

A look at how DevOps practices are transforming the role of the system administrator

Marcus Robinson

Technical Evangelist, Microsoft

@techdiction



Who am I?

- 12 years infrastructure specialist
 - Managing Director of Microsoft Partner providing outsourced IT services
 - Windows Server, System Center, Azure
 - Recent years focusing on migrations to public cloud
- Joined Microsoft in January 2016
 - 50% of my time focused on DevOps
 - Looking to increase Microsoft's involvement with DevOps
 - communities
 - Definitely an Ops guy, but starting to feel more like a Dev...

Twitter: @techdiction

Blog: www.techdiction.com



What are we going to talk about?

- Cloud Computing
- What is DevOps?
- Infrastructure As Code
- Configuration Management

~~Training~~

Cloud Computing

What is a Cloud computing?

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.



<https://www.nist.gov/itl/cloud-computing>

Cloud Computing Models

Key:

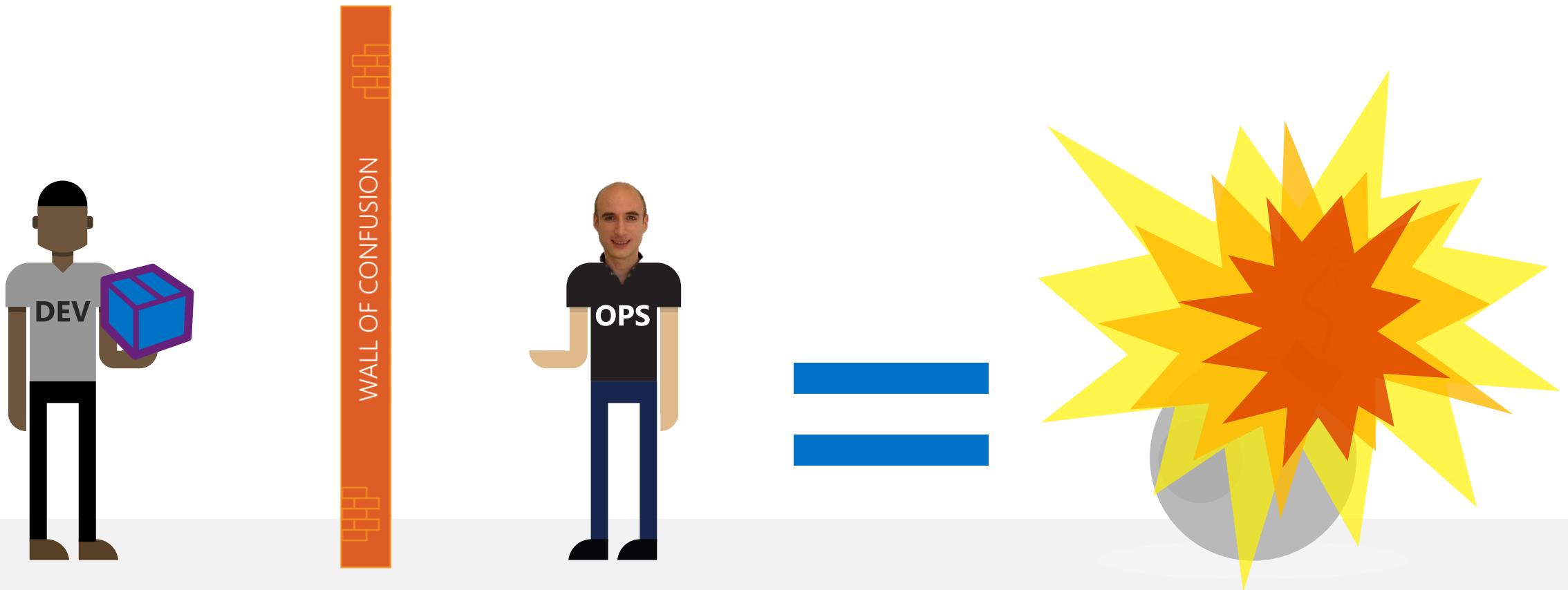
Managed by you

Managed by vendor

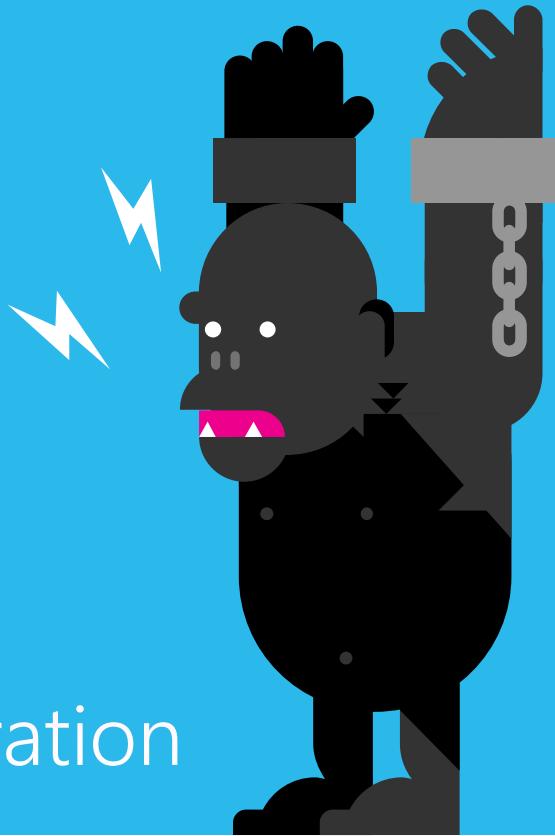
On Premises	IaaS	PaaS	SaaS
Applications	Applications	Applications	Applications
Data	Data	Data	Data
Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware
O/S	O/S	O/S	O/S
Virtualization	Virtualization	Virtualization	Virtualization
Servers	Servers	Servers	Servers
Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking

What is DevOps

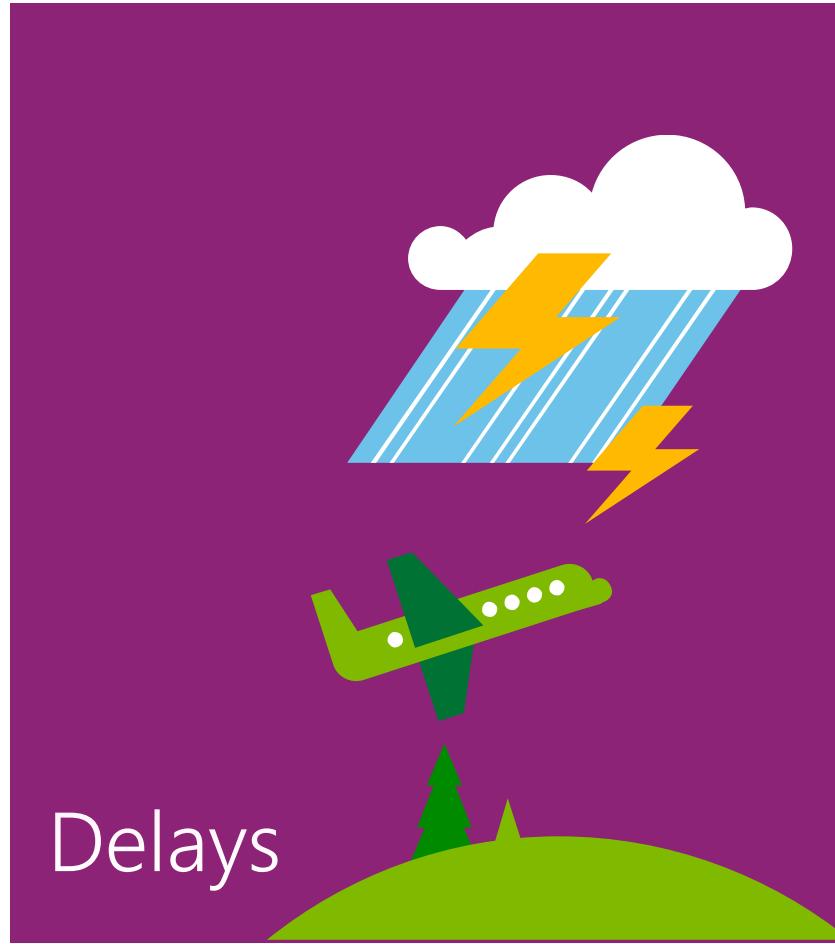
Traditional Development and Operations



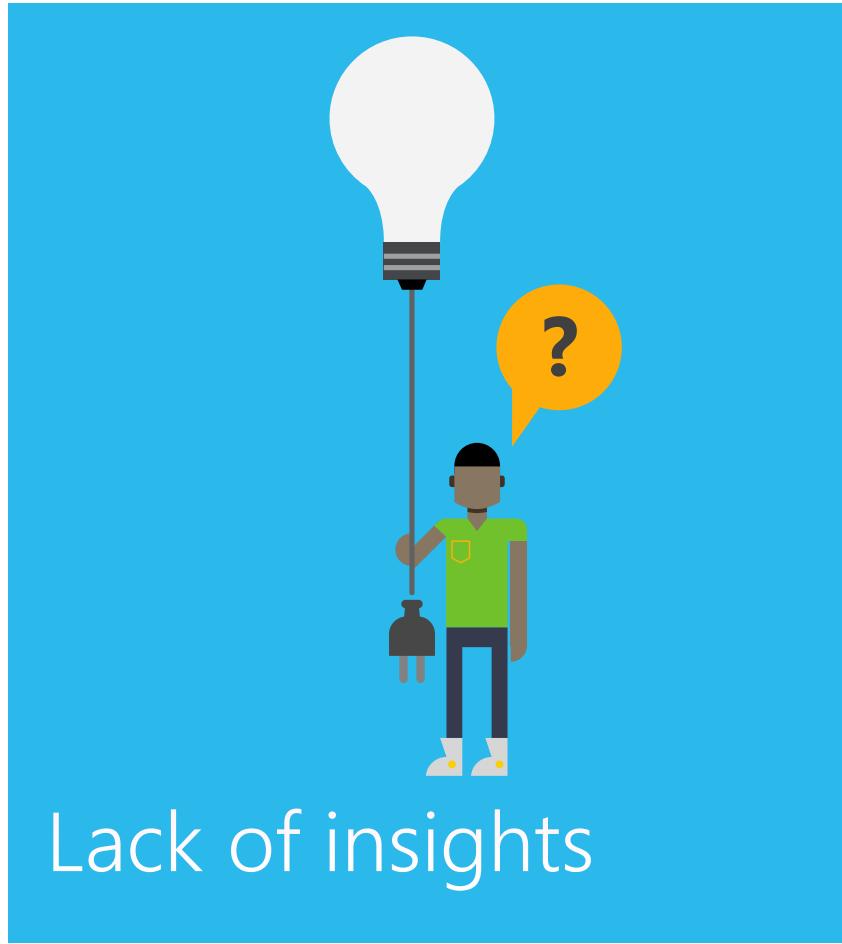
Software delivery challenges



Frustration



Delays



Lack of insights

“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?”

It's DevOps!

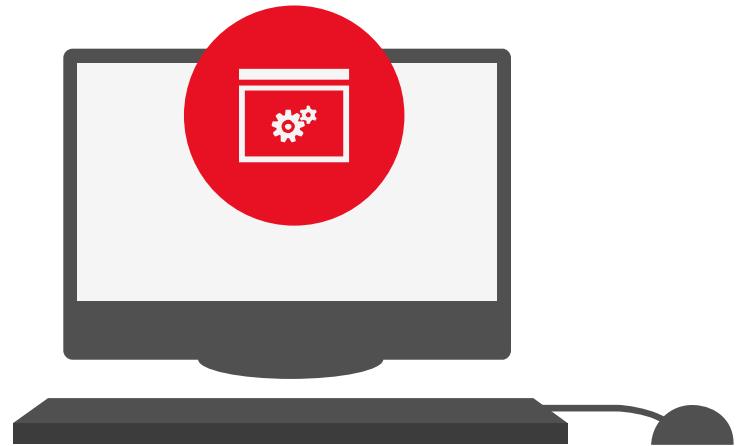
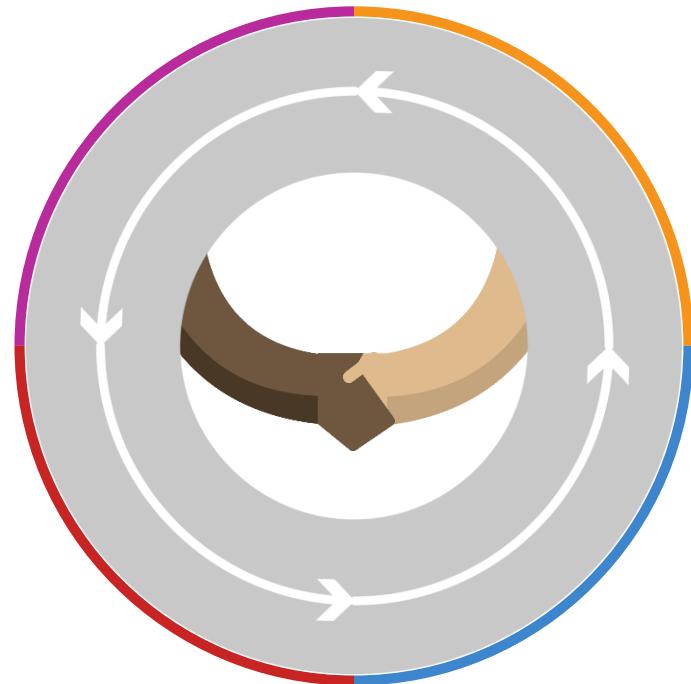
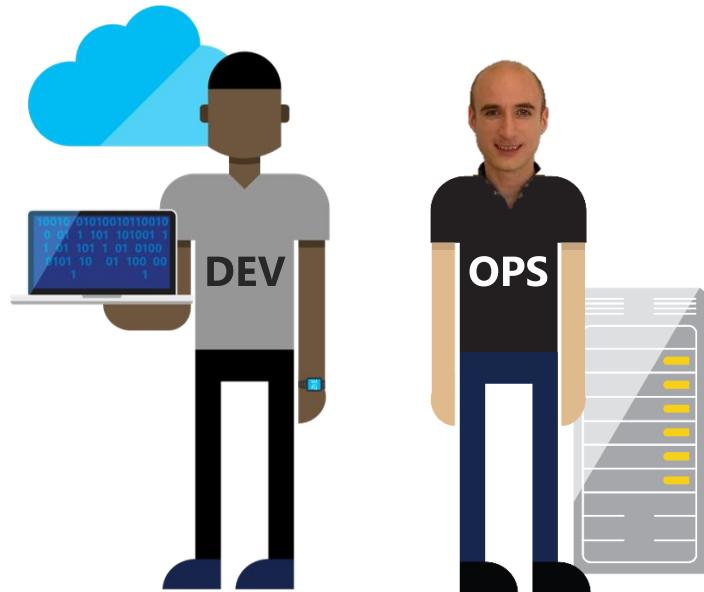
It's DevOps!

It's DevOps!

It's DevOps!



DevOps: the three stage conversation



1 | People

2 | Process

3 | Products

DevOps

1 Plan

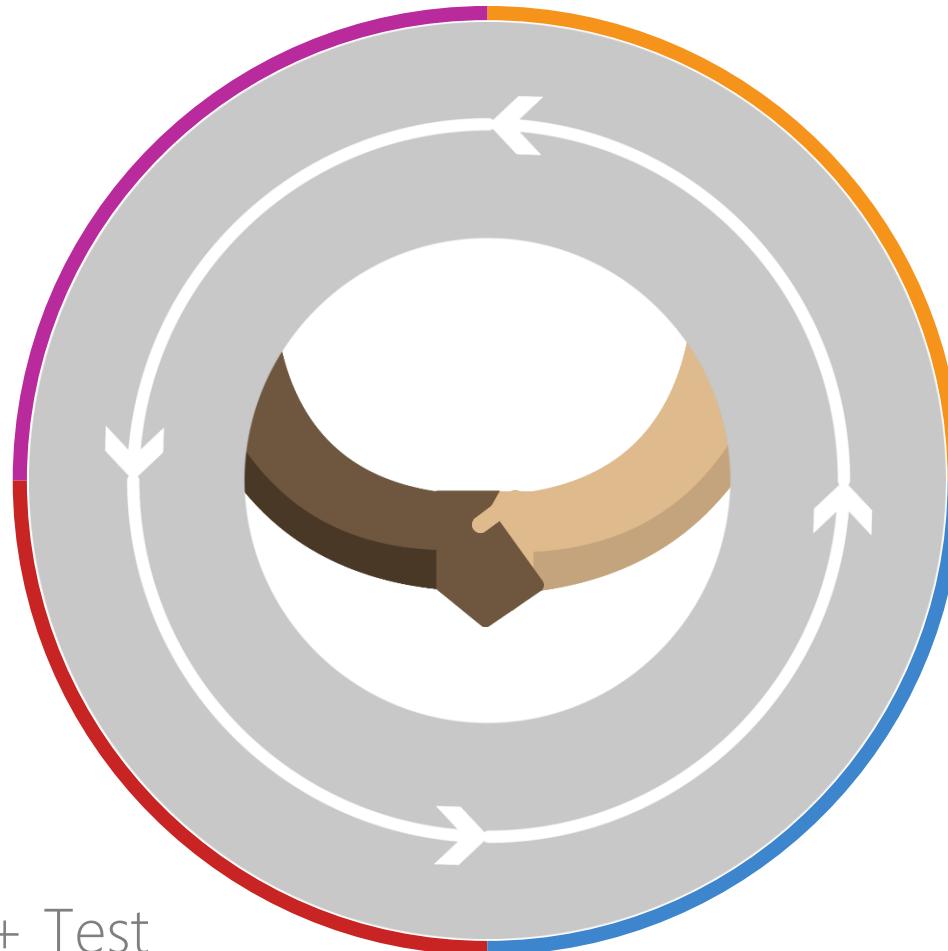
4 Monitor + Learn

Development

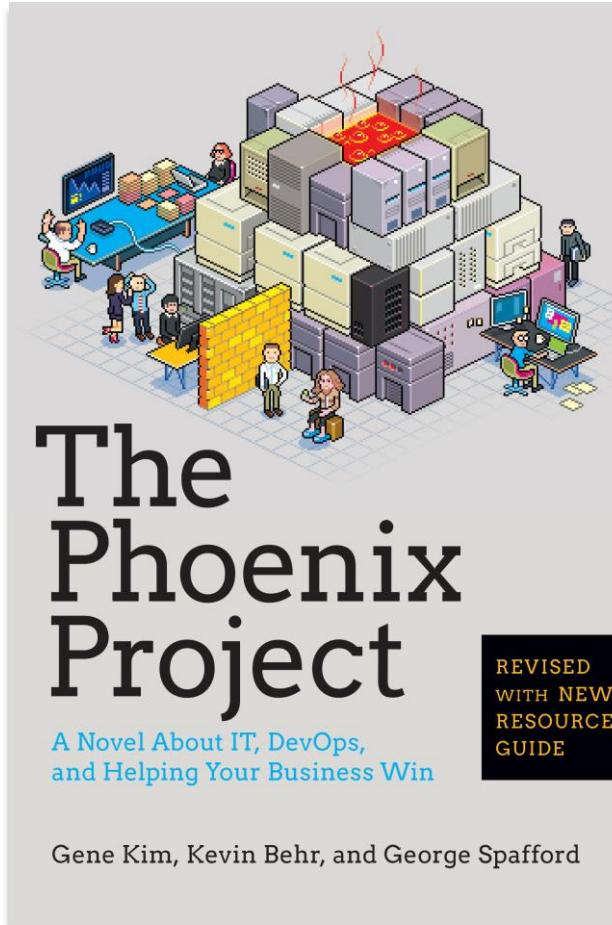
Production

2 Develop + Test

3 Release

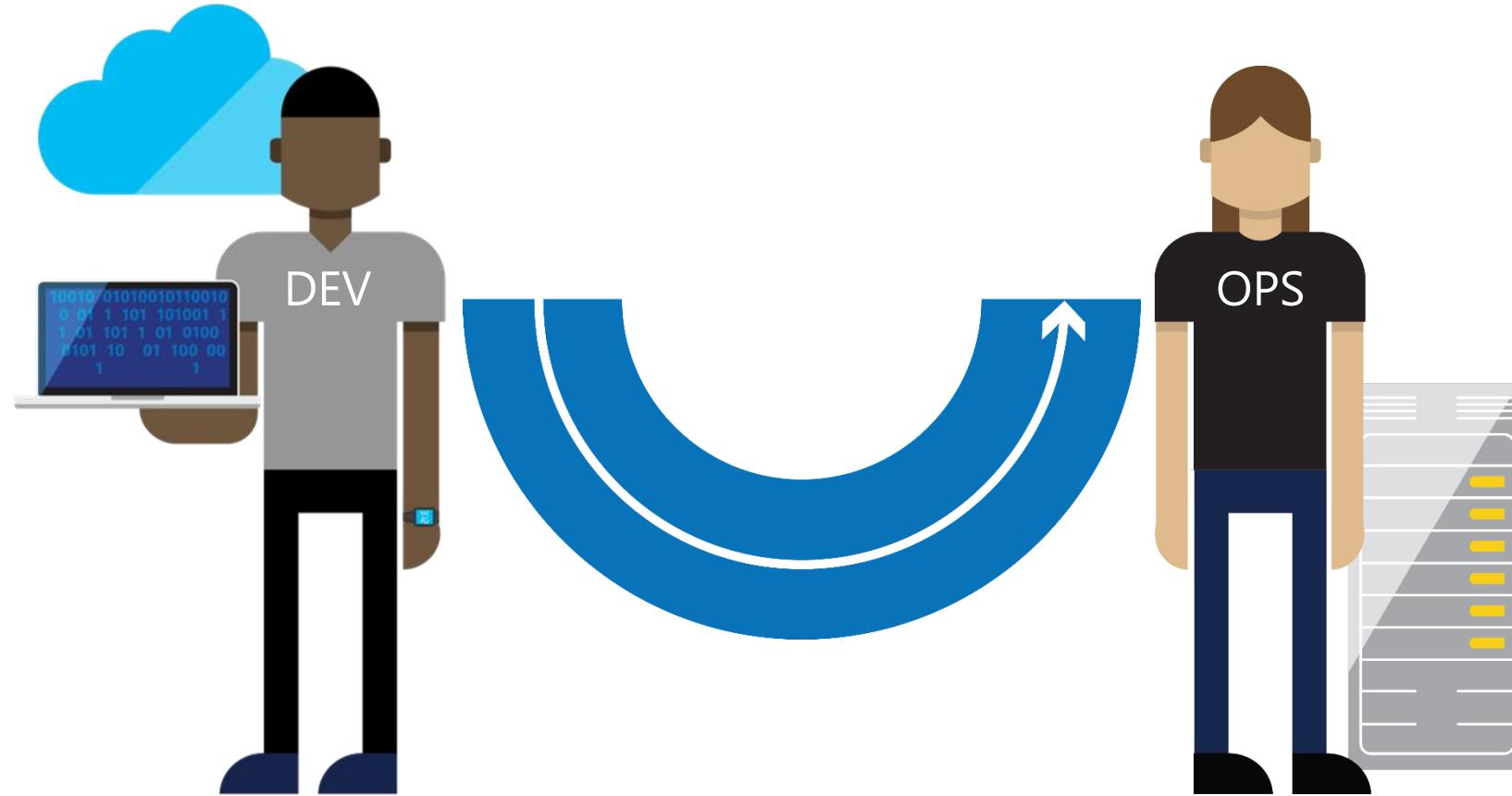


The Three Ways

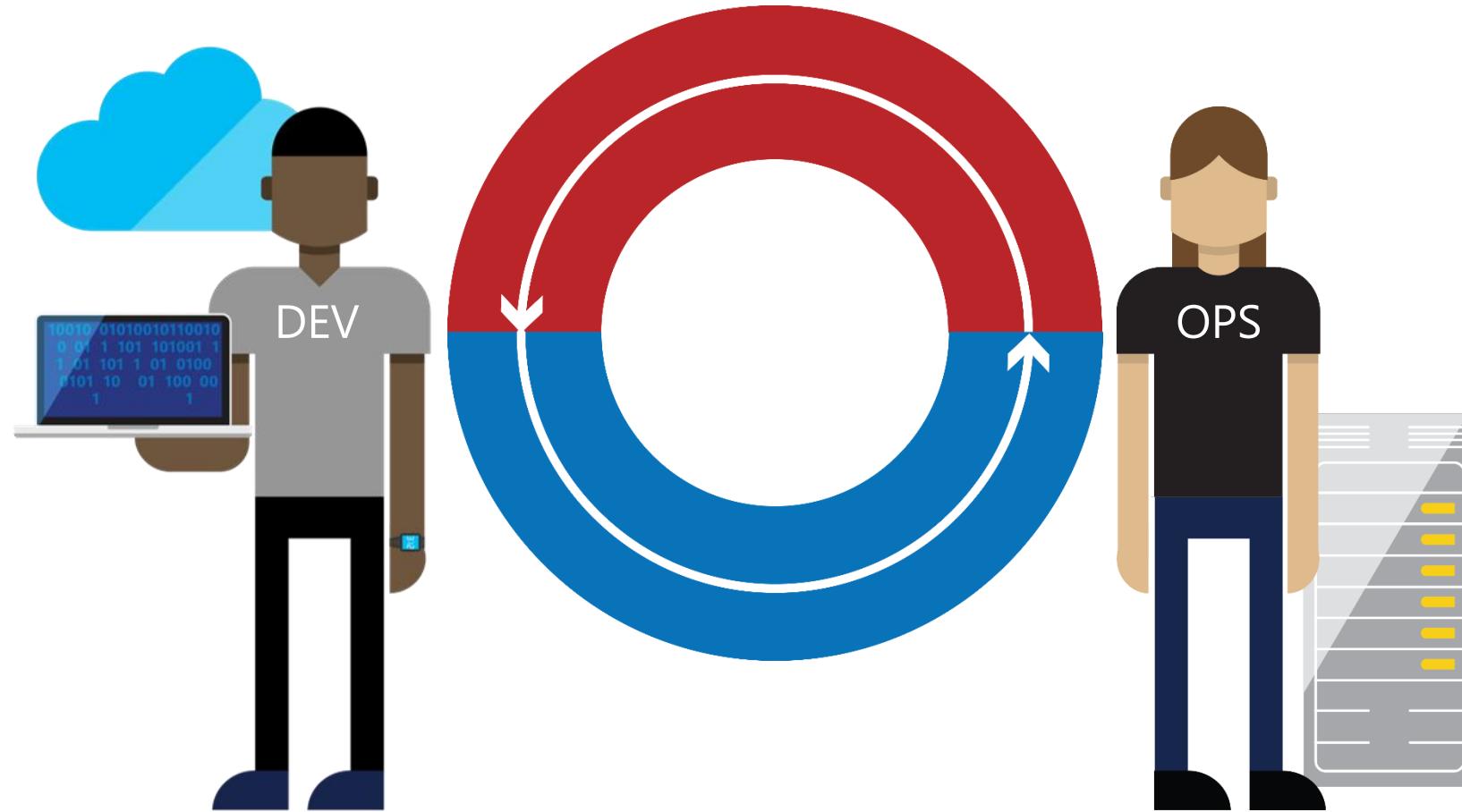


<http://itrevolution.com/the-three-ways-principles-underpinning-devops/>

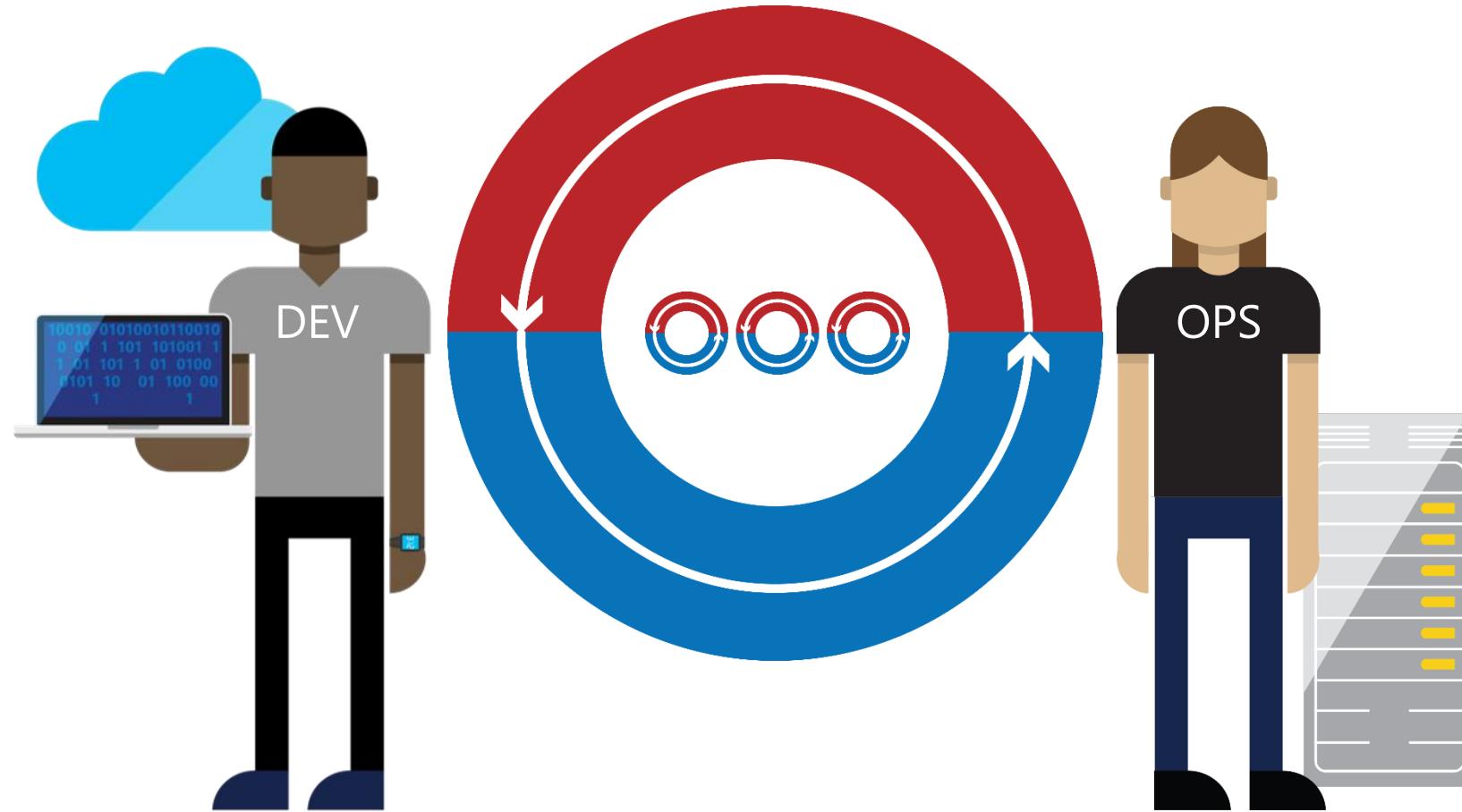
The first way (systems thinking)



The second way (feedback loops)



The third way (experimentation)



List of DevOps Practices

- Infrastructure as Code (IaC)
- Continuous Integration
- Automated Testing
- Continuous Deployment
- Release Management
- App Performance Monitoring
- Configuration Management
- Availability Monitoring
- Load Testing and Autoscale
- Feature Flags
- Automated Environment De-Provisioning
- Self Service Environments
- Automated Recovery (Rollback & Roll-Forward)
- Hypothesis Driven Development
 - Testing in Production
 - Fault Injection
 - Usage Monitoring/User Telemetry

Microsoft Ecosystem

01

Develop



People | Process | Tools

02

Build & Test



ALM Services - On-Premises | Hybrid | Cloud

03

Deploy



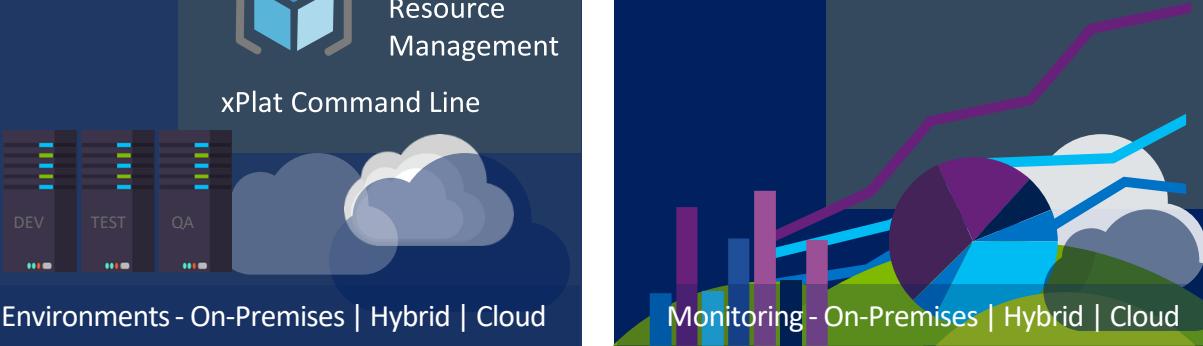
Environments - On-Premises | Hybrid | Cloud

04

Monitor & Learn



Monitoring - On-Premises | Hybrid | Cloud



Mixed Ecosystem

01

Develop

Developer Workstation



Team Collaboration

GitHub
CodePlex



People | Process | Tools

02

Build & Test

Build/CI

gradle
GRUNT
Jenkins
Hudson

Test

gradle
GRUNT

03

Deploy

Configuration

puppet_{labs}
CHEF

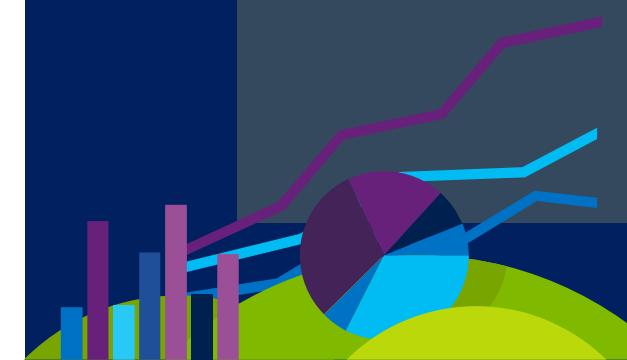
Release

gradle
GRUNT
Jenkins
Hudson
VAGRANT

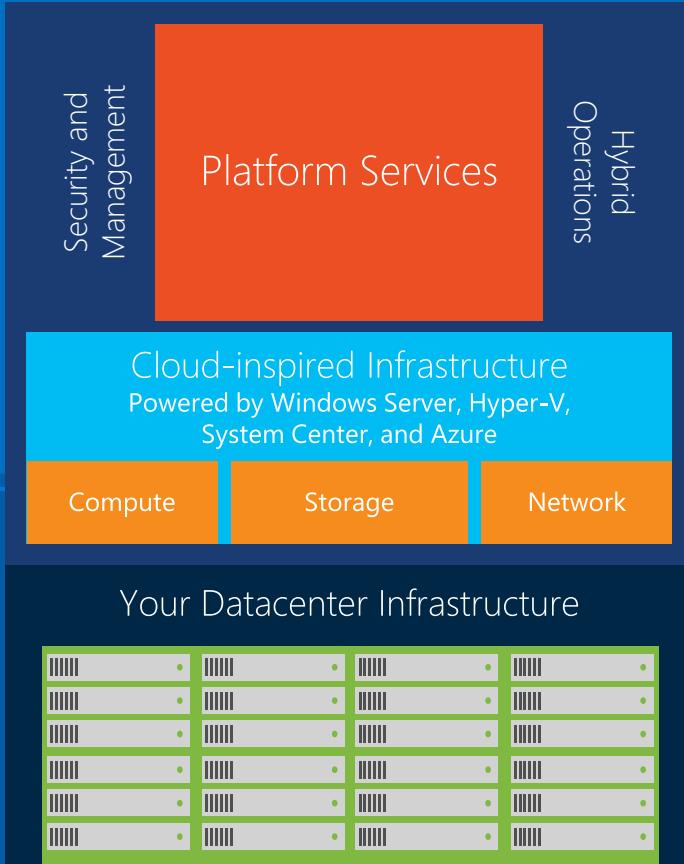
04

Monitor & Learn

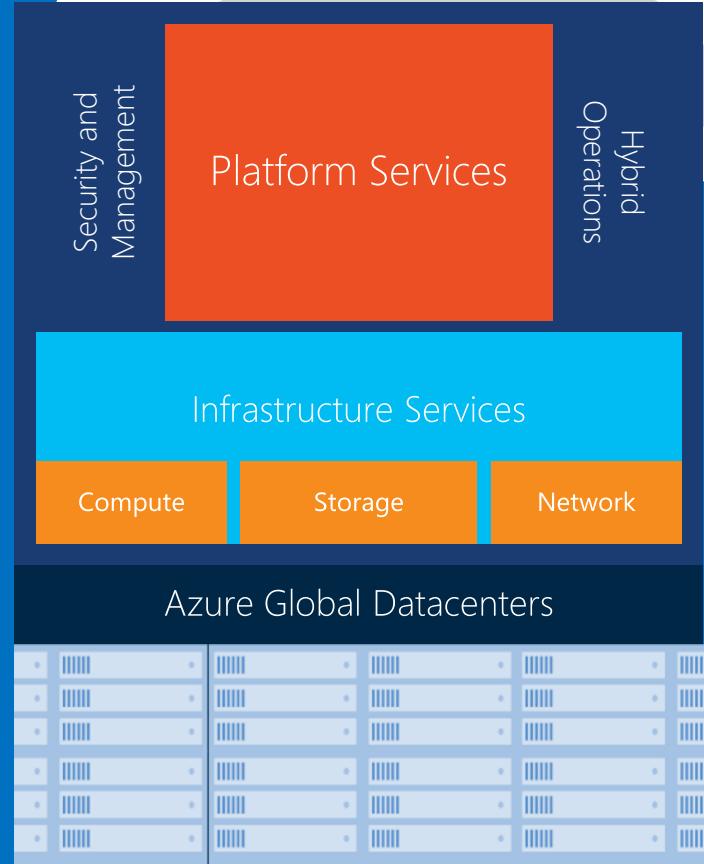
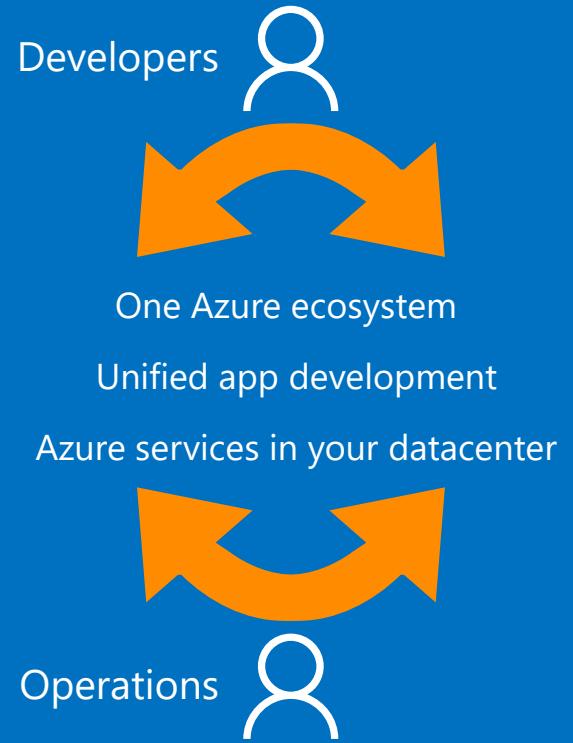
Nagios
ZABBIX



Microsoft Azure & Azure Stack



Microsoft Azure Stack
and Cloud Platform System



Microsoft Azure Cloud
Public, Global, Shared

Infrastructure As Code

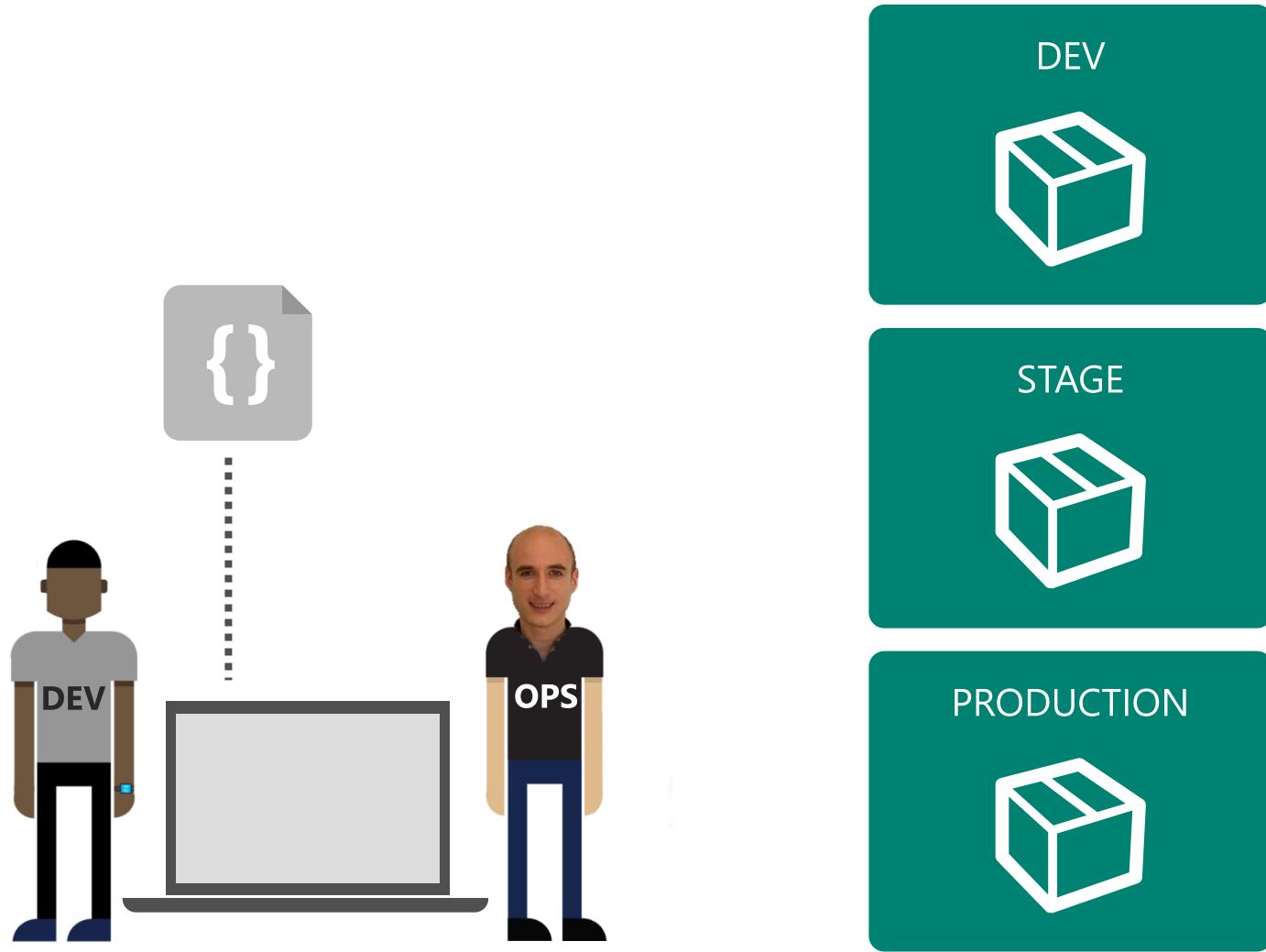
Infrastructure deployment can be tricky...



Consistency reduces scope for errors...



Infrastructure as Code



Why use Infrastructure as Code?

- Templating creates consistency
- Infrastructure can be deployed as part of the release pipeline
- Source control enables versioning and rollback leading to faster remediation of issues
- Deployment automation leads to more frequent releases

DEMO

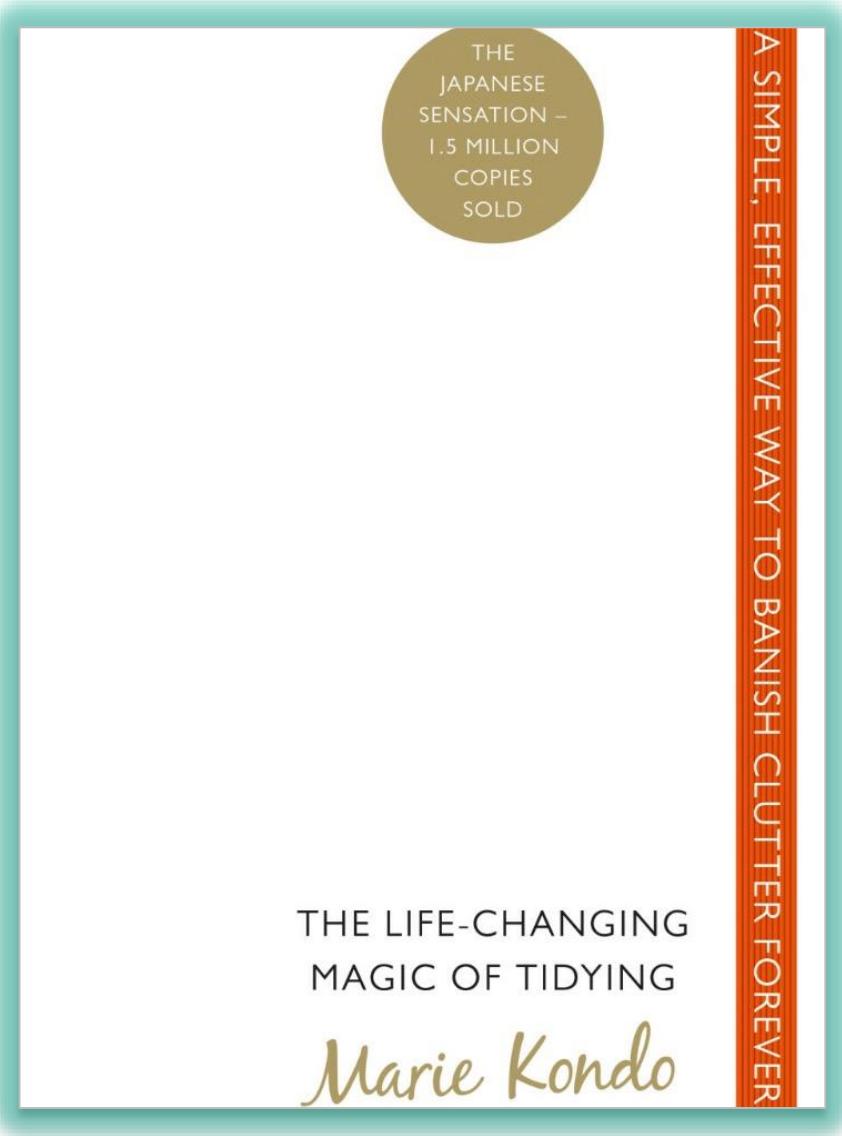
Infrastructure as Code with
Azure Resource Manager
Deployment Templates

What about configuration?



Configuration Management

Real world configuration management



Joanna
Configuration Manager

Configured to a set specification



Compliant

Configuration Drift...

(otherwise known as “Marcus put the washing away”)



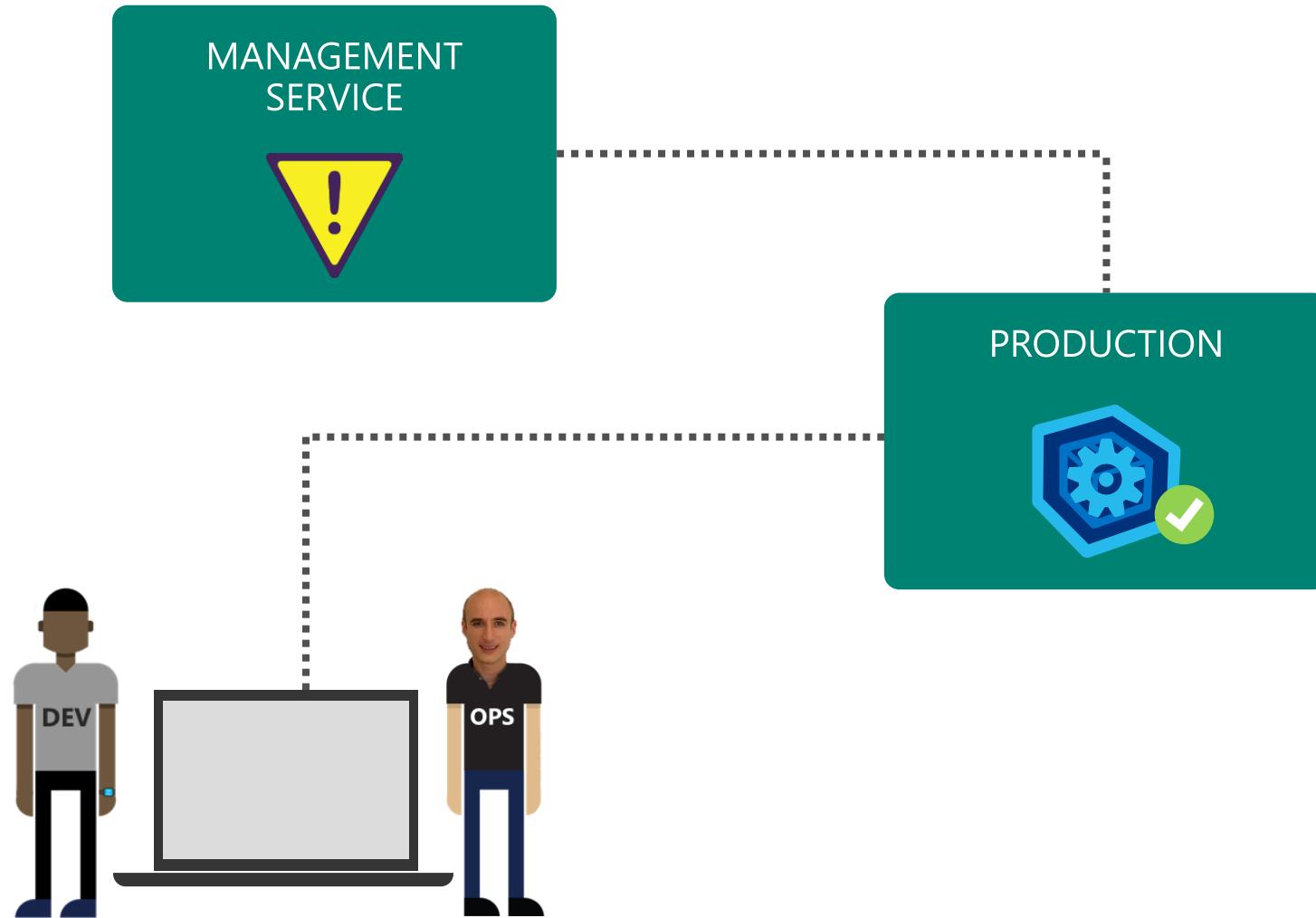
Not Compliant

Configuration Corrected



Compliant

Configuration Management

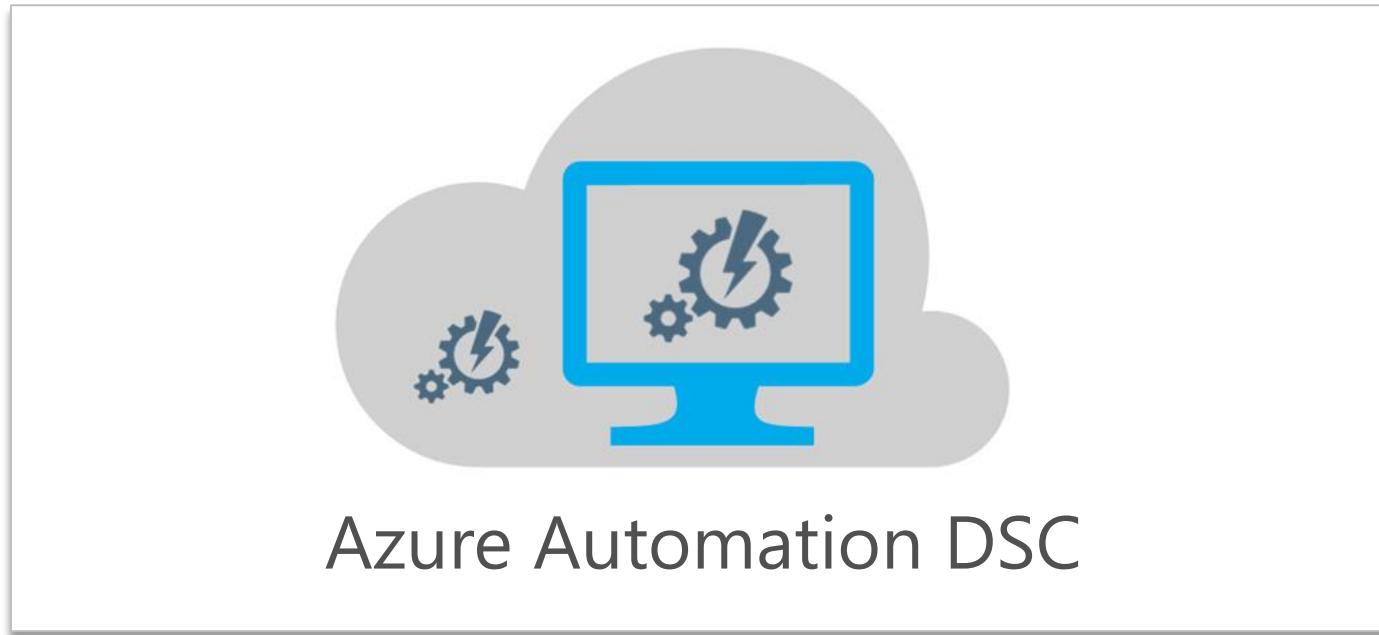


Why use configuration management?

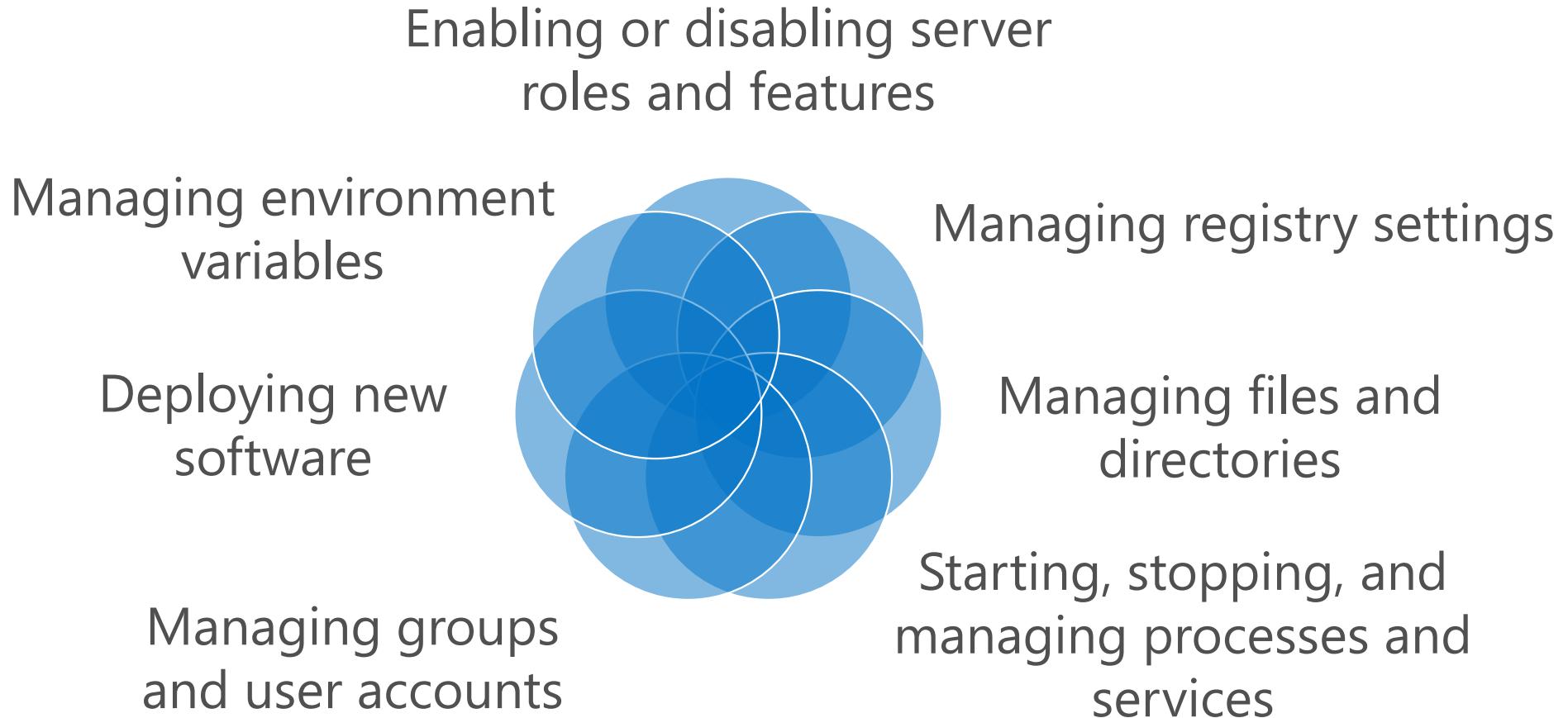
All the advantages of IaC plus:

- Faster detection and remediation of issues
- Increased resiliency leading to increased availability

Configuration Management Technologies



What might we configure?



A PowerShell DSC Configuration

```
Configuration ProjectXWebServer {
    Node Localhost {
        windowsFeature webServerRole
        {
            Name = "Web-Server"
            Ensure = "Present"
        }
        File AppFiles
        {
            Ensure          = "Present"
            SourcePath      = "\\buildserver\appfiles\
            DestinationPath = "c:\inetpub\wwwroot\
            Type            = "Directory"
            DependsOn       = "[windowsFeature]webServerRole"
        }
        ...
    }
}
```

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](#)

PowerShell DSC: Additional Resources

- Public repository:

www.powershellgallery.com

- Create a local repository for resources:

```
Register-PSRepository -Name MyTeam  
    -SourceLocation \\server1\Gallery  
    -InstallationPolicy Trusted
```

- Author your own resources:

`Get-TargetResource`

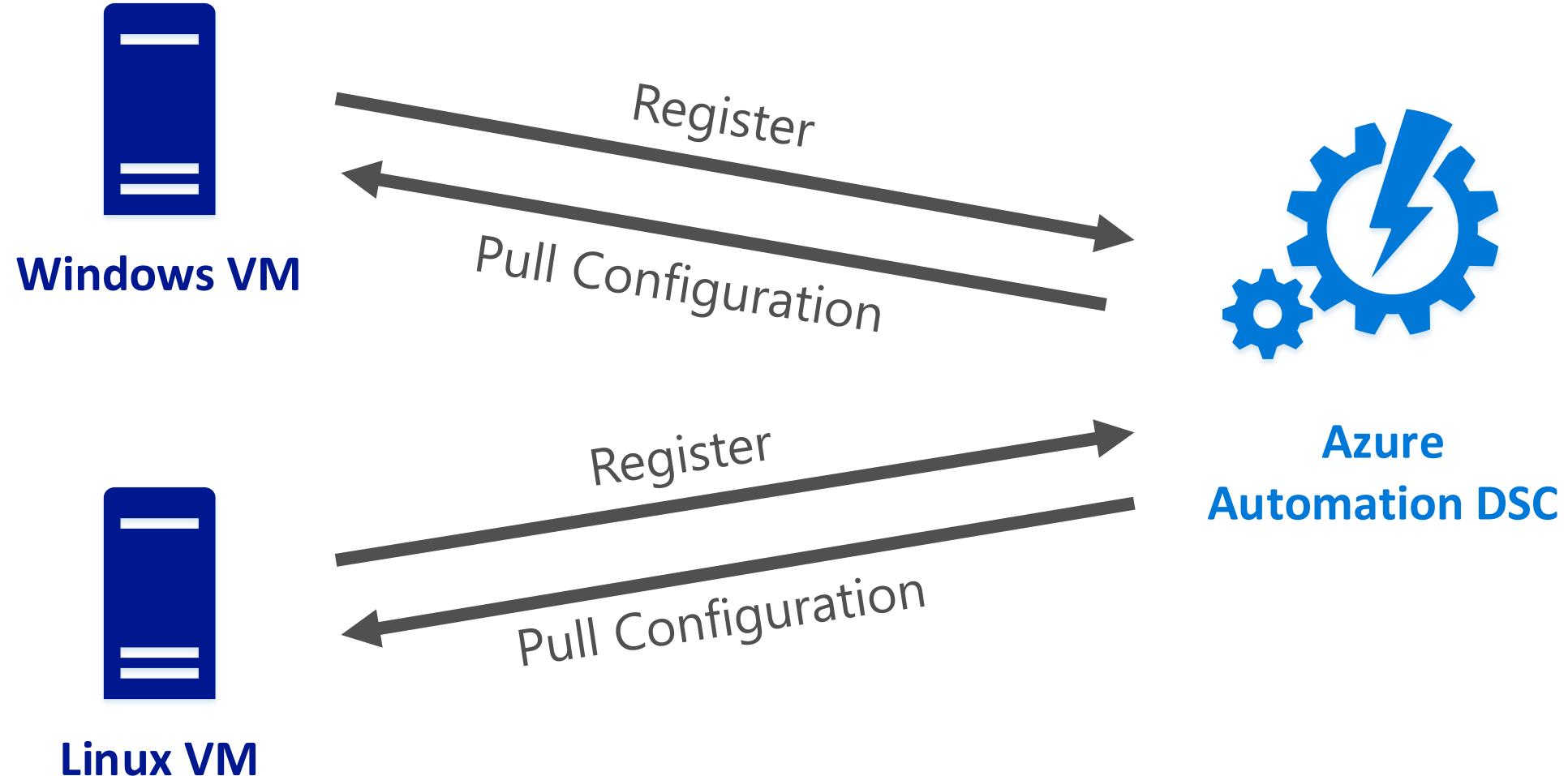
`Set-TargetResource`

`Test-TargetResource`

DEMO

PowerShell DSC Examples

Azure Automation DSC



Pull server hosted in Azure for use on premises or in the cloud...

PowerShell DSC: Pull Server

1. Production server (node) registers with a pull server
2. Configuration downloaded by the production server from the pull server
3. Configuration occurs and status of configuration is reported back to the pull server
4. Production server periodically contacts pull server to update status and check for new configurations

PowerShell DSC: Local Configuration Manager

- Associates the node with pull server
- Refresh mode: push or pull
- Configuration refresh frequency
- Configuration mode
- Configuration mode frequency
- Enable reboot of node

and more...

LCM configuration options when on boarding to Azure

The screenshot displays a configuration interface for the Local Configuration Manager (LCM) when onboarding to Azure. The interface has a blue header bar with the title "LCM configuration options when on boarding to Azure". Below the header, there are several configuration fields:

- Refresh Frequency ⓘ**: A text input field containing the value "30".
- Configuration Mode Frequency ⓘ**: A text input field containing the value "15".
- Configuration Mode ⓘ**: A dropdown menu set to "ApplyAndMonitor".
- Allow Module Override ⓘ**: A checkbox followed by an empty square input field.
- Reboot Node if Needed ⓘ**: A checkbox followed by an empty square input field.
- Action after Reboot ⓘ**: A dropdown menu set to "ContinueConfiguration".

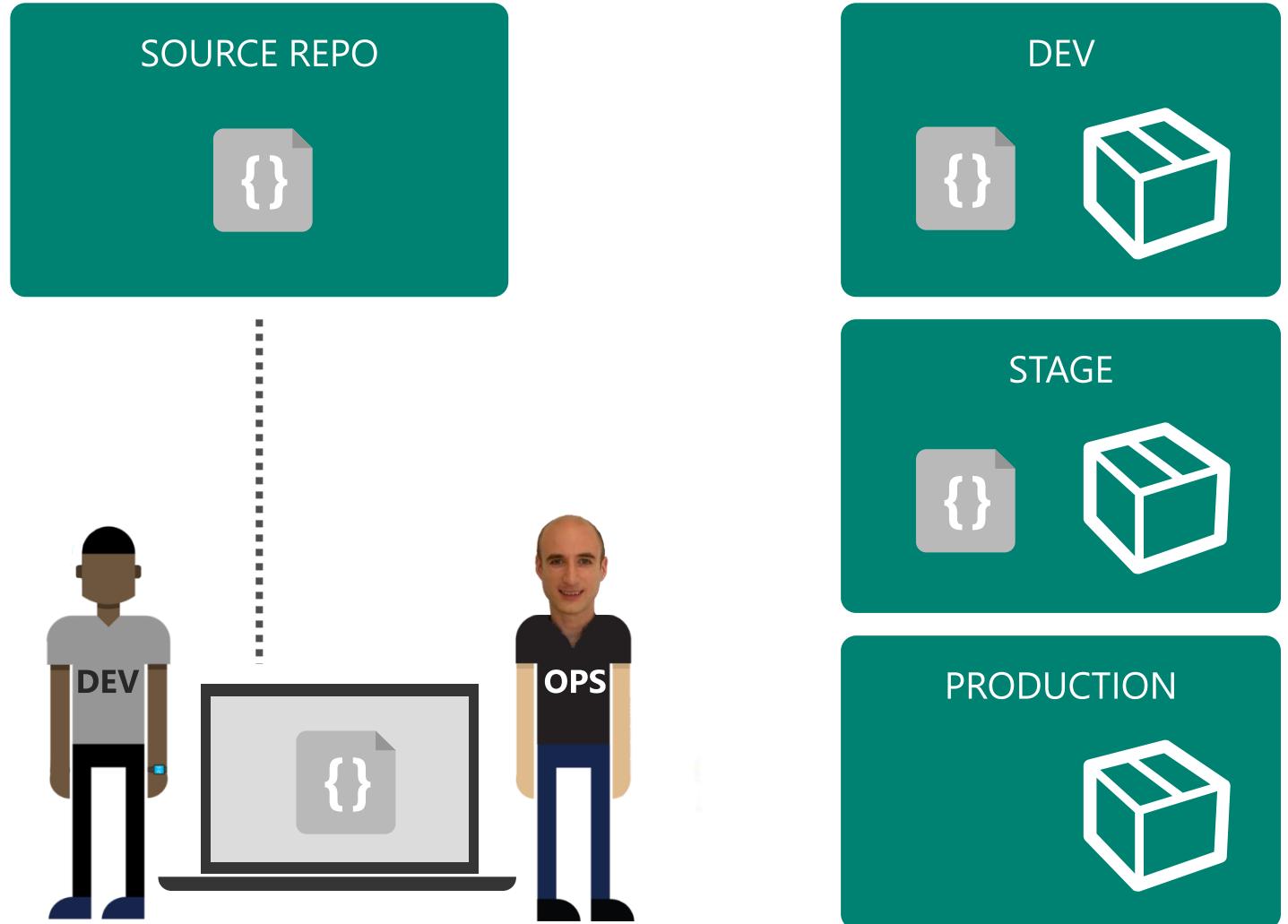
Registering with a Pull Server

- Azure Virtual Machines
 - VM Extension in an ARM Template
 - Via the Portal
- On Premises VMs
 - Create and compile a DSC Meta Configuration
 - Use Azure PowerShell
 - `Get-AzureRmAutomationDscOnboardingMetaconfig`

DEMO

Configuration Management
with PowerShell DSC and
Azure Automation

Release Management



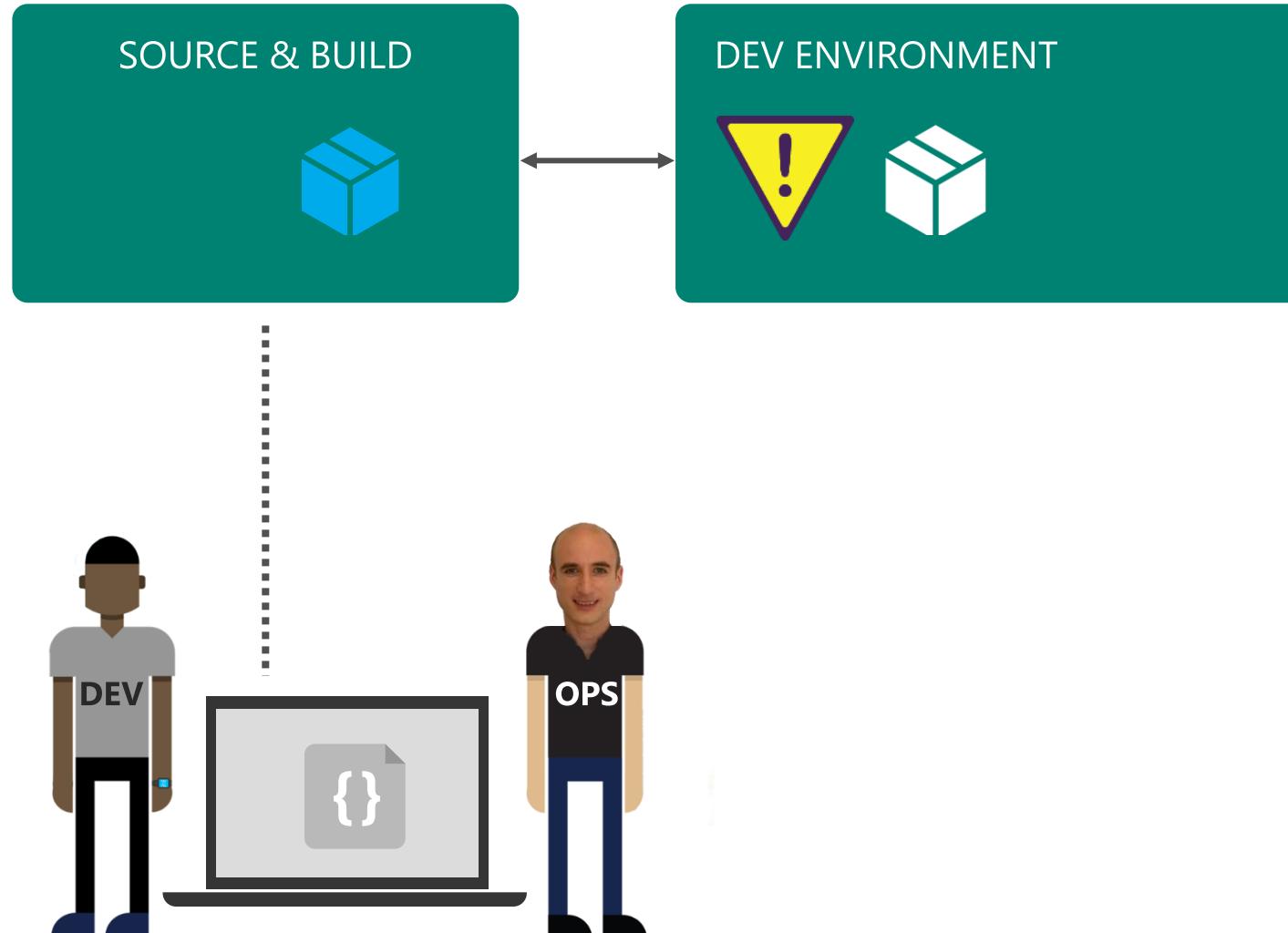
Value

- Optimized Resources
- Accelerate Delivery

Measure

- Deployment Frequency
- MTTR
- Availability

Continuous Deployment



Value

- Optimized Resources
- Accelerate Delivery

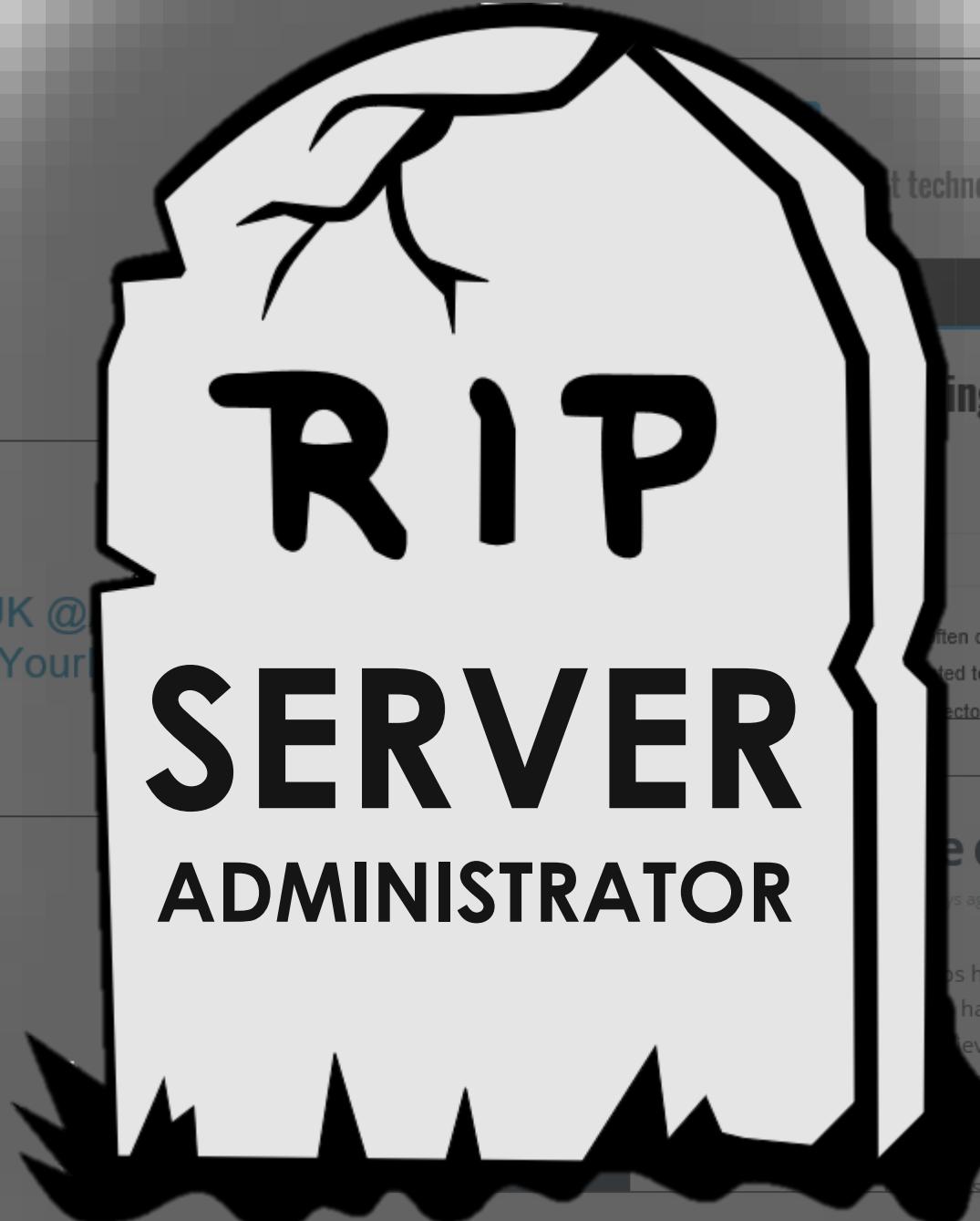
Measure

- Deployment Frequency
- MTTR
- Availability

DEMO

Release Management with
Visual Studio Team Services
(VSTS) Release Manager

Serverless



 **Ed Baker**
@edbaker1965

@techdiction @TechNetUK @
#Serverless I say, **#WashYourOwnDish**

6:30 PM - 9 Apr 2016

...

it technology.

EVENTS

TWITTER

LINKEDIN

BIO

Ring of the end for Windows

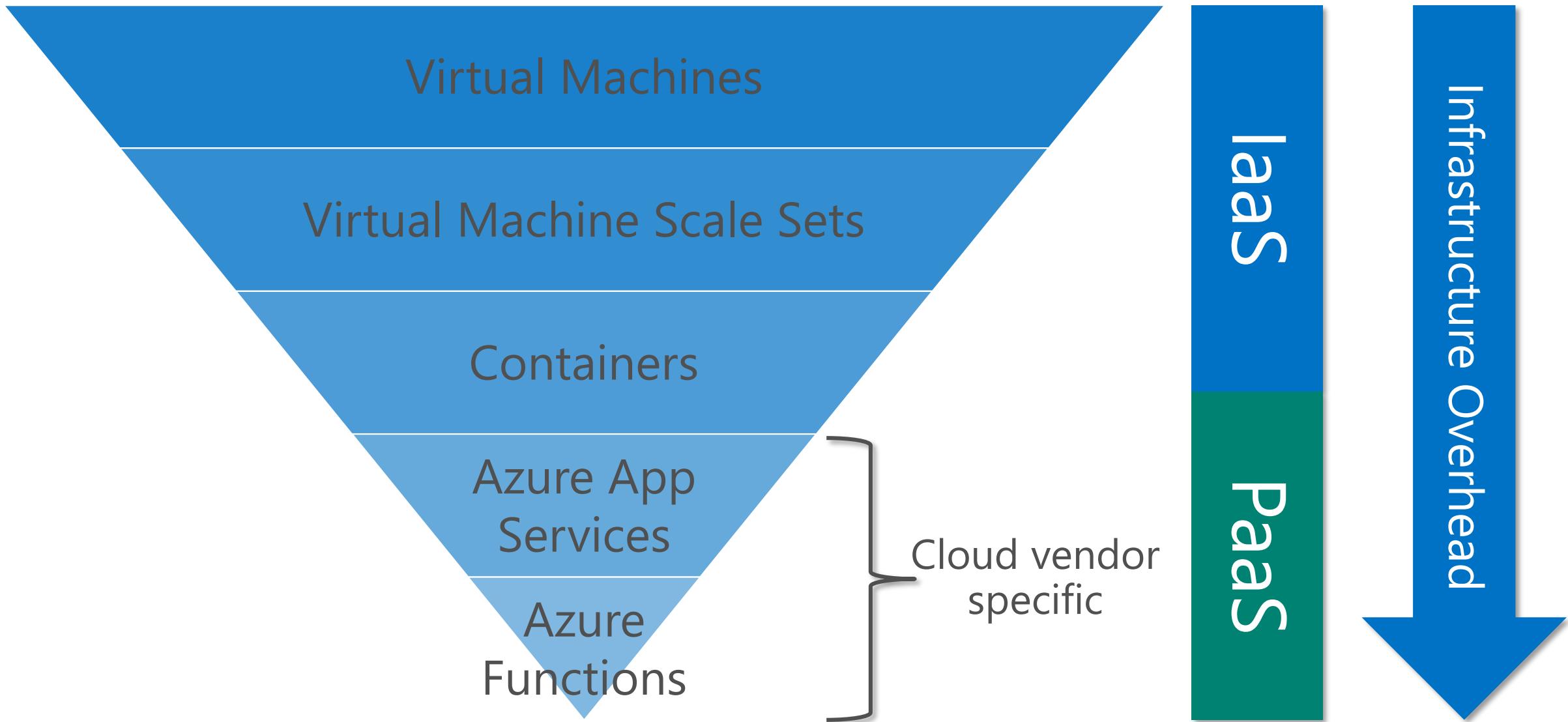
#Microsoft, msignite

I often choose sessions because of the speakers. However I also ensure I attend technology, the things I see as game changers. The technologies I attended included a session on the new Azure Functions, a session on the new Container Registry and a couple of more general Windows Server sessions. Here's my summary of what I learned.

The death of the server

Cloud has become a very 'on trend' word in the last year. A combination of factors have influenced this, least of all the power of the Cloud. I for one do believe that DevOps is the destination, more like a fuel stop along the way to Cloud. Regardless of if we are willing to admit it, we are automating more and more of a job (that includes developers like me too) and that isn't necessarily a bad thing. If we have progressed enough to relinquish ourselves of the need to perform mundane tasks (such as preparing

Where these technologies fit...



So why have I been talking about servers?

- How many organisation use servers operating systems?
- Will organisations have servers in 5 years time? 10 years time?
- There will be a transition period
- Cloud computing can bring benefits to server based infrastructure
- DevOps practices can bring benefits to server based infrastructure

Summary

- Consistency, Consistency, Consistency
- Automation, Automation, Automation
- Think about abstraction and the right technology choice
- Keep learning!

Want to try this out?

Code used in this session: <https://github.com/marrobi/InfrastructureToAzure/>

Visual Studio Dev Essentials: <https://developer.microsoft.com>



Developer tools

Editors, designers, and debuggers to develop for any platform



Cloud services

Compute, storage, analytics, team collaboration and more



Software

Trials and downloads, from operating systems to Office online apps



Training and support

World-class technical training and priority support

IT Pro Cloud Essentials: <https://www.itprocloudessentials.com>



Cloud Services

Get in the cloud with Azure and extended trials of Office 365 and Enterprise Mobility Suite



Education

Increase your cloud knowledge and get certified with training courses from Microsoft Virtual Academy and PluralSight



Support

Get a free support incident and priority support in TechNet forums

Free Resources for DevOps Practices

Technical resources:

DevOps Fundamentals:

<https://channel9.msdn.com/Series/DevOps-Fundamentals>

DevOps Dimensions:

<https://channel9.msdn.com/Shows/DevOps-Dimension>

Get access to free online training:

<https://mva.microsoft.com/training-topics/devops>

Free Microsoft Learning Courses

<https://openedx.microsoft.com/courses>

Contact me @techdiction
marrobi@microsoft.com

Questions?