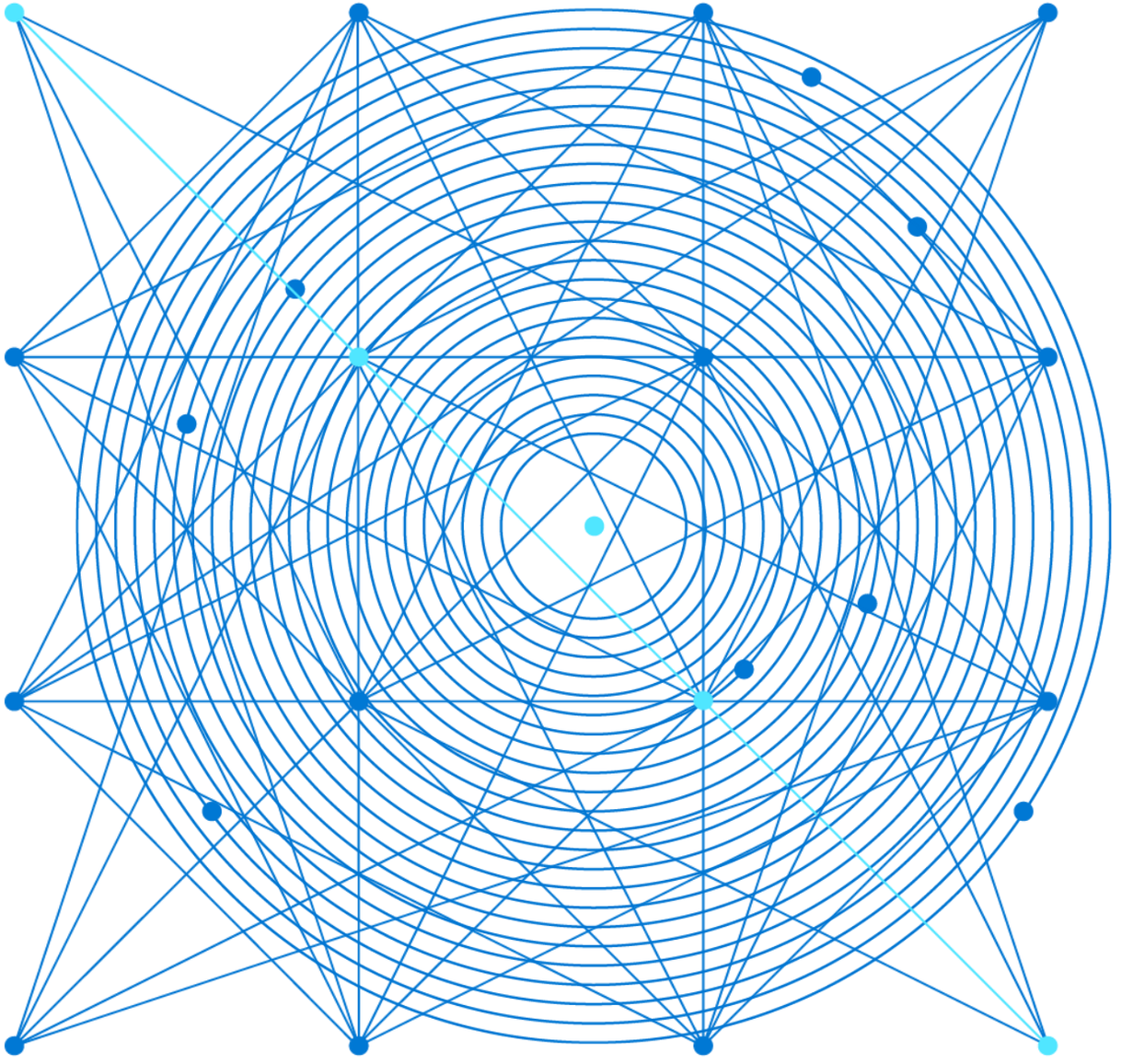
AZ-303: Microsoft Azure Architect Technologies



Module 9: Automate Deployment and Configuration of Resources

Azure Resource Manager Templates, Virtual Hard Disk Template, and Automation Runbooks

Learning Objectives

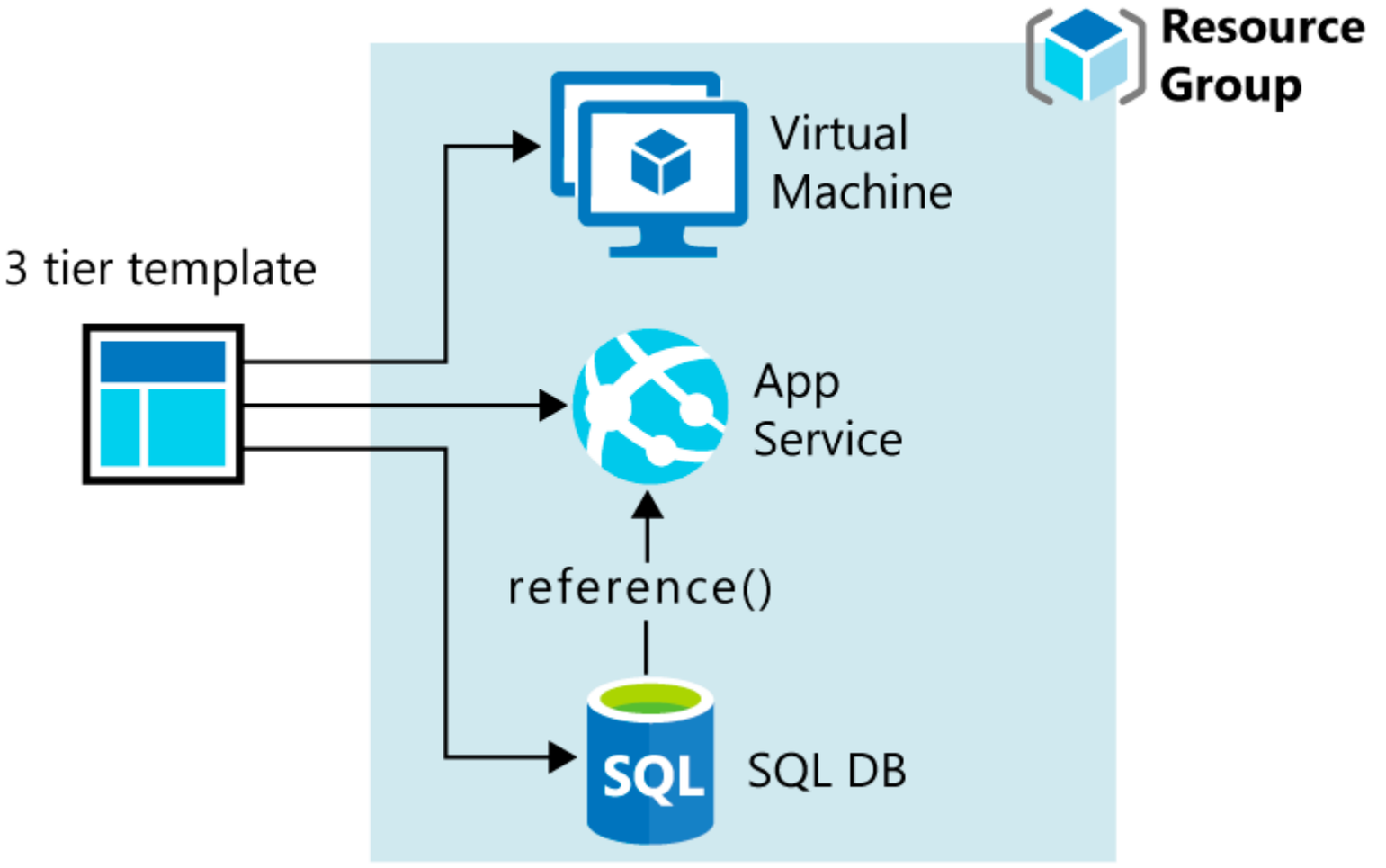
You will learn the following:

- Azure Resource Manager Templates
- Save a template for a VM
- Evaluate Location for New Resources
- Configure a Virtual Hard Disk Template
- Deploy from a Template
- Create and Execute an Automation Runbook

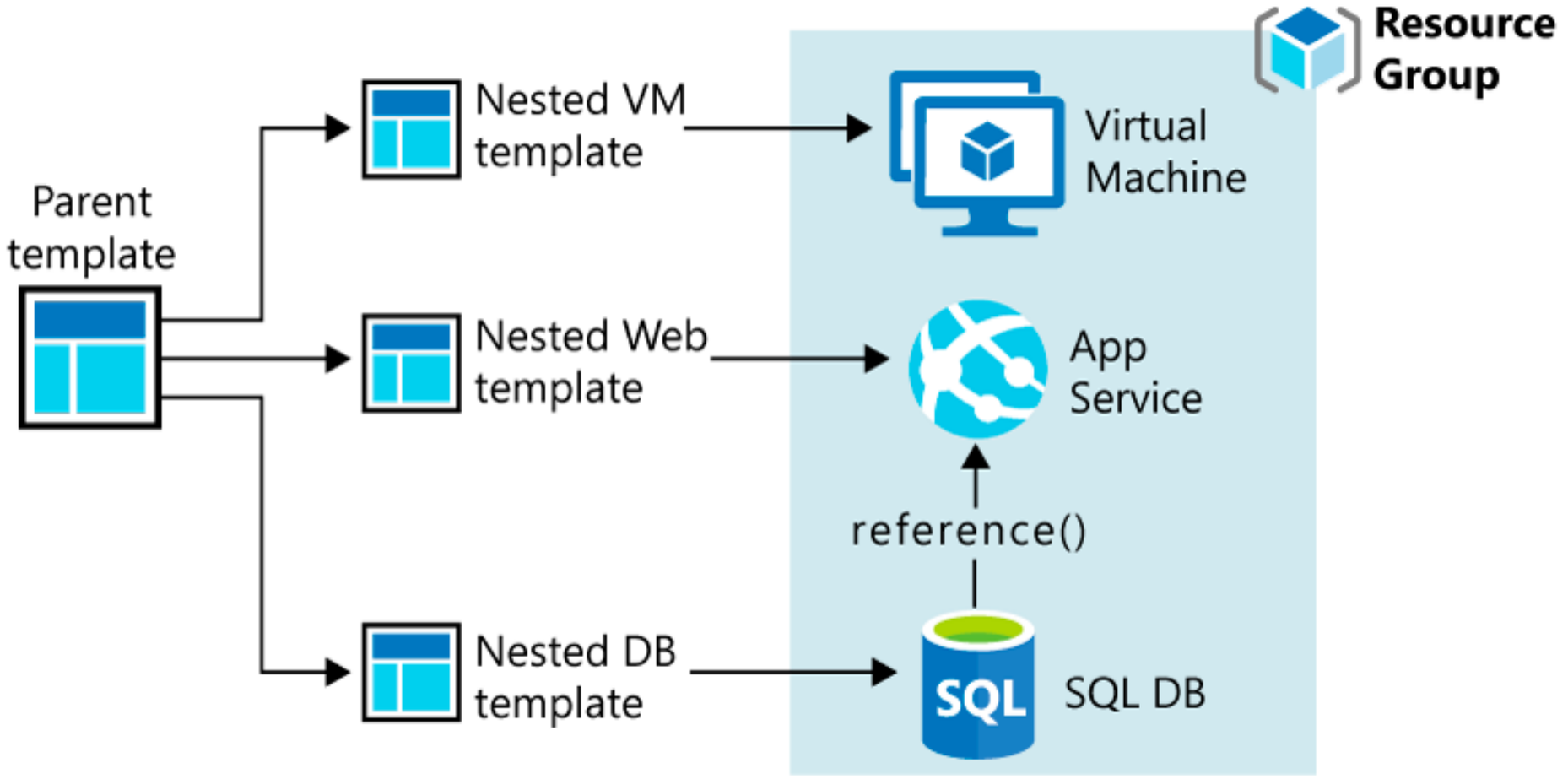
Azure Resource Manager Templates

Overview of Resource Manager Templates (1 of 3)

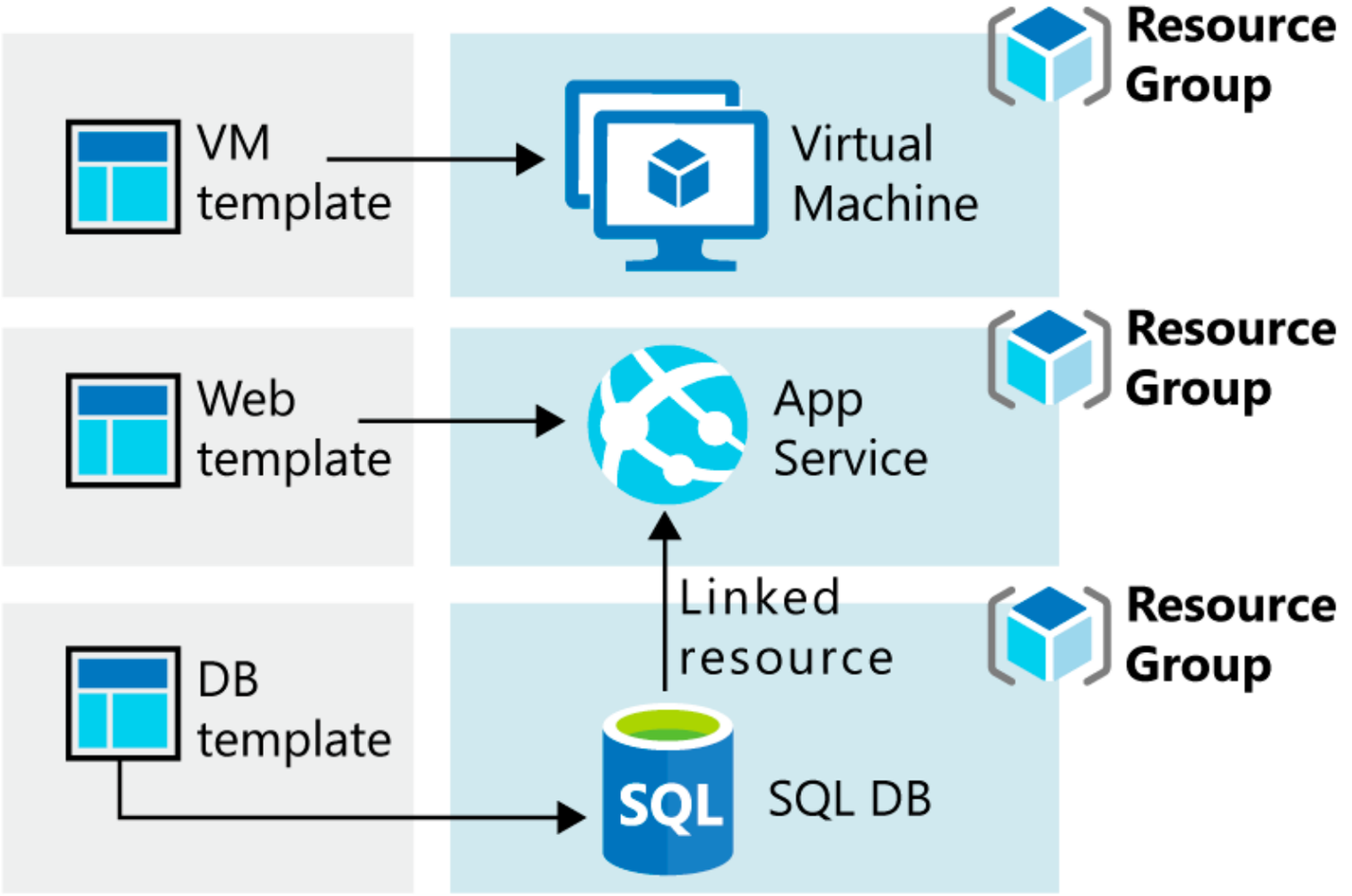
- What are Resource Manager templates?
- Template design



Overview of Resource Manager Templates (2 of 3)



Overview of Resource Manager Templates (3 of 3)



What's in a Resource Manager Template? (1 of 6)

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

What's in a Resource Manager Template? (2 of 6)

```
"parameters": {
  "adminUsername": {
    "type": "string",
    "metadata": {
      "description": "Username for the Virtual Machine."
    }
  },
  "adminPassword": {
    "type": "securestring",
    "metadata": {
      "description": "Password for the Virtual Machine."
    }
  }
}
```

What's in a Resource Manager Template? (3 of 6)

```
"variables": {
  "nicName": "myVMNic",
  "addressPrefix": "10.0.0.0/16",
  "subnetName": "Subnet",
  "subnetPrefix": "10.0.0.0/24",
  "publicIPAddressName": "myPublicIP",
  "virtualNetworkName": "MyVNET"
}
```

What's in a Resource Manager Template? (4 of 6)

```
"functions": [
  {
    "namespace": "contoso",
    "members": {
      "uniqueName": {
        "parameters": [
          {
            "name": "namePrefix",
            "type": "string"
          }
        ],
        "output": {
          "type": "string",
          "value":
"[concat(toLower(parameters('namePrefix')),
uniqueString(resourceGroup().id))]"
        }
      }
    }}],
```

What's in a Resource Manager Template? (5 of 6)

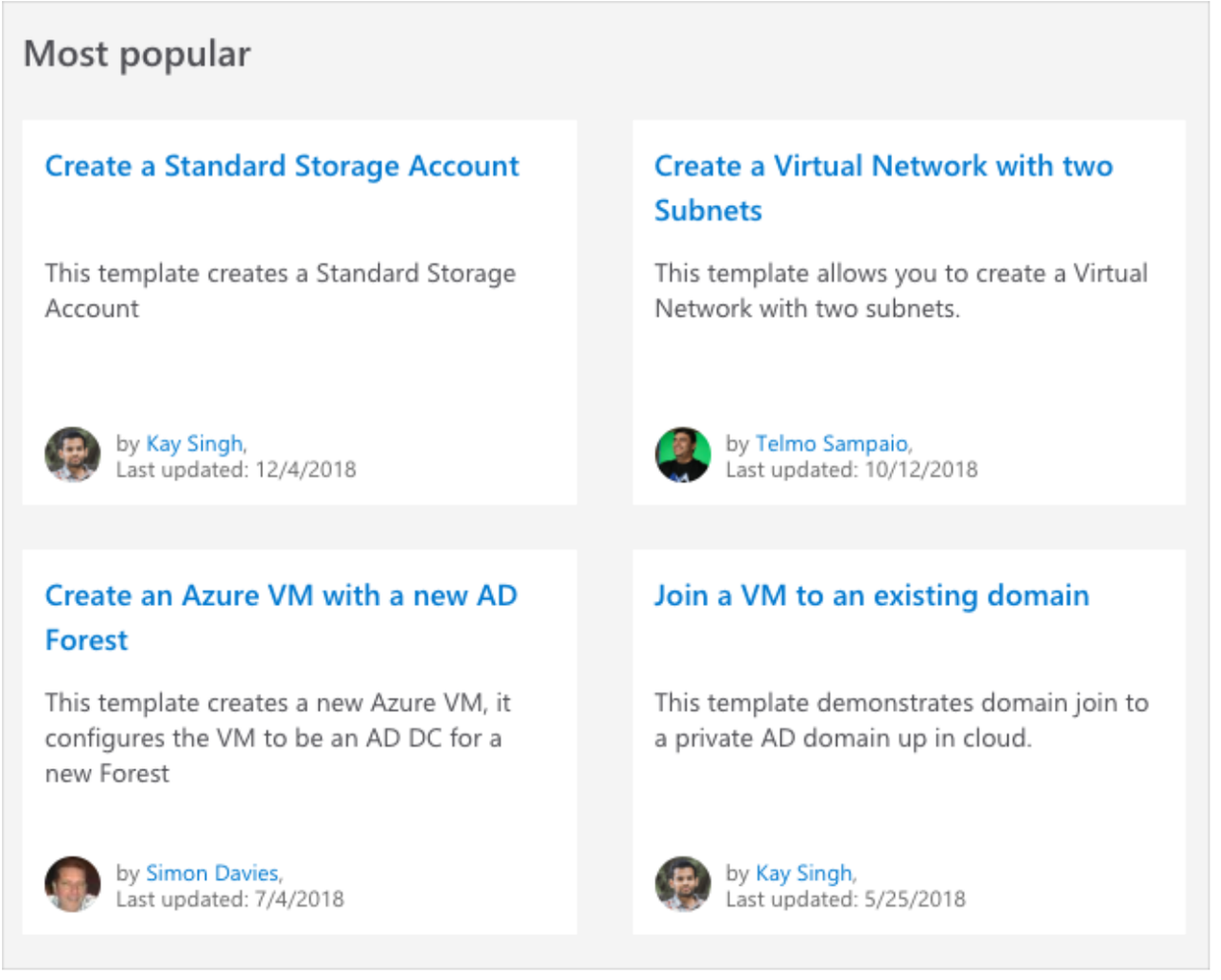
```
"resources": [
{
  "type": "Microsoft.Network/publicIPAddresses",
  "name": "[variables('publicIPAddressName')]",
  "location": "[parameters('location')]",
  "apiVersion": "2018-08-01",
  "properties": {
    "publicIPAllocationMethod": "Dynamic",
    "dnsSettings": {
      "domainNameLabel": "[parameters('dnsLabelPrefix')]"
    }
  }
}
],
```

What's in a Resource Manager Template? (6 of 6)

```
"outputs": {
  "hostname": {
    "type": "string",
    "value": "[reference(variables('publicIPAddressName')).dnsSettings.fqdn]"
  }
}
```

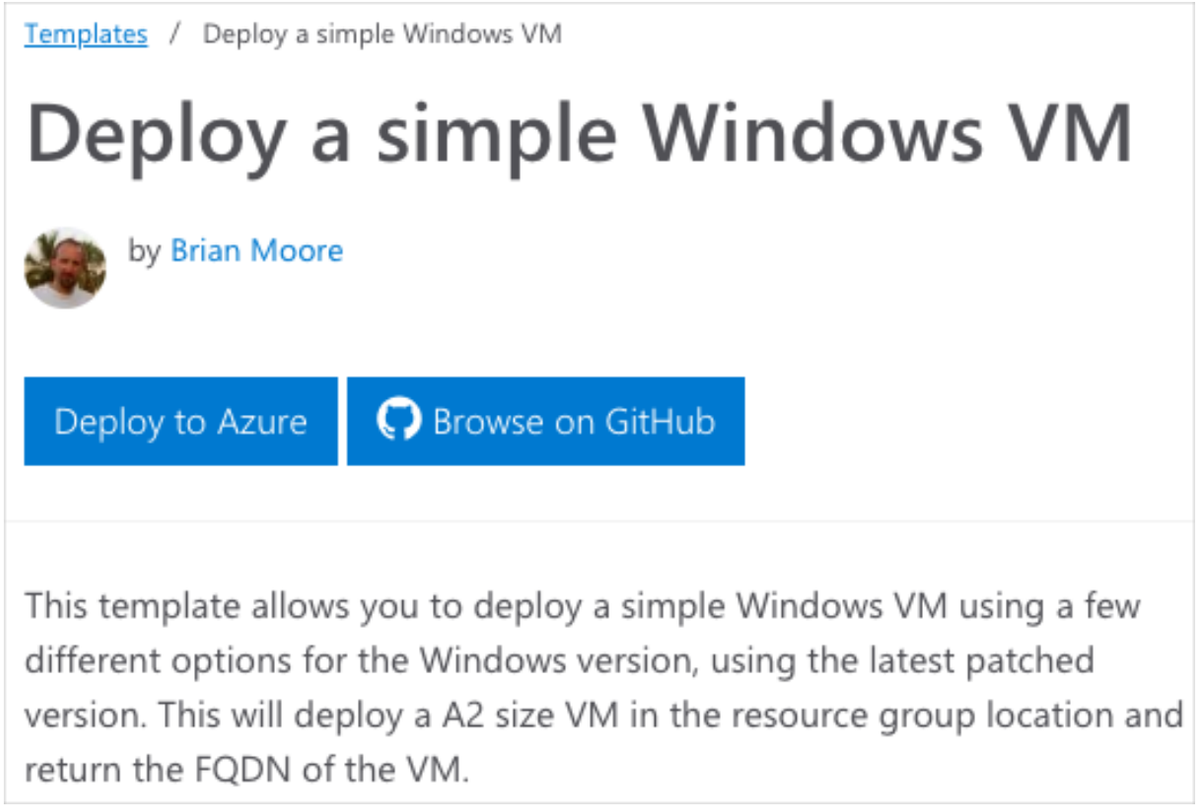
Azure Quickstart Templates (1 of 5)

Browse to Quickstart template gallery



Azure Quickstart Templates (2 of 5)

Select a template

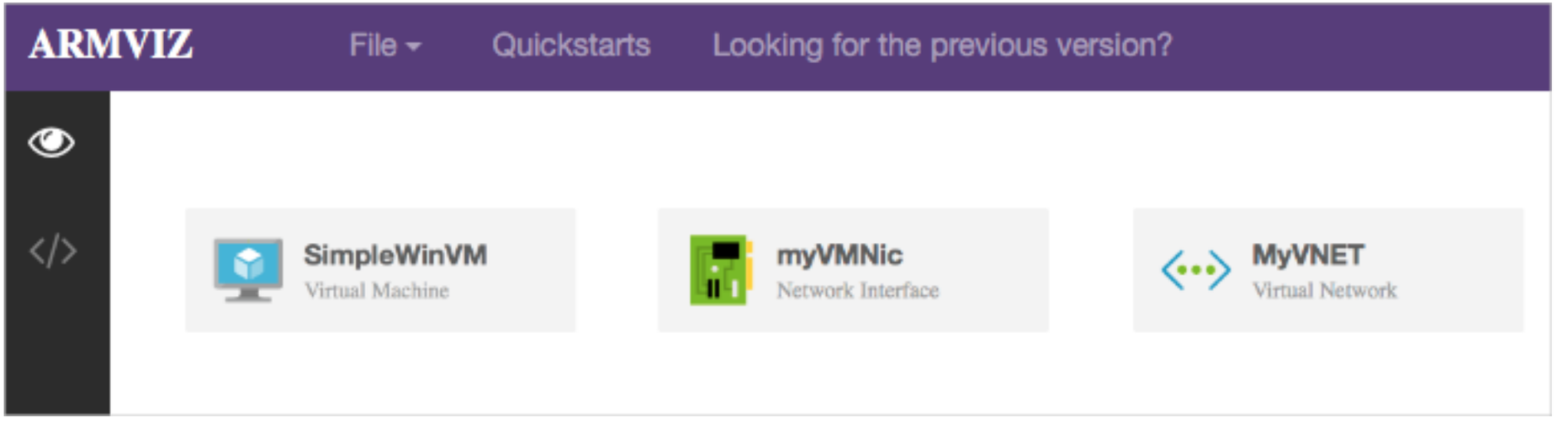


Azure Quickstart Templates (3 of 5)

View the template's source code on GitHub

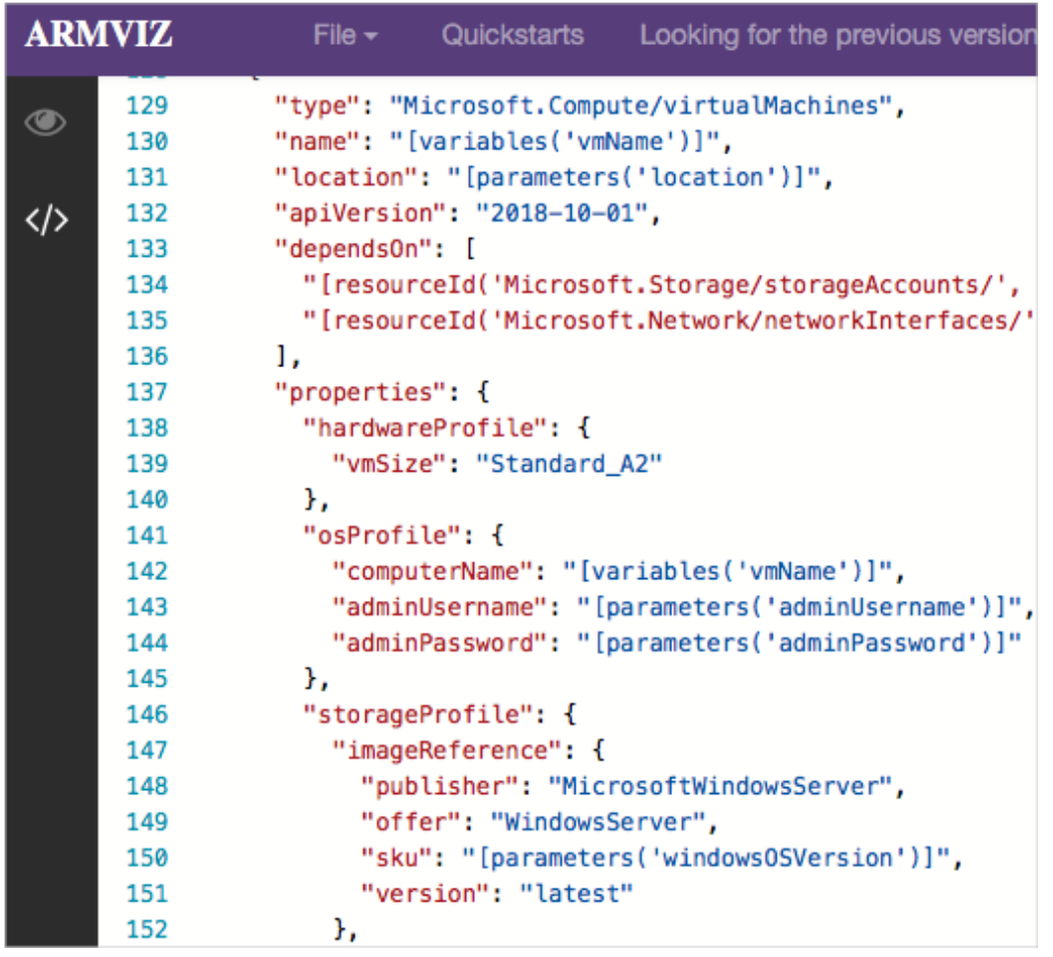
Azure Quickstart templates (4 of 5)

Visualize the template



Azure Quickstart templates (5 of 5)

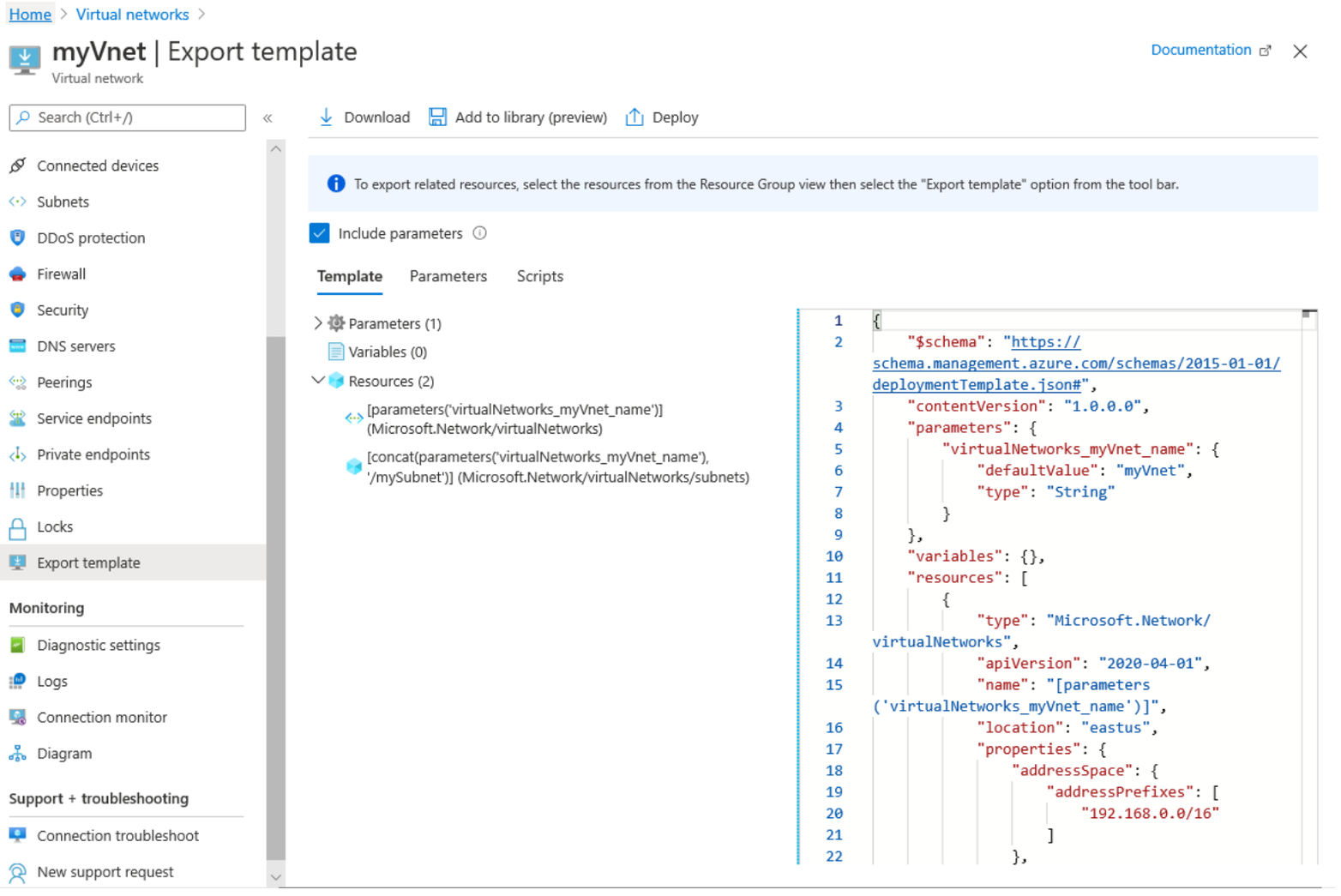
Review JSON that defines the Azure resource



Save a Template for a VM

Download the Template for a VM

Export and download the template using the Azure portal



Download the Template using PowerShell

An example of downloading an ARM template using PowerShell:

```
Export-AzResourceGroup `
      -ResourceGroupName "myResourceGroup" `
      -Path "C:\users\public\downloads"
```

Create a Virtual Hard Disk Template

Disk Images for Azure VMs

- What is an Azure virtual hard disk?
- What is a virtual machine image?
- What is a generalized image?
- What is a specialized virtual image?

Deploy an Azure VM from a VHD

Use a deployment template:

- Include the vhdUrl parameter (URL of the virtual hard disk)

Run a PowerShell script:

```
# specify storage account of an existing generalized VHD
$storageaccount = (…)
# set generalized VHD URL
$vhdUrl =
"https://$storageaccount.blob.core.windows.net/vhds/(…).vhd"
# deploy a VM using the existing VHD
New-AzResourceGroupDeployment -vhdUrl $vhdUrl (…)
```

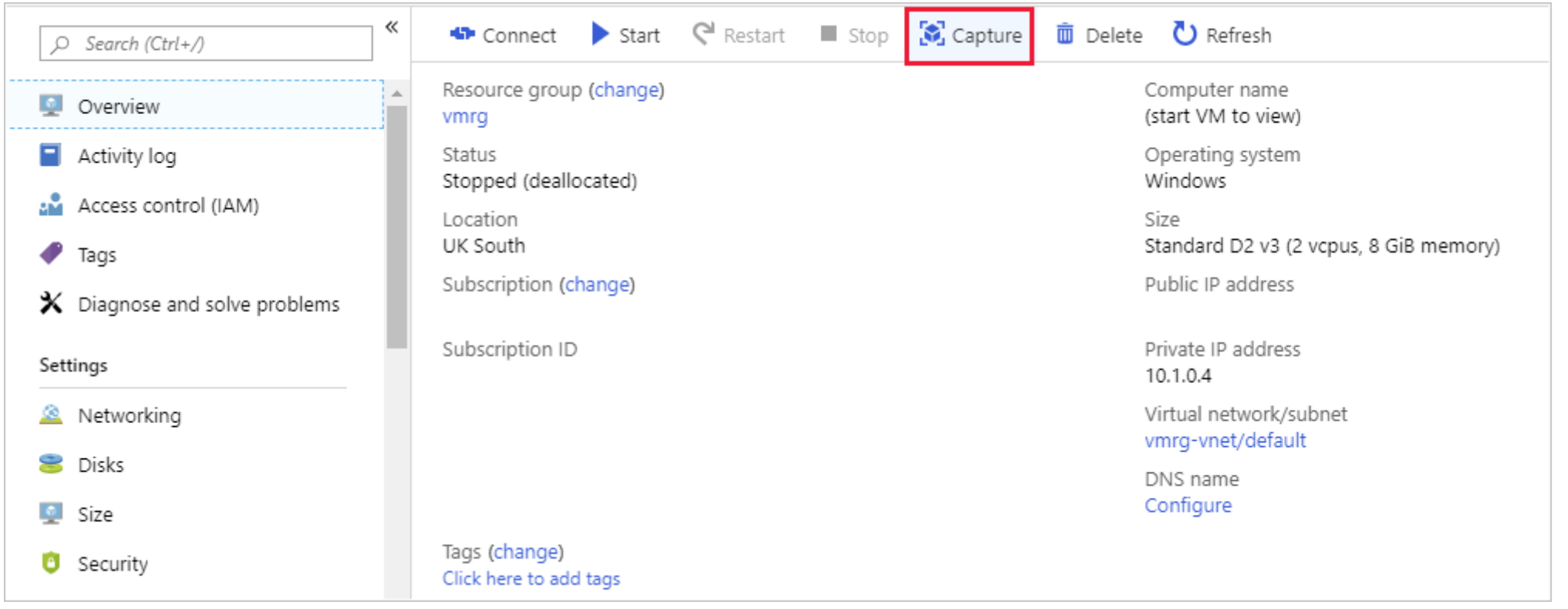
Virtual hard Disk Deployment Template

```
"storageProfile": {
   "osDisk": {
     "name": "[concat(parameters('vmName'),'-osDisk')]",
     "osType": "[parameters('osType')]",
     "caching": "ReadWrite",
     "image": {
       "uri": "[parameters('vhdUrl')]"
     },
     "vhd": {
       "uri": "[variables('osDiskVhdName')]"
     },
     "createOption": "FromImage"
   }
},
```

Create a VM from a VHD (1 of 3)

To create an image in the Azure portal:

- Generalize the OS of an Azure VM and stop/deallocate it
- Go to the blade of the virtual machine and select **Capture**

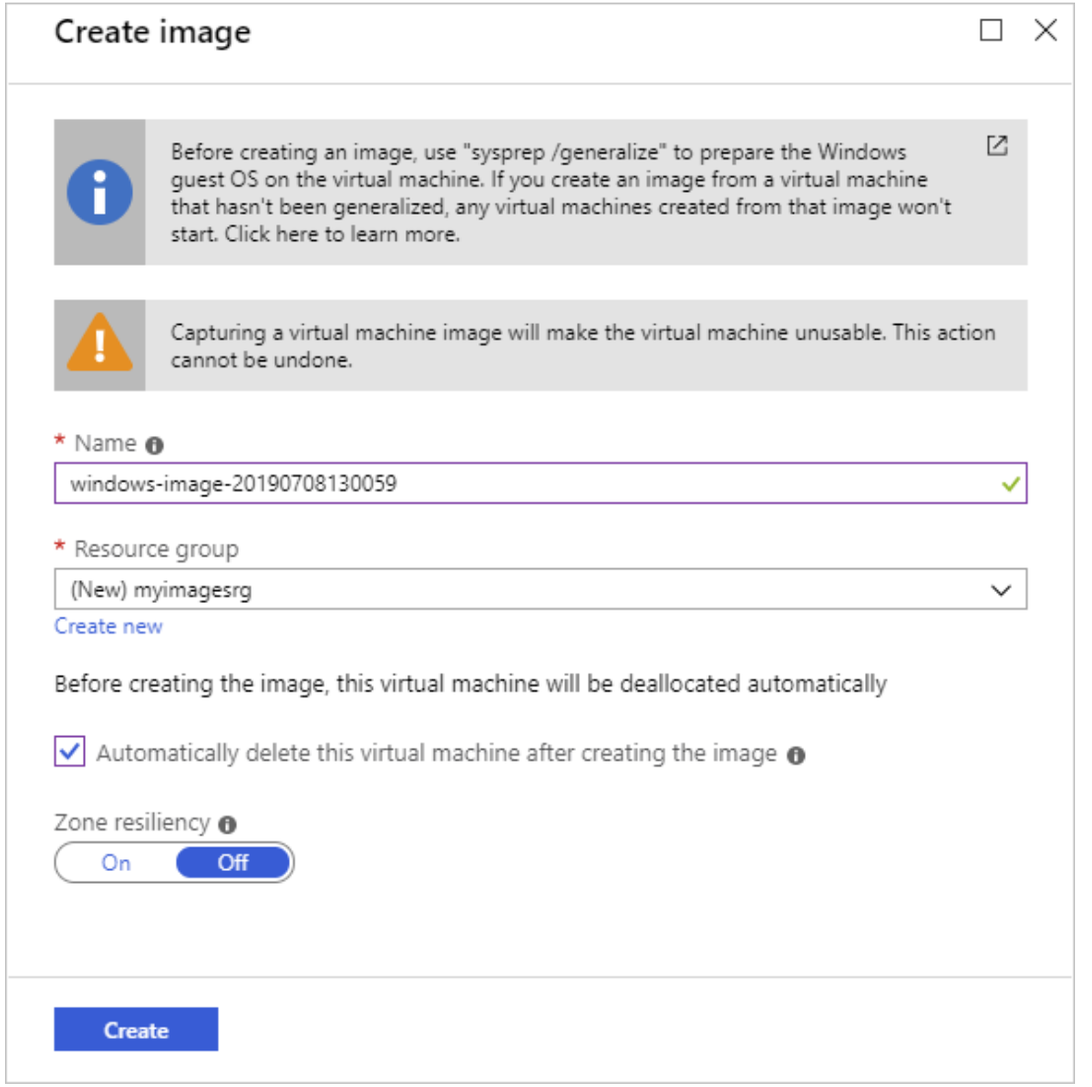


Create a VM from a VHD (2 of 3)

Provide **Create image** settings

Alternatively, you can use

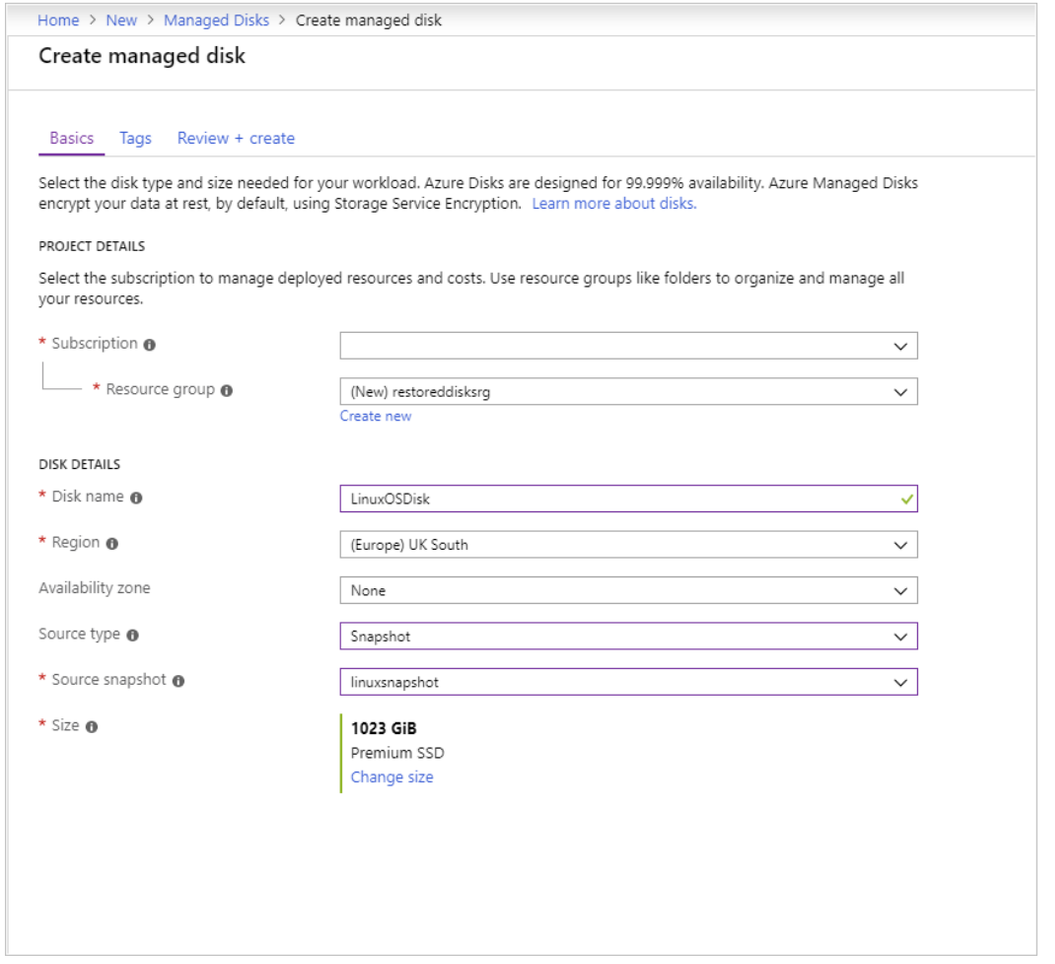
- Azure PowerShell
- Azure CLI



Create a VM from a VHD (3 of 3)

You can also create an Azure VM from a snapshot of its VHD files:

- Create a snapshot of each VHD
- For each snapshot, create a managed disk
- Create an Azure VM using the managed disks



Deploy from a Template

Deploy an ARM template using CLI

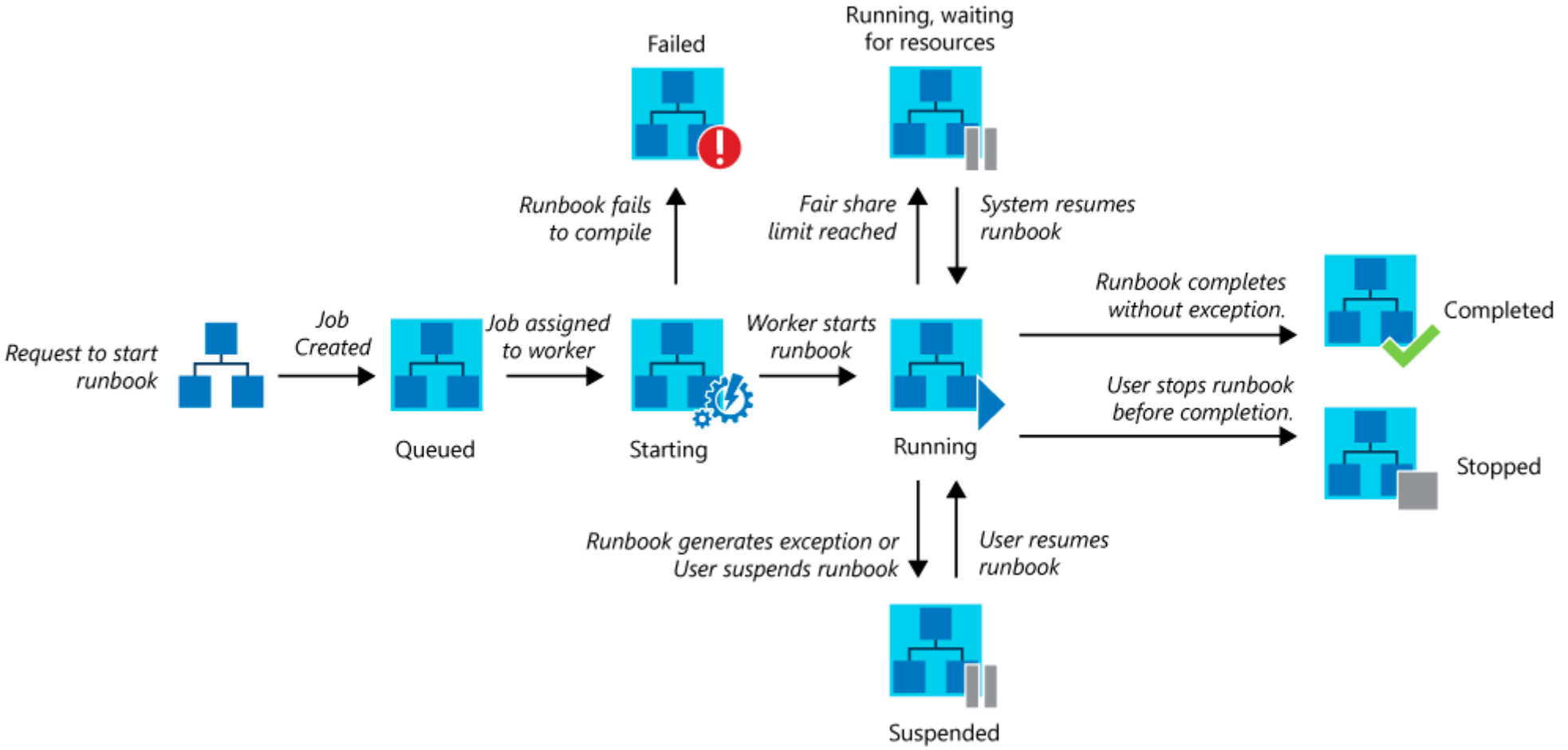
Sample deployment of an Azure storage account

```
"resources": [
  {
    "type": "Microsoft.Storage/storageAccounts",
    "apiVersion": "2019-04-01",
    "name": "[variables('storageAccountName')]",
    "location": "[parameters('location')]",
    "sku": {
      "name": "[parameters('storageSKU')]"
    },
    "kind": "StorageV2",
    "properties": {
      "supportsHttpsTrafficOnly": true
    }
  },
```

Create and Execute an Automation Runbook

Runbooks in Azure Automation (1 of 2)

The lifecycle of a runbook job for PowerShell runbooks, PowerShell Workflow runbooks, and graphical runbooks



Runbooks in Azure Automation (2 of 2)

Azure Automation Runbooks can run in:

- An Azure sandbox: a shared environment, against Azure resources
- A Hybrid Runbook Worker: in any environment, directly on the computer that hosts the worker role and against local resources in the environment

Import a PowerShell Runbook from the Runbook Gallery

In the Azure portal:

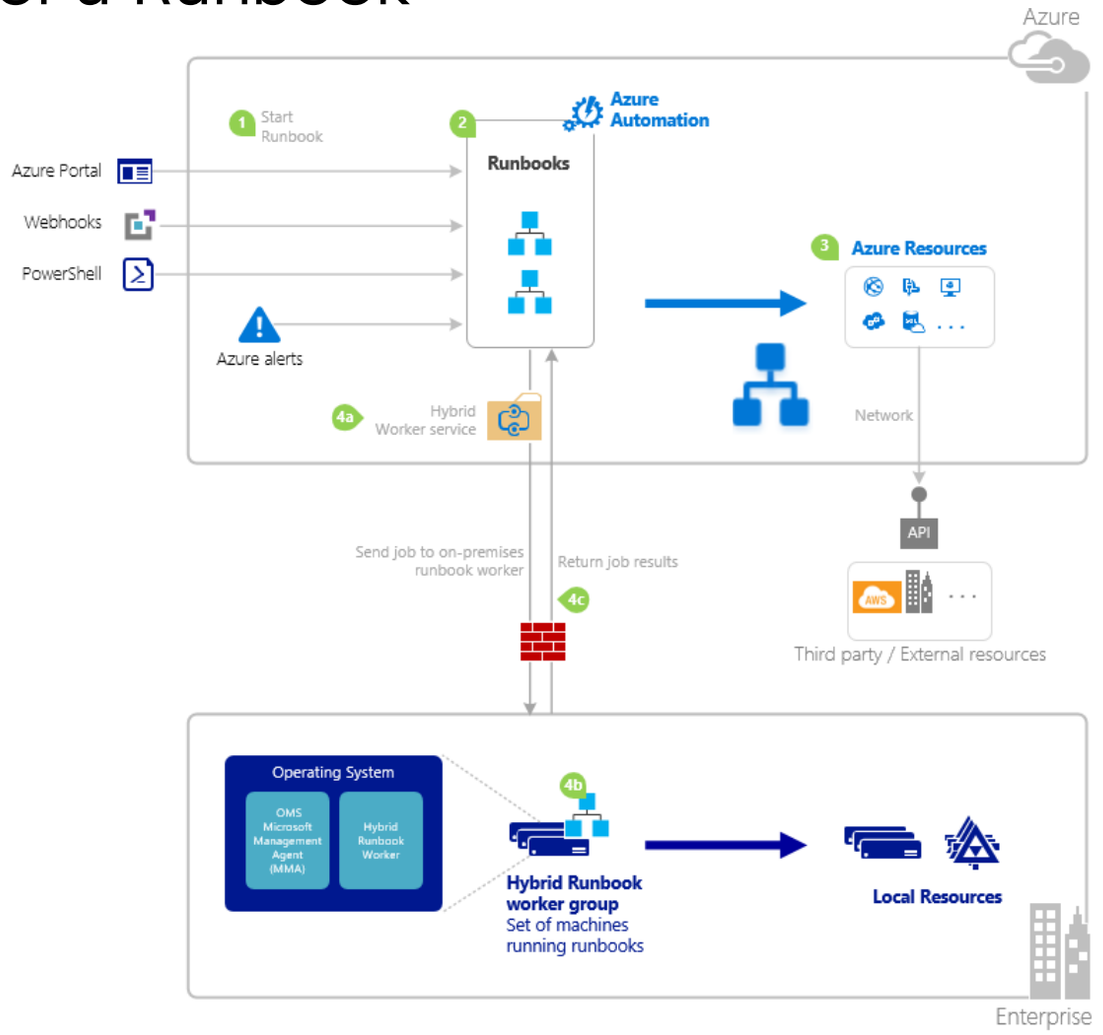
- Select **Runbooks gallery** under **Process Automation**
- Select **Source: PowerShell Gallery**
- Locate and select the gallery item you want to import

You also have the option of:

- Adding a PowerShell Runbook to the gallery
- Importing a module from the module gallery

Start a Runbook in Azure Automation (1 of 2)

The life cycle of a Runbook



1. An actor starts a runbook
2. Azure automation notes that a runbook should be started
3. Cloud resources - Runbook acts on local Azure resources or other external resources reachable via the network
4a. On-premises – Hybrid runbook group sends the runbook to an on-premises machine to run
4b. Runbook acts on its local networked resources
4c. Job results are returned

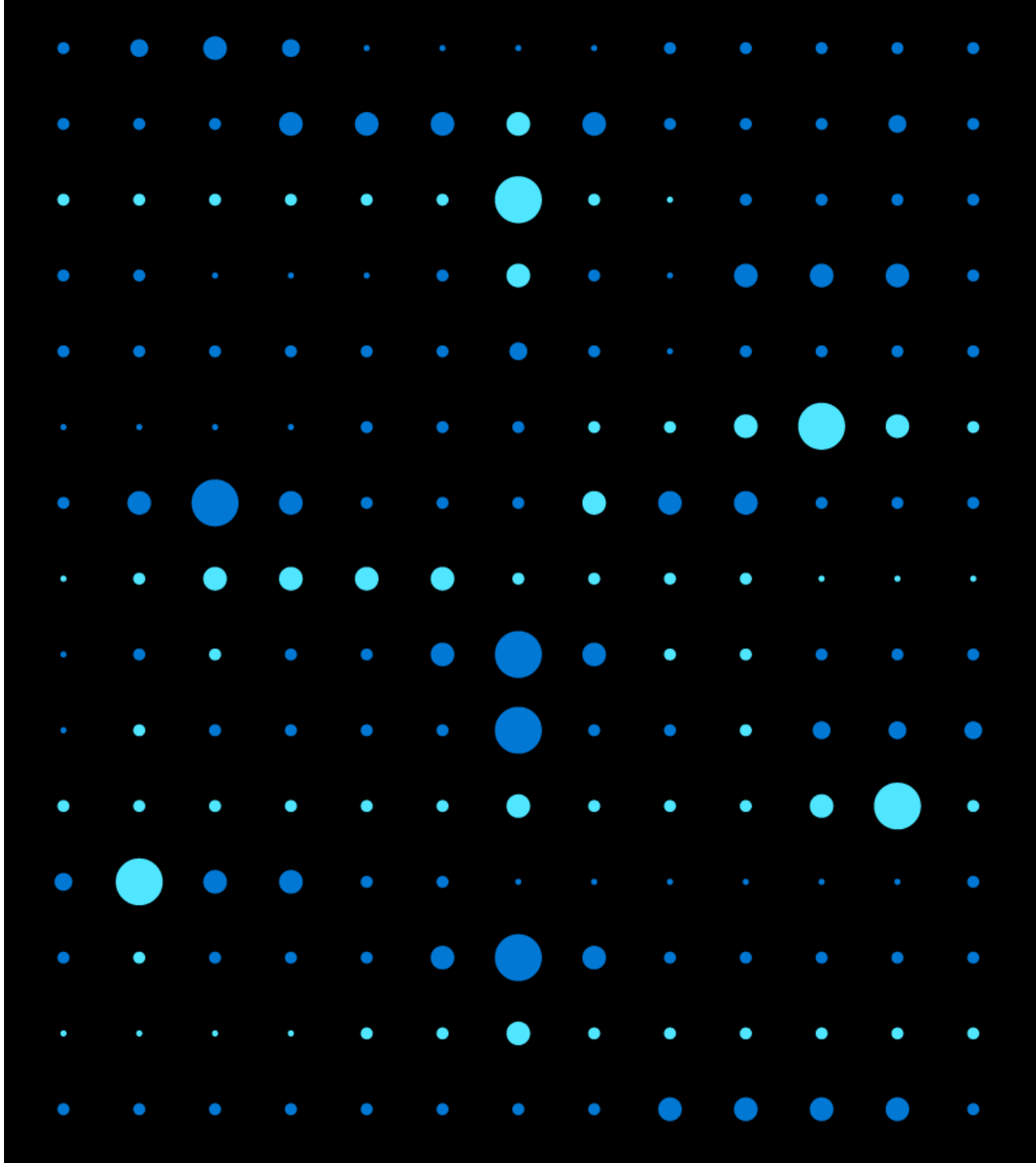
Start a Runbook in Azure Automation (2 of 2)

You can start a runbook by using:

- the Azure portal
- PowerShell

```
Start-AzAutomationRunbook
      -AutomationAccountName "MyAutomationAccount" `
      -Name "Test-Runbook" `
      -ResourceGroupName "ResourceGroup01"
```

Demonstration: Create and Run a Workflow Runbook



Module Review Questions

Microsoft Azure

Online Role-based training resources:

Microsoft Learn

https://docs.microsoft.com/en-us/learn/

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Thank you.