



Azure ARM Templates

Deep Dive



About me

- Lennart Passig
- IT-Architect @ orange networks GmbH
- Private mail: lp@propassig.de
- Business mail: l.passig@orangenet.de
- Twitter: @lennoert
- Where can you find my blogs:
<http://mscommunity.cloud>
<http://techgenix.com>
<https://propassig.de>
- Co-Founder Community:
HttBorninthe.cloud and [@mscc_germany](https://twitter.com/mscc_germany)





Agenda

- Infrastructure as Code
- (Custom Script) Extensions
- Probleme mit (Custom Script) Extensions
- Template Nesting
- Demo
- Takeaway



Infrastructure as Code

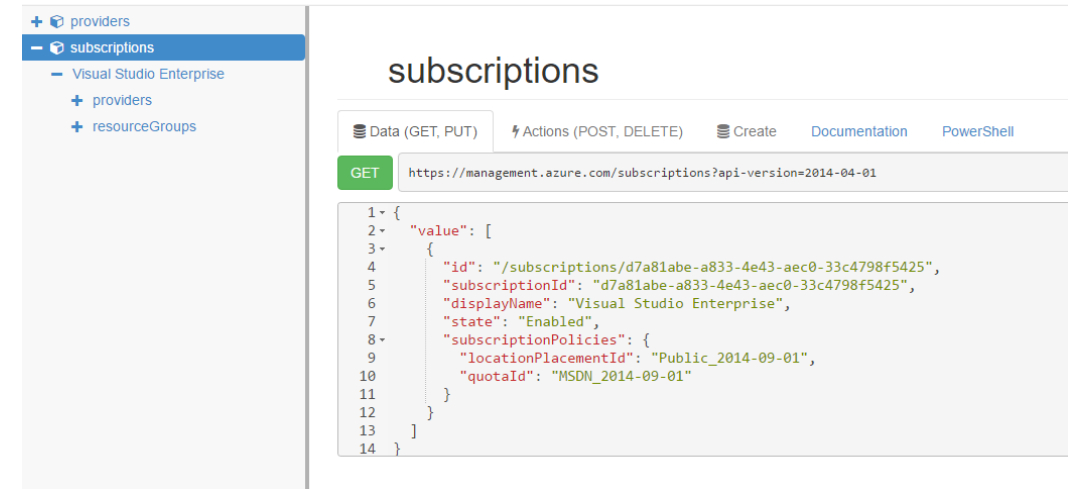
Grundlagen

- Azure Resource Manager API
- Azure Portal (ehem. Preview Portal)
- Nutzt das JSON Format
- Push des Templates via REST oder Azure Powershell

```
"resources": [  
  {  
    "type": "Microsoft.Storage/storageAccounts",  
    "name": "[variables('vhdStorageName')]",  
    "apiVersion": "2015-06-15",  
    "location": "[resourceGroup().location]",  
    "tags": {  
      "displayName": "StorageAccount"  
    },  
    "properties": {  
      "accountType": "[variables('vhdStorageType')]"  
    }  
  },  
]
```

Visualisierung der ARM API/Templates

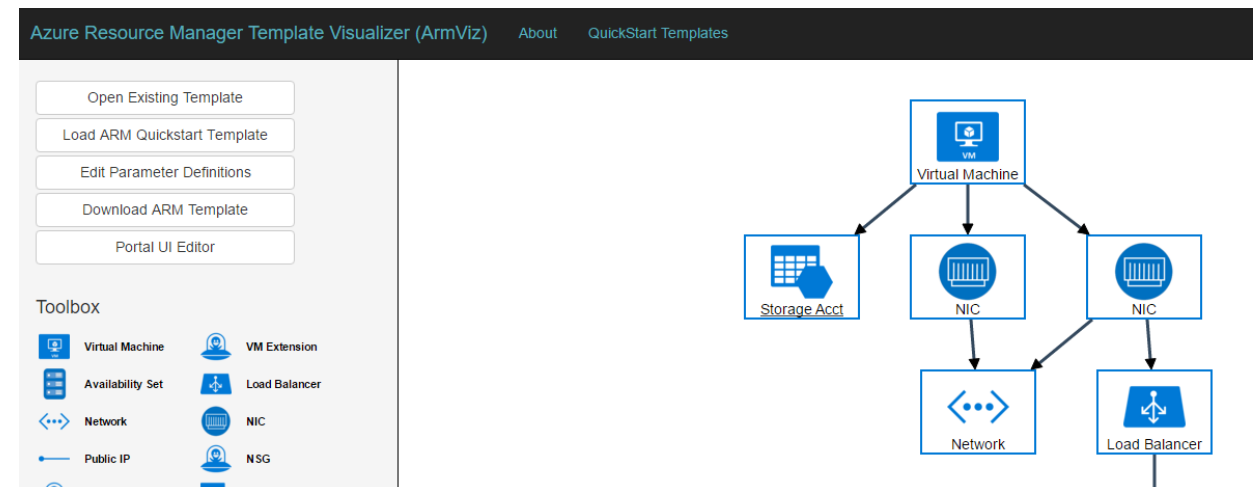
- ARM Resource Explorer:
 - <https://resources.azure.com/>



```

1 {
2   "value": [
3     {
4       "id": "/subscriptions/d7a81abe-a833-4e43-aec0-33c4798f5425",
5       "subscriptionId": "d7a81abe-a833-4e43-aec0-33c4798f5425",
6       "displayName": "Visual Studio Enterprise",
7       "state": "Enabled",
8       "subscriptionPolicies": {
9         "locationPlacementId": "Public_2014-09-01",
10        "quotaId": "MSDN_2014-09-01"
11      }
12    }
13  ]
14 }
  
```

- ARM Template Visualizer
 - <http://armviz.io/>





(Custom Script) Extensions

Extensions

```
Set-AzureRmVMAccessExtension  
Set-AzureRmVMAddDomainExtension  
Set-AzureRmVMAEMExtension  
Set-AzureRmVMBackupExtension  
Set-AzureRmVMBginfoExtension  
Set-AzureRmVMChefExtension  
Set-AzureRmVMCustomScriptExtension  
Set-AzureRmVMDiagnosticsExtension  
Set-AzureRmVMDiskEncryptionExtension  
Set-AzureRmVMDscExtension  
Set-AzureRmVMExtension  
Set-AzureRmVMSqlServerExtension
```



Custom Script Extensions

- Läuft im Hintergrund
- Wird mit lokalen Administrator Berechtigungen ausgeführt
- Kann in der Provisioning Phase ausgeführt werden oder später im Betrieb
- Anwendungsbeispiele:
 - Update VM (Hinzufügen einer Datadisk)
 - Install Agents
 - Install Features
 - Powershell 5 auf Windows Server 2012 R2 installieren!
 - Install Software



Install WMF 5.0

```
workflow Install-WMF
{
    InlineScript {
        #Change directory
        Set-Location -Path 'C:\Windows\System32'

        $url = 'http://download.microsoft.com/download/3/F/D/3FD04B49-26F9-4D9A-8C34-4533B9D5B020/win8.1Andw2K12R2-KB3066437-x64.msu'
        $output = "$PSScriptRoot\PS5.msu"
        #Download Framework
        Invoke-WebRequest -Uri $url -OutFile $output

        #Install WMF 5.0
        & .\wusa.exe $output /quiet /norestart
    }
}

Install-WMF
```



Install Software

```
workflow Install-Workflow
{
    InlineScript {
        #Register Chocolatly Package source
        Register-PackageSource -Name chocolatey -ProviderName Chocolatey -Location http://chocolatey.org/api/v2/ -Trusted -Force

        #Install packages
        Install-Package -Name GoogleChrome -Source Chocolatey -Force
        Install-Package -Name adobereader -Source Chocolatey -Force
        Install-Package -Name fiddler4 -Source Chocolatey -Force
        Install-Package -Name SharePointDesigner2013x64 -Source Chocolatey -Force
        Install-Package -Name CAMLDesigner2013 -Source Chocolatey -Force
        Install-Package -Name SearchQueryTool -Source Chocolatey -Force
        Install-Package -Name SharePointManager2013 -Source Chocolatey -Force
        Install-Package -Name ulsviewer -Source Chocolatey -Force
        Install-Package -Name notepadplusplus -Source Chocolatey -Force
        Install-Package -Name PowerGUI -Source Chocolatey -Force
        Install-Package -Name visualstudio2013professional -Source Chocolatey -Force
    }
}
Install-Workflow
```



Probleme mit (Custom Script) Extensions



Probleme mit (Custom Script) Extensions

Pro VM und Template
kann nur eine Extension
ausgeführt werden!



Template Nesting

Template Nesting (1/2)

```
},  
{  
  "comments": "Extension to install additional Software",  
  "name": "Software",  
  "type": "Microsoft.Resources/deployments",  
  "apiVersion": "2015-01-01",  
  "dependsOn": [  
    "[concat('Microsoft.Compute/virtualMachines/', variables('vmName'), '/extensions/Microsoft.Azure.Diagnostics.IaaS.Diagnostics')]"  
  ],  
  "properties": {  
    "mode": "Incremental",  
    "templateLink": {  
      "uri": "[variables('ArtifactLocationInstall')]",  
      "contentVersion": "1.0.0.0"  
    },  
    "parameters": {  
      "ArtifactLocationInstall": {  
        "value": "[variables('ArtifactLocationInstall')]"  
      },  
      "vmName": {  
        "value": "[variables('vmName')]"  
      }  
    }  
  }  
}  
]  
]
```

Template Nesting (2/2)

```
{
  "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "parameters": {
    "ArtifactLocationInstall": {
      "type": "string"
    },
    "vmName": {
      "type": "string"
    }
  },
  "resources": [
    {
      "type": "Microsoft.Compute/virtualMachines/extensions",
      "name": "[concat(parameters('vmName'), '/CustomScriptExtension')]",
      "apiVersion": "2015-06-15",
      "location": "[resourceGroup().location]",
      "properties": {
        "publisher": "Microsoft.Compute",
        "type": "CustomScriptExtension",
        "typeHandlerVersion": "1.8",
        "autoUpgradeMinorVersion": "true",
        "settings": {
          "commandToExecute": "powershell (parameters('ArtifactLocationInstall'),'InstallSoftware.ps1'"
        }
      }
    }
  ]
}
```



Step by Step Summary

- Erstellung: PowerShell Skripte
- Erstellung: „Parent“ ARM-Template
- Erstellung: „Nested“ ARM-Template
- Upload: PowerShell Skripte
- Upload: „Nested“ ARM-Template

- Execute Powershell Deployment Script : Lokal oder per Team Services



Demo Time



Takeaway



Useful links and resources

- Microsoft Pattern and Practices
 - <https://github.com/mspnp>
 - <https://github.com/mspnp/reference-architectures>
 - <https://github.com/mspnp/cloud-design-patterns>
- Azure Examples
 - <https://github.com/Azure-Samples>
- DevOps Examples
 - <https://github.com/Microsoft/PartsUnlimited/>
 - <https://github.com/Microsoft/PartsUnlimitedMRP/>