Microsoft Azure

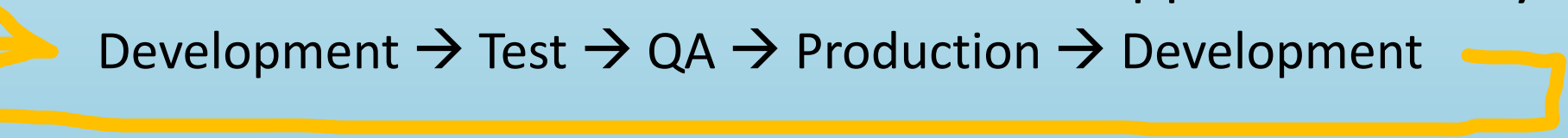# Azure Deployment Framework

ADF

- A declarative way to build Cloud Infrastructure and Services.

- Combines two common idempotent technologies for Automation

- Infrastructure as Code:
  – Azure Resource Manager (**ARM**) Deployment Templates

- Configuration as Code:
  – PowerShell Desired State Configuration (**DSC**)

- Follows a DevOps mindset for Deployment

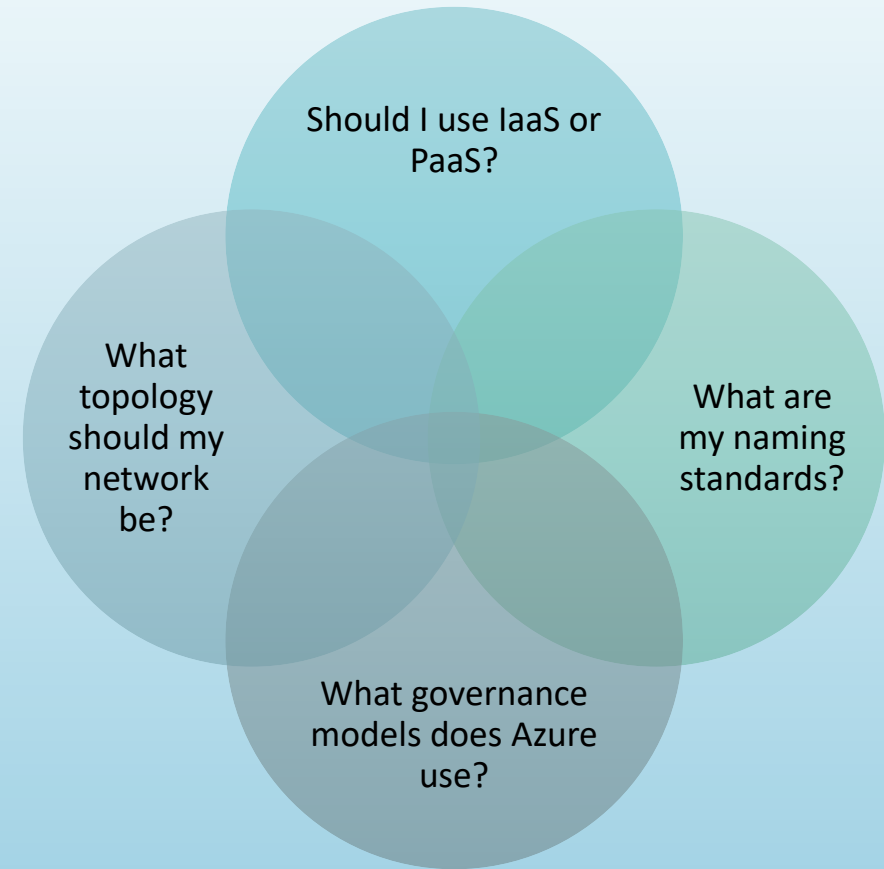- Useful for **IaaS** or **PaaS** services + monitoring + security + +

What is ADF?

- The focus of the toolkit is the initial training (ramp up) and allows the customer to **get to production** in Azure faster/efficiently.

- By using <u>Infrastructure</u> and <u>Configuration</u> as Code
  - All code is checked into source control
    - Promotes teamwork
    - Easy sharing of code between the team
    - Allows ongoing support for the customer throughout the application lifecycle
  - Documentation as Code

- We use the exact same code for the full application lifecycle

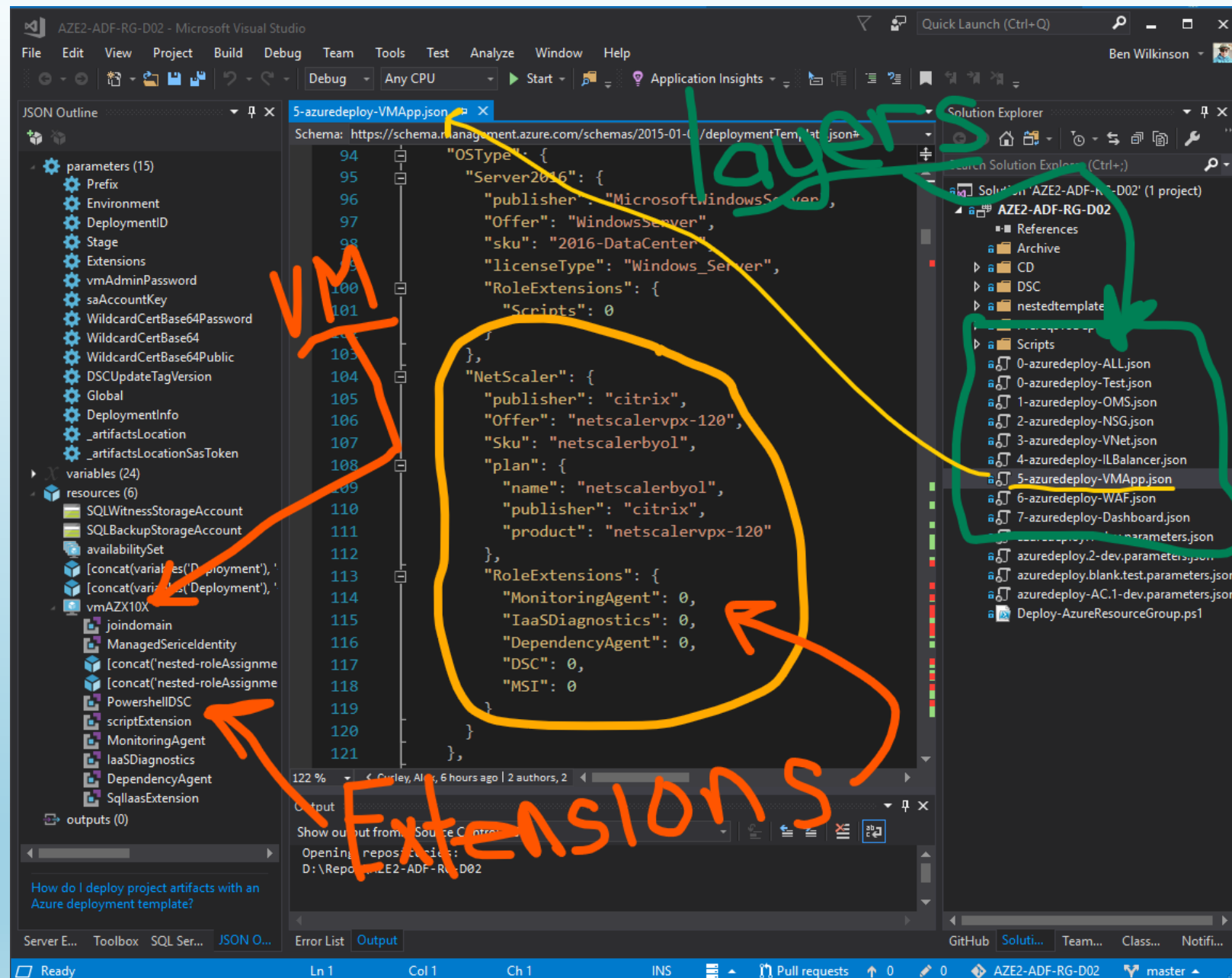 Development → Test → QA → Production → Development

  - Allows the ability to easily spin up Multiple instances of Application environments (side by side)

Why use ADF?

- To walk through the layers of Azure **and** understand the customer application step by step.

- Document requirements as you go.

- Ideal for lift and shift, with focus on full Automation (not imaging).

- Best suited to Application migrations (not full datacenter migrations).

- Easier to implement for Developers, over Operators? (IaC).

When to use ADF?

Should I use IaaS or PaaS?

What are my naming standards?

What governance models does Azure use?

What topology should my network be?

How to get started? (Understand what ADF can do)

1. Become familiar with the tools and processes used in ADF
   - Start deploying straight away
   - Start to work on the DSC configurations for the Application

2. Discuss Azure capabilities and build the configurations
   - Log Analytics
   - Virtual Networks
     - Topology
     - Subnet sizes
     - NSG's
   - Load Balancers
   - Virtual Machines
     - Linux
     - Windows
     - Appliances
   - Web Application Firewalls

How to get started?

How to get started? (start deploying with ARM)

```powershell
configuration SQLServer
{
    Import-DscResource -ModuleName PSDesiredStateConfiguration
    node $AllNodes.NodeName
    {
        if ($Node.WindowsFeaturePresent)
        {
            WindowsFeatureSet WindowsFeaturePresent
            {
                Ensure = 'Present'
                Name   = $Node.WindowsFeaturePresent
            }
        }
    }
}

$CD = @{
AllNodes = @(
    @{
        NodeName = "localhost"
        WindowsFeaturePresent = @( "RSAT-Clustering-PowerShell", "RSAT-AD-PowerShell", "RSAT-Clustering-Mgmt","Failover-Clustering",
                                   "NET-Framework-Core", "RSAT-AD-AdminCenter","RSAT-DNS-Server")
    }
    )
}

SQLServer -configurationData $CD
```

How to get started? (Become familiar with DSC)

```json
    "parameters": {
        "Stage": {
            "value": {
                "OMS": 1,
                "NSG": 1,
                "VNet": 1,
                "ADPrimary": 1,
                "ADSecondary": 0,
                "ILB": 1,
                "VMApp": 1,
                "VMSQL": 0,
                "WAF": 1,
                "DASHBOARD": 0,
                "ALERTS":0
            }
        },
        "value": {
            "MonitoringAgent": 1,
            "IaaSDiagnostics": 1,
            "DependencyAgent": 1,
            "DSC": 1,
            "Scripts": 0,
            "MSI":1
        }
    }
    "VmAdminPassword": {…
    },
    "saAccountKey": {…
    },
    "WildcardCertBase64": {…
    },
    "WildcardCertBase64Password": {…
    },
    "WildcardCertBase64Public": {…
    },
    "DSCUpdateTagVersion": {…
    },
    "Global": {
        "value": {
            "DomainName": "psobject.com",
            "AppName": "ADF",
            "NSGGlobal": "AZE2-ADF-nsgDMZ01",
            "RouteTableGlobal": "AZE2-ADF-rtDMZ01",
            "SAName": "saeastus2",
            "KVName": "kvContosoEastUS2",
            "KVUrl": "https://kvcontosoeastus2.vault.azure.net/",
            "RGName": "rgGlobal",
            "certificateThumbprint": "01358F6DB7F96BD55F1C92B605E2C50AA8C16D15",
            "vmAdminUserName": "brw",
            "sqlCredentialName": "localadmin",
            "sqlBackupservicePrincipalSecret": "e1k4UnHY+As+6U4+cAstnAzKv3qmyqA2E7ePbkiHyKc=",
            "sqlBackupservicePrincipalName": "b7743acb-28da-495d-be2f-4177ce0dc917",
            "sqlAutobackupRetentionPeriod": 5,
            "networkId": [ "10.0.",143 ],
            "alertRecipients": [ "alerts@contoso.com" ]
        }
    },
    "DeploymentInfo": {
        "value": {
            "DC1PrivateIPAddress": "230",
            "DC2PrivateIPAddress": "231",
            "DC1HostName": "AD01",
            "DC2HostName": "AD02",
            "Comment: SUBNETS": "128 + 64 + 32 + 16 + 16",
            "SubnetInfo":[
                { "name":"MT01", "prefix":"0/25", "NSG":0},
                { "name":"FE01", "prefix":"128/26", "NSG":0},
```

```json
    },
    "DeploymentInfo": {
        "value": {
            "DC1PrivateIPAddress": "230",
            "DC2PrivateIPAddress": "231",
            "DC1HostName": "AD01",
            "DC2HostName": "AD02",
            "Comment: SUBNETS": "128 + 64 + 32 + 16 + 16",
            "SubnetInfo":[
                { "name":"MT01", "prefix":"0/25", "NSG":0},
                { "name":"FE01", "prefix":"128/26", "NSG":0},
                { "name":"BE01", "prefix":"192/27", "NSG":1},
                { "name":"AD01", "prefix":"224/28", "NSG":0},
                { "name":"WAF01", "prefix":"240/28", "NSG":0}
            ],
            "LBInfo": [
                {
                    "LBName": "VPX",
                    "ASName": "VPX",
                    "Sku": "Basic",
                    "DirectReturn": true,
                    "PublicIP": "Static",
                    "FrontEnd": [
                        {
                            "Type": "Public",
                            "LBFEName": "VPX"
                        }
                    ],
                    "Services": [
                        {
                            "LBFEName": "VPX",
                            "RuleName": "VPX-80",
                            "LBFEPort": 80,
                            "LBBEPort": 80,
                            "LBBEProbePort": 9000
                        },
                        {
                            "LBFEName": "VPX",
                            "RuleName": "VPX-22",
                            "LBFEPort": 22,
                            "LBBEPort": 22,
                            "LBBEProbePort": 9000
                        }
                    ]
                }
            ],
            "computeSizeLookupOptions": {
                "AD-P": "Standard_D2s_v3",
                "AD-D": "Standard_A2m_v2",
                "AAP-P": "Standard_D2s_v3",
                "AAP-D": "Standard_D2s_v3",
                "ADC-P": "Standard_D2s_v3",
                "ADC-D": "Standard_D2s_v3",
                "FIL-P": "Standard_D2s_v3",
                "FIL-D": "Standard_DS1",
                "JMP-P": "Standard_D4s_v3",
                "JMP-D": "Standard_D2s_v3",
                "PROXYRHEL-P": "Standard_D4s_v3",
                "PROXYRHEL-D": "Standard_D2s_v3",
                "CLS01-D": "Standard_DS13_v2",
                "CLS02-D": "Standard_DS13_v2",
                "CLS01-P": "Standard_DS13_v2",
                "CLS02-P": "Standard_DS13_v2",
                "VPX-P": "Standard_DS3_v2",
                "VPX-D": "Standard_DS3_v2"
            },
            "Appservers": {
                "ADPrimaryAS": [
```

```json
            "SQLServerS": [
                "CLS01",
                "CLS02"
            ],
            "SQLServers": [
                {
                    "VMName": "SQL01",
                    "ASName": "CLS01",
                    "Role": "SQL",
                    "Zone": 0,
                    "DDRole": "SQL4TB",
                    "NICs": [
                        {
                            "Subnet": "BE01",
                            "LB": "CLS01",
                            "FastNic": 1,
                            "Primary":1
                        }
                    ],
                    "AppInfo": {
                        "ClusterInfo": {
                            "CLIP": "216",
                            "CLNAME": "CLS01",
                            "Primary": "SQL01",
                            "Secondary": [
                                "SQL02"
                            ]
                        },
                        "aoinfo": [
                            {
                                "GroupName": "AG01",
                                "PrimaryAG": "SQL01",
                                "SecondaryAG": "SQL02",
                                "AOIP": "215",
                                "ProbePort": "59999",
                                "InstanceName": "ADF_1"
                            }
                        ]
                    }
                },
                {
                    "VMName": "SQL02",
                    "CLNAME": "CLS01",
                    "ASName": "CLS01",
                    "Role": "SQL",
                    "Zone": 0,
                    "Internet": "PLB01",
                    "DDRole": "SQL4TB",
                    "NICs": [
                        {
                            "Subnet": "BE01",
                            "LB": "CLS01",
                            "FastNic": 1,
                            "Primary":1
                        }
                    ],
                    "AppInfo": {
                        "ClusterInfo": {
                            "CLIP": "216",
                            "CLNAME": "CLS01",
                            "Primary": "SQL01",
                            "Secondary": [
                                "SQL02"
                            ]
                        },
                        "aoinfo": [
                            {
                                "GroupName": "AG01",
                                "PrimaryAG": "SQL01",
```

The layers of deployment

The network layers

The Virtual Machine Extensions

The secrets from Keyvault

The Global settings e.g. domain name Etc.

Load Balancers

SQL Servers

The compute sizes - Dev and Prod

Alwyas on Availability groups

Cluster Info

Links

- Sample projects
  - https://github.com/brwilkinson/AzureDeploymentFramework

- Template Information
  - https://docs.microsoft.com/en-us/azure/templates/

- Feel free to reach out directly for other private projects
  - Assistance with Templates / DSC / PowerShell

- All feedback is welcome . . . The ADF is always changing.

Questions?