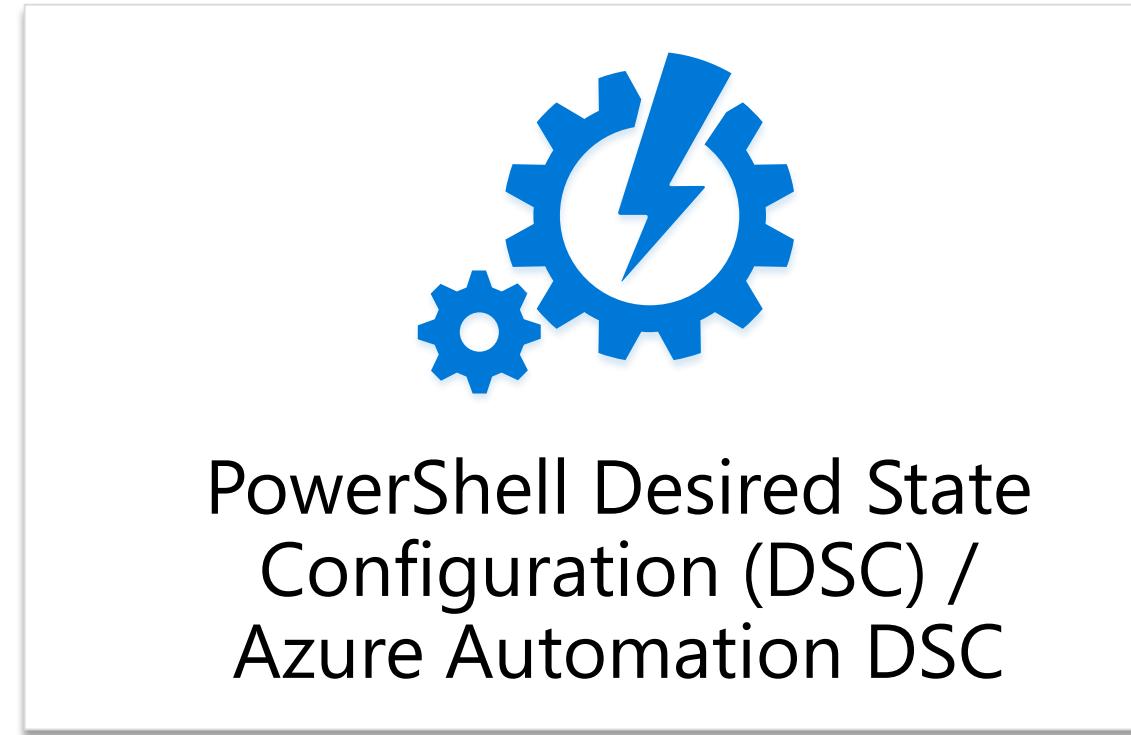
# DevOps for Azure Configuration Management



# What might we configure?



# Configuration Management Technologies



# PowerShell Desired State Configuration

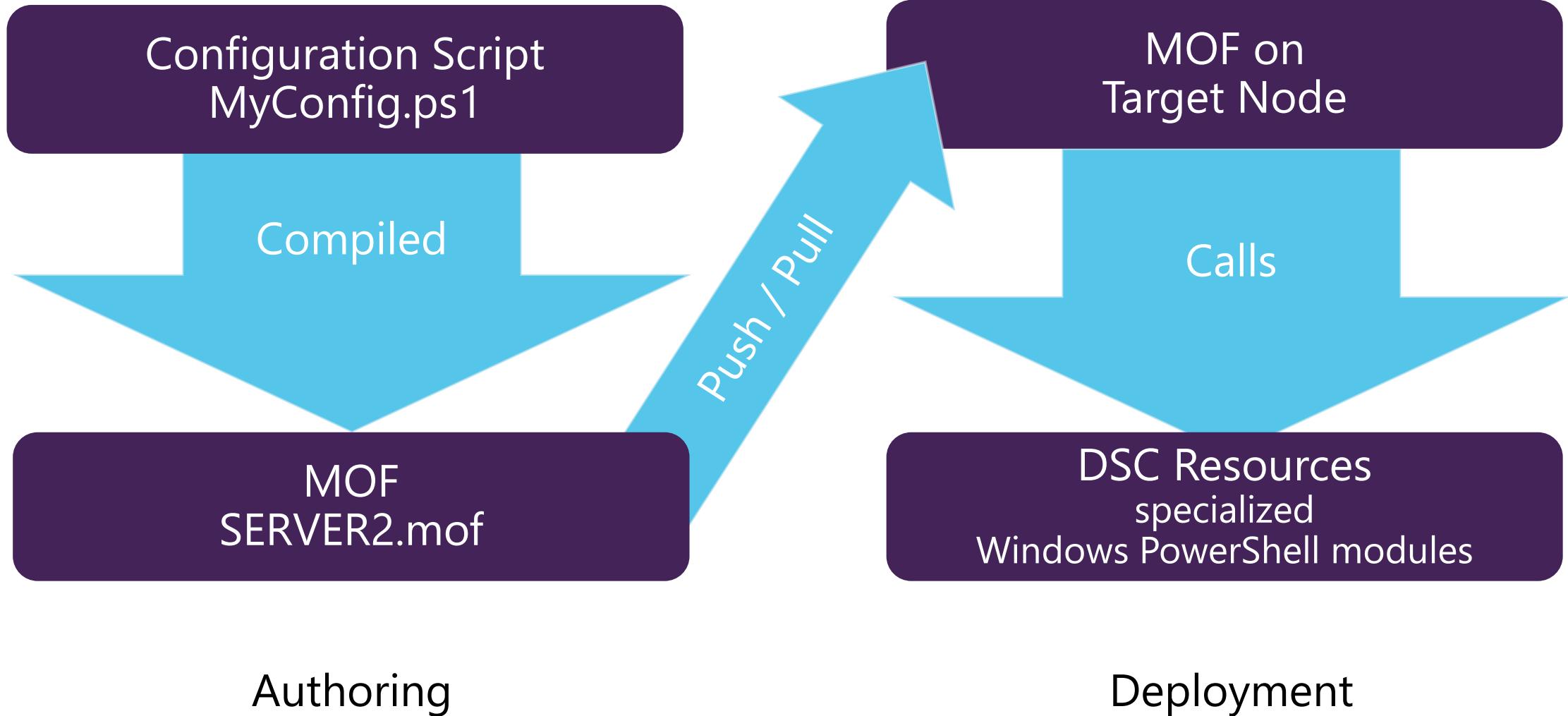
Enables you to **ensure** that the components of your data center have the **correct configuration**

Supports **continuous deployment**

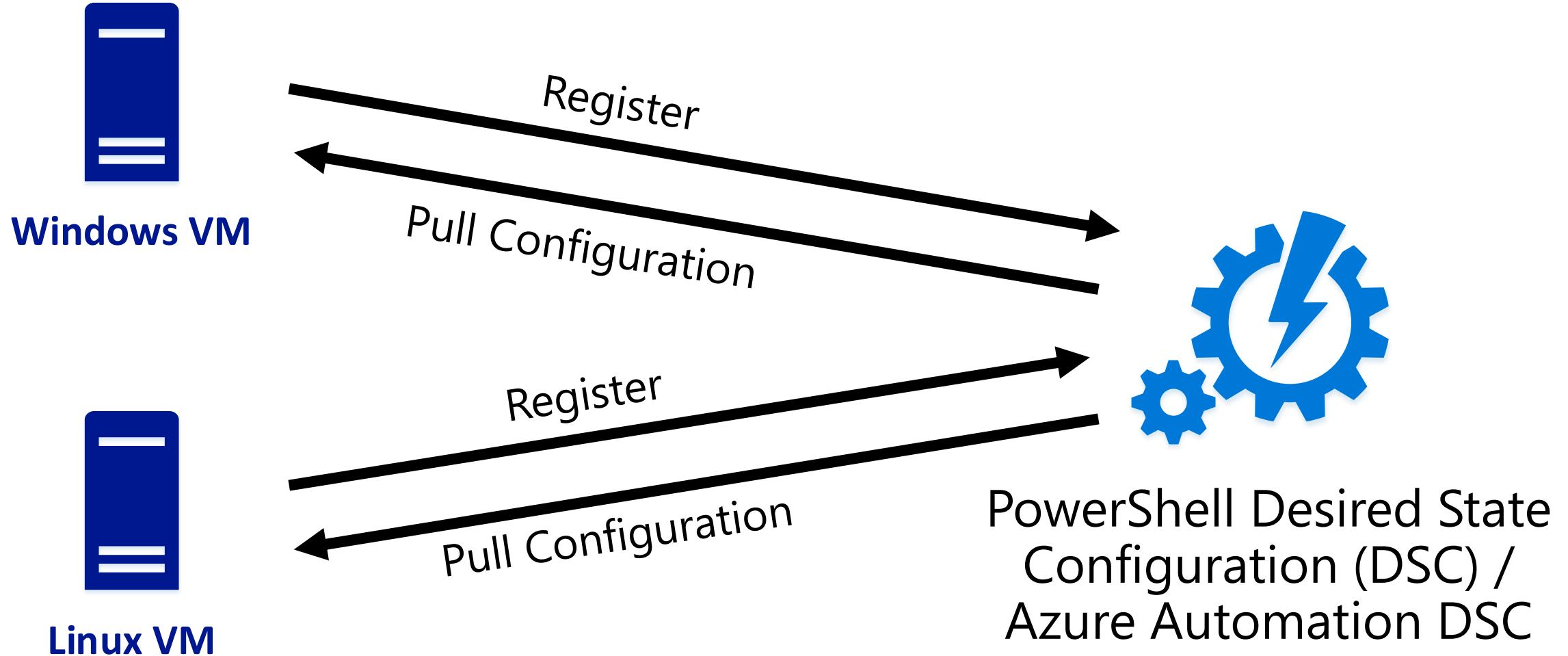
Prevents **configuration drift**

Enable declarative, autonomous and idempotent (repeatable) deployment, configuration and conformance of **standards-based managed elements**

# DSC Architectural Overview



# DSC Pull Server



# A PowerShell DSC Configuration

Configuration Example

```
{  
    Node ('localhost')  
    {  
        File CopyDeploymentBits  
        {  
            Ensure          = "Present"  
            Type           = "Directory"  
            Recurse         = $true  
            SourcePath      = "C:\DSC\"  
            DestinationPath = "C:\Destination"  
        }  
    }  
}
```

Example

# Built in DSC Resources

- [Archive Resource](#)
- [Environment Resource](#)
- [File Resource](#)
- [Group Resource](#)
- [Log Resource](#)
- [Package Resource](#)
- [Registry Resource](#)
- [Script Resource](#)
- [Service Resource](#)
- [User Resource](#)
- [WindowsFeature Resource](#)
- [WindowsProcess Resource](#)

Demo:  
Desired State  
Configuration (DSC)



# PowerShell DSC: Additional Resources

- Public repository:

[www.powershellgallery.com](http://www.powershellgallery.com)

- Awesome eBook:

[www.powershell.org/ebook](http://www.powershell.org/ebook)

# DevOps for Azure Continuous Testing



# DevOps habits and practices

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**TEAM  
AUTONOMY & ENTERPRISE  
ALIGNMENT**

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**PRODUCTION  
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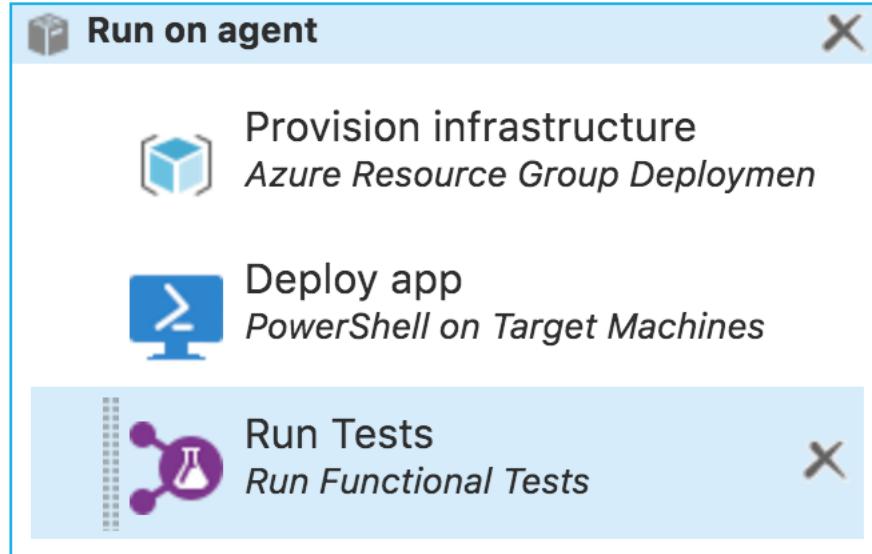
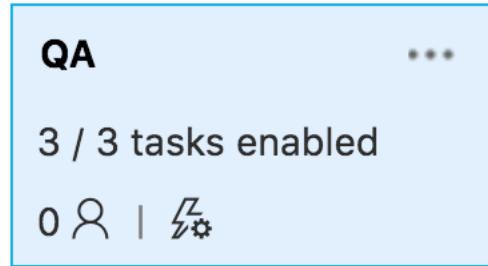
**INFRASTRUCTURE  
is a  
FLEXIBLE RESOURCE**

# Question

Your testing team is constantly asking for more applications and more frequent releases as they simply haven't got enough work. In your organisation is this:

- A. True.
- B. False.
- C. What testing team?

# Continuous Testing



Release is not just  
about code  
deployment

Demo:

# Continuous Testing



# Load testing available as tasks

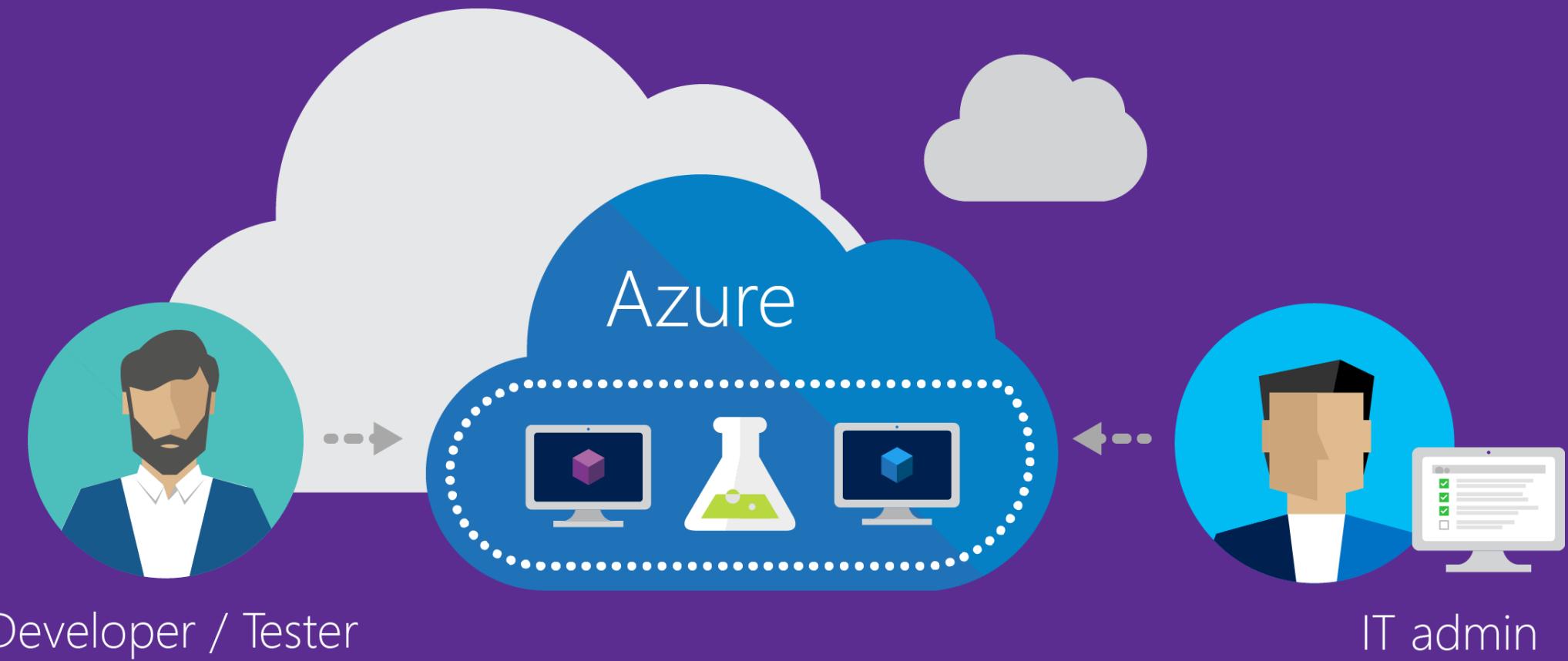
## Task catalog

All Build Utility Test Package Deploy

 Cloud-based Apache JMeter Load Test Runs the Apache JMeter load test in cloud	<span>Add</span>
 Cloud-based Load Test Runs the load test in the cloud with Visual Studio Team Services	<span>Add</span>
 Cloud-based Web Performance Test Runs a quick web performance test in the cloud with Visual Studio Team Services	<span>Add</span>

# Azure DevTest Labs

Fast, easy, and lean dev-test environments in Azure.  
Specifically for your team. On demand.



# Visual Studio App Center



## Visual Studio App Center

Continuous Everything – Build, Test, Deploy, Engage, Repeat.

[Get started for free >](#)



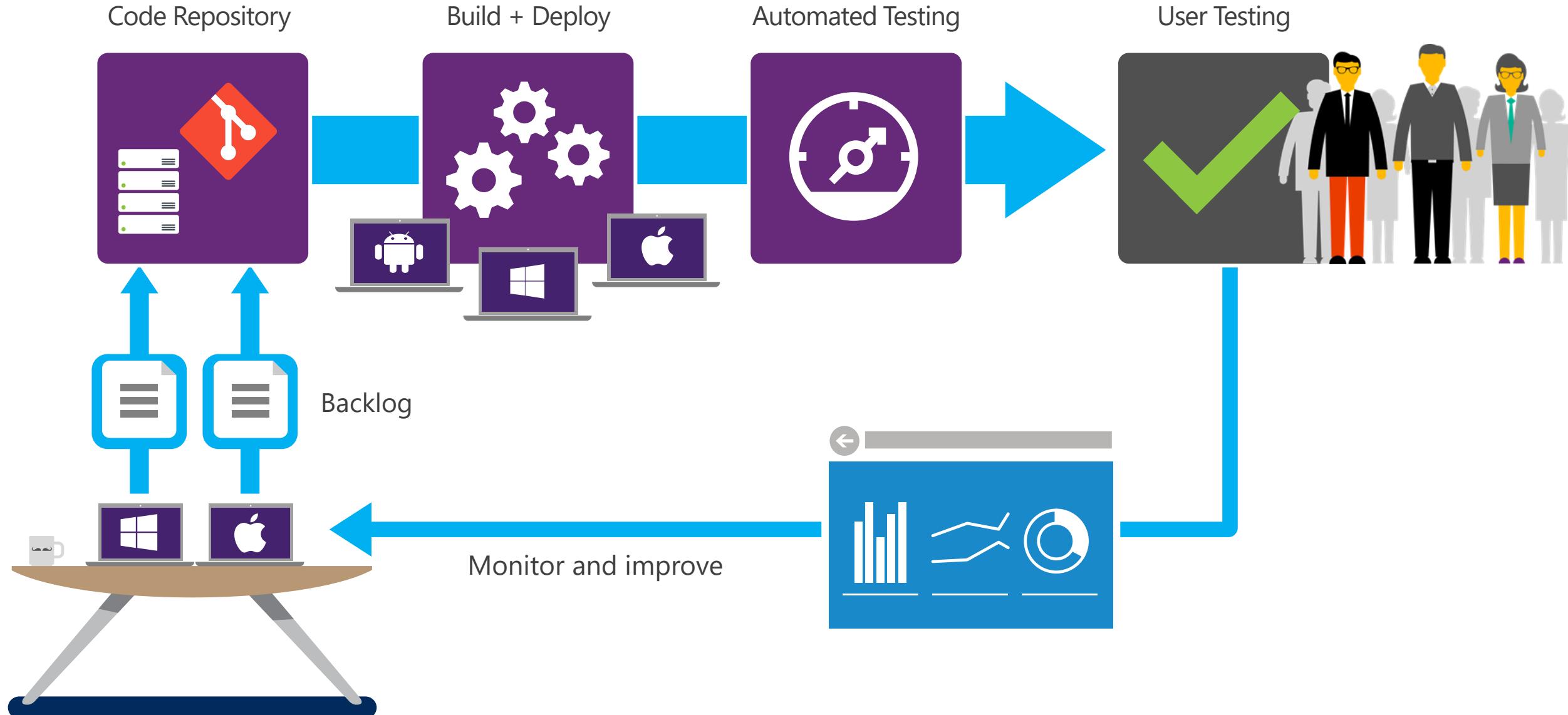
**OBJ-C**



The screenshot shows the Visual Studio App Center interface. On the left, a sidebar menu for "My App - iOS - M" includes links for App Center, ContosoAir - iOS, Getting Started, Build, Test, Distribute, Crashes, Analytics, Push, and Settings. The main area displays a table of branches:

BRANCHES	Status	Last commit
AppInsightBugBranch	BUILT	 Adding cross-platform UI Tests Chester Jones
AutoFlightRebookBranch	BUILT	 Added trigger to start auto book feature Erica Wang
development	BUILT	 edited extraction code Chad Allen
master	BUILT	 bump Derrick Williams
mobile-center-xamarin	BUILT	 fix bug 1234 Miguel Soto
BugBranch	NONE	 made some changes for demo Prita Patarn

# Continuous Delivery for mobile apps



# DevOps for Azure

## Working with Databases



# Replicate existing approach using tasks

## Batch Script

 Run a windows cmd or bat script and optionally allow it to change the environment

Add

## Command Line

 Run a command line with arguments

Add

## PowerShell

 Run a PowerShell script

Add



## Azure SQL Database Incremental Deployment (Development)

Deploy an Azure SQL Database using multiple DACPAC and performing incremental deployments based on current Data-Tier Application version

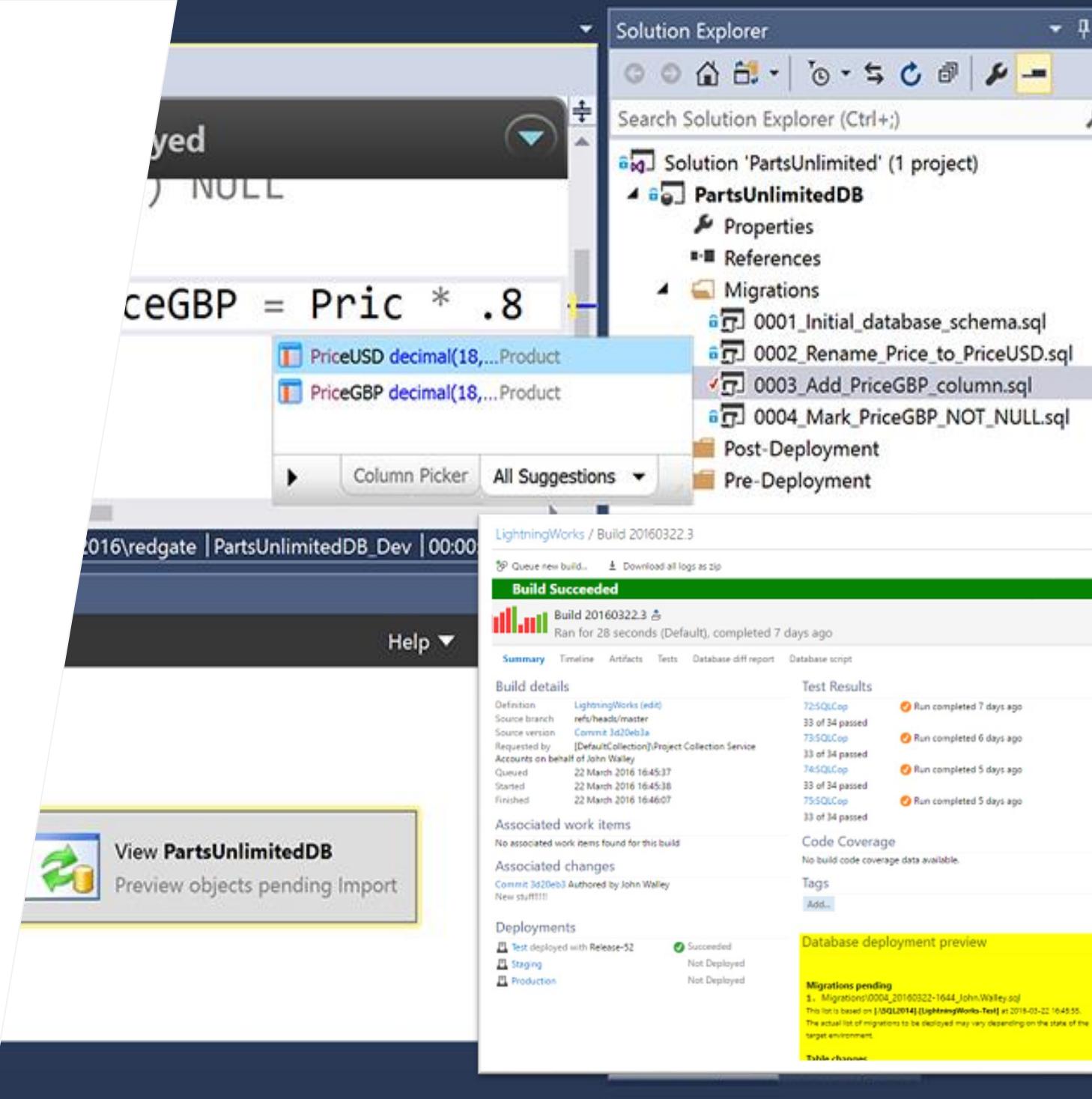
Add

# Redgate ReadyRoll

Extend DevOps processes to SQL Server and Azure SQL databases

Develop, source control, and safely automate deployments of database changes, right alongside your application changes.

Your database will no longer be the bottleneck to delivering value to your customers quickly.



Plug-in into Visual Studio



readyroll

ALTER scripts for tables and reference data

CREATE scripts for programmable objects

Continuous validation of scripts

Available in marketplace:

<https://marketplace.visualstudio.com/items?itemName=redgatesoftware.redgate-readyroll>

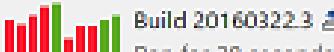
Bundled with Visual Studio Enterprise

# Integrated into Build and Release

LightningWorks / Build 20160322.3

Queue new build... Download all logs as zip

## Build Succeeded



Build 20160322.3

Ran for 28 seconds (Default), completed 7 days ago

[Summary](#) [Timeline](#) [Artifacts](#) [Tests](#) [Database diff report](#) [Database script](#)

### Build details

Definition [LightningWorks \(edit\)](#)  
Source branch [refs/heads/master](#)  
Source version [Commit 3d20eb3a](#)  
Requested by [\[DefaultCollection\]Project Collection Service](#)  
Accounts on behalf of [John Walley](#)  
Queued [22 March 2016 16:45:17](#)  
Started [22 March 2016 16:45:18](#)  
Finished [22 March 2016 16:46:07](#)

### Associated work items

No associated work items found for this build

### Associated changes

[Commit 3d20eb3](#) Authored by [John Walley](#)  
New stuff!!!!

### Deployments

<a href="#">Test deployed with Release-52</a>	Succeeded
<a href="#">Staging</a>	Not Deployed
<a href="#">Production</a>	Not Deployed

### Test Results

<a href="#">72SQLCop</a>	Run completed 7 days ago
33 of 34 passed	
<a href="#">73SQLCop</a>	Run completed 6 days ago
33 of 34 passed	
<a href="#">74SQLCop</a>	Run completed 5 days ago
33 of 34 passed	
<a href="#">75SQLCop</a>	Run completed 5 days ago
33 of 34 passed	

### Code Coverage

No build code coverage data available.

### Tags

[Add...](#)

### Database deployment preview

#### Migrations pending

1. [Migrations/0004\\_20160322-1644\\_John.Walley.cs](#)

This list is based on [ASQ12014] (LightningWorks-Test) at 2016-03-22 16:45:55.

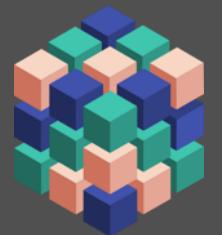
The actual list of migrations to be deployed may vary depending on the state of the target environment.

#### Table changes

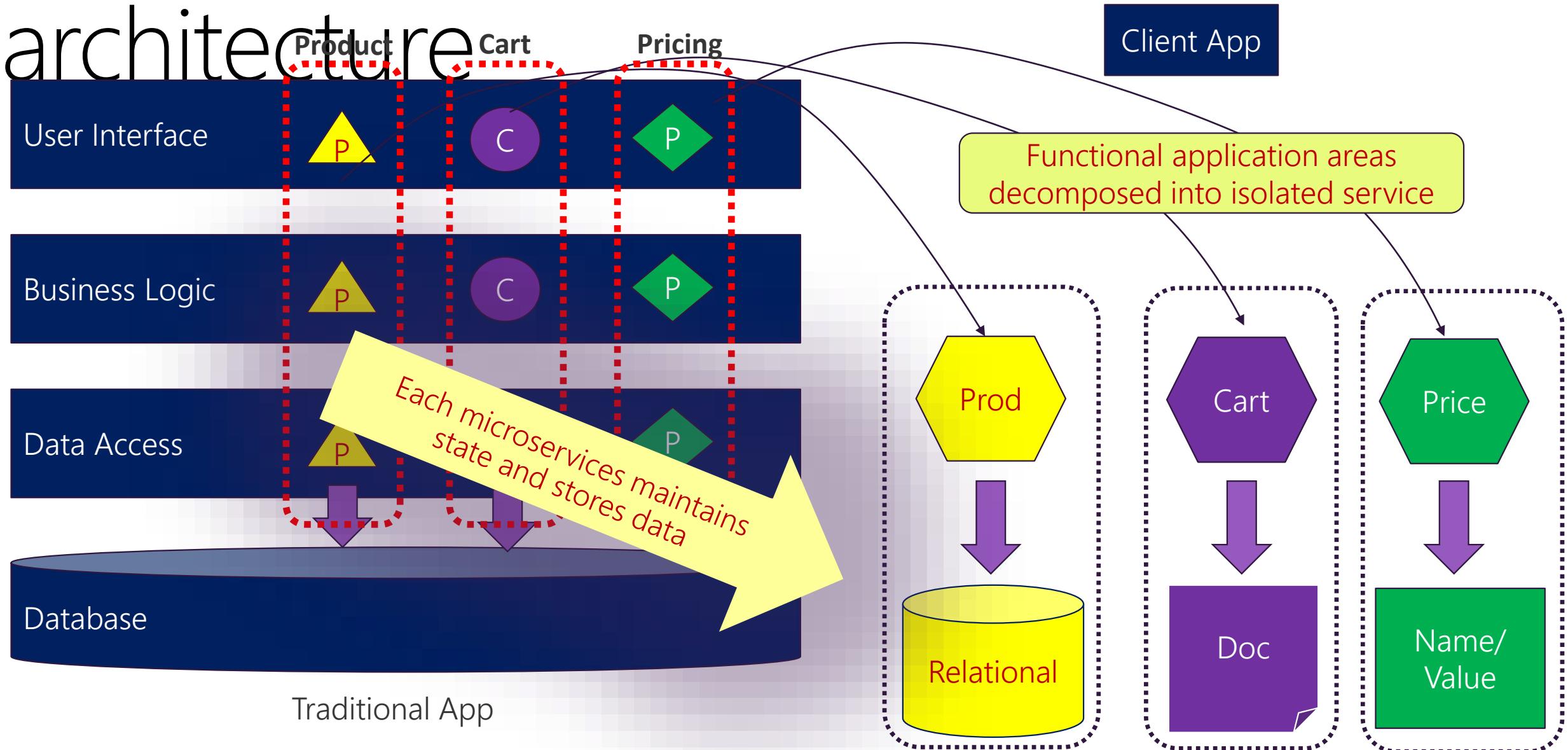
# DevOps for Azure Microservices



# Why move to a microservices architecture?

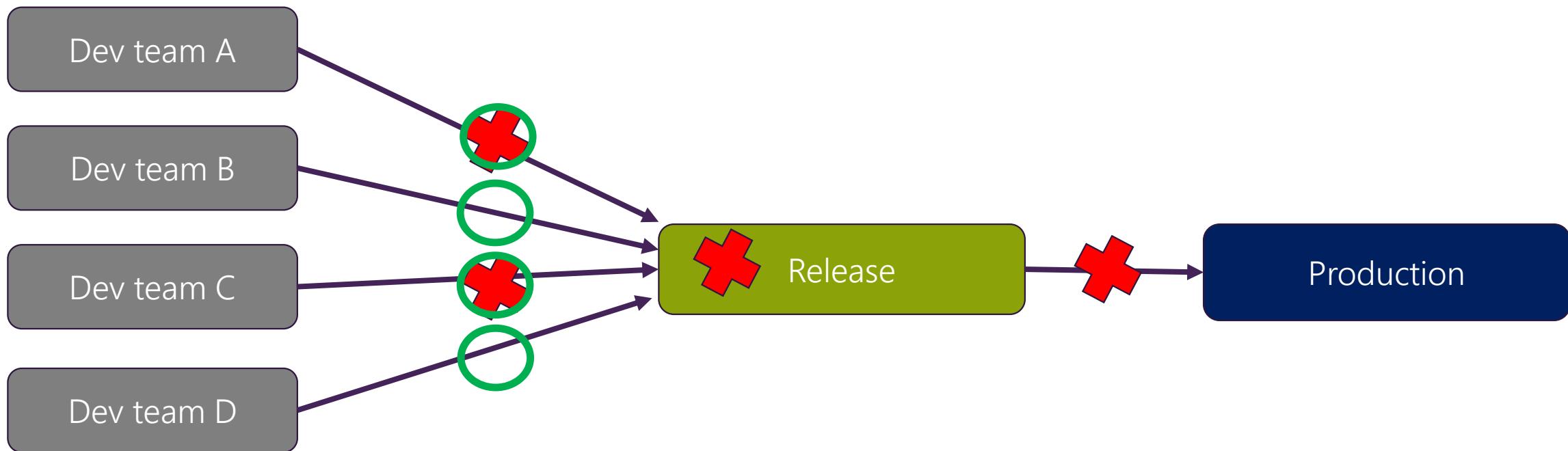


# Moving to microservices architecture



# How Monoliths Destroy Agility

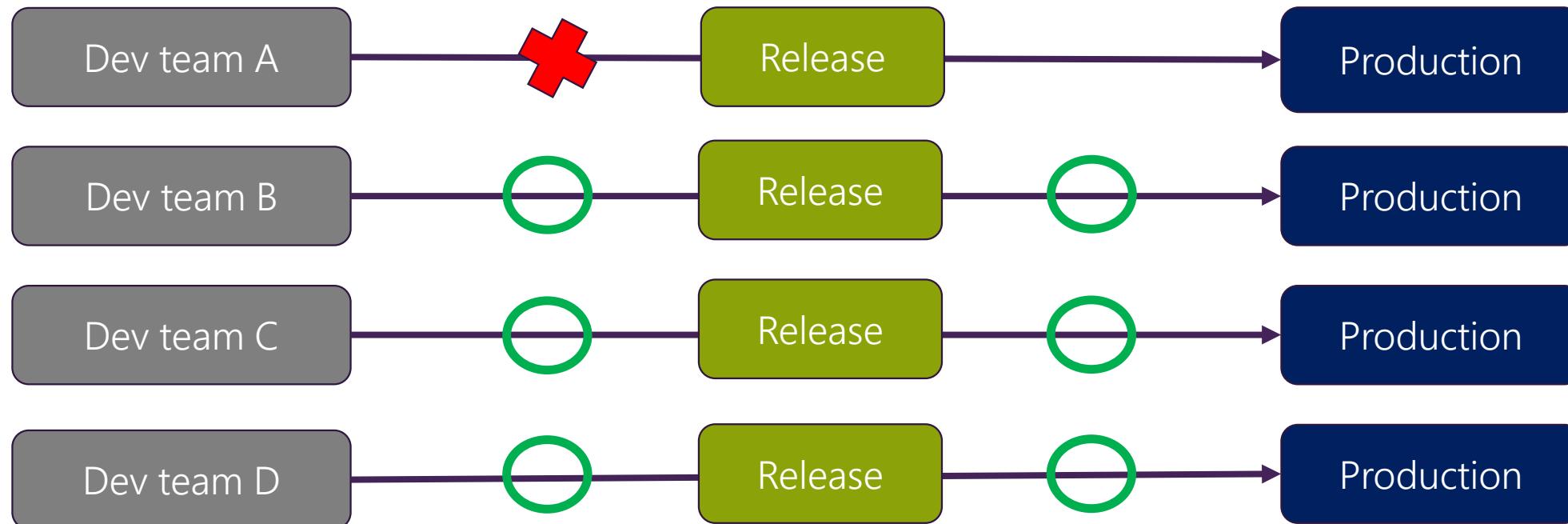
- Single codebase with single release pipeline
  - All teams share same dependencies – tightly-coupled
  - All teams release in the same cadence
  - A defect in a dependency can block multiple teams and the release itself



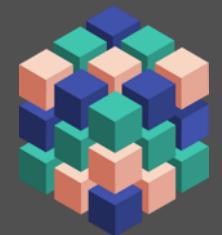
# Agility Benefits of Microservices

Each team owns its own service and deploys separately

- Services are isolated and do not directly share dependencies
- Each has its own release cadence
- Each deploys independently



# How to implement a microservices architecture?



# Implementing MicroServices

## Serverless

Abstraction from servers

Deploy code only

## Containers

Self contained code and dependencies

Higher portability

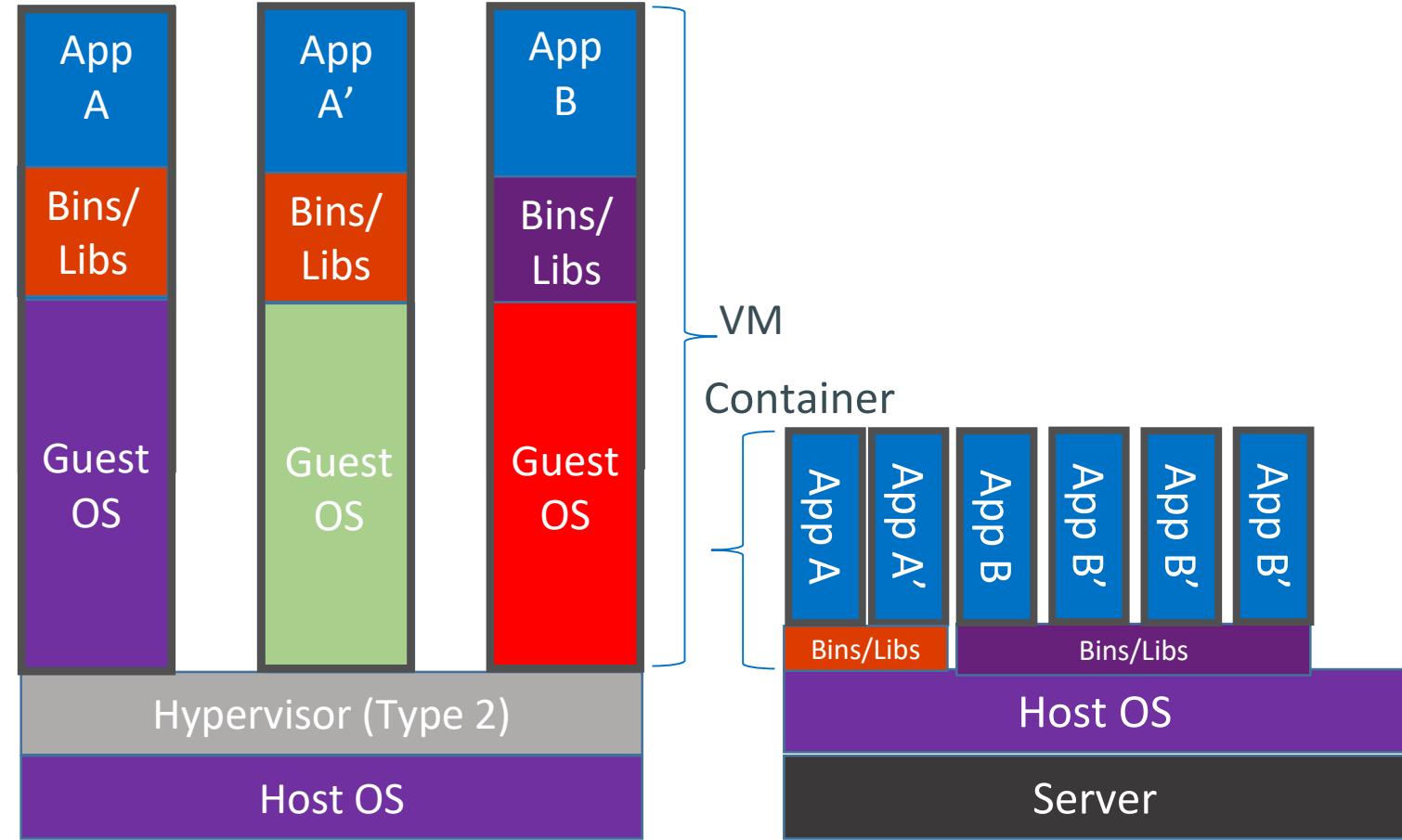
# Containers

Hasn't this been  
solved already?



Anyone heard  
of  
virtualisation?

# Virtual Machines VS Containers



Therefore smaller,  
faster, higher density

# Container benefits

Agility	Density	Repeatable execution	Cloud Portability
<ul style="list-style-type: none"><li>• Independent release</li><li>• Independent technology</li><li>• Independent updates</li></ul>	<ul style="list-style-type: none"><li>• Scale</li><li>• Partitioning</li><li>• Startup speed</li></ul>	<ul style="list-style-type: none"><li>• Immutable environment</li><li>• Consistency across environments</li></ul>	<ul style="list-style-type: none"><li>• Container engines across clouds and on-premise</li></ul>

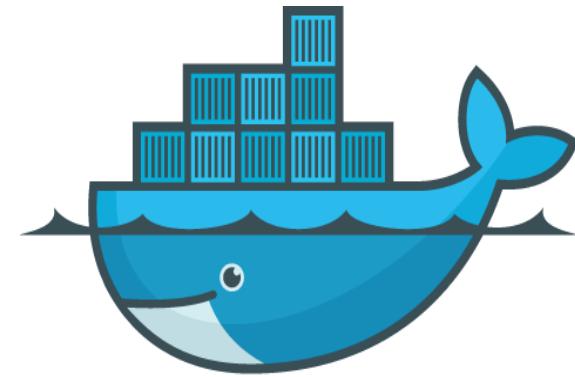
# Which Container Engine?

Rocket

LXD

Spoonium

Flockport LXC



*docker*

# Docker

## Docker

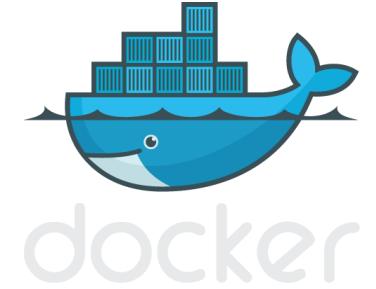
- Aka The Docker Project
- Open Source Project

## Docker Hub

- <https://hub.docker.com/>
- Repository (registry) of container images
  - > "App Store" for container images

## Docker Inc.

- The company behind Docker
- Commercial services around Docker



# How does Azure support Docker?

Azure  
Container  
Instance (ACI)

Run containers from the  
command line with a single  
command

Azure App  
Service

Deploy web application using  
containers

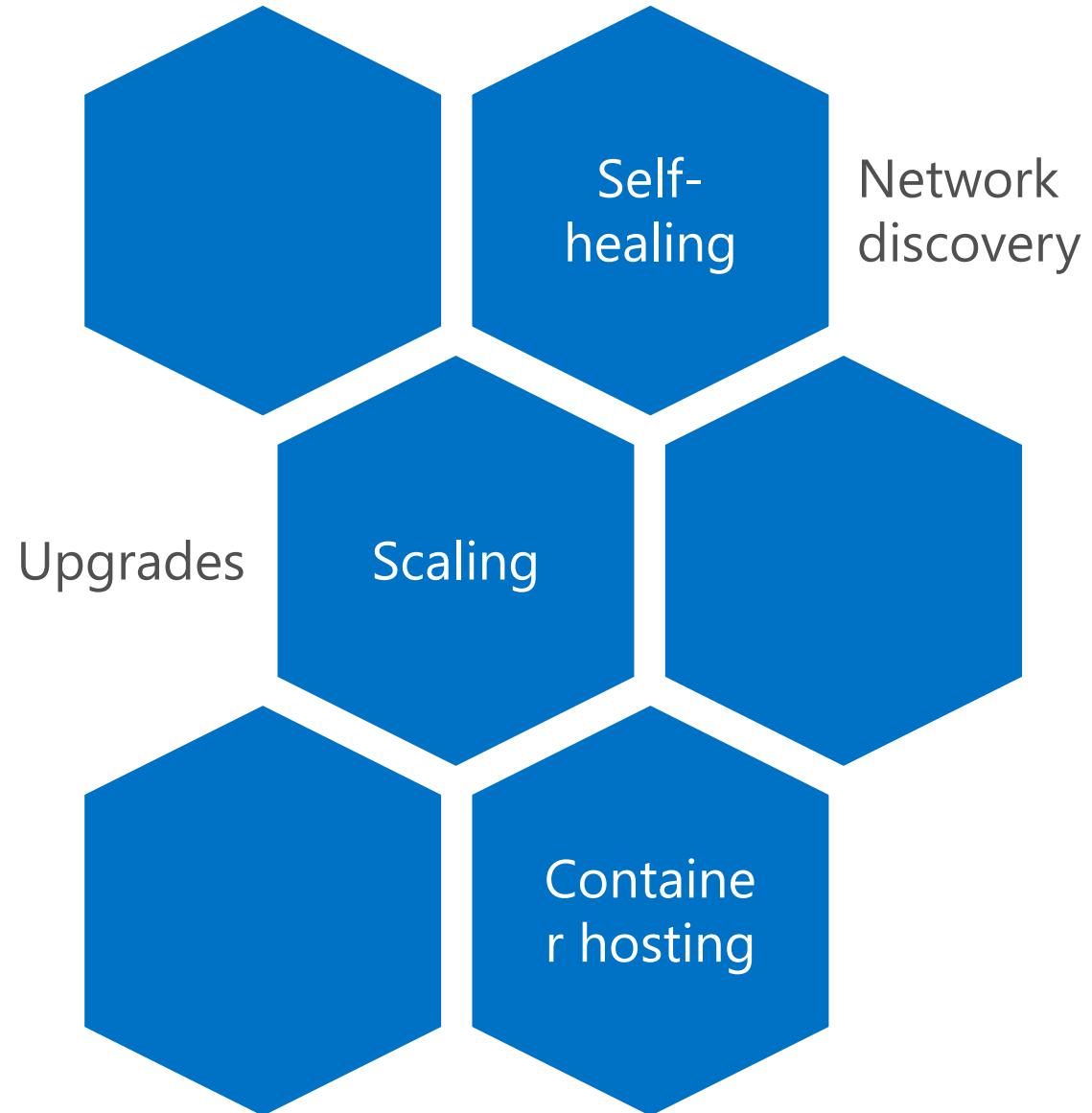
Azure Batch

Run repetitive compute jobs  
using containers

Azure  
Container  
Registry (ACR)

Store and manage container  
images

# What happens when I have >1 container?



# Container Orchestrators

Microsoft Azure  
Service Fabric



**kubernetes**  
by Google™

 MESOSPHERE



# How does Azure support Container Orchestrators?

Service Fabric

Scale and orchestrate containers using Microsoft orchestrator

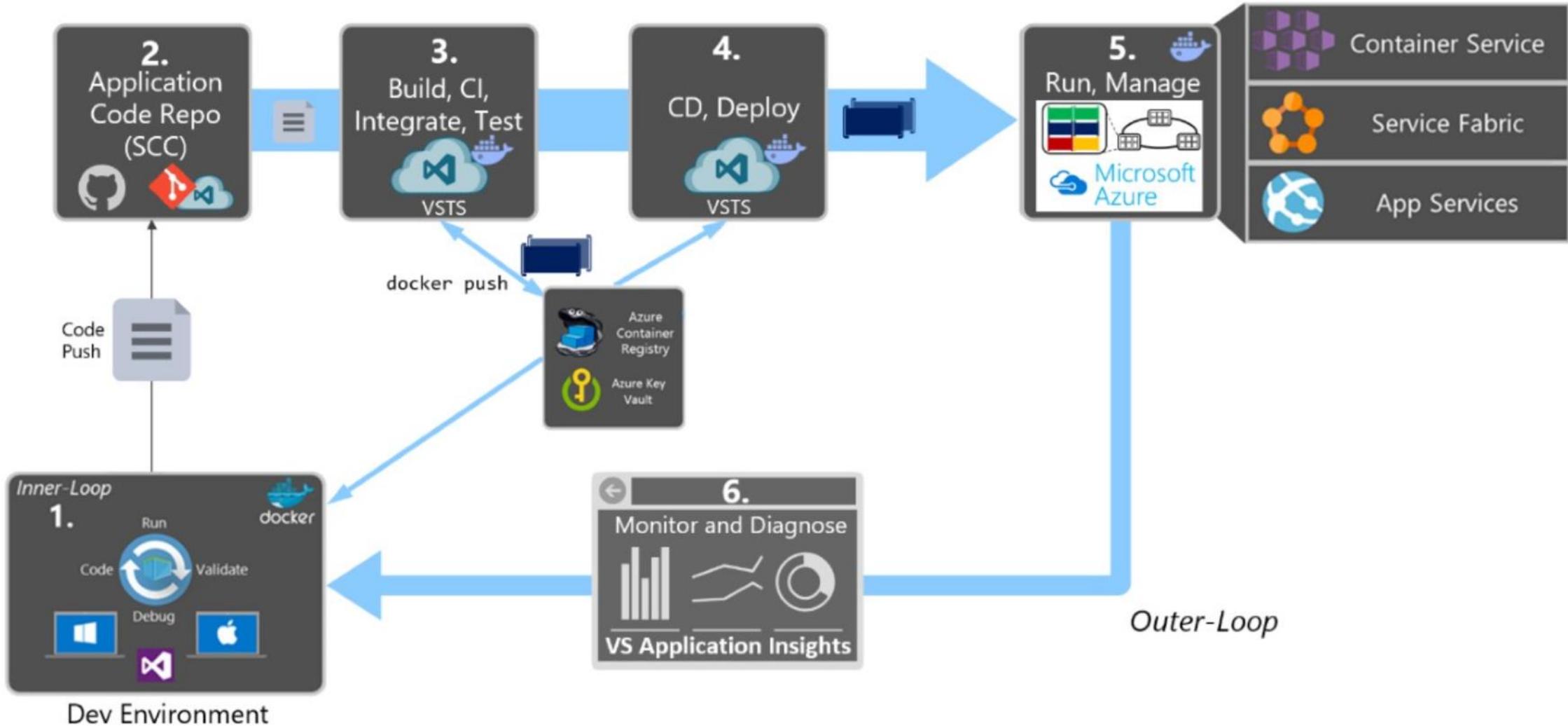
Azure Container Service (ACS)

Scale and orchestrate containers using Kubernetes, DC/OS or Docker Swarm

Azure Container Service for K8s (AKS)

Scale and orchestrate containers using a managed Kubernetes cluster

# DevOps with Containers



# Demo: Containers



# DevOps for Azure Application Insights



# DevOps habits and practices

## PRACTICES

Automated Testing  
Continuous Integration  
Continuous Deployment  
Release Management



## PRACTICES

Enterprise Agile  
Continuous Integration  
Continuous Deployment  
Release Management

## PRACTICES

Usage Monitoring  
Telemetry Collection  
Testing in Production  
Stakeholder Feedback



*EVIDENCE gathered in PRODUCTION*

## PRACTICES

Testing in Production  
Usage Monitoring  
User Telemetry  
Stakeholder feedback  
Feature flags

## PRACTICES

Code Reviews  
Automated Testing  
Continuous Measurement

*MANAGED TECHNICAL DEBT*

## PRACTICES

Application Performance Management  
Infrastructure as Code  
Continuous Delivery  
Release Management  
Configuration Management  
Automated Recovery

## PRACTICES

Application Performance Management  
Infrastructure as Code  
Continuous Deployment  
Release Management  
Configuration Management  
Automated Recovery

*PRODUCTION FIRST MINDSET*

*INFRASTRUCTURE is a FLEXIBLE RESOURCE*

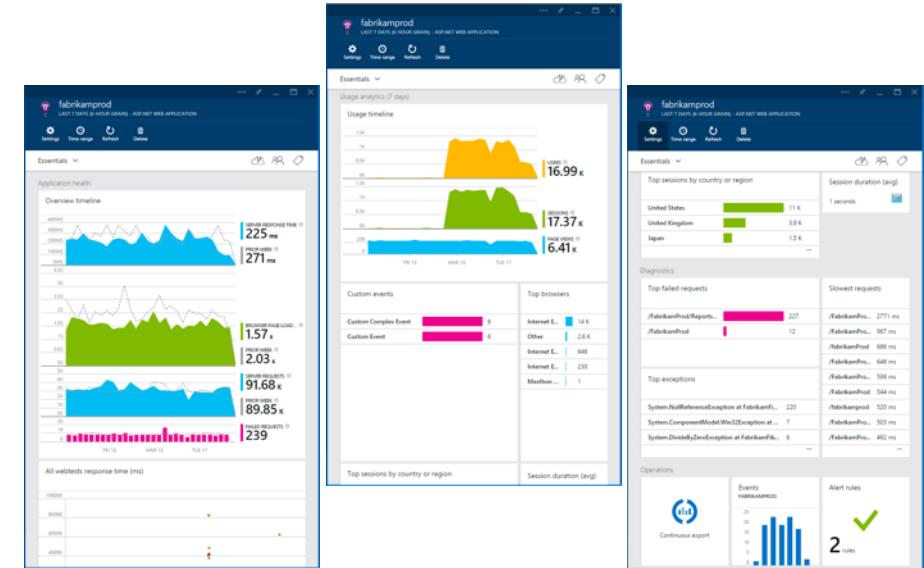
# Application Insights



Telemetry is collected at each tier: services, server applications, and browser



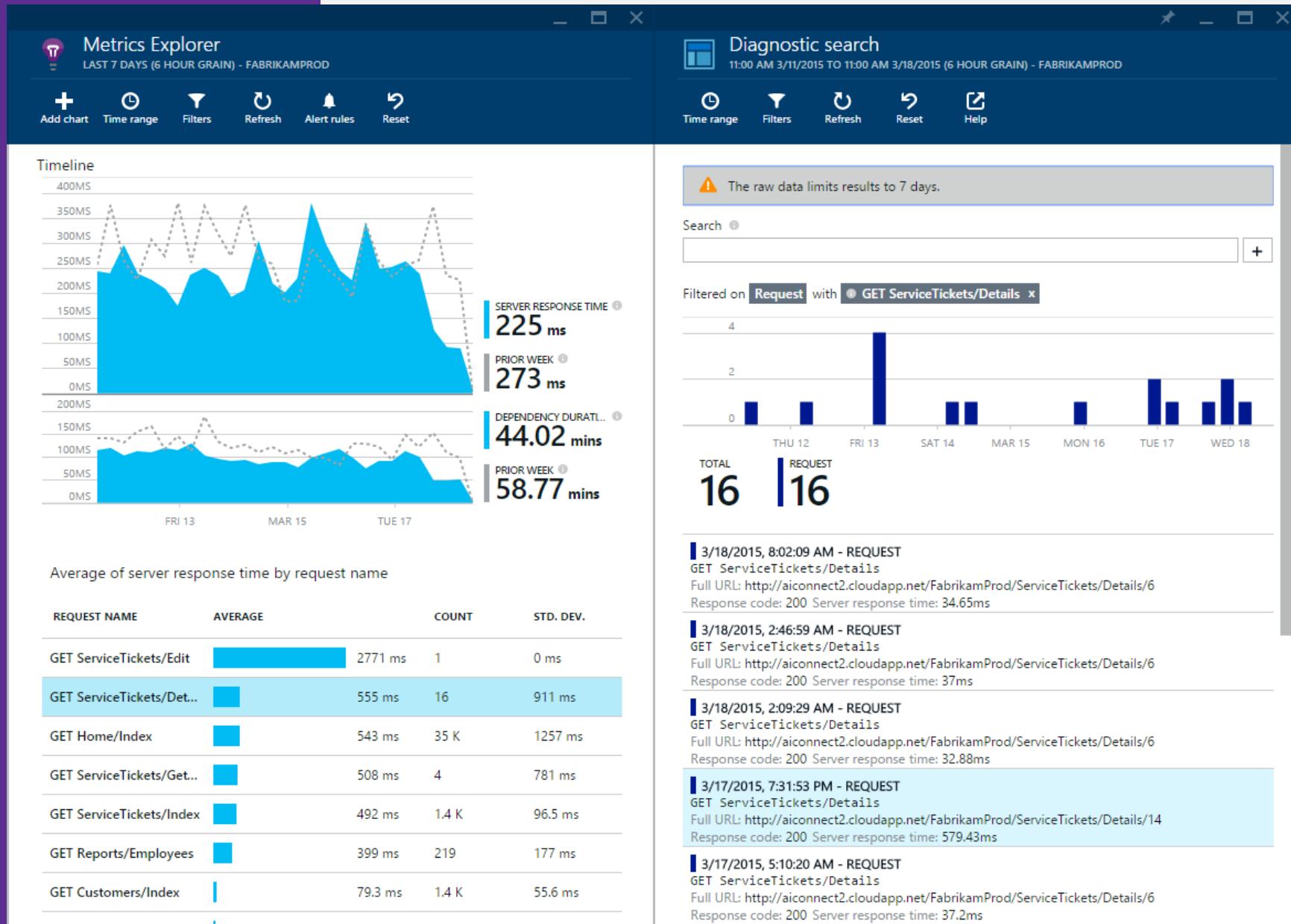
Telemetry arrives to Application Insights service in the cloud where it is processed & stored



Get 360° view of the application covering availability, performance, and usage

# Improve MTTD & MTTR

- Availability Monitoring
- Intelligent APM
- Application Analytics
- Cross Platform / Cross Language

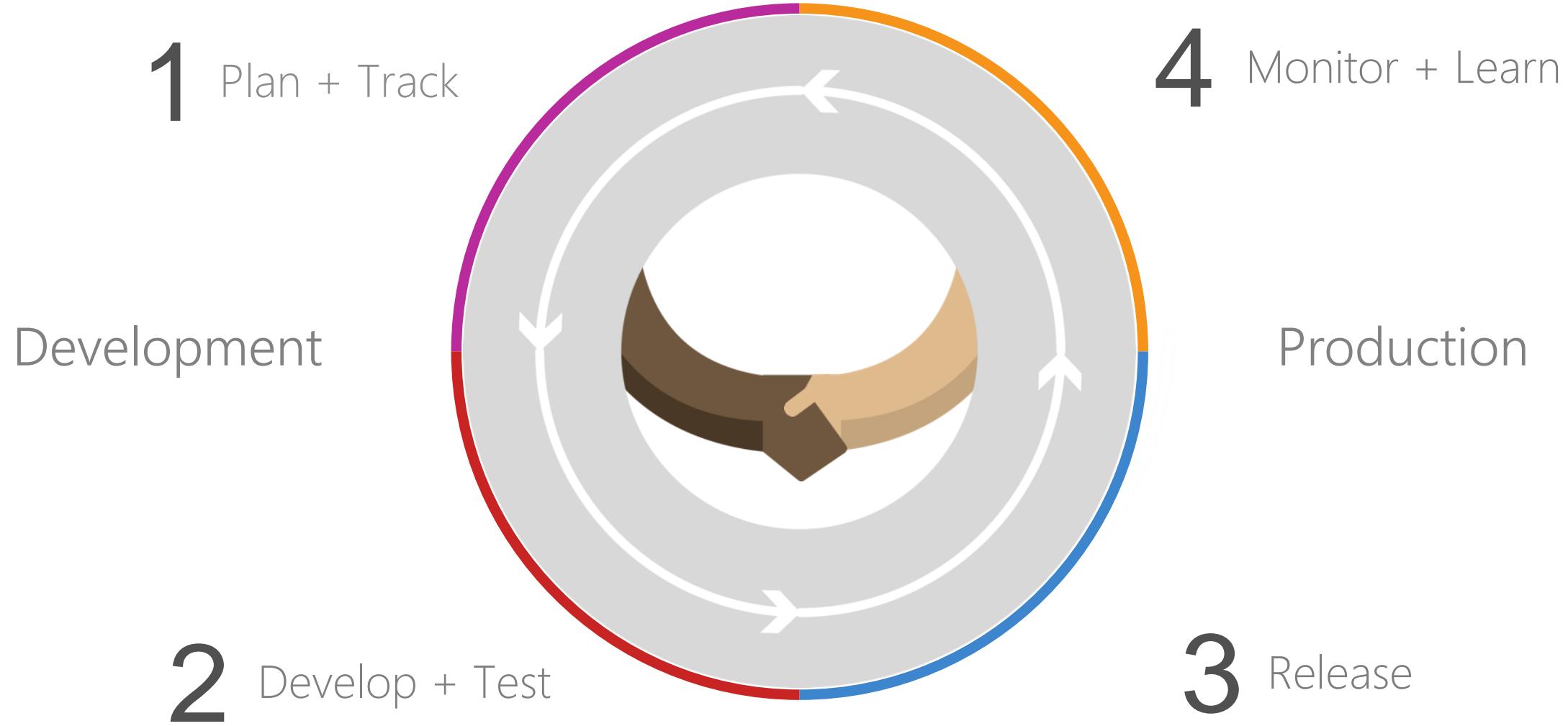


Slides: <http://aka.ms/DevOpsAzure>

DevOps for Azure  
Close



# DevOps with Azure



# DevOps habits and practices

## PRACTICES

- Automated Testing
- Continuous Integration
- Continuous Deployment
- Release Management



## PRACTICES

- Enterprise Agile
- Continuous Integration
- Continuous Deployment
- Release Management

## PRACTICES

- Usage Monitoring
- Telemetry Collection
- Testing in Production
- Stakeholder Feedback



*EVIDENCE gathered in PRODUCTION*

## PRACTICES

- Testing in Production
- Usage Monitoring
- User Telemetry
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- Feature flags

## PRACTICES

- Code Reviews
- Automated Testing
- Continuous Measurement



## PRACTICES

- Application Performance Management
- Infrastructure as Code
- Continuous Delivery
- Release Management
- Configuration Management
- Automated Recovery

## PRACTICES

- Application Performance Management
- Infrastructure as Code
- Continuous Deployment
- Release Management
- Configuration Management
- Automated Recovery



# DevOps Resources

Microsoft's Journey To DevOps:

<https://stories.visualstudio.com/devops/>

Tooling documentation:

<https://www.visualstudio.com/docs/build/define/build>

<https://www.visualstudio.com/docs/release/overview>

<https://www.visualstudio.com/en-us/docs/test/continuous-testing/continuous-testing>

<https://azure.microsoft.com/en-in/documentation/articles/app-insights-overview/>

Want to see more?

[colinb@microsoft.com](mailto:colinb@microsoft.com)

[gidavies@microsoft.co](mailto:gidavies@microsoft.co)

m



# Need a hand?



- Configuration
- Training
- Migration
- Mentoring

Microsoft &  
DevOps Gold Partners

Slides and queries:

Slides:

<http://aka.ms/DevOpsAzure>

DSC Assets:

<https://github.com/colinbeales/DevOpsEventDSC>

Slides: <http://aka.ms/DevOpsAzure>

Close

Questions?

