

Microsoft Azure Administrator: Automate Deployment and Configuration of Virtual Machines

MANAGE DEPLOYMENTS WITH ARM TEMPLATES



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Course Coverage of Certification Objectives



Manage Deployments with ARM Templates

- Modify ARM template
- Deploy from template
- Save a deployment as an ARM template

Automate Configuration and Deployment of VMs

- Automate configuration management by using custom script extension
- Configure VHD template



Exercise Files

Slides

Code

Links to Resources

The screenshot displays the Pluralsight course page for "Securing Microsoft Azure Networks" by Michael Teske. The page is divided into several sections:

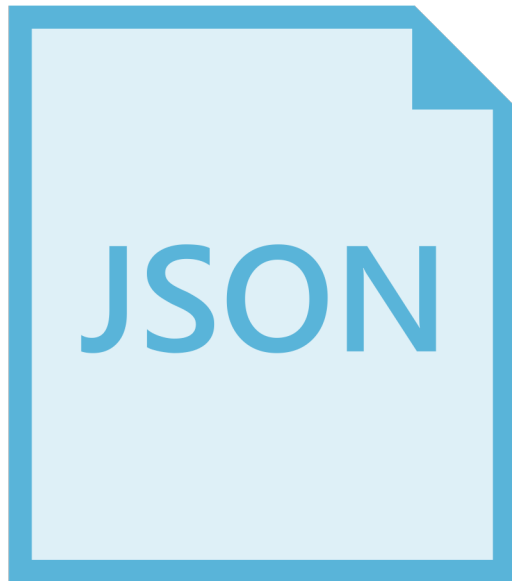
- Header:** The course title "Securing Microsoft Azure Networks" is prominently displayed, followed by the author's name "by Michael Teske". Below this is a brief description: "This course provides a fundamental understanding of Azure network security services, resources, and features to help you better secure your Azure environment. Along the way, you'll learn Microsoft's best practices and their role in your journey."
- Actions:** A row of buttons includes "Start Course" (highlighted in orange), "Bookmark", "Add to Channel", and "Download Course".
- Table of Contents:** A horizontal menu with tabs for "Table of contents", "Description", "Transcript", "Exercise files" (which is the active tab), "Discussion", "Learning Check", and "Recommended".
- Exercise Files Section:** This section explains the purpose of the files: "These exercise files are intended to provide you with the assets you need to create a video-based hands-on experience. With the exercise files, you can follow along with the author and re-create the same solution on your computer. We find this to be even more effective than written lab exercises." Below this text is a button labeled "Download exercise files".
- Course Author:** A sidebar on the right introduces Michael Teske as an "Author Evangelist with Pluralsight" who has "20+ years of experience in the IT Ops industry".
- Course Info:** This sidebar section lists the course level as "Beginner", a rating of five stars, a duration of "1h 30m", and a release date of "28 May 2019".
- Share Course:** At the bottom of the sidebar, there are social media icons for Facebook, Twitter, and LinkedIn.



Modify an ARM template



ARM Templates



JSON format

Contains the resources to create in Azure

Submit template to the Azure Resource Manager

Tracked deployments



ARM Template Format

```
{  
  "$schema": "https://schema.management.azure.com/schemas/2019-04-  
    01/deploymentTemplate.json#",  
  "contentVersion": "1.0.0.0",  
  "parameters": {},  
  "functions": [],  
  "variables": {},  
  "resources": [],  
  "outputs": {}  
}
```



ARM Template

```
1  {  
2    "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",  
3    "contentVersion": "1.0.0.0",  
4    "parameters": {  
5      "networkSecurityGroups_web_nsg_name": {  
6        "defaultValue": "web-nsg",  
7        "type": "String"  
8      }  
9    },  
10   "variables": {},
```



ARM Template

```
11  "resources": [  
12    {  
13      "type": "Microsoft.Network/networkSecurityGroups",  
14      "apiVersion": "2020-05-01",  
15      "name": "[parameters('networkSecurityGroups_web_nsg_name')]",  
16      "location": "centralus",  
17      "tags": {  
18        "environment": "production"  
19      },  
20      "properties": {  
21        "securityRules": [  
22          {  
23            "name": "Port_443",  
24            "properties": {  
25              "protocol": "*",  
26              "sourcePortRange": "*",  
27              "destinationPortRange": "443",  
28              "sourceAddressPrefix": "*",  
29              "destinationAddressPrefix": "*",  
30              "access": "Allow",  
31              "priority": 100,  
32              "direction": "Inbound",  
33              "sourcePortRanges": [],  
34              "destinationPortRanges": [],  
35              "sourceAddressPrefixes": [],  
36              "destinationAddressPrefixes": []  
37            }  
38          }  
39    ]  
  }
```

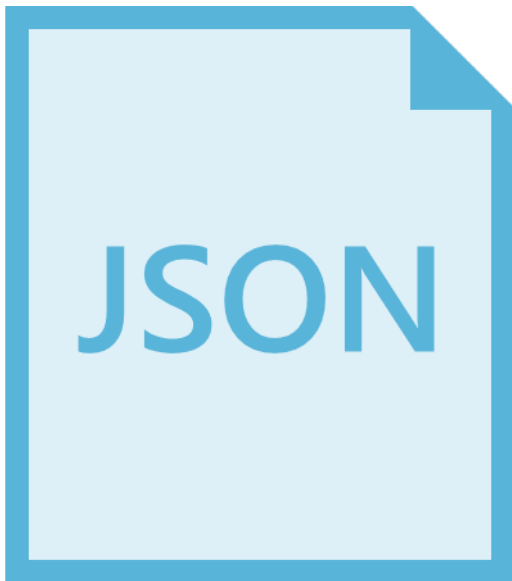


ARM Template

```
42 {
43     "type": "Microsoft.Network/networkSecurityGroups/securityRules",
44     "apiVersion": "2020-05-01",
45     "name": "[concat(parameters('networkSecurityGroups_web_nsg_name'), '/Port_443')]",
46     "dependsOn": [
47         "[resourceId('Microsoft.Network/networkSecurityGroups', parameters('networkSecurityGroups_web_nsg_name'))]"
48     ],
49     "properties": {
50         "protocol": "*",
51         "sourcePortRange": "*",
52         "destinationPortRange": "443",
53         "sourceAddressPrefix": "*",
54         "destinationAddressPrefix": "*",
55         "access": "Allow",
56         "priority": 100,
57         "direction": "Inbound",
58         "sourcePortRanges": [],
59         "destinationPortRanges": [],
60         "sourceAddressPrefixes": [],
61         "destinationAddressPrefixes": []
62     }
63 }
64 ]
```



Modify ARM Template



Can modify existing template in portal

- Choose Export template under Automation
- Select Deploy to edit template
- Make changes and save
- Select purchase




Modify ARM Template

Dashboard > web-nsg >

Custom deployment

Deploy from a custom template

TEMPLATE

 2 resources

[Edit template](#) [Edit paramet...](#) [Learn more](#)

BASICS

Subscription *

Resource group * [Create new](#)

Location

SETTINGS

Network Security Groups_web_nsg_name

TERMS AND CONDITIONS

[Azure Marketplace Terms](#) | [Azure Marketplace](#)

By clicking "Purchase," I (a) agree to the applicable legal terms associated with the offering; (b) authorize Microsoft to charge or bill my current payment method for the fees associated the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s); and (c) agree that, if the deployment involves 3rd party offerings, Microsoft may share my contact information and other details of such deployment with the publisher of that offering.

☐ I agree to the terms and conditions stated above

[Purchase](#)



Demo



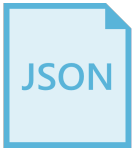
Modify ARM template



Deploy from template



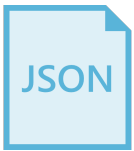
Deploy from Template



Generate a template in the portal



Download the template



Edit and deploy modified template



Find Deploy a Custom Template blade



Choose build your own template and upload the file and deploy



Deploy from Template

[Download](#) [Add to library \(preview\)](#) [Deploy](#)

i To export related resources, select the resources from the Resource Group view then select the "Export template" option from the tool bar.

☒ Include parameters ⓘ

TemplateParametersScripts

> Parameters (1)

Variables (0)

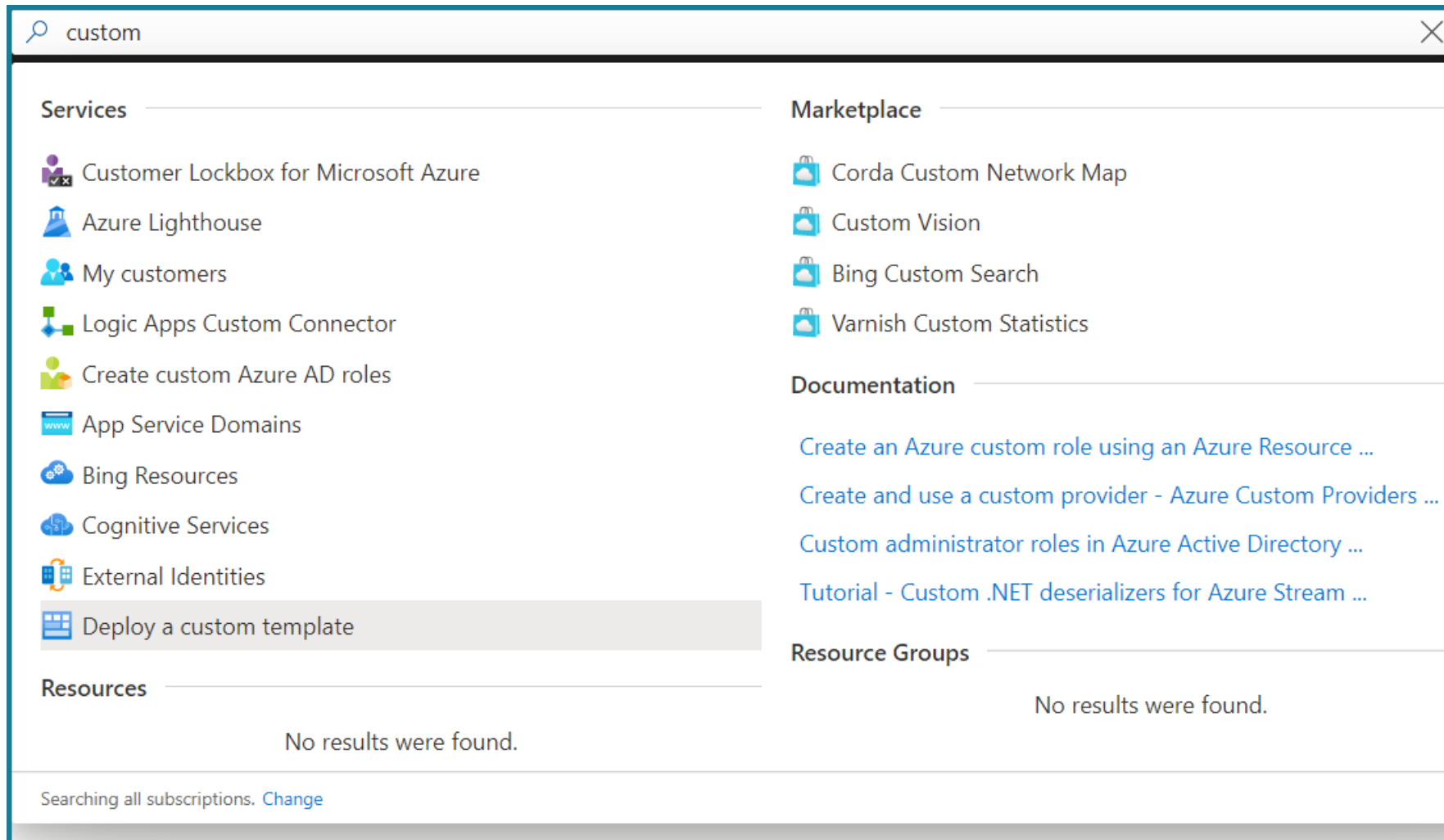
Resources (2)

- [parameters('networkSecurityGroup')]
(Microsoft.Network/networkSecurityGroups)
- [concat(parameters('networkSecurityGroup'), '/Port_443')]
(Microsoft.Network/networkSecurityGroups)

```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "networkSecurityGroups_web_nsg_name": {
6       "defaultValue": "web-nsg",
7       "type": "String"
8     }
9   },
10  "variables": {},
11  "resources": [
12    {
13      "type": "Microsoft.Network/networkSecurityGroups",
14      "apiVersion": "2020-05-01",
15      "name": "[parameters('networkSecurityGroups_web_nsg_name')]",
16      "location": "centralus",
17      "tags": {
18        "environment": "production"
19      },
20      "properties": {
21        "securityRules": [
22          {
23            "name": "Port_443",
24            "properties": {
25              "protocol": "*",
26              "sourcePortRange": "*",
27              "destinationPortRange": "443",
28              "sourceAddressPrefix": "*",
29              "destinationAddressPrefix": "*",
30              "access": "Allow",
31              "priority": 100,
32              "direction": "Inbound",
33            }
34          }
35        ]
36      }
37    }
38  ]
39 }
```



Deploy from Template



Deploy from Template

[Dashboard](#) >


Custom deployment

Deploy from a custom template

Select a template

Basics

Review + create

Automate deploying resources with Azure Resource Manager templates in a single, coordinated operation. Create or select a template below to get started. [Learn more about template deployment](#) 



Build your own template in the editor

Common templates



Create a Linux virtual machine



Create a Windows virtual machine



Create a web app



Create a SQL database

Load a GitHub quickstart template

Quickstart template (disclaimer) ⓘ



Deploy from Template

[Dashboard](#) >


Custom deployment

Deploy from a custom template

Select a template

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Quickstart template (disclaimer) ⓘ




Deploy from Template


[Dashboard](#) > [Custom deployment](#) >


Edit template

Edit your Azure Resource Manager template

[+](#) Add resource [↑](#) Quickstart template [↑](#) Load file [↓](#) Download

 Parameters (0)

 Variables (0)

 Resources (0)

<<

```
1  {
2    "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3    "contentVersion": "1.0.0.0",
4    "parameters": {},
5    "resources": []
6  }
```



Deploy from Template



Custom deployment

Deploy from a custom template

[Select a template](#)

Basics[Review + create](#)

Template

 [Customized template](#) 
2 resources

[Edit template](#)[Edit parameters](#)

Deployment scope

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ

ps-course-development

Resource group * ⓘ

ps-course-rg

[Create new](#)

Parameters

Region ⓘ

Central US

Network Security Groups_web_nsg_name

web-nsg2

[Review + create](#)

[< Previous](#)

[Next : Review + create >](#)



Demo



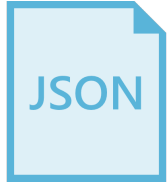
Deploy from Template



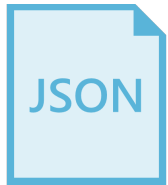
Save a deployment as an ARM template



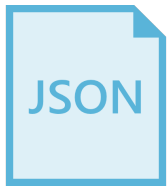
Save a Deployment as an ARM Template



Locate resource group in the portal



Choose Export template



Download template



Save a Deployment as an ARM Template

Dashboard > Resource groups > ps-course-rg

ps-course-rg | Export template

Resource group

Search (Ctrl+/) << Download Add to library (preview) Deploy

Settings

- Quickstart
- Deployments
- Policies
- Properties
- Locks

Cost Management

- Cost analysis
- Cost alerts (preview)
- Budgets
- Advisor recommendations

Monitoring

- Insights (preview)
- Alerts
- Metrics
- Diagnostic settings
- Logs
- Advisor recommendations
- Workbooks

Automation

- Export template

To export related resources, select the resources from the Resource Group view then select the "Export template" option from the tool bar.

☒ Include parameters ⓘ

Template Parameters Scripts

Parameters (8)
Variables (0)
Resources (13)

- [parameters('networkSecurityGroup')] (Microsoft.Network/networkSecurityGroups)
- [parameters('publicIPAddresses_bastion')] (Microsoft.Network/publicIPAddresses)
- [parameters('virtualNetworks_main')] (Microsoft.Network/virtualNetworks)
- [parameters('virtualMachines_windows_1')] (Microsoft.Compute/virtualMachines)
- [concat(parameters('virtualMachines_windows_1'), '/CustomScriptExtension')] (Microsoft.Compute/virtualMachines)
- [parameters('schedules_shutdown')] (microsoft.devtestlab/schedules)
- [parameters('networkInterfaces_windows_1758')] (Microsoft.Network/networkInterfaces)
- [concat(parameters('networkSecurityGroups_web_nsg'), '/Port_80')] (Microsoft.Network/networkSecurityGroups)
- [concat(parameters('virtualNetworks_main'), '/AzureBastionSubnet')] (Microsoft.Network/virtualNetworks)
- [concat(parameters('virtualMachines_windows_1758'), '/back-end')] (Microsoft.Network/virtualNetworks)

```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "extensions_CustomScriptExtension_commandToExecute": {
6       "type": "SecureString"
7     },
8     "bastionHosts_bastion_name": {
9       "defaultValue": "bastion",
10      "type": "String"
11    },
12    "virtualMachines_windows_1_name": {
13      "defaultValue": "windows-1",
14      "type": "String"
15    },
16    "virtualNetworks_main_vnet_name": {
17      "defaultValue": "main-vnet",
18      "type": "String"
19    },
20    "publicIPAddresses_bast_pip_name": {
21      "defaultValue": "bast-pip",
22      "type": "String"
23    },
24    "networkSecurityGroups_web_nsg_name": {
25      "defaultValue": "web-nsg",
26      "type": "String"
27    },
28    "networkInterfaces_windows_1758_name": {
29      "defaultValue": "windows-1758",
30      "type": "String"
31    }
```



```
Export-AzResourceGroup -ResourceGroupName "ps-course-rg" -Path "C:\downloads"
```


```
-Resource /subscriptions/123/resourceGroups/ps-course-rg `
/providers/Microsoft.network/networksecuritygroups/web-nsg
```

Save a Deployment as an ARM Template

Using PowerShell



```
Export-AzResourceGroup -ResourceGroupName "ps-course-rg" -Path "C:\downloads"
```



```
-Resource /subscriptions/123/resourceGroups/ps-course-rg `
/providers/Microsoft.network/networksecuritygroups/web-nsg
```

Save a Deployment as an ARM Template

Using PowerShell



Demo



Save a deployment as an ARM template



Up Next:

Automate Configuration and Deployment of VMs

