

Lab 2: Work with an ARM template from an existing resource

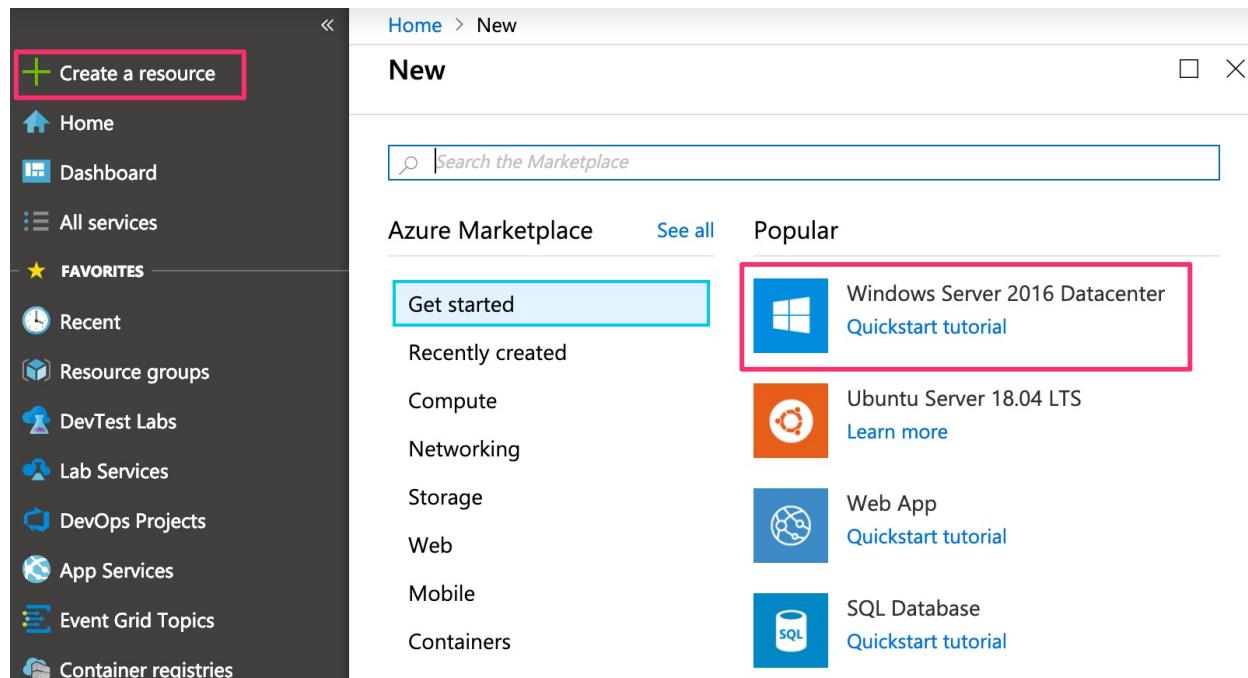
<- Lab 1: Provision a server via the Azure Portal and use DSC to configure the IIS role | Home | Lab 3: Creating ARM templates from scratch ->

This lab will step through exporting an ARM template from a virtual machine and then reusing it as Infrastructure as Code in the Azure Portal.

The Virtual Machine created in the previous lab generates a large number of parameters related to DSC configuration so in order to keep the steps simpler a new VM will be created first.

Part 1: Export an ARM Template from an existing resource

1. In the [Azure Portal](https://portal.azure.com) (<https://portal.azure.com>) go to Create a resource and select Windows Server 2016 Datacenter:



2. Create a new resource group (to keep it separate from the earlier VM), and complete the name, username and password fields. Add the RDP port and then click review and create (i.e. keep all other defaults for storage and networking), then create when the validation is complete:

* Subscription 

Azure On Line Services 

* Resource group 

(New) InfraLab2 

Create new 

INSTANCE DETAILS

* Virtual machine name 

WinServer2 

* Region 

UK South 

Availability options 

No infrastructure redundancy required 

* Image 

Windows Server 2016 Datacenter 

Browse all images 

* Size 

Standard DS1 v2 

1 vcpu, 3.5 GB memory 

ADMINISTRATOR ACCOUNT

* Username 

vmadmin 

* Password 

***** 

* Confirm password 

***** 

INBOUND PORT RULES

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

* Public inbound ports 

None Allow selected ports 

* Select inbound ports 

RDP 

 These ports will be exposed to the internet. Use the Advanced controls to limit inbound traffic to known IP addresses. You can also update inbound traffic rules 

Review + create 

Previous 

Next : Disks > 

3. Navigate to the Virtual Machine that you just created (no need to wait for it to be running), and select the Export Template blade:

The screenshot shows the Azure portal interface for a virtual machine named 'WebServer'. On the left, there's a sidebar with various settings like Overview, Activity log, and Tags. The 'Export template' button is highlighted with a red box. The main pane displays the VM's configuration, including its resource group ('InfraLab2-RG'), status ('Running'), location ('UK South'), subscription ('Azure On Line Services'), and network information. It also shows CPU and Network usage metrics over the last 1 hour.

4. Take a moment to look at the exported ARM template, the parameters and how you could use CLI, Powershell or code to invoke the ARM template. Some resources can't be exported at the moment but you can ignore those warnings for now and then click Add to library:

The screenshot shows the Azure Resource Manager template editor. At the top, there are buttons for Download, Add to library (which is highlighted with a red box), and Deploy. A warning message says '2 resource types cannot be exported yet and are not included in the template. See error details.' Below, there's an info icon and a note about automating deployment. The template editor has tabs for Template, Parameters, CLI, PowerShell, .NET, and Ruby. The 'Template' tab is selected, showing the JSON code for the ARM template. The code defines parameters for virtual machines, network interfaces, and storage accounts.

```

1  {
2      "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3      "contentVersion": "1.0.0.0",
4      "parameters": {
5          "virtualMachines_WebServer_name": {
6              "defaultValue": "WebServer",
7              "type": "String"
8          },
9          "networkInterfaces_webserver972_name": {
10             "defaultValue": "webserver972",
11             "type": "String"
12         },
13         "publicIPAddresses_WebServer_ip_name": {
14             "defaultValue": "WebServer-ip",
15             "type": "String"
16         },
17         "storageAccounts_infralab2rgdiag_name": {
18             "defaultValue": "infralab2rgdiag",
19             "type": "String"
20         }
}

```

5. Give the template a name and a description, and then click Save:

Home > Virtual machines > WebServer - Export 1

Save template

* Name
WindowsWebServer 

* Description
The standard definition of a Windows Web Server for this organisation

 Once you select Save, the template will be saved to More services > Templates.

6. Search for templates in the Azure Portal search and select Templates (preview):

7. You should see your template listed and you now have the start of a library of templates from which to create new resources on demand:

NAME	DESCRIPTION	MODIFIED
windowswebserver	The standard definition of a Windo...	26/03/2019

Note that the VM you created above is not needed so delete it and/or its resource group at any point here.

Part 2: Creating new resources from templates in the library

1. In the templates click on your newly created template:

The screenshot shows the 'Templates' blade in Microsoft Azure. It displays a single item named 'windowswebserver'. The 'NAME' column shows a JSON icon followed by 'windowswebserver'. The 'DESCRIPTION' column states 'The standard definition of a Windows Web Server for this organisation'. The 'MODIFIED' column shows the date '26/03/2019'. The 'Deploy' button is highlighted with a red box.

2. There are options to edit the template which we'll explore later, but for now select Deploy:

The screenshot shows the 'View Template' blade for the 'windowswebserver' template. On the left, there's a summary card with 'Deploy' (highlighted with a red box), 'Edit', and 'More' options. Below it are sections for 'Description' (containing 'The standard definition of a Windows Web Server for this organisation'), 'Publisher' (containing 'gidavies@microsoft.com'), and 'Modified' (containing '26/03/2019'). On the right, the ARM template code is displayed in a code editor window. The code defines several parameters, including 'virtualMachines_WebServer_name', 'networkInterfaces_webserver972_name', 'publicIPAddresses_WebServer_ip_name', 'storageAccounts_infralab2rgdiag_name', and 'virtualNetworks_InfraLab2_RG_vnet_name'.

```

1   "$schema": "https://schema.management.azure.com/schemas/201
2   "contentVersion": "1.0.0.0",
3   "parameters": {
4     "virtualMachines_WebServer_name": {
5       "defaultValue": "WebServer",
6       "type": "String"
7     },
8     "networkInterfaces_webserver972_name": {
9       "defaultValue": "webserver972",
10      "type": "String"
11    },
12    "publicIPAddresses_WebServer_ip_name": {
13      "defaultValue": "WebServer-ip",
14      "type": "String"
15    },
16    "storageAccounts_infralab2rgdiag_name": {
17      "defaultValue": "infralab2rgdiag",
18      "type": "String"
19    },
20    "virtualNetworks_InfraLab2_RG_vnet_name": {
21      "defaultValue": "InfraLab2-RG-vnet",
22      "type": "String"
23    }
  
```

3. This will now create a new VM using the ARM template. Create a new resource group so that you can easily see (and later delete) everything that gets created. Notice that various parameters are exposed for you to override. In order to clearly understand what will get created add your initials as a prefix to each of the first six parameters. The remainder can be left as defaults:

Home > Templates > windowswebserver > Custom deployment

Custom deployment

Deploy from a custom template

BASICS

* Subscription	Azure On Line Services
* Resource group	InfraLab2 Create new
* Location	UK South

SETTINGS

Virtual Machines_Win Server2_name	gdWinServer2
Storage Accounts_infralab2diag_name	gdinfralab2diag
Network Interfaces_winserver293_name	gdwinserver293
Virtual Networks_Infra Lab2_vnet_name	gdInfraLab2-vnet
Public IP Addresses_Win Server2_ip_name	gdWinServer2-ip
Network Security Groups_Win Server2_nsg_name	gdWinServer2-nsg
Subnets_default_name	default
Security Rules_RDP_name	RDP

Prefix with your initials

4. Review the terms and conditions at the bottom of the page, check the box and click Purchase:

Security Rules_RDP_name	RDP
Virtual Machines_Web Server_id	/subscriptions/2482da3d-7516-4b32-9057-d311caa99664/resourceGroups/InfraLab2...

TERMS AND CONDITIONS

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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

5. The new Virtual Machine will then be created and deployed. Note that at the time of writing you may see an error in the deployment:

webserver - Overview

awswebserver - Overview

Delete Cancel Redeploy Refresh

! Parameter 'osDisk.managedDisk.id' is not allowed. Click here to learn more.

Your deployment failed

Check the status of your deployment, manage resources or go to your dashboard to easily find it next time.

Deployment name: gdavies_microsoft.com
Subscription: Azure On Line Services
Resource group: lab2test-rg

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

Start time: 26/03/2019, 12:05:32
Duration: 28 seconds
Correlation ID: 9041b701-156f-4ed1-8bab-057ce99

RESOURCE	TYPE
gdWinServer2	Microsoft.Compute/...
gdwinserver293	Microsoft.Network/n...
gdWinServer2-nsg/RDI	Microsoft.Network/n...
gdInfraLab2-vnet/defa	Microsoft.Network/v...
gdWinServer2-nsg	Microsoft.Network/n...
gdInfraLab2-vnet	Microsoft.Network/v...
qdinfralab2diag	Microsoft.Storage/st...

Errors

[Summary](#) [Raw Error](#)

ERROR DETAILS

Parameter 'osDisk.managedDisk.id' is not allowed. (Code: InvalidParameter, Target: osDisk.managedDisk.id)

WAS THIS HELPFUL?

Troubleshooting Options

[Common Azure deployment errors](#)
[Check Usage + Quota](#)
[New Support Request](#)

This appears to be an incorrect error and the virtual machine will be successfully created.

6. Navigate to the resource group created in the deployment and you will be able to see all of the resources created from your template:

Home > Virtual machines > WinServer2 > InfraLab2

InfraLab2
Resource group

Search (Ctrl+Shift+F) Add Edit columns Delete resource group Refresh Move Assign tags Delete Export to

Overview

Subscription (change)
Azure On Line Services

Subscription ID
2482da3d-7516-4b32-9057-d311caa99664

Tags (change)
Click here to add tags

Deployments
1 Succeeded

Settings

Quickstart Deployments

Policies

Properties

Locks

Export template

Cost Management

Cost analysis

Cost alerts

Budgets

Advisor recommendations

NAME	TYPE	LOCATION
infralab2diag	Storage account	UK South
InfraLab2-vnet	Virtual network	UK South
WinServer2	Virtual machine	UK South
WinServer2_OsDisk_1_83b66e1652084623a571079b774b4338	Disk	UK South
winserver293	Network interface	UK South
WinServer2-ip	Public IP address	UK South
WinServer2-nsg	Network security group	UK South

7. Optionally RDP in to the virtual machine to validate the deployment. You can also stop the VM and/or delete the resource group just created as this is no longer needed. You can redeploy in the same way whenever you want from the template library.

Part 3: Editing the template parameters to provide allowed values

1. In the template library open the ARM template for editing (Edit | ARM Template). Maximise the editing window to make it easier to work on the file:

The screenshot shows the Azure portal interface for editing an ARM template. On the left, there's a navigation pane with 'Home > Templates > windowswebserver > Edit Template > ARM Template'. The main area has three tabs: 'Edit Template' (highlighted with a red box), 'Save', and 'Discard'. Below the tabs, there are sections for 'Description' (The standard definition of a Windows Web Server for this organisation), 'Publisher' (gidavies@microsoft.com), and 'Modified' (26/03/2019). A 'View Template' link is also present. The right side of the screen displays the ARM template JSON code. A red box highlights the 'Template added' section under the 'General windowswebserver' node. At the bottom right, there's an 'OK' button.

```

1 {
2     "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3     "contentVersion": "1.0.0.0",
4     "parameters": {
5         "virtualMachines_WinServer2_name": {
6             "defaultValue": "WinServer2",
7             "type": "String"
8         },
9         "storageAccounts_infralab2diag_name": {
10            "defaultValue": "infralab2diag",
11            "type": "String"
12        },
13        "networkInterfaces_winserver293_name": {
14            "defaultValue": "winserver293",
15            "type": "String"
16        },
17        "virtualNetworks_InfraLab2_vnet_name": {
18            "defaultValue": "InfraLab2-vnet",
19            "type": "String"
20        },
21        "publicIPAddresses_WinServer2_ip_name": {
22            "defaultValue": "WinServer2-ip",
23            "type": "String"
24        },
25        "networkSecurityGroups_WinServer2_nsg_name": {
26            "defaultValue": "WinServer2-nsg",
27            "type": "String"
28        }
}

```

2. Notice that the virtual machine size is hardcoded at line 53 in the ARM template to be a Standard_DS1_v2:

```

39         "type": "String"
40     }
41 },
42 "variables": {},
43 "resources": [
44     {
45         "type": "Microsoft.Compute/virtualMachines",
46         "name": "[parameters('virtualMachines_WinServer2_name')]",
47         "apiVersion": "2018-10-01",
48         "location": "uksouth",
49         "tags": {},
50         "scale": null,
51         "properties": {
52             "hardwareProfile": {
53                 "vmSize": "Standard_DS1_v2"
54             },
55             "storageProfile": {
56                 "imageReference": {
57                     "publisher": "MicrosoftWindowsServer",
58                     "offer": "WindowsServer",

```

3. We want to provide a list of sizes that may be used. First that requires a new parameter in the ARM template file. At the end of the current parameters we will add a new VM size parameter. At line 40 replace the virtualmachineSize section with the following, noting that the final existing parameter needs to have a comma added after it as it is no longer the last member of the parameters array:

```
,  
    "virtualmachineSize": {  
        "defaultValue": "Standard_DS1_v2",  
        "type": "String",  
        "allowedValues": [  
            "Standard_DS1_v2",  
            "Standard_DS2_v2",  
            "Standard_DS3_v2"  
        ]  
    }  
}
```

Home > Templates > windowswebserver > Edit Template > ARM Template

X **ARM Template**
windowswebserver

```
25     "networkSecurityGroups_WinServer2_nsg_name": {  
26         "defaultValue": "WinServer2-nsg",  
27         "type": "String"  
28     },  
29     "subnets_default_name": {  
30         "defaultValue": "default",  
31         "type": "String"  
32     },  
33     "securityRules_RDP_name": {  
34         "defaultValue": "RDP",  
35         "type": "String"  
36     },  
37     "virtualMachines_WinServer2_id": {  
38         "defaultValue":  
        "/subscriptions/  
        a571079b774b4338"/resourceGroups/Infral  
39     },  
40     "type": "String"  
41 },  
42     "virtualmachineSize": {  
43         "defaultValue": "Standard_DS1_v2",  
44         "type": "String",  
45         "allowedValues": [  
46             "Standard_DS1_v2",  
47             "Standard_DS2_v2",  
48             "Standard_DS3_v2"  
49         ]  
50     },  
51     "variables": {},  
52     "resources": [  
53
```

Note the comma

This adds a new parameter that provides three size options for the VM.

4. Next the parameter needs to be used in the main body of the ARM template. Go to line 62 (used to be line 53 before adding the parameter above):

```
a571079b774b4338",
39         "type": "String"
40     },
41     "virtualmachineSize": {
42         "defaultValue": "Standard_DS1_v2",
43         "type": "String",
44         "allowedValues": [
45             "Standard_DS1_v2",
46             "Standard_DS2_v2",
47             "Standard_DS3_v2"
48         ]
49     }
50 },
51 "variables": {},
52 "resources": [
53     {
54         "type": "Microsoft.Compute/virtualMachines",
55         "name": "[parameters('virtualMachines_WinServer2_name')]",
56         "apiVersion": "2018-10-01",
57         "location": "uksouth",
58         "tags": {},
59         "scale": null,
60         "properties": {
61             "hardwareProfile": {
62                 "vmSize": "Standard_DS1_v2"
63             },
64             "storageProfile": {
65                 "imageReference": {
66                     "publisher": "MicrosoftWindowsServer",
67                     "offer": "WindowsServer",
68                     "sku": "2019-Datacenter"
69                 }
70             }
71         }
72     }
73 ]
```

and replace that line with the following:

```
"vmSize": "[parameters('virtualmachineSize')]"
```

ARM Template

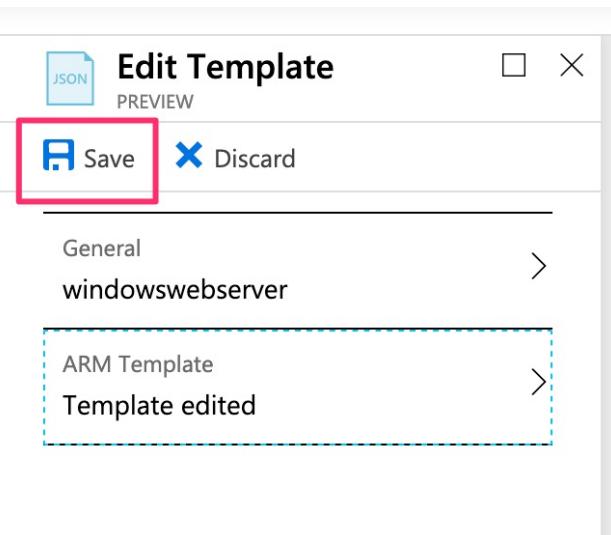
windowswebserver

```

39         "a571079b774b4338",
40             "type": "String"
41     },
42     "virtualMachineSize": {
43         "defaultValue": "Standard_DS1_v2",
44         "type": "String",
45         "allowedValues": [
46             "Standard_DS1_v2",
47             "Standard_DS2_v2",
48             "Standard_DS3_v2"
49         ]
50     },
51     "variables": {},
52     "resources": [
53         {
54             "type": "Microsoft.Compute/virtualMachines",
55             "name": "[parameters('virtualMachines_WinServer2_name')]",
56             "apiVersion": "2018-10-01",
57             "location": "uksouth",
58             "tags": {},
59             "scale": null,
60             "properties": {
61                 "hardwareProfile": {
62                     "vmSize": "[parameters('virtualMachineSize')]"
63                 },
64                 "storageProfile": {
65                     "imageReference": {
66                         "publisher": "MicrosoftWindowsServer",
67                         "offer": "WindowsServer",
68                         "sku": "2019-Datacenter"
69                     }
70                 }
71             }
72         }
73     ]
74 }

```

This is now taking it's value from the newly added parameter. Click OK and then Save.



5. Click Deploy and see that new parameter is shown and the allowed values are listed:

Home > Templates > windowswebserver > Custom deployment

Custom deployment

Deploy from a custom template

Virtual Machines_Win Server2_name	WinServer2
Storage Accounts_infralab2diag_name	infralab2diag
Network	
Interfaces_winserver293_name	winserver293
Virtual Networks_Infra	
Lab2_vnet_name	InfraLab2-vnet
Public IP Addresses_Win	
Server2_ip_name	WinServer2-ip
Network Security Groups_Win	
Server2_nsg_name	WinServer2-nsg
Subnets_default_name	default
Security Rules_RDP_name	RDP
Virtual Machines_Win Server2_id	/subscriptions/2482da3d-7516-4b32-9057-d311caa99664/resourceGroups/InfraLab2...
Virtualmachine Size	Standard_DS1_v2
TERMS AND CONDITIONS	Standard_DS1_v2 Standard_DS2_v2 Standard_DS3_v2

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

6. No need to deploy another VM as this part was to show you how to customise the ARM Template but if you do create another VM then again, create a new resource group, add a unique suffix to the parameters and remember to delete the resource group once you've created and validated it.

[<- Lab 1: Provision a server via the Azure Portal and use DSC to configure the IIS role](#) | [Home](#) |
[Lab 3: Creating ARM templates from scratch ->](#)