

About me

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Welcome to a new session about

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Azure ARM development

Video type: Full Session

Video category: Level-400



Session Agenda

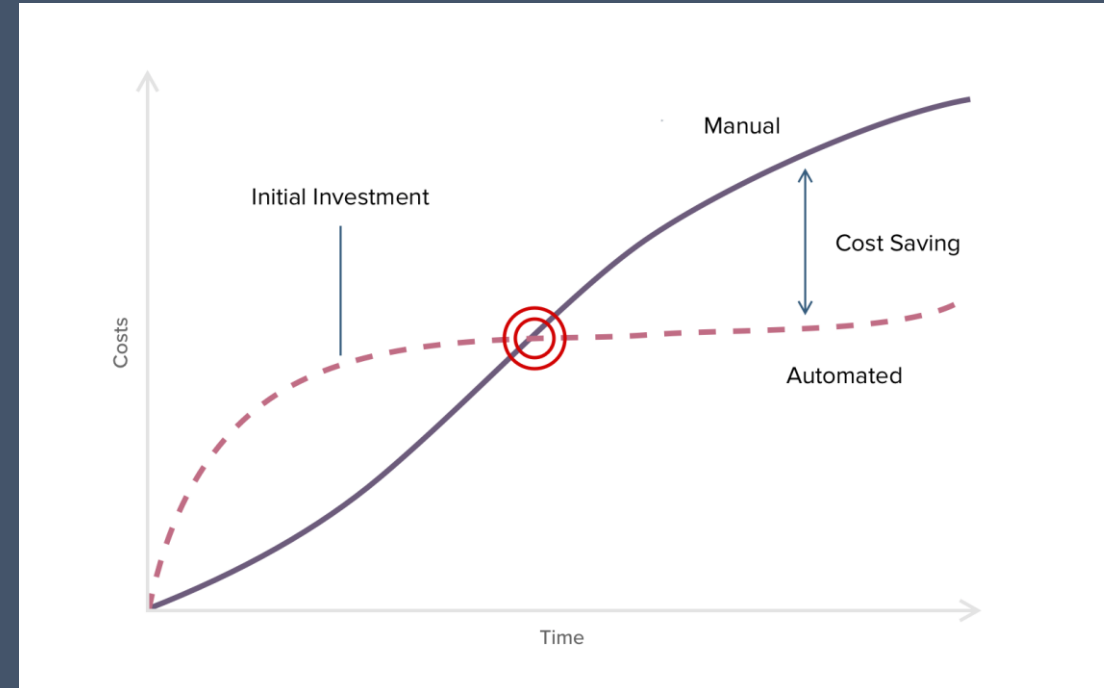
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- Why IaC?
- What are ARM Templates
- ARM Template structure
- ARM Template deployment options
- DEMO
- ARM Template best practice
- V-Next




- Why
 - Standardisation
 - Recurrence
 - Create Ressource library
 - Cost
 - Time safing
- What
 - Everything
 - **Azure**
 - Azure AD
 - Office365



What are ARM Templates

- JSON file, which is passed to the Azure Resource Manager
- A declarative IaC template
- Defines resources that are to be deployed (resource provider)
- Defines input parameters, variables and outputs



Resource Type	Usage
Microsoft.Compute/virtualMachines	Virtual Machines (VMs) ~ (V2)
Microsoft.Storage/storageAccounts	Storage accounts (V2)
Microsoft.Compute/availabilitySets	
Microsoft.Network/networkInterfaces	Virtual network interface card (NIC)
Microsoft.Network/loadBalancers	Azure Load Balancer or Internal Load Balancer
Microsoft.Network/virtualNetworks	Virtual networks (V2)
Microsoft.ClassicStorage	V1 storage – not managed by ARM
Microsoft.ClassicCompute	V1 VMs – not managed by ARM

ARM Template structure

JSON

```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
  "contentVersion": "",
  "apiProfile": "",
  "parameters": { },
  "variables": { },
  "functions": [ ],
  "resources": [ ],
  "outputs": { }
}
```

- Template file (xxx.template.json)
- Parameter file (xxx.param.json)
- Template nesting possible
- Linked template possible
- Template specs (new)

Resource definition

```
{  
  "type": "Microsoft.Network/networkSecurityGroups",  
  "apiVersion": "2018-12-01",  
  "name": "[variables('networkSecurityGroups_NSGFrontendWE_name')]",  
  "location": "[resourceGroup().location]",  
  "properties": {  
    "securityRules": [ ...  
  ]  
}  
},
```

- Name
- Location
- ResourceType
- ResourceGroup
- Properties

ARM template deployment

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- Azure Portal
- PowerShell
- Azure CLI
- Azure SDK (.Net, Java, Python, Node.js, Ruby, PHP)
- Azure Resource Manager REST API
- CI/CD pipelines (Azure DevOps, GitHub Actions,...)
-



Switch to the Live Demo!


APPLAUSE

- Azure VM deployment
- Resource deployed and then?

Best practice

- Think carefully about what needs to be provisioned
- Consider deployment chunks (reusability)
- Consider a uniform naming scheme in advance
- Superior input and output
- Versioning and documentation
- Using linked templates / template specs
- Secrets have to be kept outside!
- Consider development environment (VSCode, Visual Studio, ...)
- Testing!





```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "DeploymentType": { ...
15   },
16   "VMName": { ...
24   },
25   },
26   "functions": { ...
44   },
45   "variables": {
46     //Variables using the function 'uniqueName'
47     "virtualNetworks_vnetwe_name": "[functiondemo.uniqueName('arm-vnet-')]",
48     "networkSecurityGroups_NSGFrontendWE_name": "[functiondemo.uniqueName('arm-nsg-')]",
49     "publicIPAddresses_demovmwe_ip_name": "[functiondemo.uniqueName('arm-pip-')]",
50     "nicname_vm_we": "[functiondemo.uniqueName('arm-nic-')]",
51     "demovmwe01VnetID": "[resourceId(resourceGroup().name, 'Microsoft.Network/virtualNetworks/subnets', variables('
52     '
53     'dscurl': '<Define the DSC URL>'
54     '
55     'resources': { ...
56     '
57     '
353   }
354 }
```

ARM Template

```
1 @allowed([
2   'NetworkOnly'
3   'FullDeployment'
4 ])
5 @description('NetworkOnly deploys the network components and the FullDeployment the whole solution')
6 param DeploymentType string = 'FullDeployment'
7
8 @minLength(5)
9 @maxLength(15)
10 @description('Minimum 5 chars, maximum 15 chars are allowed!')
11 param VMName string = 'bicep-vm01'
12
13 var virtualNetworks_vnetwe_name = 'bicep-vnet-${uniqueString(toLower(resourceGroup().id))}'
14 var networkSecurityGroups_NSGFrontendWE_name = 'bicep-nsg-${uniqueString(toLower(resourceGroup().id))}'
15 var publicIPAddresses_demovmwe_ip_name = 'bicep-pip-${uniqueString(toLower(resourceGroup().id))}'
16 var nicname_vm_we = 'bicep-nic-${uniqueString(toLower(resourceGroup().id))}'
17
18 var dscurl = '<Define the DSC URL>'
19
20
21 //Get existing resource
22 //=====
23 > resource SecredDemoKV 'Microsoft.KeyVault/vaults@2019-09-01' existing = { ...
24 }
25 //=====
26
27
28
29
30
31 > resource NSG 'Microsoft.Network/networkSecurityGroups@2021-02-01' = { ...
32 }
33
34
35 > resource VNET 'Microsoft.Network/virtualNetworks@2021-02-01' = { ...
36 }
37
38
39 > resource PIP 'Microsoft.Network/publicIPAddresses@2021-02-01' = { ...
40 }
41
42
43 > resource VMNIC 'Microsoft.Network/networkInterfaces@2021-02-01' = if (DeploymentType == 'FullDeployment') { ...
44 }
45
46 > module deployvm 'deployvm.bicep' = { ...
47 }
48 }
```

Bicep Template

- Azure Native > Change to Azure Bizeps
- Multi Cloud > Change to Terraform