

Azure Automation fun met ARM Templates & PowerShell mijn DevOps Cloud avonturen

Esther Barthel



About Esther

▪ 20 years of Technical Consulting

- Solutions Architect at **cognition IT**
- Design | Implement | Troubleshooting

▪ Community programs

- Citrix Technology Professional (CTP)
- Microsoft Most Valuable Professional (MVP)
- CUGC Women in Tech Mentorship program leader



▪ DevOps, automation

- REST APIs | JSON | PowerShell



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 <http://www.virtues.it>

Agenda



- ☐ Azure IaaS
- ☐ ARM Templates
 - ☐ JSON formatting
 - ☐ Az PowerShell
- ☐ Azure Automation
 - ☐ Runbooks based on PowerShell
 - ☐ Hybrid Workers
- ☐ Demo



DEVOPS &
AUTOMATION

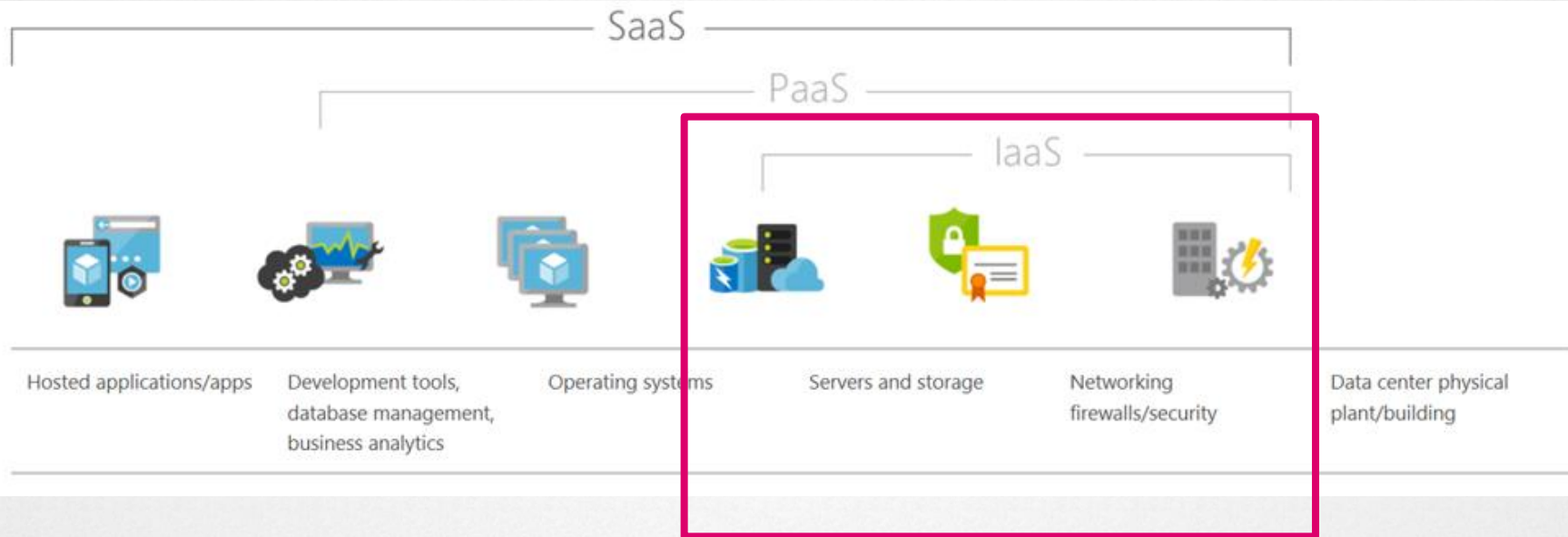


Azure IaaS

Services & Objects



Azure IaaS



Azure IaaS

+ Create a resource
Storage accounts

+ Create a resource
Virtual machines
Virtual networks
Network interfaces
Public IP addresses
Network security groups
Load balancers
Availability sets



Family	Description
A-series	cost-effective, general purpose compute
D(S) -series	cost-effective, general purpose compute (faster CPU and local SSD)
F(s)-series	best value compute capability per core, lower memory footprint
G(S)-series	highest memory footprint
H-series	very high end workloads (eg CFD)
N-series	GPU-enabled. NV for visualisation, NC for compute



Azure IaaS

Create a virtual machine

✓ Validation passed

Basics Disks Networking Management Advanced Tags Review + create

PRODUCT DETAILS

Citrix ADC 11.0

by Citrix

[Terms of use](#) | [Privacy policy](#)

Not covered by credits ⓘ

0.0000 EUR/hr

Standard A2

by Microsoft

[Terms of use](#) | [Privacy policy](#)

Subscription credits apply ⓘ

0.1012 EUR/hr

[Pricing for other VM sizes](#)

BASICS

Subscription

Visual Studio Enterprise

Resource group

RG-PSARM

Virtual machine name

ns02

Region

(Europe) West Europe

Availability options

No infrastructure redundancy required

Authentication type

Password

Username

adm-demo

Public inbound ports

None

DISKS

OS disk type

Standard SSD

Create

Previous

Next

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DEVOPS &
AUTOMATION



ARM Templates

JSON & Expressions





ARM Template

... structure of an **Azure Resource Manager template**.

The template consists of **JSON** and expressions that you can use to construct values for your deployment.





JavaScript Object Notation (JSON)

Syntax rules

■ data is in **name/value pairs**

A name/value pair consists of a field name (in double quotes), followed by a colon, followed by a value:

Example

```
"name": "John"
```





JavaScript Object Notation (JSON)

Syntax rules

■ data is separated by **commas**

Example

```
{  
  "employee":{ "name":"John", "age":30, "city":"New York" }  
}
```





JavaScript Object Notation (JSON)

Syntax rules

■ curly braces {} hold **objects**

Example

```
{  
  "employee":{ "name":"John", "age":30, "city":"New York" }  
}
```





JavaScript Object Notation (JSON)

Syntax rules

■ square brackets [] hold **arrays**

Example

```
[ "Ford", "BMW", "Fiat" ]
```





JavaScript Object Notation (JSON)

Nested Arrays in JSON Objects

Values in an array can also be another array, or even another JSON object:

Example

```
myObj = {  
  "name": "John",  
  "age": 30,  
  "cars": [  
    { "name": "Ford", "models": [ "Fiesta", "Focus", "Mustang" ] },  
    { "name": "BMW", "models": [ "320", "X3", "X5" ] },  
    { "name": "Fiat", "models": [ "500", "Panda" ] }  
  ]  
}
```





ARM Template

Template format

In its simplest structure, a template has the following elements:

JSON

 Copy

```
{
  "$schema": "http://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
  "contentVersion": "",
  "parameters": { },
  "variables": { },
  "functions": [ ],
  "resources": [ ],
  "outputs": { }
}
```



sources: <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-authoring-templates>
<https://docs.microsoft.com/en-us/azure/templates/> (Reference Guide!)

ARM Template

```
1 {
2   "$schema": "http://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3   "contentVersion": "",
4   "parameters": {
5     "<parameter-name>": {
6       "type": "<type-of-parameter-value>",
7       "defaultValue": "<default-value-of-parameter>",
8       "allowedValues": [ "<array-of-allowed-values>" ],
9       "minValue": <minimum-value-for-int>,
10      "maxValue": <maximum-value-for-int>,
11      "minLength": <minimum-length-for-string-or-array>,
12      "maxLength": <maximum-length-for-string-or-array-parameters>,
13      "metadata": {
14        "description": "<description-of-the parameter>"
15      }
16    },
17  },
18  "variables": {
19    "<variable-name>": "<variable-value>",
20    "<variable-object-name>": {
21      "<variable-complex-type-value>"
22    },
23    "<variable-object-name>": {
24      "copy": [
25        "<array-of-objects>"
26      ]
27    },
28  },
29  "functions": [
30    {
31      "namespace": "<namespace-for-your-function>",
32      "members": {
33        "<function-name>": {
34          "parameters": [
35            {
36              "name": "<parameter-name>",
37              "type": "<type-of-parameter-value>"
38            }
39          ],
40          "output": {
41            "type": "<type-of-output-value>",
42            "value": "<function-expression>"
43          }
44        }
45      }
46    }
47  ]
48 }
```

```
63 "resources": [
64   {
65     "condition": "<boolean-value-whether-to-deploy>",
66     "apiVersion": "<api-version-of-resource>",
67     "type": "<resource-provider-namespace/resource-type-name>",
68     "name": "<name-of-the-resource>",
69     "location": "<location-of-resource>",
70     "tags": {
71       "<tag-name1>": "<tag-value1>",
72       "<tag-name2>": "<tag-value2>"
73     },
74     "comments": "<your-reference-notes>",
75     "copy": {
76       "name": "<name-of-copy-loop>",
77       "count": "<number-of-iterations>",
78       "mode": "<serial-or-parallel>",
79       "batchSize": "<number-to-deploy-serially>"
80     },
81     "dependsOn": [
82       "<array-of-related-resource-names>"
83     ],
84     "properties": {
85       "<settings-for-the-resource>": {
86         "copy": [
87           {
88             "name": ,
89             "count": ,
90             "input": { }
91           }
92         ]
93       },
94       "resources": [
95         "<array-of-child-resources>"
96       ]
97     }
98   },
99   "outputs": {
100     "<outputName>": {
101       "type": "<type-of-output-value>",
102       "value": "<output-value-expression>"
103     }
104   }
105 }
```




ARM Template

Quickstart: Create and deploy Azure Resource Manager templates by using the Azure portal

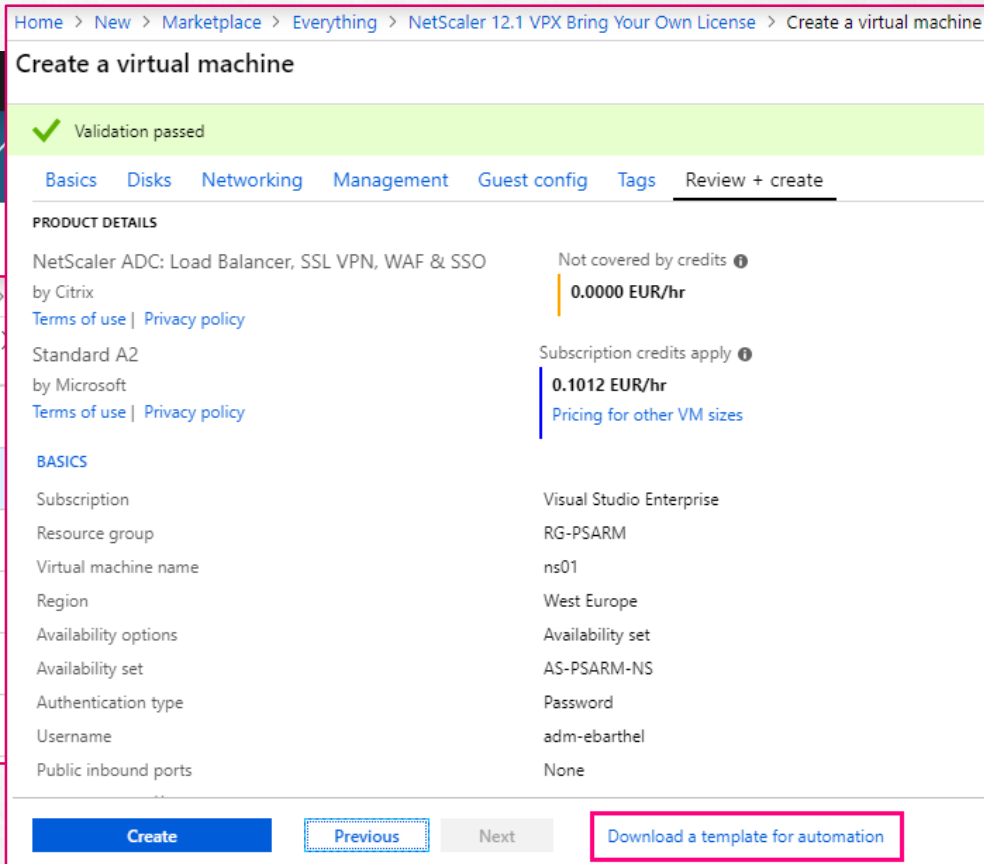
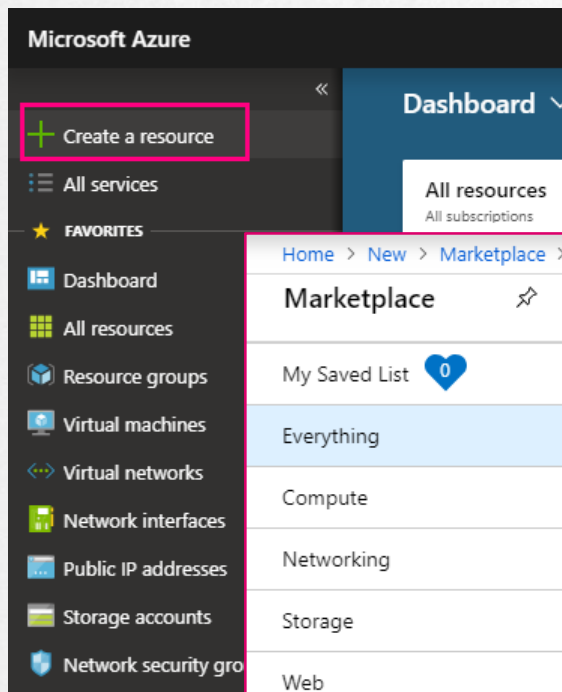
📅 07-09-2018 • ⌚ 10 minuten om te lezen • Medewerkers 🌐 🚧

Learn how to create your first Azure Resource Manager template by generating one using the Azure portal, and how to edit and deploy the template from the portal.



sources: <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-manager-quickstart-create-templates-use-the-portal>

ARM Template



ARM Template

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Template

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Automate deploying resources with Azure Resource Manager templates in a single, coordinated operation. Define resources and configurable input parameters and deploy with script or code.

[Template](#) [Parameters](#) [CLI](#) [PowerShell](#) [.NET](#) [Ruby](#)

Parameters (18)

Variables (3)

Resources (4)

[parameters('networkInterfaceName')]

[parameters('networkSecurityGroupName')]

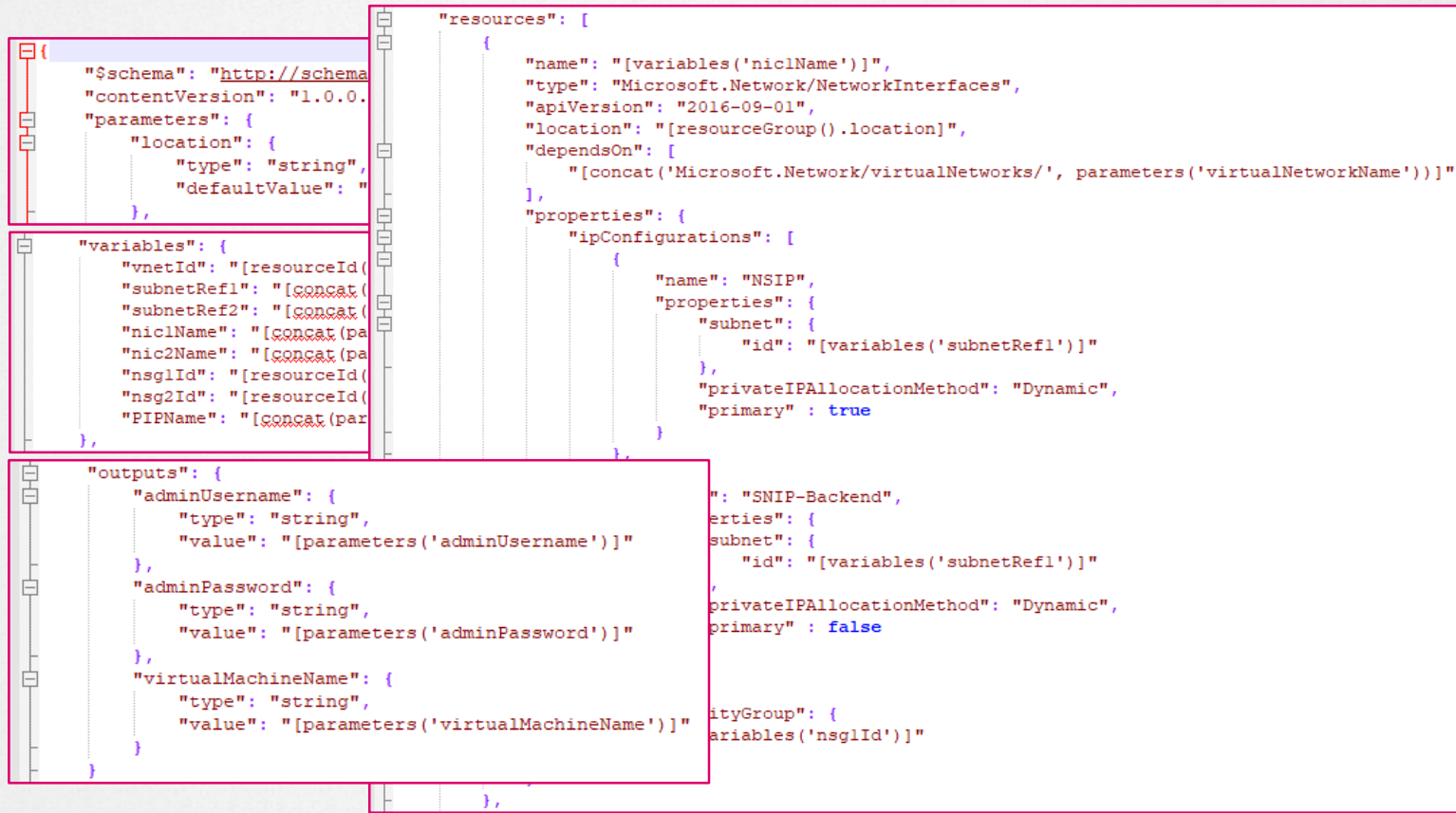
[parameters('publicIpAddressName')]

[parameters('virtualMachineName')]


```
1 {
2   "$schema": "http://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "location": {
6       "type": "string"
7     },
8     "networkInterfaceName": {
9       "type": "string"
10    },
11    "networkSecurityGroupName": {
12      "type": "string"
13    },
14    "networkSecurityGroupRules": {
15      "type": "array"
16    },
17    "virtualNetworkId": {
18      "type": "string"
19    },
20  }
```



ARM Template



ARM Template



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- > Express Route Gateways
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- > **Network Interfaces**
 - TAP Configurations
 - Network Profiles
- > Network Security Groups

Microsoft.Network/networkInterfaces template reference

📅 09/26/2018 • ⌚ 22 minutes to read • Contributors 👤

API Version: 2018-08-01

Template format

To create a Microsoft.Network/networkInterfaces resource, add the following JSON to the resources section of your template.

JSON

```
{
  "name": "string",
  "type": "Microsoft.Network/networkInterfaces",
  "apiVersion": "2018-08-01",
  "location": "string",
  "tags": {},
  "properties": {
    "virtualMachine": {
      "id": "string"
    },
    "networkSecurityGroup": {
      "id": "string",
      "location": "string",
      "tags": {},
      "properties": {
        "securityRules": [
```


Copy

In this article

- [Template format](#)
- [Property values](#)
- [Quickstart templates](#)



ARM Template

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Property values

The following tables describe the values you need to set in the schema.

Microsoft.Network/networkInterfaces object


Name	Type	Required	Value
name	string	Yes	
type	enum	Yes	Microsoft.Network/networkInterfaces
apiVersion	enum	Yes	2018-08-01
location	string	No	Resource location.
tags	object	No	Resource tags.
properties	object	Yes	Properties of the network interface. - NetworkInterfacePropertiesFormat object
resources	array	No	tapConfigurations

In this article

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- [Property values](#)
- [Quickstart templates](#)



ARM Template

Microsoft Azure

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- ▾ **Network Interfaces**
 - TAP Configurations
 - Network Profiles
- > Network Security Groups

NetworkInterfaceIPConfigurationPropertiesFormat object

Name	Type	Required	Value
privateIPAddress	string	No	Private IP address of the IP configuration.
privateIPAllocationMethod	enum	No	Defines how a private IP address is assigned. Possible values are: 'Static' and 'Dynamic'. - Static or Dynamic
privateIPAddressVersion	enum	No	Available from Api-Version 2016-03-30 onwards, it represents whether the specific ipconfiguration is IPv4 or IPv6. Default is taken as IPv4. Possible values are: 'IPv4' and 'IPv6'. - IPv4 or IPv6
subnet	object	No	Subnet bound to the IP configuration. - Subnet object
primary	boolean	No	Gets whether this is a primary customer address on the network interface.
publicIPAddress	object	No	Public IP address bound to the IP configuration. - PublicIPAddress object
applicationSecurityGroups	array	No	Application security groups in which the IP configuration is included. - ApplicationSecurityGroup object

In this article

- [Template format](#)
- [Property values](#)**
- [Quickstart templates](#)



ARM Template

```
{
  "name": "[variables('nic2Name')]",
  "type": "Microsoft.Network/networkInterfaces",
  "apiVersion": "2016-09-01",
  "location": "[resourceGroup().location]",
  "dependsOn": [
    "[concat('Microsoft.Network/publicIpAddresses/', variables('PIPName'))]",
    "[concat('Microsoft.Network/virtualNetworks/', parameters('virtualNetworkName'))]"
  ],
  "properties": {
    "ipConfigurations": [
      {
        "name": "VIP-NSG-Public",
        "properties": {
          "subnet": {
            "id": "[variables('subnetRef2')]"
          },
          "privateIPAllocationMethod": "Dynamic",
          "primary": false,
          "publicIpAddress": {
            "id": "[resourceId('Microsoft.Network/publicIpAddresses', variables('PIPName'))]"
          }
        }
      }
    ]
  },
}
```


ARM Template

Microsoft Azure

<<

+ Create a resource

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Network interfaces

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Templates

Standardmap - PREVIEW

+ Add Edit columns More

Filter by name...

<input type="checkbox"/>	NAME	↑↓
<input checked="" type="checkbox"/>	JSON	armt_netscaler_byol_v201810...
<input type="checkbox"/>	JSON	nsdemo
<input type="checkbox"/>	JSON	nstemplate

JSON armt_netscaler_b... Template - PREVIEW

Deploy Edit More

Description

ARM Template for a custom NetScaler BYOL deployment

Publisher

virtues_it@live.com

Modified

7-10-2018

[View Template](#)

ARM Template

[Home](#) > [Templates](#) > [armit_netscaler_byol_v20181005](#) > Custom deployment

Custom deployment

Deploy from a custom template

TEMPLATE



8 resources



Edit template



Edit parameters



Learn more

BASICS

- * Subscription
- * Resource group
[Create new](#)
- * Location

SETTINGS

- Location
- * Virtual Machine Name
- Virtual Machine Size
- Admin Username
- Virtual Network Name
- Virtual Network Address Prefix
- * Admin Password ✓

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ARM Template

... Your deployment is underway

Check the status of your deployment, manage resources, or troubleshoot deployment issues. Pin this page to your dashboard to easily find it next time.



Deployment name: virtues_it_live.com.armt_netscaler_byol_v20181005

Subscription: [Visual Studio Enterprise](#)

Resource group: [RG-PSARM](#)

DEPLOYMENT DETAILS [\(Download\)](#)

Start time: 7-10-2018 13:59:31

Duration: 55 seconds

Correlation ID: 8d2f1098-fa8c-48c3-abe2-3989bdf2cf5c

RESOURCE	TYPE	STATUS	OPERATION DETAILS
✓ ns02-nic1	Microsoft.Network/NetworkInterfaces	Created	Operation details
✓ ns02-nic2	Microsoft.Network/networkInterfaces	Created	Operation details
✓ ns02-PIP	Microsoft.Network/publicIpAddresses	OK	Operation details
✓ nsg-ns-external	Microsoft.Network/networkSecurityGro...	OK	Operation details
✓ nsg-ns-internal	Microsoft.Network/networkSecurityGro...	OK	Operation details
✓ RG-PSARM-vnet	Microsoft.Network/virtualNetworks	OK	Operation details
✓ AS-PSARM-NS	Microsoft.Compute/AvailabilitySets	OK	Operation details



ARM Template

✔ Your deployment is complete

Check the status of your deployment, manage resources, or troubleshoot deployment issues. Pin this page to your dashboard to easily find it next time.



Deployment name: virtues_it_live.com.armt_netscaler_byol_v20181005

Subscription: [Visual Studio Enterprise](#)

Resource group: [RG-PSARM](#)

DEPLOYMENT DETAILS [\(Download\)](#)

Start time: 7-10-2018 13:59:31

Duration: 4 minutes 46 seconds

Correlation ID: 8d2f1098-fa8c-48c3-abe2-3989bdf2cf5c

RESOURCE	TYPE	STATUS	OPERATION DETAILS
✔ ns02	Microsoft.Compute/virtualMachines	OK	Operation details
✔ ns02-nic1	Microsoft.Network/NetworkInterfaces	Created	Operation details
✔ ns02-nic2	Microsoft.Network/networkInterfaces	Created	Operation details
✔ ns02-PIP	Microsoft.Network/publicIpAddresses	OK	Operation details
✔ nsg-ns-external	Microsoft.Network/networkSecurityGro...	OK	Operation details
✔ nsg-ns-internal	Microsoft.Network/networkSecurityGro...	OK	Operation details
✔ RG-PSARM-vnet	Microsoft.Network/virtualNetworks	OK	Operation details
✔ AS-PSARM-NS	Microsoft.Compute/AvailabilitySets	OK	Operation details





DEVOPS &
AUTOMATION



Az

Azure PowerShell Module



Install the Azure PowerShell module

12/13/2018 • 4 minutes to read • Contributors

This article tells you how to install the Azure PowerShell modules using PowerShellGet. These instructions work on Windows, macOS, and Linux platforms. For the Az module, currently no other installation methods are supported.

Requirements

Azure PowerShell works with PowerShell 5.1 or higher on Windows, or PowerShell Core 6.x and later on all platforms. If you aren't sure if you have PowerShell, or are on macOS or Linux, [install the latest version of PowerShell Core](#).

Install the Azure PowerShell module

```
PS C:\Users\hwadmin> Install-Module -Name Az
```

```
PS C:\Users\hwadmin> Get-InstalledModule -Name Az
```

Version	Name	Repository	Description
2.1.0	Az	PSGallery	Microsoft Azure PowerShell - Cmdlets to manage resources in Azure. This module is compatible with WindowsPowerShell and PowerShell Core....

```
PS C:\Users\hwadmin>
```

PowerShell, run the following command in an elevated session (Run as Administrator on Windows, or with superuser privileges on macOS or Linux):

PowerShell

Copy

Try It

```
Install-Module -Name Az -AllowClobber
```

If you don't have access to administrator privileges, you can install for the current user by adding the `-Scope CurrentUser` argument.

PowerShell

Copy

Try It

```
Install-Module -Name Az -AllowClobber -Scope CurrentUser
```

sources: <https://docs.microsoft.com/en-us/powershell/azure/install-az-ps?view=azps-2.2.0>



Install the Azure PowerShell module

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Install the Azure PowerShell module

```
PS C:\Users\hwadmin> Install-Module -Name Az
PS C:\Users\hwadmin> Get-InstalledModule -Name Az
```

Version	Name	Repository
2.1.0	Az	PSGallery

```
PS C:\Users\hwadmin>
```

prefix the Install-Module cmdlet with **PowerShellGet** to prevent errors

PowerShell, run the following command in an elevated session (Run as Administrator on Windows, or with superuser privileges on macOS or Linux):

PowerShell

Copy

Try It

```
Install-Module -Name Az -AllowClobber
```

If you don't have access to administrator privileges, you can install for the current user by adding the `-Scope CurrentUser` argument.

PowerShell

Copy

Try It

```
Install-Module -Name Az -AllowClobber -Scope CurrentUser
```

sources: <https://docs.microsoft.com/en-us/powershell/azure/install-az-ps?view=azps-2.2.0>

Current Installed Modules:

Version	Name	Repository	Description
2.1.0	Az	PSGallery	Microsoft Azure PowerShell - Cmdlets to manage resources in Azure. This module is compatible with WindowsPowerShell and PowerShell Core....
1.5.2	Az.Accounts	PSGallery	Microsoft Azure PowerShell - Accounts credential management cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.1	Az.Aks	PSGallery	Microsoft Azure PowerShell - Azure managed Kubernetes cmdlets for Windows PowerShell and PowerShell Core....
1.1.0	Az.AnalysisServices	PSGallery	Microsoft Azure PowerShell - Analysis Services cmdlets for Windows PowerShell and PowerShell Core....
1.1.0	Az.ApiManagement	PSGallery	Microsoft Azure PowerShell - Api Management service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.0	Az.ApplicationInsights	PSGallery	Microsoft Azure PowerShell - Application Insights management cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core. Creates and ma...
1.2.2	Az.Automation	PSGallery	Microsoft Azure PowerShell - Automation service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.0	Az.Batch	PSGallery	Microsoft Azure PowerShell - Batch service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.0	Az.Billing	PSGallery	Microsoft Azure PowerShell - Billing service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.2.0	Az.Cdn	PSGallery	Microsoft Azure PowerShell - CDN service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.1	Az.CognitiveServices	PSGallery	Microsoft Azure PowerShell - Cognitive Services management cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core. Creates and manag...
2.1.0	Az.Compute	PSGallery	Microsoft Azure PowerShell - Compute service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core. Manages virtual machines, host...
1.0.1	Az.ContainerInstance	PSGallery	Microsoft Azure PowerShell - Container Instance cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.1	Az.ContainerRegistry	PSGallery	Microsoft Azure PowerShell - Container Registry service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.1	Az.DataFactory	PSGallery	Microsoft Azure PowerShell - Data Factory service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.0	Az.DataLakeAnalytics	PSGallery	Microsoft Azure PowerShell - Data Lake Analytics in Windows PowerShell and PowerShell Core....
1.2.1	Az.DataLakeStore	PSGallery	Microsoft Azure PowerShell - Azure Data Lake Store cmdlets in Windows PowerShell and PowerShell Core....
1.0.0	Az.DeploymentManager	PSGallery	PowerShell .Net Core Microsoft Azure PowerShell - Deployment Manager cmdlets for Azure Resource Manager....
1.0.0	Az.DevTestLabs	PSGallery	Microsoft Azure PowerShell - DevTest Labs service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.0	Az.Dns	PSGallery	Microsoft Azure PowerShell - DNS service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.1	Az.EventGrid	PSGallery	Microsoft Azure PowerShell - Event Grid service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.0	Az.EventHub	PSGallery	Microsoft Azure PowerShell - Event Hubs service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.0	Az.FrontDoor	PSGallery	Microsoft Azure PowerShell - Front Door service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
2.0.0	Az.HDInsight	PSGallery	Microsoft Azure PowerShell - HDInsight service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.0	Az.IoTHub	PSGallery	Microsoft Azure PowerShell - IoT Hub service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.2.0	Az.KeyVault	PSGallery	Microsoft Azure PowerShell - Key Vault service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.2.1	Az.LogicApp	PSGallery	Microsoft Azure PowerShell - Logic Apps cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.0	Az.MachineLearning	PSGallery	Microsoft Azure PowerShell - Machine Learning Web Services cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.0	Az.MarketplaceOrdering	PSGallery	Microsoft Azure PowerShell - Marketplace Ordering agreements service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.0	Az.Media	PSGallery	Microsoft Azure PowerShell - Media service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.2.1	Az.Monitor	PSGallery	Microsoft Azure PowerShell - Monitor service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.8.1	Az.Network	PSGallery	Microsoft Azure PowerShell - Networking service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.0	Az.NotificationHubs	PSGallery	Microsoft Azure PowerShell - Notification Hubs cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.2.0	Az.OperationInsights	PSGallery	Microsoft Azure PowerShell - Operational Insights service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core.
1.1.0	Az.PolicyInsights	PSGallery	Microsoft Azure PowerShell - Azure Policy Insights cmdlets for Windows PowerShell and PowerShell Core. Allows querying policy evaluation events and compli...
1.1.0	Az.PowerBIEEmbedded	PSGallery	Microsoft Azure PowerShell - Power BI Embedded service management cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core. Creates a...
1.4.0	Az.RecoveryServices	PSGallery	Microsoft Azure PowerShell - Recovery Services cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.1.0	Az.RedisCache	PSGallery	Microsoft Azure PowerShell - Redis Cache service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.1	Az.Relay	PSGallery	Microsoft Azure PowerShell - Relay service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.4.0	Az.Resources	PSGallery	Microsoft Azure PowerShell - Azure Resource Manager and Active Directory cmdlets in Windows PowerShell and PowerShell Core. Manages subscriptions, tenant...
1.1.0	Az.ServiceBus	PSGallery	Microsoft Azure PowerShell - Service Bus service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.1	Az.ServiceFabric	PSGallery	Microsoft Azure PowerShell - Service Fabric cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.2	Az.SignalR	PSGallery	Microsoft Azure PowerShell - Azure SignalR service commands for Windows PowerShell and PowerShell Core....
1.10.0	Az.Sql	PSGallery	Microsoft Azure PowerShell - SQL service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.3.0	Az.Storage	PSGallery	Microsoft Azure PowerShell - Storage service data plane and management cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core. Crea...
1.0.0	Az.StreamAnalytics	PSGallery	Microsoft Azure PowerShell - Stream Analytics service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.0.1	Az.TrafficManager	PSGallery	Microsoft Azure PowerShell - Traffic Manager service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....
1.2.1	Az.Websites	PSGallery	Microsoft Azure PowerShell - App Service (Web Apps) service cmdlets for Azure Resource Manager in Windows PowerShell and PowerShell Core....

Az PowerShell 2.2.0 ▾

Azure PowerShell

Introducing the new Az module

Install

▸ Tutorials

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▾ Reference

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Resources

Export-AzResourceGroup

Get-AzDenyAssignment

Get-AzDeployment

Get-AzDeploymentOperation

Get-AzLocation

Get-AzManagedApplication

Resources

[Export-AzResourceGroup](#)

Captures a resource group as a template and saves it to a file.

[Get-AzDenyAssignment](#)

Lists Azure RBAC deny assignments at the specified scope.

[Get-AzDeployment](#)

Get deployment

[Get-AzDeploymentOperation](#)

Get deployment operation

[Get-AzLocation](#)

Gets all locations and the supported resource providers for each location.

[Get-AzManagedApplication](#)

Gets managed applications

[Get-AzManagedApplicationDefinition](#)

Gets managed application definitions

[Get-AzManagementGroup](#)

Gets Management Group(s)

[Get-AzProviderFeature](#)

Gets information about Azure provider features.

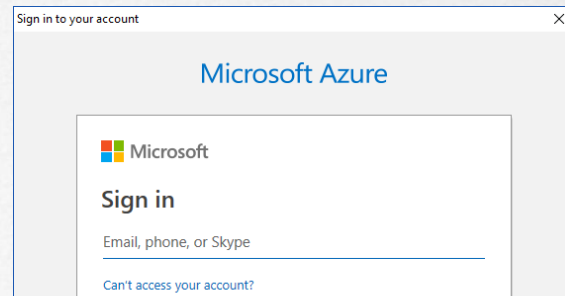
[Get-AzProviderOperation](#)

Gets the operations for an Azure resource provider that are securable using Azure RBAC.

sources: <https://docs.microsoft.com/en-us/powershell/module/az.resources/?view=azps-2.2.0#resources>

Az – PowerShell

```
# -----  
# | Interactive Login |  
# -----  
  
# Login using interactive login to Azure (popup)  
Login-AzAccount
```



Plan to manage your app or service with **Azure PowerShell**?

Run your script with an **AAD Service Principal**, rather than your own credentials.



Az – Service Principal

Standaardmap - App registrations
Azure Active Directory

Search (Ctrl+/)

- Enterprise applications
- Devices
- App registrations**
- App registrations (Legacy)
- Identity Governance

+ New registration Endpoints Troubleshooting Got feedback?

Welcome to the new and improved App registrations (now Generally Available). See what's new →

All applications Owned applications

DISPLAY NAME	APPLICATION (CLIENT) ID	CREATED ON	CERTIFICATES & SECRETS
PS PSARM		7-8-2018	✓ Current



step 1: <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-create-service-principal-portal>

Az – AppID, AppKey & TenantID

PSARM

<< Delete Endpoints

PSARM - Certificates & secrets

Manage

- Branding
- Authentication
- Certificates & secrets**
- API permissions
- Expose an API

Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

[+ New client secret](#)

DESCRIPTION	EXPIRES	VALUE	
PSARM_key_201808	7-8-2019	Hidden	

step 2: <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-create-service-principal-portal>



```
Write-Output ""
Write-Output "## -----"
Write-Output "## | Section 1 - Logging onto Azure using the Az PowerShell Module |"
Write-Output "## -----"
Write-Output ""
```

```
#region Logon information
# Read App secrets from CSV file
$AppSecrets = Import-Csv -Path "C:\Sources\Azure_App_Secrets.csv" -Delimiter ","
$ApplicationID = $AppSecrets.AppID
$ApplicationKey = $AppSecrets.AppKey
$TenantID = $AppSecrets.TenantID
# Create Azure Credentials
$SPpasswd = ConvertTo-SecureString $ApplicationKey -AsPlainText -Force
$SPCreds = New-Object System.Management.Automation.PSCredential($ApplicationID, $SPpasswd)
#endregion

#region Step 0: Sign in to Azure with Service Principal
write-output "Step 0: Create a session to Azure ..."
$Session = Connect-AzAccount -Credential $SPCreds -TenantId $TenantID -ServicePrincipal `
-SkipContextPopulation
#endregion
```

```
Write-Output ""
Write-Output "## -----"
Write-Output "## | Section 1 - Logging onto Azure using the Az PowerShell Module |"
Write-Output "## -----"
Write-Output ""
```

Step 0: Create a session to Azure ...
=> Session Created Successful!

```
#region Logon
# Read App Secrets
$AppSecrets = Get-Content -Path $AppSecretsPath -Raw
$AppID = $AppSecrets.ApplicationID
$TenantID = $AppSecrets.TenantID
# Create Azure Credentials
$SPpasswd = ConvertTo-SecureString $ApplicationKey -AsPlainText -Force
$SPCreds = New-Object System.Management.Automation.PSCredential($ApplicationID, $SPpasswd)
#endregion

#region Step 0: Sign in to Azure with Service Principal
Write-Output "Step 0: Create a session to Azure ..."
$Session = Connect-AzAccount -Credential $SPCreds -TenantId $TenantID -ServicePrincipal `
-SkipContextPopulation
#endregion
```



```
Write-Output ""
Write-Output "## -----"
Write-Output "## | Section 2 - Deploy NetScaler VPX BYOL, based on custom ARM Template (w/ 2 NICs) |"
Write-Output "## -----"
Write-Output ""

## Create Hashtable object
Write-Output "Step 2: Create a Hashtable object that contains all the ARM Template variables and values."
$ObjTemplateParameter = @{}

## Add the parameter values to it
$ObjTemplateParameter.Add('location', 'westeurope')
$ObjTemplateParameter.Add('virtualMachineName', $NetScalerName)
$ObjTemplateParameter.Add('virtualMachineSize', 'Standard_A4_v2')
$ObjTemplateParameter.Add('adminUsername', $NSUsername)
$ObjTemplateParameter.Add('adminPassword', $SecurePassword)
$ObjTemplateParameter.Add('virtualNetworkName', 'RG-PSARM-vnet')
$ObjTemplateParameter.Add('virtualNetworkAddressPrefix', '10.1.4.0/24')
$ObjTemplateParameter.Add('availabilitySetName', 'AS-PSARM-NS')
$ObjTemplateParameter.Add('nic1SubnetName', 'sn-internal')
$ObjTemplateParameter.Add('nic1SubnetAddressPrefix', '10.1.4.0/26')
$ObjTemplateParameter.Add('nic2SubnetName', 'sn-external')
$ObjTemplateParameter.Add('nic2SubnetAddressPrefix', '10.1.4.64/26')
$ObjTemplateParameter.Add('networkSecurityGroupName', 'nsg-ns-internal')
$ObjTemplateParameter.Add('networkSecurityGroup2Name', 'nsg-ns-external')

## Create NetScaler, using ARM Template and TemplateParameterObject for (input) parameters
New-AzResourceGroupDeployment -ResourceGroupName $ResourceGroupName -TemplateFile $strTemplateFile `
    -TemplateParameterObject $ObjTemplateParameter
```



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Azure Automation

Runbooks & Hybrid Workers



Azure Automation

[Home](#) > [Automation Accounts](#) > DevOps-PSARM - Runbooks



DevOps-PSARM - Runbooks

Automation Account

Process Automation



Runbooks



Jobs



Runbooks gallery



Hybrid worker groups



Watcher tasks



Create a runbook



Import a runbook



Browse gallery



Learn more



Refresh

NAME	AUTHORING STATUS	RUNBOOK TYPE	LAST MODIFIED
az_RB_deploy_NS_v3	In edit	PowerShell Runbook	2-6-2019 06:47
Az_RB_deploy_NS_v4	Published	PowerShell Runbook	3-6-2019 23:07
AzureAutomationTutor...	Published	Graphical Runbook	14-8-2018 12:40
AzureAutomationTutor...	Published	Python 2 Runbook	14-8-2018 12:40

Azure Automation

Home > Automation Accounts > DevOps-PSARM - Runbooks > Az_RB_de

Az_RB_deploy_NS_v4

Runbook

Search (Ctrl+/) <<

Start View Edit Link

Resource group
RG-PSARM

Account
DevOps-PSARM

Location
West Europe

Recent Jobs

STATUS	CREATED
✓ Completed	4-6-2019 00:43
■ Stopped	4-6-2019 00:36
✓ Completed	3-6-2019 23:08

Start Runbook

Az_RB_deploy_NS_v4

Parameters

NETSCALERNAME ⓘ
Default will be used
Optional, String, Default: "ns01"

NSPASSWORD ⓘ
Default will be used
Optional, String, Default: "NetScalerDemo!"

NSUSERNAME ⓘ
Default will be used
Optional, String, Default: "adm-demo"

Run Settings

Run on ⓘ
Azure Hybrid Worker

Choose Hybrid Worker group
HWG-PSARM

OK

Hybrid Worker

```
# Getting Started with Az Module
Install-Module Az

#region Logon information
    $AppSecrets = Import-Csv -Path "C:\Sources\Azure_App_Secrets.csv" -Delimiter ","
    $SubscriptionID = $AppSecrets.SubscriptionID
#endregion

#region Install Hybrid Worker
    # Script variables
    $AutomationAccountName = "DevOps-PSARM"
    $AAResourceGroupName = "RG-PSARM"
    $LogAnalyticsWorkspaceName = "OMS-WS-PSARM"
    $OMSResourceGroupName = "RG-PSARM"
    $HybridGroupName = "HWG-PSARM"

    # Install Hybrid worker locally and add to specified Hybrid worker Group in Azure
    C:\Scripts\New-OnPremiseHybridWorker.ps1 -AutomationAccountName $AutomationAccountName `
    -AAResourceGroupName $AAResourceGroupName -OMSResourceGroupName $OMSResourceGroupName `
    -HybridGroupName $HybridGroupName -SubscriptionID $SubscriptionID `
    -WorkspaceName $LogAnalyticsWorkspaceName
#endregion
```





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PowerShell in Action



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 **Microsoft**

Microsoft Azure

Create a resource

Home

Dashboard

All services

FAVORITES

All resources

Resource groups

Virtual machines

Virtual networks

Network interfaces

Public IP addresses

Storage accounts

Network security groups

Load balancers

Availability sets

Automation Accounts

Key vaults

Disks

Templates

Azure Active Directory

Virtual network gateways

Log Analytics workspaces

App Services

SQL databases

SQL data warehouses

Monitor

Advisor

Security Center

Cost Management + Bill...

Help + support

Dashboard > Automation Accounts > DevOps-PSARM - Runbooks > Az_RB_deploy_NS_v4

Az_RB_deploy_NS_v4

Runbook

Search (Ctrl+J)

Overview

Activity log

Tags

Diagnose and solve problems

Resources

Jobs

Schedules

Webhooks

Runbook settings

Properties

Description

Logging and tracing

Settings

Locks

Export template

Support + troubleshooting

New support request

Start

View

Edit

Link to schedule

Add webhook

Delete

Export

Refresh

Resource group : RG-PSARM

Account : DevOps-PSARM

Location : West Europe

Subscription : Visual Studio Enterprise

Tags (change) : [Click here to add tags](#)

Subscription ID :

Status : Published


Runbook type : PowerShell Runbook

Last modified : 3-6-2019 23:05

Recent Jobs

STATUS	CREATED	LAST UPDATED
✔ Completed	3-6-2019 22:51:08	3-6-2019 22:58:07
✔ Completed	3-6-2019 22:20:54	3-6-2019 22:21:22
✔ Completed	3-6-2019 22:17:53	3-6-2019 22:18:22

Virtual Machine

 **ns01 - Networking**
Virtual machine

Overview

Settings

Networking

Disks

Size

Security

Extensions

Availability set

Configuration


Identity

Attach network interface

Detach network interface

ns01-nic1

ns01-nic2

 **Network Interface: ns01-nic2**

[Effective security rules](#)

[Topology](#)


Virtual network/subnet: [RG-PSARM-vnet/sn-external](#) NIC Public IP: **None** NIC Private IP: **10.1.4.70**

[Inbound port rules](#)

[Outbound port rules](#)

[Application security groups](#)

[Load balancing](#)

 Network security group [nsg-ns-external](#) (attached to network interface: [ns01-nic2](#))

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
1002	allow_SSL_443	443	Any	Any	Any	✓ Allow
65000	AllowVnetInBound	Any	Any	VirtualNetw...	VirtualNetw...	✓ Allow
65500	DenyAllInBound	Any	Any	Any	Any	✗ Deny

Virtual Machine



ns01-nic2 - IP configurations

Network interface

Overview

Settings

IP configurations

DNS servers

Network security group

Properties

Locks

Export template

+ Add Save Discard

IP configurations

* Subnet







sn-external (10.1.4.64/26)














NAME	IP VER...	TYPE	PRIVATE IP ADDRESS	PUBLIC IP ADDRESS	
VIP-NSG-Public	IPv4	Secondary	10.1.4.68 (Dynamic)	13.94.151.44 (ns01-PIP)	...
VIP-LB-SF	IPv4	Secondary	10.1.4.69 (Dynamic)	-	...
VIP-NSG-Internal	IPv4	Primary	10.1.4.70 (Dynamic)	-	...
SNIP-Public	IPv4	Secondary	10.1.4.71 (Dynamic)	-	...

Resources

All resources

Standaardmap

 Add  Edit columns  Refresh  Export to CSV |  Assign tags  Delete  Try preview

<input type="checkbox"/>	NAME 	TYPE 	RESOURCE GROUP 	LOCATION 	SUBSCRIPTION 
<input type="checkbox"/>	 ns01	Virtual machine	RG-PSARM	West Europe	Visual Studio Enterprise
<input type="checkbox"/>	 ns01_OsDisk_1_7d59669c...	Disk	RG-PSARM	West Europe	Visual Studio Enterprise
<input type="checkbox"/>	 ns01-nic1	Network interface	RG-PSARM	West Europe	Visual Studio Enterprise
<input type="checkbox"/>	 ns01-nic2	Network interface	RG-PSARM	West Europe	Visual Studio Enterprise
<input type="checkbox"/>	 ns01-PIP	Public IP address	RG-PSARM	West Europe	Visual Studio Enterprise
<input type="checkbox"/>	 nsg-ns-external	Network security group	RG-PSARM	West Europe	Visual Studio Enterprise
<input type="checkbox"/>	 nsg-ns-internal	Network security group	RG-PSARM	West Europe	Visual Studio Enterprise
<input type="checkbox"/>	 RG-PSARM-vnet	Virtual network	RG-PSARM	West Europe	Visual Studio Enterprise



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The Scripts

Where to go next?



GitHub

Check out the scripts and get started after the presentation



Sharing the **Azure Automation fun** and demo **scripts** with the **Community**:

<https://github.com/cognitionIT/AzureAutomation>





Presented by:

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Solutions Architect



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<http://www.virtues.it>

COGNITION
LEARN IT. KNOW IT. SHARE IT.





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Bonus Scripts

Automatic Deployments





Bonus: Automatically start a Runbook

A way to interact with an API via series of HTTP calls

- **VERB:** HTTP Method (GET, PUT, POST, DELETE, OPTIONS)
- **URI:** the URI of the resource on which the operation is performed
- **HTTP Version:** usually "HTTP v1.1"
- **Request Header:** contains metadata (formatting, etc.)
- **Request Body:** actual message content

<VERB>

<URI>

<HTTP Version>

<Request Header>

<Request Body>

Bonus: Automatically start a Runbook

```
#region Start specified Runbook
```

```
$Uri = 'https://management.azure.com/subscriptions/'  
$Uri = $Uri + '{0}/resourceGroups/{1}/providers/Microsoft.Automation/automationAccounts/{2}/jobs/{3}?api-version={4}'  
-f $SubscriptionID, $ResourceGroupName, $AutomationAccountName, $((New-Guid).guid), $APIVersion
```

```
$body = ConvertTo-Json @{  
    "properties" = @{  
        "runbook" = @{"name" = $RunbookName}  
        "parameters" = @{"NetScalerName" = "ns01"; "NSPassword" = "NetScalerDemo!"; "NSUsername" = "adm-demo"}  
        "runon" = $HybridWorkerGroup  
    }  
    "tags" = @{}  
} -Depth 5
```

```
# Invoke-RestMethod parameters
```

```
$params = @{  
    ContentType = "application/json"  
    Headers = @{"authorization" = "Bearer $($token.Access_Token)"}  
    Method = "Put"  
    URI = $Uri  
    Body = $body  
}
```

```
# Make the REST API call
```

```
$oRunbook = Invoke-RestMethod @params
```

```
#endregion
```



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PowerShell in Action



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AutoStartAzureAutomationRunbook_v0_4.ps1 X

```
1 #requires -Version 3
2 # -----
3 # Based upon the script shared by MS employee Stefan Stranger
4 # https://blogs.technet.microsoft.com/stefan_stranger/2017/08/09/triggering-azure-automation-runbooks-using-the-azure-arm-rest-api/
5 # ... and the script from Laurie Rhodes
6 # http://www.laurierhodes.info/?q=node/118
7 # -----
8
9
10 ## -----
11 ## | Section 1 - Create a Access Token for Azure with REST API call |
12 ## -----
13 Write-Output ""
14 Write-Host "* Creating an Access Token for Azure, using REST API" -ForegroundColor Yellow
15
16 # Azure Automation account information
17 $ResourceGroupName = "RG-PSARM"
18 $AutomationAccountName = "DevOps-PSARM"
19 $APIVersion = "2015-10-31"
20 $RunbookName = "Az_RB_deploy_NS_v4"
21 $HybridWorkerGroup = "HWG-PSARM"
22
23 #region Read App secrets from CSV file
24 #source: https://docs.microsoft.com/en-us/powershell/module/microsoft.powershell.utility/import-csv?view=powershell-6
25 $AppSecrets = Import-Csv -Path "C:\$_Sources\Azure_App_Secrets.csv" -Delimiter ","
26 $ClientID = $AppSecrets.AppID
27 $ClientSecret = $AppSecrets.AppKey
28 $TenantID = $AppSecrets.TenantID
29 $SubscriptionID = $AppSecrets.SubscriptionID
30 #endregion
31
32 $TokenEndpoint = {https://login.windows.net/{0}/oauth2/token} -f $TenantID
33 $ARMResource = "https://management.core.windows.net/";
34
35 # Create the JSON payload
36 $Body = @{
37     'resource' = $ARMResource
38     'client_id' = $ClientID
39     'grant_type' = 'client_credentials'
40     'client_secret' = $ClientSecret
41 }
42
```

PS C:_Scripts\PoSH\AzureAutomation>

Completed | Ln 1 Col 38 | 145%



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The Links

Resources



Resources

Microsoft Azure:

- <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-create-service-principal-portal>
- <https://docs.microsoft.com/en-us/powershell/azure/create-azure-service-principal-azureps?view=azurermps-6.9.0>
- <https://docs.microsoft.com/en-us/powershell/azure/overview?view=azurermps-6.9.0>
- <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-authoring-templates>

GitHub:

- <https://github.com/cognitionIT>
- <https://github.com/cognitionIT/AzureAutomation>
- <https://github.com/Azure/azure-quickstart-templates>



Next session: 11:30 – 12:30

Overleven in de jungle van DevOps tools

Joran Markx

Feedback

Please review my session in the
Yellenge App!

Thank You!