



Microsoft
Azure

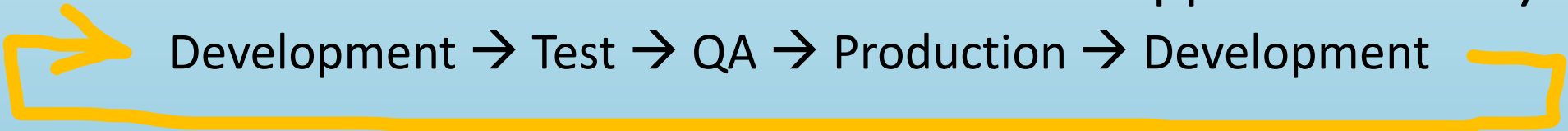
Azure Deployment Framework

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?

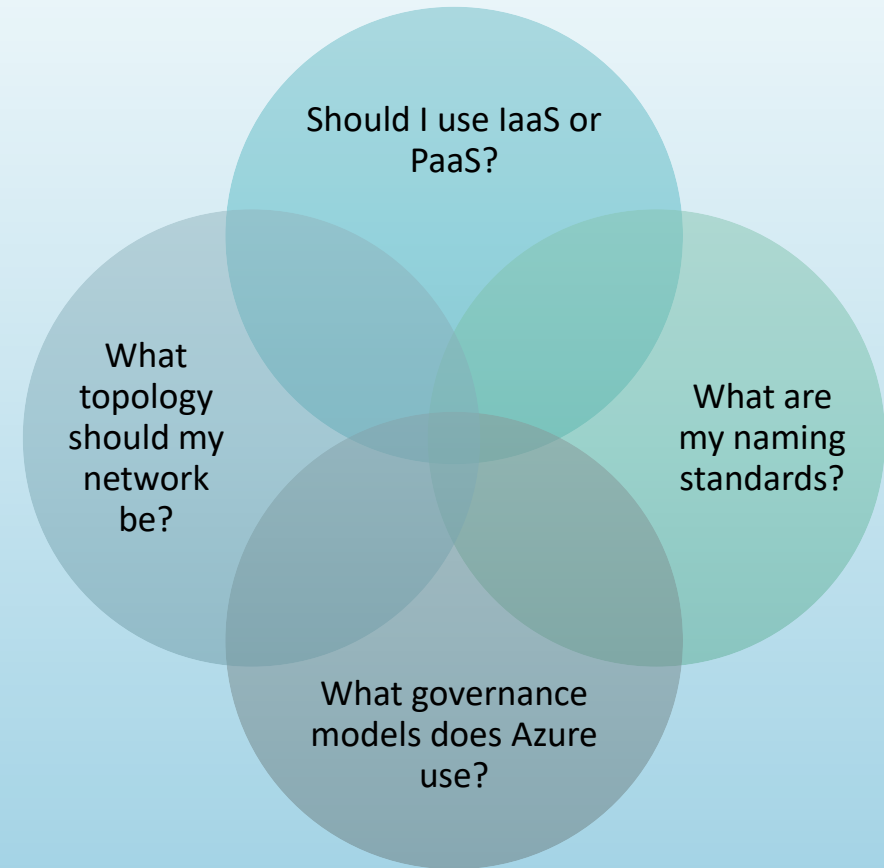
- The focus of the toolkit is the initial training (ramp up) and allows the customer to **get to production** in Azure faster/efficiently.
- By using Infrastructure and Configuration as Code
 - All code is checked into source control
 - Promotes teamwork
 - Easy sharing of code between the team
 - Allows 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

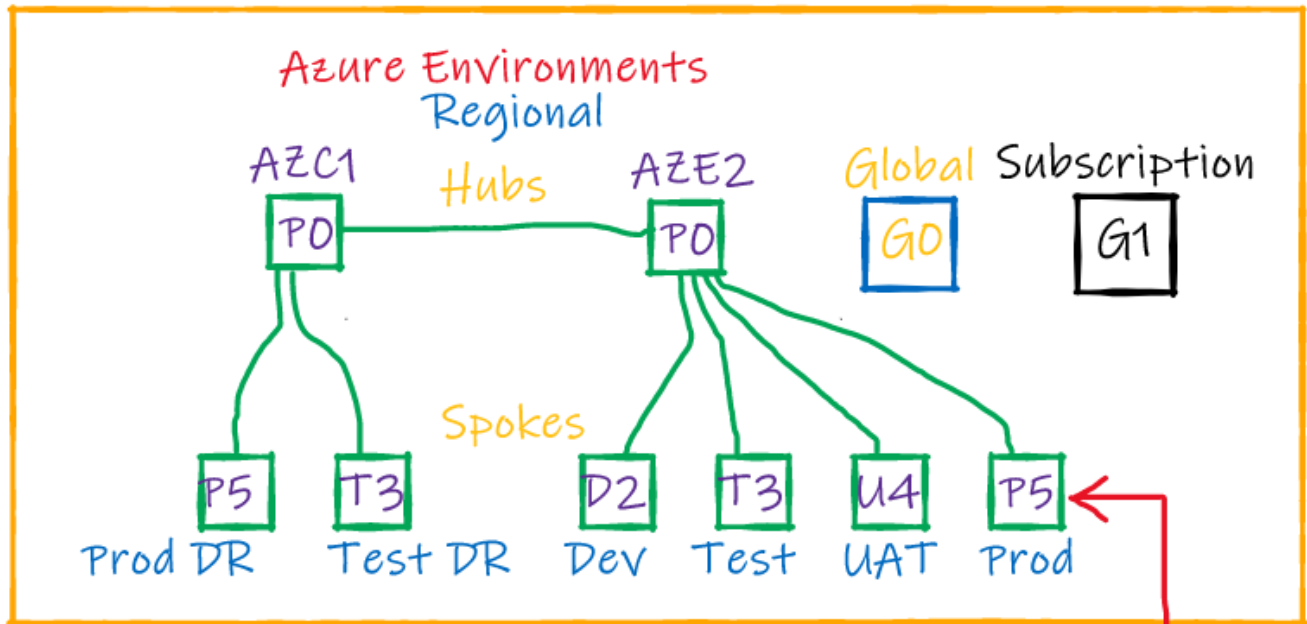
 - Allows the ability to easily spin up Multiple instances of Application environments (side by side)

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).

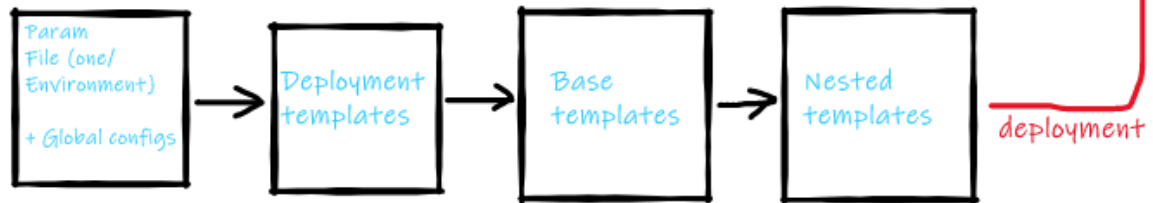


When to use ADF?



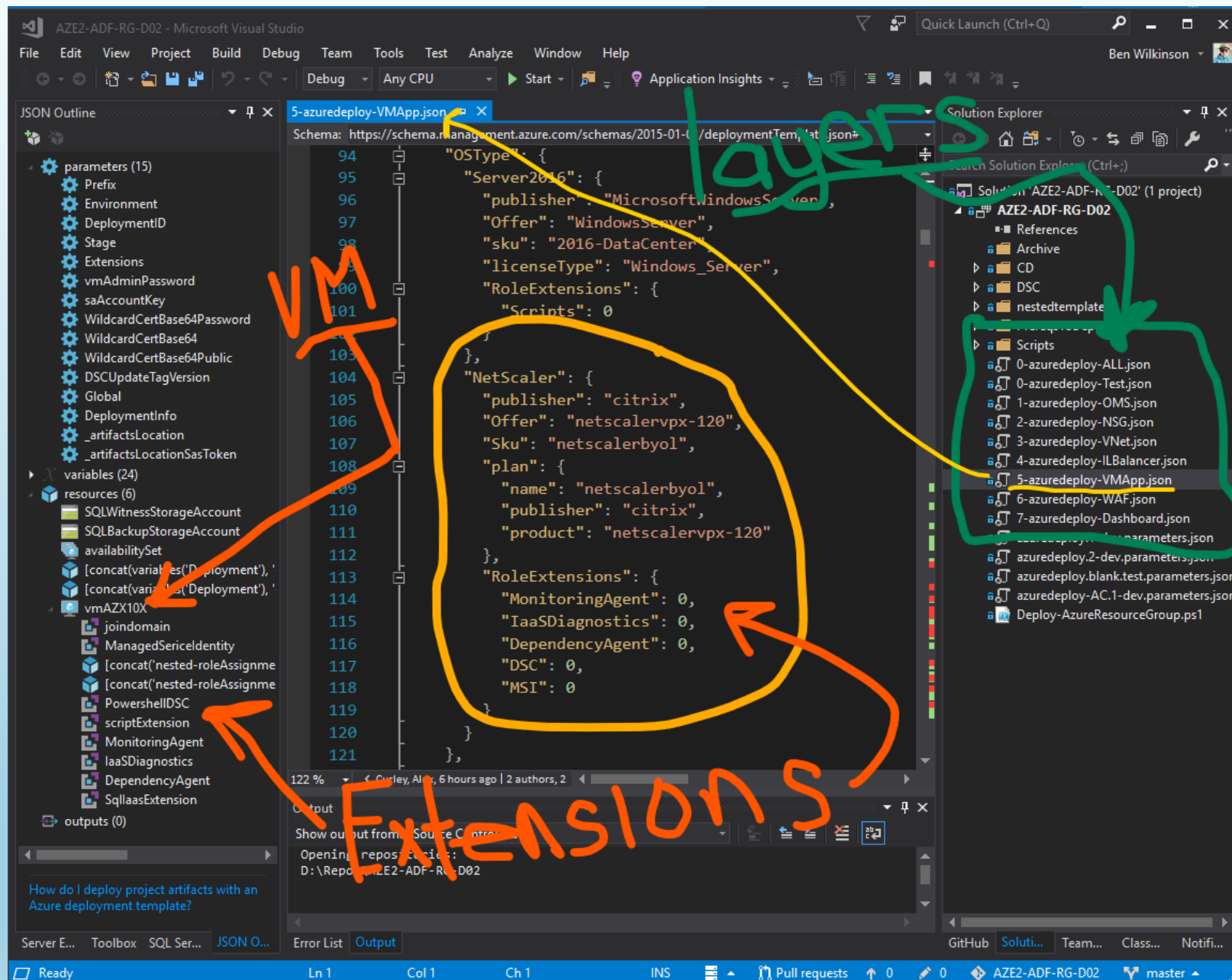
Parameter Files, one per environment
 azuredeploy.AZC1.P0.parameters.json
 azuredeploy.AZC1.T3.parameters.json
 azuredeploy.AZC1.P5.parameters.json
 azuredeploy.AZE2.P0.parameters.json
 azuredeploy.AZE2.D2.parameters.json
 azuredeploy.AZE2.T3.parameters.json
 azuredeploy.AZE2.U4.parameters.json
 azuredeploy.AZE2.P5.parameters.json
 azuredeploy.AZE2.GO.parameters.json
 azuredeploy.AZE2.G1.parameters.json

Global configs
 Global-Global.json
 Global-AZC1.json
 Global-AZE2.json
 Global-ConfigVM.json



<u>Deployment templates</u>	→	<u>Base templates</u>	→	<u>Nested templates</u>
O-azuredeploy-ALL.json		O-azuredeploy-KV.json		disks.json
O-azuredeploy-Initial.json		O-azuredeploy-Storage.json		PublicIP.json
O-azuredeploy-sub-initialRG.json		O-azuredeploy-vnet.json		loadbalancer.json

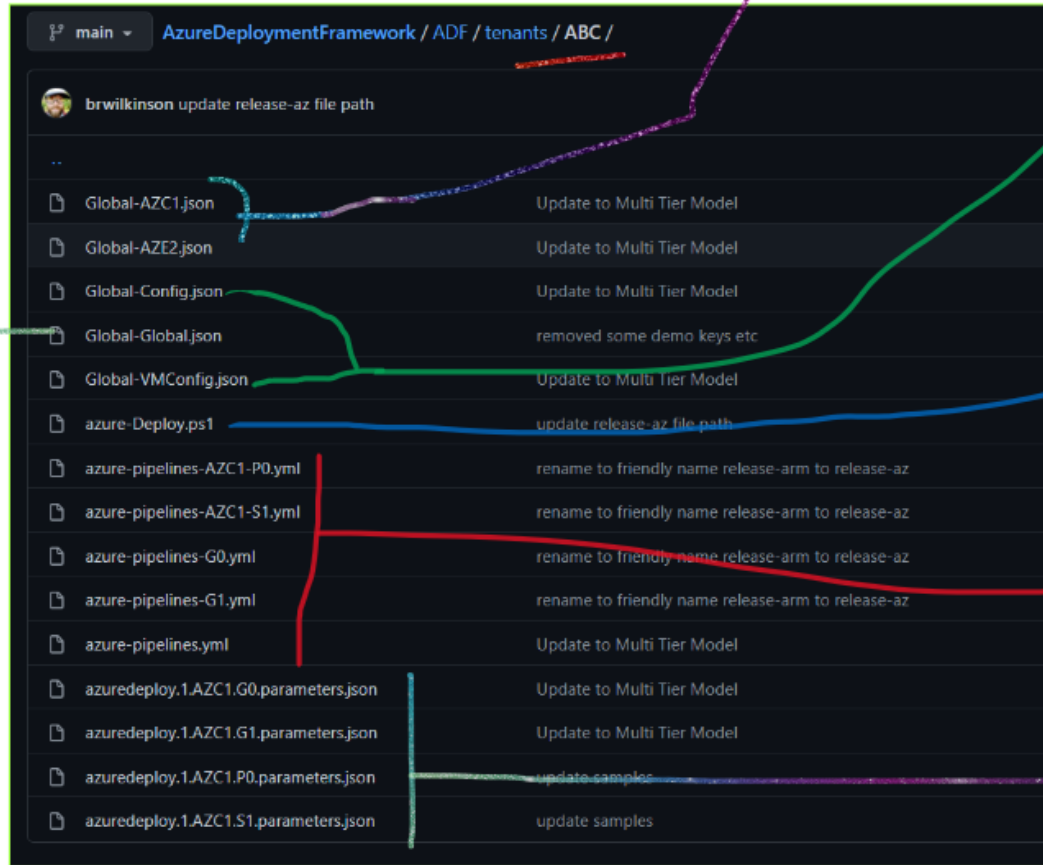
How to get started? (Understand what ADF can do)



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

1) global meta data
you have to fill this out
first, then go to the site
meta data after for each region

2) site/region specific data e.g. Azure Eastus2
and CentralUS e.g. network ranges for those
regions.



5) some global data, like OS and Disk lookups

3) This is the best place to start
these have individual deploy commands for
this tenant, you enter the \$enviro to kick
off a deployment to a particular enviro e.g. S1

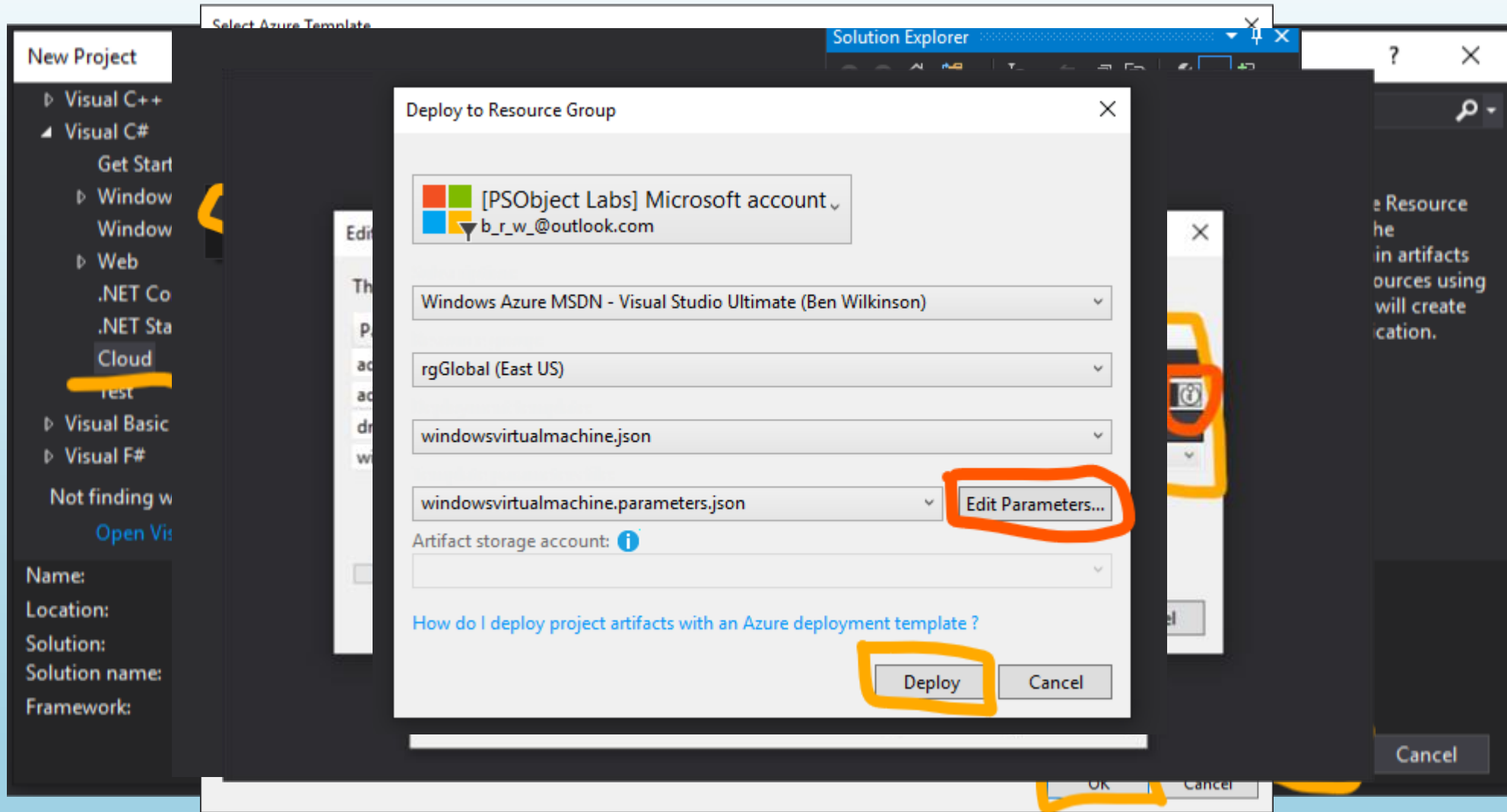
6) These are yaml pipelines, don't worry about
these yet, they just have deploy all commands
one for each resource group.

4) These are parameter files
you have one for each resource group
lets say P0 is your production hub
then S1 is your sandbox, which would be a spoke

How to get started? (Which files to look at)

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)

```

1 configuration SQLServer
2 {
3     Import-DscResource -ModuleName PSDesiredStateConfiguration
4     node $AllNodes.NodeName
5     {
6         if ($Node.WindowsFeaturePresent)
7         {
8             WindowsFeatureSet WindowsFeaturePresent
9             {
10                Ensure = 'Present'
11                Name = $Node.WindowsFeaturePresent
12            }
13        }
14    }
15 }
16
17 $CD = @{}
18 AllNodes = @(
19     @{}
20     NodeName = "localhost"
21     WindowsFeaturePresent = @( "RSAT-Clustering-PowerShell", "RSAT-AD-PowerShell", "RSAT-Clustering-Mgmt", "Failover-Clustering",
22     "NET-Framework-Core", "RSAT-AD-AdminCenter", "RSAT-DNS-Server" )
23 )
24 )
25 }
26
27 SQLServer -configurationData $CD

```

How to get started? (Become familiar with DSC)

```
"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
    }
  }
}
```

The layers of deployment

```
"value": {
  "MonitoringAgent": 1,
  "IaaSDiagnostics": 1,
  "DependencyAgent": 1,
  "DSC": 1,
  "Scripts": 0,
  "MSI": 1
}
```

The Virtual Machine Extensions

```
vmAdminPassword: {...},
saAccountKey: {...},
wildcardCertBase64: {...},
wildcardCertBase64Password: {...},
wildcardCertBase64Public: {...},
bSCUpdateTagVersion: {...}
```

The secrets from Keyvault

```
"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+cAsnAzKv3qmyqA2E7ePbk1HyKc=",
    "sqlBackupServicePrincipalName": "b7743acb-28da-495d-be2f-4177ce0dc917",
    "sqlAutobackupRetentionPeriod": 5,
    "networkId": [ "10.0.", 143 ],
    "alertRecipients": [ "alerts@contoso.com" ]
  }
}
```

The Global settings e.g. domain name Etc.

```
"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 }
    ]
  }
}
```

The network layers

```
"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
      }
    ]
  }
]
```

Load Balancers

```
"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"
}
```

The compute sizes - Dev and Prod

```
"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"
        }
      ]
    }
  }
]
```

SQL Servers

Always on Availability groups

```
"VMName": "SQL02",
"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",
      "SecondaryAG": "SQL02"
    }
  ]
}
```

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?