

# ISEC 545 DATA PRIVACY AND SECURITY

## HOS01B – Disk Encryption

06/21/2021 Developed by Mary Oh

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### Before You Start

- Version numbers may not match with the most current version at the time of writing. If given the option to choose between stable release (long-term support) or most recent, please choose the stable release rather than beta-testing version.
- This tutorial targets Windows users and MacOS users.
- There might be subtle discrepancies along the steps. Please use your best judgement while going through this cookbook style tutorial to complete each step.
- For your working directory, use your course number. This tutorial may use a different course number as an example.
- The directory path shown in screenshots may be different from yours.
- If you are not sure what to do or confused with any steps:
  - Consult the resources listed below.
  - If you cannot solve the problem after a few tries, ask a TA for help.

### Learning Outcomes

- Learn how to encrypt disk

### Resources

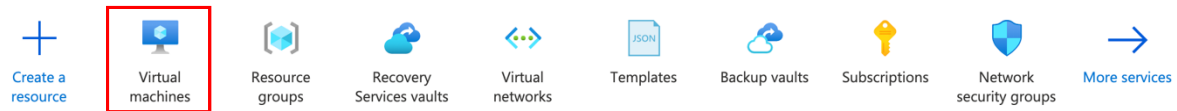
- Azure - <https://docs.microsoft.com/en-us/>

1. Login to your Azure portal.

## Creating a VM

1. On your portal, locate and select Virtual Machine. If it's not listed under the Azure Services, select More services, locate, and select Virtual Machine.

### Azure services



2. Create Virtual Machine.

[Home](#) >

# Virtual machines

City University of Seattle (cityuseattle.onmicrosoft.com)

[+ Create](#) [Switch to classic](#) [Reservations](#) [Mar](#)

[+ Virtual machine](#)

[+ Start with a preset configuration](#)

Showing 0 to 0 of 0 records.

3. Fill out the information. If you use your CityU email to create the account, your subscription should be defaulted to Azure for Students.
4. Create new Resource Group called ISEC545.

## Create a virtual machine

[Basics](#) [Disks](#) [Networking](#) [Management](#) [Advanced](#) [Tags](#) [Review + create](#)

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* [?](#) [Azure for Students](#)

Resource group \* [?](#) [\(New\) Resource group](#)

[Create new](#)

### Instance details

Virtual machine name \* [?](#)

Region \* [?](#)

Availability options [?](#)

Image \* [?](#)

A resource group is a container that holds related resources for an Azure solution.

Name \*

isec545

OK

Cancel

[See all images](#)

5. Use the following information to create your VM. Don't worry about the cost, you get \$100 credit with the Azure Student and we will delete all our resources after. Please ensure you are using Azure Student account or a free tier account, otherwise you might incur fees.

## Create a virtual machine ...


### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *	<div>①</div>	<div>Azure for Students</div>	▼
Resource group *	<div>①</div>	<div>isec545</div>	▼

[Create new](#)

### Instance details

Virtual machine name *	<div>①</div>	<div>hos01-sample</div>	✓
Region *	<div>①</div>	<div>(US) West US 2</div>	▼
Availability options	<div>①</div>	<div>No infrastructure redundancy required</div>	▼
Image *	<div>①</div>	<div> Windows Server 2016 Datacenter - Gen1</div>	▼
		<a href="#">See all images</a>	
Azure Spot instance	<div>①</div>	<input type="checkbox"/>	
Size *	<div>①</div>	<div>Standard_D2s_v3 - 2 vcpus, 8 GiB memory (\$137.24/month)</div>	▼
		<a href="#">See all sizes</a>	

6. Under Administrator account, create a username and password.
7. Select none for the inbound port rules. We don't need to allow access to our VM since we are creating this as pre-requisite to disk encryption.

## Create a virtual machine ...

### Administrator account

Username \* ⓘ  ✓

Password \* ⓘ  ✓

Confirm password \* ⓘ  ✓

### Inbound port rules

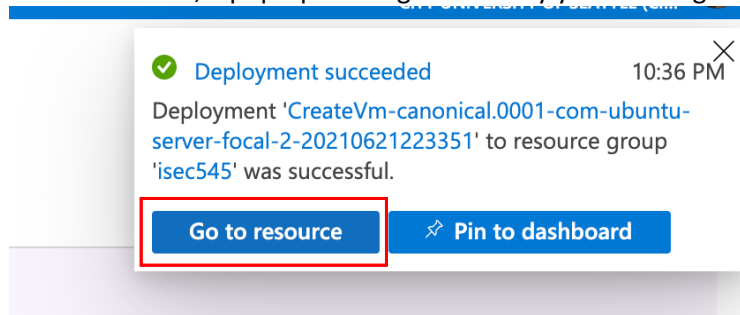
Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports \* ⓘ ☒ None ☐ Allow selected ports

Select inbound ports  ▼

**i** All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

8. Review and create.
9. Once the resource is created, a pop-up message will notify you. Select go to resource.



## Encrypt the Virtual Machine

1. Under the menu towards the left, select Disks, and select Additional Settings.

[Home](#) > [hos01-sample](#)

Virtual machine

Search (Cmd+/) << Save Discard Refresh Additional settings

Overview  
Activity log  
Access control (IAM)  
Tags  
Diagnose and solve problems

Settings

Networking  
Connect  
Disks  
Size

OS disk

Swap OS disk

Disk name	Storage type	Size (GiB)
<a href="#">hos01-sample_disk1_5e7fcb761</a>	Premium SSD LRS	30

Data disks

Filter by name

Showing 0 of 0 attached data disks

+ Create and attach a new disk Attach existing disks

2. Under Encryption Settings > Disks to Encrypt, select OS and data disk.
3. Under Key Vault, select Create New.

### Encryption settings

Azure Disk Encryption (ADE) provides volume encryption for the OS and data disks. [Learn more about Azure Disk Encryption.](#)

Disks to encrypt ⓘ

OS and data disks

Azure Disk Encryption is integrated with Azure Key Vault to help manage encryption keys. As a prerequisite, you need to have an existing key vault with encryption permissions set. For additional security, you can create or choose an optional key encryption key to protect the secret.

Key Vault \* ⓘ

Select a key vault

[Create new](#)

Key ⓘ

Select a key

Version ⓘ

Select a key version

4. On the Create Key Vault screen, ensure the resource group is isec545, and use key vault name hos01-key-vault.

## Create key vault ...

Azure Key Vault is a cloud service used to manage keys, secrets, and certificates. Key Vault eliminates the need for developers to store security information in their code. It allows you to centralize the storage of your application secrets which greatly reduces the chances that secrets may be leaked. Key Vault also allows you to securely store secrets and keys backed by Hardware Security Modules or HSMs. The HSMs used are Federal Information Processing Standards (FIPS) 140-2 Level 2 validated. In addition, key vault provides logs of all access and usage attempts of your secrets so you have a complete audit trail for compliance.

### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *	Azure for Students
Resource group *	isec545

[Create new](#)

### Instance details

Key vault name * ⓘ	hos01-key-vault ✓
Region *	West US 2
Pricing tier * ⓘ	Standard

- Under Access Policies tab, check the Azure Disk Encryption for volume encryption box.

## Create key vault ...

Basics Access policy Networking Tags Review + create

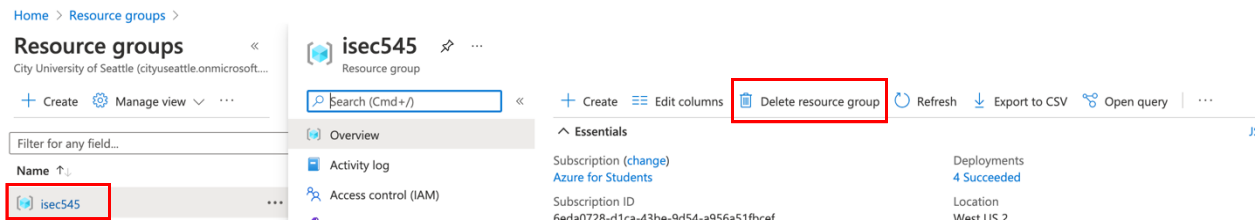
Enable Access to:

- ☐ Azure Virtual Machines for deployment ⓘ
- ☐ Azure Resource Manager for template deployment ⓘ
- ☒ Azure Disk Encryption for volume encryption ⓘ

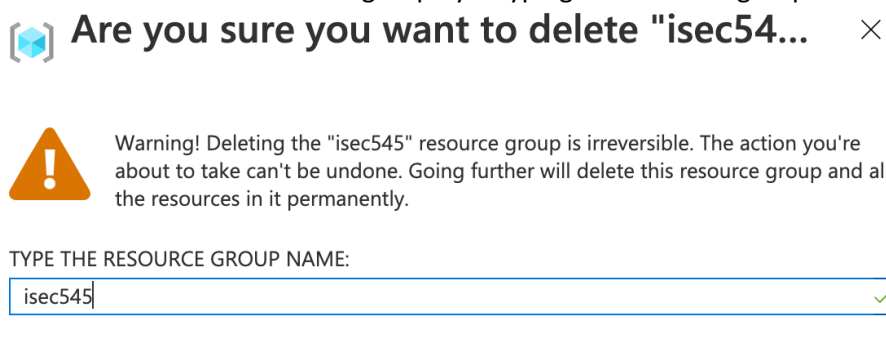
- Review and create.
- After the key vault has passed validation, select create. This will return you to the Select key from Azure Key Vault screen.
- Leave the key field blank. It shouldn't be available for you as well.
- Click save.

## Delete your resources

1. Click Home on the top left corner.
2. On your portal, locate and select Resource Groups. If it's not listed under the Azure Services, select More services, locate, and select Resource Groups.
3. Under Resource Group > isec545, click delete resource group. This should delete all resources under this resource group.



4. Confirm the deletion of the resource group by retyping the resource group name.



5. Ensure resource group is deleted before logging out to avoid incurring any fees.

## Consider these questions for your report:

1. What is resource group?
2. What is virtual machine?
3. What is key vault?
4. What is encryption?
5. Why is encryption important?
6. When to use encryption? Why?

## Push your work to GitHub

1. Open your terminal. Make sure you are in the right path.
2. Type the following command:

`git add .` (to copy all changes you have made)

`git commit -m "Submission for H0S01 - YourName"` (To add a message to your submission)

`git push origin master` (to upload your work to Github)