

Kubernetes cloud management for Azure Stack Edge

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Applies to

Preview release for Kubernetes cloud management on Azure Stack Edge

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Revision History

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Kubernetes cloud management for Azure Stack Edge

About Kubernetes on Azure Stack Edge

Azure Stack Edge Pro with GPU is an AI-enabled edge computing device with network data transfer capabilities. Microsoft ships you a cloud-managed device that acts as network storage gateway and has a built-in Graphical Processing Unit (GPU) that enables accelerated AI-inferencing.

On your Azure Stack Edge Pro device, you can create a Kubernetes cluster by configuring the compute. When the compute role is configured, the Kubernetes cluster including the master and worker nodes are all deployed and configured for you. This cluster is then used for workload deployment via kubectl, IoT Edge, or Azure Arc.

In the earlier releases on your Azure Stack Edge Pro device:

- Kubernetes and IoT Edge roles were coupled together and were configured by a long, single step of compute configuration. When the compute role was configured, the Kubernetes cluster including the master and worker nodes were all deployed and configured for you. Your IoT Edge role was configured and the associated IoT Hub and IoT Edge devices were created.
- You could deploy Azure Arc separately via the PowerShell interface of the device. Azure Arc enables organizations to view, manage, and govern their on-premises Kubernetes clusters using the Azure portal, command line tools, and APIs.

In this preview release:

- Kubernetes can be enabled via the Azure portal by itself. In these instances, you would use the kubectl to manage your Kubernetes cluster.
- IoT Edge is configured as an addon but when configured, requires the configuration of Kubernetes cluster as well.
- Azure Arc for Kubernetes cluster is also an addon which can be configured via the Azure portal when you configure the Kubernetes cluster or you can configure it separately as well.

Scenarios covered

The following scenarios enabled by this feature are described in this document:

1. Enable Kubernetes service on your device. This can be done with and without configuring the Azure Arc for Kubernetes clusters as an addon.

- If you enable Azure Arc on Kubernetes cluster, then you use Azure Arc to manage your cluster from Azure.
- o If you disable Azure Arc, you can use *kubect1* to manage your cluster by directly connecting to the device.

2. Enable IoT Edge service on your device. To enable IoT Edge service, you must enable the Kubernetes service on your device. Kubernetes is the hosting platform for IoT Edge.

3. **Remove Kubernetes service**. When you remove the Kubernetes service, this action also removes the Azure IoT Edge and the Azure Arc for Kubernetes cluster addons.

4. **Remove IoT Edge service**. When you remove the IoT Edge service, this action removes only the IoT Edge service. You can choose to retain/remove the Kubernetes service and the Azure Arc for Kubernetes cluster addon.

This guide provides a step-by-step procedure of the preceding scenarios. The target audience for this guide is the IT administrators who are familiar with the setup and deployment of workloads on the Azure Stack Edge device.

Important: Kubernetes cloud management on Azure Stack Edge Pro devices is in preview. Please review the <u>terms of use for the preview</u> and sign up before you deploy this solution.

Sign up for Kubernetes cloud management preview

If you intend to sign up for private preview, make sure that the subscription that you'll use does not have any existing resources. If you have any existing resources in the subscription where the IoT Edge is configured, remove the IoT Edge configuration. For details, follow the steps in <u>Remove the IoT Edge configuration</u>.

Once the IoT Edge configuration is successfully removed, you can request to enable Kubernetes cloud management. If the preceding steps are not followed, your Azure Stack Edge resource will be unsupported.

Use the following custom URL to create any resources in your subscription via the Azure portal for the duration of the preview:

• <u>https://aka.ms/ase-cloud-mgmt-k8s</u>

If you are not using the specified URL and instead use the production URL: <u>https://portal.azure.com</u>, then:

- You will only see the IoT role.
- You won't see the Kubernetes features and won't be able to use those features.
- If you configure compute with this URL, the configuration won't work.

Important: If you opt out of the preview, it is your responsibility to delete the Kubernetes configuration before you make the opt-out request. Any resources that you configured in the preview will not be supported once you have opted out of the preview.

Prerequisites

Before you begin, make sure that:

- You have your Microsoft account with access credentials.
- Your subscription should be enabled for Kubernetes cloud management preview. After the subscription is enabled, Azure Stack Edge team will reach out to you via the email address provided during the preview sign-up.
- Make sure that you have access to an Azure Stack Edge Pro GPU device. This device should be configured and activated as per the detailed instructions in <u>Tutorial:</u> <u>Activate Azure Stack Edge Pro with GPU</u>.
- You have a client to access your device. The client system is running a <u>supported</u> <u>operating system</u>.
 - If using a Windows client, make sure that it is running PowerShell 5.0 or later.
 - You have the Kubernetes API endpoint from the **Device** page in the local UI of your device. You will use this endpoint to create an entry in the client *hosts* file. On a Windows system, go to *C:/windows/system32/drivers/etc/hosts* and add the following entry:

<Kubernetes master node IP> <Kubernetes endpoint>

For more information, see the instructions in Get Kubernetes API endpoint.

- Before you enable Azure Arc on the Kubernetes cluster, you will need to enable and register *Microsoft.Kubernetes* and *Microsoft.KubernetesConfiguration* against your subscription. See how to register <u>Kubernetes resource providers</u>.
- If you intend to deploy Azure Arc for Kubernetes cluster, then you'll need to create a resource group. You must have owner level access to this resource group.

Enable Kubernetes service

Perform the following steps in the Azure portal to create a Data Box resource.

- 1. Sign in to the Azure preview portal at this URL: <u>https://aka.ms/ase-cloud-mgmt-k8s</u> . All deployment steps must be performed via the Azure preview portal.
- 2. In the Azure Stack Edge resource for your device, go to **Edge services > Kubernetes** or select the **Kubernetes** tile in the right-pane.

Home >					
myasegpudev2 … Azure Stack Edge					×
	⊍ Update device 📧 Reset device pas	ssword 🕤 Return device ♡ Feedback 📋	Delete 🛛 💍 Refresh		
 Overview 	A Warning alert(s) present. Click here to v	view details. →			
Activity log				View Cost ISON View	w
Access control (IAM)	Resource group (change) : myasegpurg		Status : Online		
🗳 Tags	Location : eastus2euap		Model : Azure St	ack Edge Pro - 1 GPU	
Diagnose and solve problems	Subscription (change) : Edge Gateway	Test	Current software version : Azure St.	ack Edge 2102 (2.2.1504.2640)	
Settings	Subscription ID : db4e2fdb-6d8	0-4e6e-b7cd-736098270664	Time zone : Pacific St	andard Time	
A Locks			Capacity : 5.37 TB		
	Tags (change) : Click here to a	dd tags			
E Order details	Your device is running fine!				
Edge services	Deployed edge services				
Virtual machines	Name	Status			
🕅 IoT Edge	No deployed services				
🖶 Kubernetes					
Cloud storage gateway	Edge services				
Monitoring	DD Now	Nau	17		
Device events	000 Ivew	- New	1		
Alerts	Kubernetes	Virtual machines	IoT Edge	Cloud storage gateway	
mi Metrics	Rapidly build, deliver, and scale containerized application at edge.	Bring your workloads to the edge that aren't yet containerized.	Manage containerized application at edge and integrate with IoT Hub.	Seamlessly send your data to Azure Storage account.	
Automation					
Tasks (preview)	How to get started?	How to get started?	How to get started?	How to get started?	
Support + troubleshooting	-		-		

3. In the **Kubernetes > Overview**, select Add to enable Kubernetes service on your device. This service will allow you to deploy and orchestrate Kubernetes workloads on your device.

Home > myasegpudev2 >		
Azure Stack Edge Pro - 1 GPU	view	×
	+ Add Persistent volume 📋 Remove 💍 Refresh	
💮 Overview	Get started with deploying Kubernetes	
Persistent volumes		
Properties	Configure Kubernetes service	
	Configure Kubernetes to deploy and manage containerized applications.	
	To enable the service,	
	 Set up your on-premises network for Edge computing. Configure your Azure subscription for cloud management. 	
	Add	
	Steps to deploy Kubernetes	
	What's next	
	Deploy and manage containerized applications.	

- 4. Select a Kubernetes version and the node size.
 - a. Specify a Kubernetes server version or accept the default. **Kubernetes version** is the server version that is installed on your device and is tied with the Kubernetes client version installed on your client that is accessing the device. The server version associated with the 2101 release is v1.17.3. (The client version installed on client system used to access the device should be skewed from the server by no more than one version.)
 - b. Select the **Node size**. Given you are working with development or test workloads, use *Standard_DS_V1* node size. Currently this is the only supported size. The node size is the size of the worker VM. This size can't be changed after creating the cluster.
 - c. Enable Azure Arc management via checking the box against Manage containers from cloud via Azure Arc enabled Kubernetes.

Create Kubernetes service			2
myasegpudev2			
Basic cluster configuration			
Select the Kubernetes cluster size and ve development or test workloads, use Star	ersion to be used. For production workloads, use Standard_DS2_v2 nodes. For ndard_DS1_v2		
Kubernetes version * 🕡	1.15.10 (default)	\sim	
Node size *	Standard DS v2 (default)	\sim	
Arc enabled Kubernetes (Preview)			
Manage containers from cloud via /	Arc enabled Kubernetes		
Settings	Change		
Subscription name	Edge Gateway Test		
Resource group	myasegpurg		
Arc enabled Kubernetes cluster name	ase-myasegpudev2-9ffdf49ce7dadf89c00f370		
Region	East US		
hegion			

i. Accept the defaults. If you want to modify the default Azure Arc configuration, select change. You'll need to provide a resource group, cluster name, and region.

Configure Arc enabled	l Kubernetes ×
Provide a subscription, resource group, clu	uster name, and region.
Subscription name 🕕	Edge Gateway Test
Resource group * 🕡	mydbgnewrg 🗸 🗸
	You don't have sufficient permissions to configure Arc resource on the resource group level. If the access has been recently granted, may take sometime to be reflected.
Arc enabled Kubernetes cluster name *	ase-myasegpudev2-9ffdf49ce7dadf89c00f370 ~
Region * 🛈	East US 🗸
Region * 🛈	East US

- ii. The subscription name should be automatically populated.
- iii. Supply a unique resource group name. You must have owner level access to this resource group. To verify the access level for the resource group, go to Resource group > Access control (IAM) > View my access. Under the Role assignments, you should be listed as an Owner.



- iv. Specify a name for your Arc enabled Kubernetes cluster or accept the provided default.
- v. Select a region where you will create a resource for your Arc enabled Kubernetes cluster. A filtered list of supported regions is displayed in the dropdown list. For more information, see <u>supported regions for</u> <u>Azure Arc enabled Kubernetes</u>.
- vi. Select **Configure**. You can also reset the Arc settings in this blade to default by selecting the **Reset to default** option.

Configure Arc enabled Kubernetes		
5		
Provide a subscription, resource group, cli	uster name, and region.	
Subscription name	Edge Gateway Test	
Subscription name ()		
Resource group *	mvaseopurg	\sim
Resource group	myosegpang	
Arc enabled Kubernetes cluster name *	ase-myasegpudev2-arc	~
0	3 2.	
Region * 🛈	East US	\sim
Configure Close Reset to	default	

vii. Select Create to create the Kubernetes service.

Home > Kubernetes >		
Create Kubernetes se myasegpudev2	rvice	>
Basic cluster configuration		
Select the Kubernetes cluster size and ve development or test workloads, use Star	ersion to be used. For production workloads, use Standard_DS2_v2 nodes. For ndard_DS1_v2	
Kubernetes version * 🕡	1.15.10 (default)	\sim
Node size * 🗊	Standard DS v2 (default)	\sim
Arc enabled Kubernetes (Preview)		
Manage containers from cloud via	Arc enabled Kubernetes	
Settings	Change	
Subscription name	Edge Gateway Test	
Resource group	myasegpurg	
Arc enabled Kubernetes cluster name	ase-myasegpudev2-arc	
Region	East US	
Create		

d. You see a notification that the service creation is in progress. Creation of the service and also of a Arc enabled Kubernetes resource with the specified setting takes several minutes. You can select the **Refresh** from the command bar to refresh the pane.

Creation of the Arc resource can take longer than the creation of Kubernetes service. This will also be reflected as the pane is updated.

Home > Kubernetes Overv Azure Stack Edge Pro - 1 GPU	iew				×
	🕂 Add Persistent volume 📋 Remove	🕐 Refresh			
😤 Overview	Kubernetes service is running fine!				
 Persistent volumes Properties 	Connect Kubernetes clusters to Azure using Azure	Arc. For IoT specific scenarios, use	e azure IoT Edge service. L	earn more	
	Addons	Creating	Persistent volumes If your containers need to shares as persistent volum Add Persistent volum	o store data on the device, use Edge SMB or NFS mes.	
	IoT Edge Service Configure IoT	Ready to set up			
	Edge Shares For container to store or transfer files and folders to Azure Storage account (other than temp data), create a share.	Edge Storage account For container to transfer unstru binary, audio, or video streamii Storage account, create a stora	uctured data like ng data to Azure age account.	Network bandwidth usage If containers uploads data to cloud using shares configure network bandwidth usage across multiple time-of-day schedules.	
	Configure Shares	Configure Storage account		Configure Bandwith schedule	

e. After the service is created, your pane is updated to indicate that the Kubernetes service is running.

Home > Kubernetes Overvi Azure Stack Edge Pro - 1 GPU	ew				×
P Search (Ctrl+/) «	+ Add Persistent volume 🔳 Remove 🤇	🔾 Refresh			
🚭 Overview	Kubernetes service is running fine!				
 Persistent volumes Properties 	Connect Kubernetes clusters to Azure using Azure	Arc. For IoT specific scenarios, u	use azure IoT Edge service.	Learn more	
	Addons Total No Arc configured K8s Manage	🔇 Running	Persistent volumes If your containers need shares as persistent volu Add Persistent volu	s to store data on the device, use Edge SMB or NFS umes.	
	IoT Edge Service Configure IoT	🛞 Ready to set up			
	Edge Shares For container to store or transfer files and folders to Azure Storage account (other than temp data), create a share.	Edge Storage account For container to transfer uns binary, audio, or video strear Storage account, create a sto	structured data like ming data to Azure orage account.	Network bandwidth usage If containers uploads data to cloud using shares configure network bandwidth usage across multiple time-of-day schedules.	
	Configure Shares	Configure Storage account		Configure Bandwith schedule	

Enable IoT Edge service

When you enable IoT Edge, Kubernetes is automatically enabled. Perform the following steps in the Azure portal to create a Data Box resource.

 Use your Microsoft Azure credentials to log into the Azure preview portal at this URL: <u>https://aka.ms/ase-cloud-mgmt-k8s</u>. Note all deployment steps must be performed via the Azure preview portal.

2. Go to **Edge services > IoT Edge**. Alternatively you can select the **IoT Edge** tile in the right-pane.

3. In the IoT Edge > Overview, go to the Configure IoT Edge service tile and select Add.

- 4. On the Basics tab in the Create IoT Edge service, follow these steps.
- 1. Select a subscription.
- 2. Select a resource group to deploy your IoT Edge service.

3. Create a new or select from an existing IoT Hub resource that you want to use with your device. Use the provided name for IoT Hub resource or enter your own.

4. Select Next:Kubernetes services.

Home > myasegpudev2 > IoT B	idge >	
Create IoT Edge se Izure Stack Edge Pro - 1 GPU	rvice …	>
Basics Kubernetes services	Review + Create	
Connect the device to a new stand more	lard tier (S1) Azure IoT Hub. To use a free tier, select an existing IoT Hub resource. Learn	
Subscription * 🕕	Edge Gateway Test 🗸 🗸	
Resource group * 🕡	myasegpurg V	
IoT Hub * 🛈	Create new Use existing	
	ase-myasegpudev2-iothub	
It takes time to create a new IoT H details for IoT Hub.	ub. Under the new IoT Hub, an IoT Edge device and IoT device are configured. Pricing	
IoT Edge device: myasegpudev2-eo IoT Gateway device: myasegpudev	lge 2-storagegateway	
Only Linux container image types	are supported.	
Review + Create Previo	us Next: Kubernetes services	

5. On the Kubernetes services tab, follow these steps:

1. Select a Kubernetes version.

2. Select the Kubernetes cluster size. This size corresponds to the size of Kubernetes worker VM. Select Standard DS V2 for the development or test workloads that you'll deploy on your device in this preview release. For more information, see <u>Dv2 and DSv2 series</u>.

3. To manage your containerized workloads via Azure Arc enabled Kubernetes, select the checkbox against the Manage containers from cloud option.

Basics Kubernetes services Re	view + Create	Â	
Basic cluster configuration			
Select the Kubernetes cluster size and ve development or test workloads, use Star	ersion to be used. For production workloads, use Standard_DS2_v2 nodes. For ndard_DS1_v2		
Kubernetes version * 🕡	1.15.10 (default)]	
Node size * 🛈	Standard DS v2 (default)]	
Arc enabled Kubernetes (Preview)			
Manage containers from cloud via A	Arc enabled Kubernetes		
Settings	Change		
Subscription name	Edge Gateway Test		
Resource group	myasegpurg		
Arc enabled Kubernetes cluster name	ase-myasegpudev2-e6c3ef38b36d6b9ae3d64ba		
Region	Fact LIS		

6. Accept the default configuration. If you want to modify the default configuration, select **Change**. On the **Configure Arc enabled Kubernetes**, follow these steps:

1. The subscription used for Azure Stack Edge will be automatically used to create Arc enabled Kubernetes.

2. Select a resource group to deploy your Arc enabled Kubernetes resource. This can be the same resource group as your Azure Stack Edge resource or a different one.

3. Enter a unique name for your Arc enabled Kubernetes resource. This will also be the Kubernetes cluster name.

4. Specify a region from the list of <u>supported regions for Arc enabled</u> <u>Kubernetes</u>.

5. Select Configure.

Configure Arc enabled Kubernetes					
Provide a subscription, resource group, clu	ster name, and region.				
Subscription name	Edge Gateway Test				
Resource group * (i)	myasegpurg	\sim			
Arc enabled Kubernetes cluster name *	ase-myasegpudev2-arc1	~			
Region * 🛈	East US	~			
Configure Close Reset to c	lefault				

7. On the Create IoT Edge service, select Next: Review + Create.

Rasics Kubernetes services Rev	view + Create	*	
Basic cluster configuration			
Select the Kubernetes cluster size and ve development or test workloads, use Star	ersion to be used. For production workloads, use Standard_DS2_v2 nodes. For idard_DS1_v2		
Kubernetes version * 🔋	1.15.10 (default)		
Node size * 🕡	Standard DS v2 (default)		
Arc enabled Kubernetes (Preview)	Arc enabled Kubernetes		
Settings	Change		
Subscription name	Edge Gateway Test		
Resource group	myasegpurg		
Arc enabled Kubernetes cluster name	ase-myasegpudev2-arc1		
Region	East US		

8. Review the configuration and select Create.

Azure Stack Edge Pro - 1 GPU	
 All validations have passed. 	
Basics Kubernetes services	Review + Create
IoT Configuration	
Subscription name	Edge Gateway Test
Resource group	myasegpurg
IoT Hub	(New) ase-myasegpudev2-iothub
IoT Edge device	myasegpudev2-edge
IoT Gateway device	myasegpudev2-storagegateway
Basic cluster configuration	
Kubernetes version	1.15.10 (default)
Node size	Standard DS v2 (default)
Azure Arc enabled Kubernetes	(Preview)
Subscription name	Edge Gateway Test
Resource group	myasegpurg
Arc enabled Kubernetes cluster	name ase-myasegpudev2-arc1
Region	East US

9. You'll see notifications that the Kubernetes cluster, IoT Edge and Arc enabled Kubernetes are being configured. This step takes up to 20 minutes.

As the services are configured, you'll see that the **Overview** page updates.

Azure Stack Edge Pro - 1 GPU	, + Add module + Add triager () Refresh	configuration 📋 Remove	() Refresh		×
Overview Modules Modules	IoT Edge service is running fine! Start processing the data using IoT Edge modules. Le	arn more			
Properties	Modules IoT Edge modules are containers that run Azure se services, or your own code. To read data from Edge local shares for processing cloud, add a Module. If multiple containers are de chained together for pipeline processing, go to Az Add module	ervices, third-party y and uploading it to ployed, which are ure IoT Hub.	Triggers Add triggers to start pro such as creation of a file Add trigger	ccessing at a repeated interval or on file events , modification of a file on a share.	
	Edge Shares For container to store or transfer files and folders to Azure Storage account (other than temp data), create a share.	Edge Storage account For container to transfer uns binary, audio, or video streau Storage account, create a sto	itructured data like ming data to Azure orage account.	Persistent volume Individual pods on which modules gets deployed are disposable resources. Use persistent volumes for modules to store and retrieve data (other than temp data).	
	Configure Shares	Configure Storage account			

As you return to the **Overview** page in the Azure Stack Edge resource, you'll see the deployed Edge services that are running.

Home > myasegpudev2 Azure Stack Edge					×
₽ Search (Ctrl+/) «	🚽 Update device 🔞 Reset device pas	sword 🕤 Return device ♡ Feedback 🧵	🛛 Delete 🛛 💍 Refresh		
Overview	▲ ✓ Essentials			View Cost	JSON View
Activity log	Your device is running fine! Deployed edge services				
Diagnose and solve problems	Name	Status			
Settings	Kubernetes	🕑 Running			
🔒 Locks	IoT Edge	🕑 Running			
Properties	Edge services				
Edge services	Dig New New	New	X	4	
Virtual machines	Kubernetes	Virtual machines	loT Edge	Cloud storage gateway	
🕅 IoT Edge	Rapidly build, deliver, and scale	Bring your workloads to the edge that	Manage containerized application at	Seamlessly send your data to Azure	
🖶 Kubernetes	containenzed application at edge.	aren t yet containefized.	edge and integrate with IOT Hub.	storage account.	
Cloud storage gateway					
Monitoring	How to get started?	How to get started?	How to get started?	How to get started?	

Add a persistent volume

PersistentVolume (PV) refers to a piece of storage in the Kubernetes cluster. Kubernetes storage can be statically provisioned as PersistentVolume. It can also be dynamically provisioned as storageclass. For more information, see <u>Storage requirements for Kubernetes</u> pods.

There are two different workflows depending on whether the compute is enabled inline when the share is created.

Compute enabled inline during share creation

On your Azure Stack Edge Pro device, statically provisioned PersistentVolumes are created using the device' storage capabilities. When you provision a share and **Use the share with Edge compute** option is enabled, this action creates a PV resource automatically in the Kubernetes cluster.

Home > myasegpudev > Cloud storage Cloud storage gatew myasegpudev P Search (Ctrl+/) «	gateway vay Shares 日 + Add share 〇 Refresh		Add share myasegpudev Share details Name * [localshare1 ~]	•
 Overview Shares Storage accounts Users Bandwidth 	Name ↑↓ Status myasesmbcloudshare1 ♥ ○ K myasesmblocalshare1 ♥ ○ K	↑↓ Type SMB	Type * ① SMB NFS Use the share with Edge Compute ① Configure as Edge local share ① 🗹	
			Use an Edge local share to process data prior to upload to the cloud. Data in local shares stays on the device. User details All privilege local user Create new Use existing myaseuser	•

To use cloud tiering, you can create an Edge cloud share with the Use the share with Edge compute option enabled. A PV is again created automatically for this share. Any application data that you write to the Edge share is tiered to the cloud.

Home > myasegpudev > Cloud storage	gateway	Add share	×
Cloud storage gatev	vay Shares ⊜	myasegpudev	
✓ Search (Ctrl+/) «	+ Add share 💍 Refresh	Share details Name *	cloudshare1 🗸
Overview	Name ↑↓ Status ↑↓ Ty	Type * 🛈	SMB NFS
Shares	myasesmbcloudshare1 OK St	B Use the share with Edge compute ①	
A Users		Configure as Edge local share	0
💿 Bandwidth		Storage account * 🛈	myasesa 🗸
		Storage service * 🕡	Block Blob 🗸
		Select blob container * (i)	• Create new 🔘 Use existing
			myasenfscloudshare1 🗸
		User details Allow only read operations ①	
		All privilege local user ①	Create new 💿 Use existing
			myaseuser V
		Create	

Compute not enabled inline during share creation

For the shares that were created with the **Use the share with Edge compute option** unchecked, you can add a persistent volume using the following steps.

1. In the Azure portal, go to the Azure Stack Edge resource for your device. Go to Cloud storage gateway > Shares. You can see the that the device currently has share that have the Edge compute option checked.

Home > myasegpudev2 > Cloud storage	e gateway							
Cloud storage gatew	v ay Sha	res ···						×
✓ Search (Ctrl+/) «	+ Add shar	e 🕐 Refresh						
Overview	Name	↑. Status	↑ Type	¢.	Used for compu	Storage account 1	Storage service	Ω
Shares			. to the		s i i i	storage account		
Storage accounts	myasesmocio	udshare1 🥑 OK	SMR		Enabled	mynewsall	BIOCK BIOD	
8 Users	myasesmbloca	alshare1 🔮 OK	SMB		Enabled	-	-	

2. Select + Add share. For this share, make sure that Use the share with Edge compute option is unchecked.

Add share		×
Share details		
Name *	pvshare	\checkmark
Type * 🗊	SMB NFS	
Use the share with Edge compute ①		
Configure as Edge local share	0	
Storage account * 🛈	mytestsa1	\sim
Storage service * 🕠	Block Blob	\sim
Select blob container * 🔅	• Create new • Use existing	
	pvshare	~
User details		
Allow only read operations 🔅		
All privilege local user 🛈	○ Create new	
	myaseuser1	\sim

3. You can see the newly created share in the list of shares and **Used for compute** shows as **Dsiabled**.

Home > myasegpudev2 > Cloud storag	e gateway	7						
Cloud storage gatev	vay Shares							×
✓ Search (Ctrl+/) «	+ Add share (C Refresh						
 Overview 	Name	↑↓ Status	↑↓ Туре	\uparrow_{\downarrow}	Used for compu↑↓	Storage account ↑↓	Storage service ↑↓	,
Shares	myasesmbcloudsha	are1 🥑 OK	SMB		Enabled	mynewsa1	Block Blob	
Storage accounts	myasesmblocalsha	re1 🥑 OK	SMB		Enabled	-	-	
 Ø Users Ø Bandwidth 	pvshare	🕑 ОК	SMB		Disabled	mytestsa1	Block Blob	

4. Go back to the **Azure Stack Edge resource > Overview**. In the right-pane, select the Kubernetes tile.

Home >					
Azure Stack Edge)
	⊍ Update device 🔞 Reset device pa	assword 🕤 Return device ♡ Feedback 🧵	🕽 Delete 🛛 🖒 Refresh		
Overview	Deployed edge services				
Activity log	Name	Status			
Access control (IAM)	Virtual machines	🕑 Running			
Tags	Kubernetes	🛛 Running			
Diagnose and solve problems	IoT Edge	🛛 Running			
ettings					
Locks	Edge services				
Properties	DO New	© New	-57		
Order details	Kubernetes	Virtual machines	LOT Edge	Cloud storage gateway	
lge services	Rapidly build, deliver, and scale	Bring your workloads to the edge that	Manage containerized application at	Seamlessly send your data to Azure	
Virtual machines	containerized application at edge.	aren't yet containerized.	edge and integrate with IoT Hub.	Storage account.	
loT Edge					
Kubernetes	How to get started?	How to get started?	How to get started?	How to get started?	
Cloud storage gateway					

5. In the **Kubernetes > Overview** page, the **Persistent volumes** tile shows two persistent volumes that exist. These volumes were created automatically when the shares were created with **Use the share with Edge compute** enabled. Select **+ Add persistent volume**.

Home > myasegpudev2 > Kubernetes Overvi Arure Stack Edge Pro = 1 (SPU	iew			;
✓ Search (Ctrl+/) «	+ Add Persistent volume 🗎 Remove	🕐 Refresh		
😴 Overview	Kubernetes service is running fine!			
Persistent volumes	Connect Kubernetes clusters to Azure using a	Azure Arc. For IoT specific scer	narios, use azure IoT Edge service. Learn more	
II Properties	Addons 2 No		Persistent volumes	
	Arc configured K8s Manage	🛇 Running	myasesmblocalshare1	
	IoT Edge Service Manage	🕑 Running	myasesmbcloudshare1	
			View all persistent volumes	

6. In the **Add persistent volumes** blade, select the share for which you want to create the persistent volume.

Add Persistent volumes Jse Edge shares to provision storage for application use				×	
✓ Share name $\uparrow \downarrow$	Туре ↑↓	Storage account $\uparrow\downarrow$	Storage service ↑↓	Status ↑↓	
🗸 pvshare	SMB	mytestsa1	Block Blob	🕑 ОК	

7. You'll see a notification that the persistent volume is being created. This operation may take a couple minutes to complete.

Notifications	×
Nore events in the activity $\log \rightarrow$	Dismiss all 🗸
 Adding Persistent Volumes on myasegpudev2. Successfully completed the operation. 	×
	a few seconds ago

8. After the persistent volume is created the Overview page updates to indicate the newly added persistent volume.

Home > myasegpudev2 > Kubernetes Ov Azure Stack Edge Pro - 1 GPU	erview			×
₽ Search (Ctrl+/)	« 🕂 Add Persistent volume 📋 Remov	re 🛛 💍 Refresh		
🖶 Overview	Kubernetes service is running fine	l		
Persistent volumes	Connect Kubernetes clusters to Azure us	ing Azure Arc. For IoT specific	scenarios, use azure IoT Edge service. Learn more	
III Properties	Addons 2 No		Persistent volumes	
	Arc configured K8s Manage	🖉 Running	myasesmblocalshare1	
	IoT Edge Service Manage	🛇 Running	myasesmbcloudshare1	
			View all persistent volumes	

9. Select View all persistent volumes to see the newly created persistent volume.

Home > myasegpudev2 > Kubernetes	ent volumes		×
✓ Search (Ctrl+/) «	+ Add Persistent volume 💍 Refresh		
🖶 Overview	Name 🏦	Accorded chara	
Persistent volumes	Name 14	Associated share 14	
Properties	myasesmblocalshare1	myasesmblocalshare1	Î
	myasesmbcloudshare1	myasesmbcloudshare1	i -
	pvshare	pvshare	Î
	·		

10. You can select the share link corresponding to any persistent volume and view the mount point details.

Home > Kubernetes		mysmbcloudshar vivase2102ase3	re1	\times
Azure Stack Edge Pro - 1 GPU		🖫 Save 🗙 Discard 💍 I	Refresh data 💍 Sync storage keys 📋 Delete	e.
	+ Add Persistent volume 💍 Refresh	Status	ОК	
Overview Persistent volumes	Name ↑↓	Туре	SMB	
Properties	mysmblocalshare1	Mounted (Used for compute)	Enabled	
	mysmbcloudshare1	Storage account	myasesa	
		Storage account container	mysmbcloudshare1	
		Last updated time		
		Last update error logs	-	
		Local mount point for Edge compute modules	mysmbcloudshare1	Ľ
		Select users	myaseuser	~

Manage via Azure Arc enabled Kubernetes

1. Go to Kuberentes > Overview. On the Addons tile, corresponding to Arc configured K8s, select Manage.

Home > myasetest01 > Kubernetes Overv Azure Stack Edge Pro - 1 GPU	/iew ···			×
	🕂 Add Persistent volume 📋 Remove 🛛 💍	Refresh		
Overview Persistent volumes Properties	Kubernetes service is running fine! Connect Kubernetes clusters to Azure using Azure Arc. For IoT specific scenarios, use azure IoT Edge service. Learn more			
	Addons Total No Arc configured K8s IoT Edge Service Configure IoT	Running Ready to set up	sistent volumes ur containers need to store data on the device, use es as persistent volumes. xdd Persistent volume	Edge SMB or NFS
	Edge Shares For container to store or transfer files and folders to Azure Storage account (other than temp data), create a share.	Edge Storage account For container to transfer unstructure binary, audio, or video streaming da Storage account, create a storage ac	Network bandwidth usage d data like If containers uploads data to clo a to Azure configure network bandwidth us count. time-of-day schedules.	oud using shares sage across multiple
	Configure Shares	Configure Storage account	Configure Bandwith schedule	

2. This action takes you to the Azure Arc enabled Kubernetes resource. Select **Enable gitops** integration.

> search (ctrl+/)	Delete O Refresh		
🐮 Overview	▲ ▲ Essentials	View Cost	JSON V
Activity log	Resource group myasegpurg	Last connectivity time 10:24:59 AM, 3/10/2021	
Access control (IAM)	Status Connected	Distribution generic	
Diagnose and solve problems	Location East US	Infrastructure azure_stack_edge	
ettings	Subscription Edge Gateway Test	Agent version 0.2.43	
3 GitOps	Subscription ID	Kubernetes version	
Policies	db4e2tdb-bd80-4e6e-b/cd-/360982/0664	1.17.3	
Properties	Tags (change) Click here to add tags		
Locks	See more		
Monitoring			
Insights (preview)	Set up automatic deployments from a git	View compliance status and set up new policies	
Alerts	repository	for Kubernetes clusters	
	GO to Gitops	Go to rolicles	

For more information, see an example of how to <u>deploy an application on Azure Arc enabled</u> <u>Kubernetes cluster on your device</u>.

Remove Kubernetes service

Perform the following steps in the Azure preview portal to remove the Kubernetes service.

- 1. In your Azure Stack Edge resource, go to Kubernetes > Overview.
- 2. From the top command bar, select **Remove**.

3. Select the configured addons that you want to remove. Both Azure Arc enabled Kubernetes and IoT Edge are addons. If you remove Kubernetes service, both IoT Edge and Azure Arc are automatically removed. The operation is irreversible and can't be undone. Select **OK**.

Azure Stack Edge Pro - 1 GPU	view	×
	 Add Persistent volume Remove Refresh 	
Overview	Remove Kubernetes service	
Persistent volumes	A Removing K8s will remove all configured addons. This operation cannot be undone.	
Properties	🔽 🗸 Kubernetes service	
	Addon: Arc enabled Kubernetes	

Remove IoT Edge service

Perform the following steps in the Azure preview portal to remove the Kubernetes service.

- 1. In your Azure Stack Edge resource, go to IoT Edge > Overview.
- 2. From the top command bar, select Remove.

Home > myasegpudev2 >			
Azure Stack Edge Overview		_	×
	+ Add module + Add trigger 🖔 Refresh configuration 📋 Remove	💍 Refresh	
A Overview	IoT Edge service is running fine!		
8 Modules	Start processing the data using IoT Edge modules. Learn more		
🦘 Triggers			
Properties	Modules	Triggers	
	2 No	1 No	
	cuda-sample1	test1	
	cuda-sample2	View all triggers	
	View all modules		
	If multiple modules needs to deployed, go to Azure IoT Hub.		

The triggers and modules associated with IoT Edge are also removed. You can choose to retain or remove the Kubernetes service entities including the Arc enabled Kubernetes cluster addon.

3. Select OK.

Manage using API

After you enable Kubernetes cloud management on your device, you'll need to use the latest version of the API for IoT Edge role management.

API usage

If you're currently performing IoT Edge role management via API, you should use the new API version. If you're using the current Role API, after you install the upcoming device software version, you must move to the PUT, GET, or DELETE Kubernetes role, followed by the PUT IoT Add-on API.

For the PUT method

The current HTTP request

- The API calls are made at this URI: <u>https://management.azure.com/subscriptions/4385cf00-</u> <u>2d3a-425a-832f-</u> <u>f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.DataBoxEdge/</u> dataBoxEdgeDevices/testedgedevice/roles/IoTRole1?api-version=2019-08-01
- The request body looks like this:

```
{
    "kind": "IOT",
    "properties": {
        "hostPlatform": "Linux",
        "ioTDeviceDetails": {
            "deviceId": "iotdevice",
            "ioTHostHub": "iothub.azure-devices.net",
            "ioTHostHubId": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285blc9dce/resourceGroups/GroupForEdgeAutomation/Microsoft.Devices/Io
tHubs/testrxiothub",
            "authentication":
                "symmetricKey": {
                    "connectionString": {
                        "value": "Encrypted << HostName=iothub.azure-
devices.net;DeviceId=iotDevice;SharedAccessKey=2C750FscEas3JmQ8Bnui5yQW
ZPyml0/UiRt1bQwd8=>>",
                        "encryptionCertThumbprint": "348586569999244",
                        "encryptionAlgorithm": "AES256"
                }
        "ioTEdgeDeviceDetails": {
            "deviceId": "iotEdge",
            "ioTHostHub": "iothub.azure-devices.net",
            "ioTHostHubId": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/Microsoft.Devices/Io
tHubs/testrxiothub",
            "authentication": {
                "symmetricKey": {
                    "connectionString": {
```

The highlighted strings in the preceeding code snippet should be the encrypted value. For more information, see <u>send event sample to Azure IoT Edge_device</u>.

The upcoming HTTP request

The API calls for the Kubernetes role are made at the following URI:
 <u>https://management.azure.com/subscriptions/4385cf00-2d3a-425a-832f-</u>
 <u>f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.DataBoxEdge/dataBoxEdgeDevices/testedgedevice/roles/KubernetesRole1?api-version=2020-12-01</u>

The request body will look like this:

```
"kind": "Kubernetes",
"properties": {
    "hostPlatform": "Linux",
    "kubernetesClusterInfo": {
        "version": "v1.17.3"
     },
     "kubernetesRoleResources": {
        "storage": {
            "endpoints": []
           },
           "compute": {
                "vmProfile": "DS1_v2"
           }
      }
}
```

• The API calls for the IoT Edge add-on are made at the following URI:

https://management.azure.com/subscriptions/4385cf00-2d3a-425a-832ff4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.DataBoxEd ge/dataBoxEdgeDevices/testedgedevice/roles/KubernetesRole1/addons/iotaddon?apiversion=2020-12-01

The request body will look like this:

```
"kind": "IotEdge",
    "properties": {
        "ioTDeviceDetails": {
            "deviceId": "iotdevice",
            "ioTHostHub": "iothub.azure-devices.net",
            "ioTHostHubId": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/Microsoft.Devices
/IotHubs/testrxiothub",
            "authentication": {
                "symmetricKey": {
                    "connectionString": {
                        "value": "Encrypted << HostName=iothub.azure-
devices.net;DeviceId=iotDevice;SharedAccessKey=2C750FscEas3JmQ8Bnui5
yQWZPyml0/UiRt1bQwd8=>>",
                         "encryptionCertThumbprint":
"348586569999244",
                         "encryptionAlgorithm": "AES256"
            }
        },
        "ioTEdgeDeviceDetails": {
            "deviceId": "iotEdge",
            "ioTHostHub": "iothub.azure-devices.net",
            "ioTHostHubId": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/Microsoft.Devices
/IotHubs/testrxiothub",
            "authentication": {
                "symmetricKey": {
                    "connectionString": {
                        "value": "Encrypted << HostName=iothub.azure-
devices.net;DeviceId=iotEdge;SharedAccessKey=2C750FscEas3JmQ8Bnui5yQ
WZPyml0/UiRt1bQwd8=>>",
                        "encryptionCertThumbprint":
"1245475856069999244",
                        "encryptionAlgorithm": "AES256"
                }
            }
        }
    }
}
```

For the GET method

The current HTTP response

- The API calls are made at the following URI:
 <u>https://management.azure.com/subscriptions/4385cf00-2d3a-425a-832f-</u>
 <u>f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.DataBoxEd</u>
 <u>ge/dataBoxEdgeDevices/testedgedevice/roles/IoTRole1?api-version=2019-08-01</u>
- The response body looks like this:

```
"kind": "IOT",
    "properties": {
        "hostPlatform": "Linux",
        "ioTDeviceDetails": {
            "deviceId": "iotdevice",
            "ioTHostHub": "iothub.azure-devices.net",
            "ioTHostHubId": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/Microsoft.Devices/IotHu
bs/testrxiothub",
            "authentication": {
                "symmetricKey": {}
            }
        },
        "ioTEdgeDeviceDetails": {
            "deviceId": "iotEdge",
            "ioTHostHub": "iothub.azure-devices.net",
            "ioTHostHubId": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/Microsoft.Devices/IotHu
bs/testrxiothub",
            "authentication": {
                "symmetricKey": {}
        "shareMappings": [],
        "roleStatus": "Enabled"
    "id": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.Dat
aBoxEdge/dataBoxEdgeDevices/testedgedevice/roles/IoTRole1",
    "name": "IoTRole1",
    "type": "dataBoxEdgeDevices/roles"
}
```

The upcoming HTTP response

• The API calls are made at the following URI:

```
https://management.azure.com/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.DataBoxEdge/
```

dataBoxEdgeDevices/testedgedevice/roles/KubernetesRole1/addons/iotaddon?apiversion=2020-12-01

• The response body looks like this:

```
{
    "kind": "IotEdge",
    "properties": {
        "provisioningState": "Creating",
        "ioTDeviceDetails": {
            "deviceId": "iotdevice",
            "ioTHostHub": "iothub.azure-devices.net",
            "ioTHostHubId": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/Microsoft.Devices/IotHu
bs/testrxiothub",
            "authentication": {
                "symmetricKey": {}
        },
        "ioTEdgeDeviceDetails": {
            "deviceId": "iotEdge",
            "ioTHostHub": "iothub.azure-devices.net",
            "ioTHostHubId": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/Microsoft.Devices/IotHu
bs/testrxiothub",
            "authentication": {
                "symmetricKey": { }
        },
        "version": "0.1.0-beta10"
    },
    "id": "/subscriptions/4385cf00-2d3a-425a-832f-
f4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.Dat
aBoxEdge/dataBoxEdgeDevices/res1/roles/kubernetesRole/addons/iotName",
    "name": " iotName",
    "type": "Microsoft.DataBoxEdge/dataBoxEdgeDevices/roles/addon",
```

For the DELETE method

The current API calls

The API calls are made at the following URI:

https://management.azure.com/subscriptions/4385cf00-2d3a-425a-832ff4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.DataBoxEdge/ dataBoxEdgeDevices/testedgedevice/roles/IoTRole1?api-version=2019-08-01

The upcoming API calls

The API calls are made at the following URI:

https://management.azure.com/subscriptions/4385cf00-2d3a-425a-832ff4285b1c9dce/resourceGroups/GroupForEdgeAutomation/providers/Microsoft.DataBoxEdge/ dataBoxEdgeDevices/testedgedevice/roles/KubernetesRole1/addons/iotaddon?apiversion=2020-12-01