

# Lab - Implement autoscaling in host pools (AD DS)

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## Student lab manual

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### Lab dependencies

- An Azure subscription you will be using in this lab.
- A Microsoft account or a Microsoft Entra account with the Owner or Contributor role in the Azure subscription you will be using in this lab and with the Global Administrator role in the Microsoft Entra tenant associated with that Azure subscription.
- The completed lab **Prepare for deployment of Azure Virtual Desktop (AD DS)**
- The completed lab **Deploy host pools and session hosts by using the Azure portal (AD DS)**

### Estimated Time

60 minutes

### Lab scenario

You need to configure autoscaling of Azure Virtual Desktop session hosts in an Active Directory Domain Services (AD DS) environment.

### Objectives

After completing this lab, you will be able to:

- Configure autoscaling of Azure Virtual Desktop session hosts
- Verify autoscaling of Azure Virtual Desktop session hosts

### Lab files

- None

### Instructions

#### Exercise 1: Configure autoscaling of Azure Virtual Desktop session hosts

The main tasks for this exercise are as follows:

1. Prepare for scaling Azure Virtual Desktop session hosts
2. Set up diagnostics to track Azure Virtual Desktop autoscaling
3. Create a scaling plan for Azure Virtual Desktop session hosts

#### Task 1: Prepare for scaling Azure Virtual Desktop session hosts

1. On your lab computer, start a web browser, navigate to the [Azure portal](#), and sign in by providing credentials of a user account with the Owner role in the subscription you will be using in this lab.

- On the lab computer, in the web browser window displaying the Azure portal, open a **PowerShell** session in the **Cloud Shell** pane.

**Note:** Host pools you plan to use with autoscale should be configured with a non-default value of the **MaxSessionLimit** parameter. You can set this value in the host pool settings in the Azure portal or by running the **Update-AzWvdHostPool** Azure PowerShell cmdlets, as in this example. You can also set it explicitly when creating a pool in the Azure portal or when running the **New-AzWvdHostPool** Azure PowerShell cmdlet.

- From the PowerShell session in the Cloud Shell pane, run the following command to set the value of the **MaxSessionLimit** parameter of the **az140-21-hp1** host pool to **2**:

```
Update-AzWvdHostPool -ResourceGroupName 'az140-21-RG' `
-Name az140-21-hp1 `
-MaxSessionLimit 2
```

**Note:** In this lab, the value of the **MaxSessionLimit** parameter is set artificially low in order to facilitate triggering the autoscaling behavior.

**Note:** Before creating your first scaling plan, you'll need to assign the **Desktop Virtualization Power On Off Contributor** RBAC role to Azure Virtual Desktop with your Azure subscription as the target scope.

- In the browser window displaying the Azure portal, close the Cloud Shell pane.
- In the Azure portal, search for and select **Subscriptions** and, from the list of subscriptions, select the one that contains the Azure Virtual Desktop resources.
- On the subscription page, select **Access control (IAM)**.
- On the **Access control (IAM)** page, in the toolbar, select the **+ Add button**, then select **Add role assignment** from the drop-down menu.
- On the **Add role assignment** blade, on the **Role** tab, specify the following settings and select **Next**:

Setting	Value
Job function role	<b>Desktop Virtualization Power On Off Contributor</b>

- On the **Add role assignment** blade, on the **Members** tab, click **+ Select members**, specify the following settings and click **Select**.

Setting	Value
Select	<b>Azure Virtual Desktop</b> or <b>Windows Virtual Desktop</b>

- On the **Add role assignment** blade, select **Review + assign**

**Note:** The value depends on when the **Microsoft.DesktopVirtualization** resource provider was first registered in your Azure tenant.

11. On the **Review + assign** tab, select **Review + assign**.

## Task 2: Set up diagnostics to track Azure Virtual Desktop autoscaling

1. On the lab computer, in the web browser window displaying the Azure portal, open a **PowerShell** session in the **Cloud Shell** pane.

**Note:** You will use an Azure Storage account to store autoscaling events. You can create it directly from the Azure portal or use Azure PowerShell as illustrated in this task.

2. From the PowerShell session in the Cloud Shell pane, run the following commands to create an Azure Storage account:

```
$resourceGroupName = 'az140-51-RG'
$location = (Get-AzResourceGroup -ResourceGroupName 'az140-11-RG').Location
New-AzResourceGroup -Location $location -Name $resourceGroupName
$suffix = Get-Random
$storageAccountName = "az140st51$suffix"
New-AzStorageAccount -Location $location -Name $storageAccountName -
ResourceGroupName $resourceGroupName -SkuName Standard_LRS
```

**Note:** Wait until the storage account is provisioned.

3. In the browser window displaying the Azure portal, close the Cloud Shell pane.
4. On your lab computer, in the browser displaying the Azure portal, navigate to the page of the **az140-21-hp1** host pool.
5. On the **az140-21-hp1** page, select **Diagnostic settings** and then select **+ Add diagnostic setting**.
6. On the **Diagnostic setting** page, in the **Diagnostic setting name** textbox, enter **az140-51-scaling-plan-diagnostics** and, in the **Category groups** section, select **Autoscale logs for pooled host pools**.
7. On the same page, in the **Destination details** section, select **Archive to a storage account** and, in the **Storage account** drop-down list, select the storage account name starting with the **az140st51** prefix.
8. Select **Save**.

## Task 3: Create a scaling plan for Azure Virtual Desktop session hosts

1. On your lab computer, in the browser displaying the Azure portal, search for and select **Azure Virtual Desktop**.
2. On the **Azure Virtual Desktop** page, select **Scaling Plans** and then select **+ Create**.
3. On the **Basics** tab of the **Create a scaling plan** wizard, specify the following information and select **Next: Schedules** > (leave others with their default values):

Setting	Value
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Setting	Value
Resource group	<b>az140-51-RG</b>
Name	<b>az140-51-scaling-plan</b>
Location	the same Azure region to which you deployed the session hosts in the previous labs
Friendly name	<b>az140-51 scaling plan</b>
Time zone	your local time zone

**Note:** Exclusion tags allow you to designate a tag name for session hosts which you want to exclude from scaling operations. For example, you might want to tag VMs that are set to drain mode so that autoscale doesn't override drain mode during maintenance using the exclusion tag "excludeFromScaling".

- On the **Schedules** tab of the **Create a scaling plan** wizard, select **+ Add schedule**.
- On the **General** tab of the **Add schedule** wizard, specify the following information and click **Next**.

Setting	Value
Schedule name	<b>az140-51-schedule</b>
Repeat on	<b>7 selected</b> (select all days of the week)

- On the **Ramp-up** tab of the **Add schedule** wizard, specify the following information and click **Next**.

Setting	Value
Start time (24 hour system)	your current time minus 9 hours
Load balancing algorithm	<b>Breadth first</b>
Minimum percentage of hosts (%)	<b>20</b>
Capacity threshold (%)	<b>60</b>

**Note:** The load balancing preference you select here will override the one you selected for your original host pool settings.

**Note:** The minimum percentage of hosts designates the percentage of session hosts you want to always remain on. If the percentage you enter isn't a whole number, it's rounded up to the nearest whole number.

**Note:** The capacity threshold represents the percentage of available host pool capacity that will trigger a scaling action to take place. For example, if two session hosts in the host pool with a max session limit of 20 are turned on, the available host pool capacity is 40. If you set the capacity threshold to 75% and the session hosts have more than 30 user sessions, autoscale will turn on a third session host. This will then change the available host pool capacity from 40 to 60.

7. On the **Peak hours** tab of the **Add schedule** wizard, specify the following information and click **Next**.

Setting	Value
Start time (24 hour system)	your current time minus 8 hours
Load balancing algorithm	<b>Depth-first</b>

**Note:** The start time designates the end time for the ramp-up phase.

**Note:** The capacity threshold value in this phase is determined by the ramp-up capacity threshold value.

8. On the **Ramp-down** tab of the **Add schedule** wizard, specify the following information and click **Next**.

Setting	Value
Start time (24 hour system)	your current time minus 2 hours
Load balancing algorithm	<b>Depth-first</b>
Minimum percentage of hosts (%)	<b>10</b>
Capacity threshold (%)	<b>90</b>
Force logoff users	<b>Yes</b>
Delay time before logging out users and shutting down VMs (min)	<b>30</b>

**Note:** If the **Force logoff users** is enabled, autoscale will put the session host with the lowest number of user sessions in drain mode, send all active user sessions a notification about impending shutdown, and forcefully sign them out after the specified delay time passes. After autoscale signs out all user sessions, it then deallocates the VM.

**Note:** If you haven't enabled forced sign out during ramp-down, session hosts with no active or disconnected sessions will be deallocated.

9. On the **Off-peak hours** tab of the **Add schedule** wizard, specify the following information and click **Add**.

Setting	Value
Start time (24 hour system)	your current time minus 1 hour
Load balancing algorithm	<b>Depth-first</b>

**Note:** The capacity threshold value in this phase is determined by the ramp-down capacity threshold value.

10. Back on the **Schedules** tab of the **Create a scaling plan** wizard, select **Next: Host pool assignments** >:

11. On the **Host pool assignments** page, in the **Select host pool** drop-down list, select **az140-21-hp1**, ensure that the **Enable autoscale** checkbox is enabled, select **Review + create**, and then select **Create**.

## Exercise 2: Verify autoscaling of Azure Virtual Desktop session hosts

The main tasks for this exercise are as follows:

1. Verify autoscaling of Azure Virtual Desktop session hosts

### Task 1: Verify autoscaling of Azure Virtual Desktop session hosts

1. On the lab computer, in the web browser window displaying the Azure portal, open a **PowerShell** session in the **Cloud Shell** pane.
2. From the PowerShell session in the Cloud Shell pane, run the following command to start the Azure Virtual Desktop session host Azure VMs you will be using in this lab:

```
Get-AzVM -ResourceGroup 'az140-21-RG' | Start-AzVM
```

**Note:** Wait until the session host Azure VMs are running.

3. On the lab computer, in the web browser window displaying the Azure portal, navigate to the page of the **az140-21-hp1** host pool.
4. On the **az140-21-hp1** page, select **Session hosts**.
5. Wait until at least one session host is listed with the **Shutdown** status.

**Note:** You might need to refresh the page to update the status of the session hosts.

**Note:** If all session hosts remain available after 15 minutes, navigate back to the **az140-51-scaling-plan** page and reduce the value of the **Minimum percentage of hosts (%) Ramp down** setting.

**Note:** Once the status of one or more session hosts changes, the autoscaling logs should be available in the Azure Storage account.

6. In the Azure portal, search and select **Storage accounts** and, on the **Storage accounts** page, select the entry representing the storage account created earlier in this exercise (which name starts with the **az140st51** prefix).
7. On the storage account page, select **Containers**.
8. In the list of containers, select **insights-logs-autoscaleevaluationpooled**.
9. On the **insights-logs-autoscaleevaluationpooled** page, navigate through the folder hierarchy until you reach the entry representing a JSON-formatted blob stored in the container.
10. Select the blob entry, select the ellipsis icon on the far right of the page, and, in the drop-down menu, select **Download**.

11. On your lab computer, open the downloaded blob in a text editor of your choice and examine its content. You should be able to find references to autoscaling events, and in this case, we can search for 'deallocated' to make this easier to identify.

**Note:** Here is a sample blob content that includes references to autoscaling events:

```
host_Ring    "R0"
Level       4
ActivityId   "00000000-0000-0000-0000-000000000000"
time        "2023-03-26T19:35:46.0074598Z"
resourceId   "/SUBSCRIPTIONS/AAAAAAAE-0000-1111-2222-333333333333/RESOURCEGROUPS/AZ140-51-RG/PROVIDERS/MICROSOFT.DESKTOPVIRTUALIZATION/SCALINGPLANS/AZ140-51-SCALING-PLAN"
operationName "ScalingEvaluationSummary"
category     "AutoscaleEvaluationPooled"
resultType   "Succeeded"
level        "Informational"
correlationId "ddd3333d-90c2-478c-ac98-b026d29e24d5"
properties
  Message "Active session hosts are at 0.00% capacity (0 sessions across 3 active session hosts). This is below the minimum capacity threshold of 90%. 2 session hosts can be drained and deallocated."
  HostPoolArmPath "/subscriptions/aaaaaaa-0000-1111-2222-333333333333/resourcegroups/az140-21-rg/providers/microsoft.desktopvirtualization/hostpools/az140-21-hp1"
  ScalingEvaluationStartTime "2023-03-26T19:35:43.3593413Z"
  TotalSessionHostCount    "3"
  UnhealthySessionHostCount "0"
  ExcludedSessionHostCount  "0"
  ActiveSessionHostCount    "3"
  SessionCount              "0"
  CurrentSessionOccupancyPercent "0"
  CurrentActiveSessionHostsPercent "100"
  Config.ScheduleName "az140-51-schedule"
  Config.SchedulePhase "OffPeak"
  Config.MaxSessionLimitPerSessionHost "2"
  Config.CapacityThresholdPercent "90"
  Config.MinActiveSessionHostsPercent "5"
  DesiredToScaleSessionHostCount "-2"
  EligibleToScaleSessionHostCount "1"
  ScalingReasonType "DeallocateVMs_BelowMinSessionThreshold"
  BeganForceLogoffOnSessionHostCount "0"
  BeganDeallocateVmCount "1"
  BeganStartVmCount "0"
  TurnedOffDrainModeCount "0"
  TurnedOnDrainModeCount "1"
```

### Exercise 3: Stop and deallocate Azure VMs provisioned in the lab

The main tasks for this exercise are as follows:

1. Stop and deallocate Azure VMs provisioned in the lab

**Note:** In this exercise, you will deallocate the Azure VMs used in this lab to minimize the corresponding compute charges.

### Task 1: Deallocate Azure VMs provisioned in the lab

1. Switch to the lab computer and, in the web browser window displaying the Azure portal, open a **PowerShell** session in the **Cloud Shell** pane.
2. From the PowerShell session in the Cloud Shell pane, run the following command to list all Azure VMs used in this lab:

```
Get-AzVM -ResourceGroup 'az140-21-RG'
```

3. From the PowerShell session in the Cloud Shell pane, run the following command to stop and deallocate all Azure VMs you used in this lab:

```
Get-AzVM -ResourceGroup 'az140-21-RG' | Stop-AzVM -NoWait -Force
```

**Note:** The command executes asynchronously (as determined by the `-NoWait` parameter), so while you will be able to run another PowerShell command immediately afterwards within the same PowerShell session, it will take a few minutes before the Azure VMs are actually stopped and deallocated.