SINGAPORE INSTITUTE OF TECHNOLOGY

ICT3102 Performance Testing and Optimisation

D2: Application User Guide

AY2021/2022, Trimester 1

User Guide For QA Team

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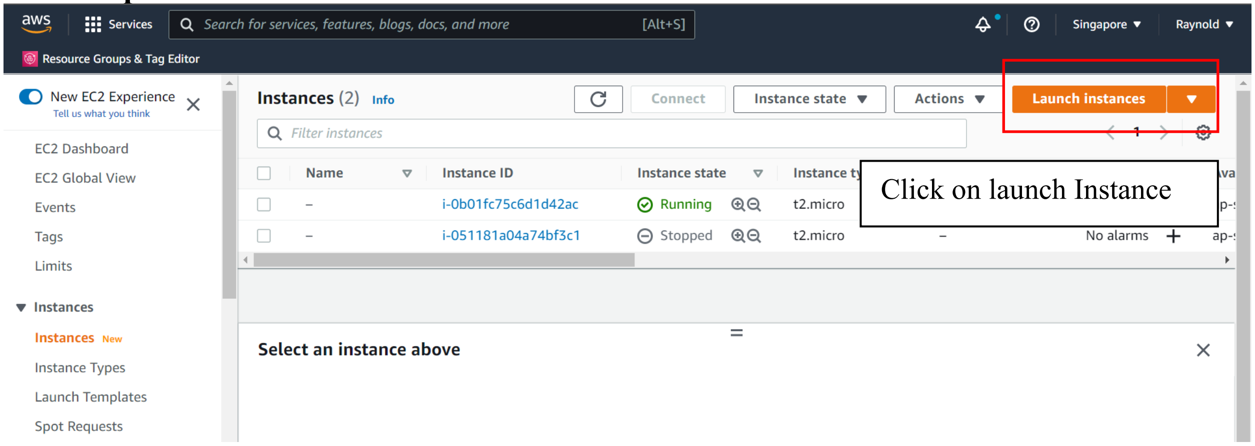
1. Setup for testing environment on AWS

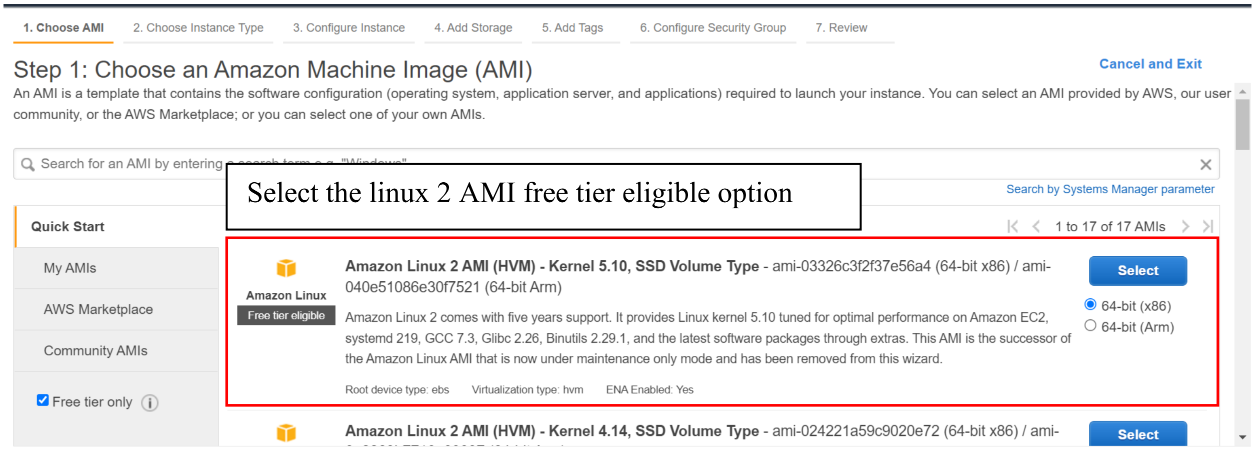
1.1 Setup new VM Instance



□	Name	Instance ID	Instance state	Instance ty			
□	–	i-0b01fc75c6d1d42ac	Running	t2.micro			p-s
□	–	i-051181a04a74bf3c1	Stopped	t2.micro	–	No alarms	ap-s

Select an instance above

Click on launch Instance



Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

☑ Free tier only

Amazon Linux
Free tier eligible

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type - ami-03326c3f2f37e56a4 (64-bit x86) / ami-040e51086e30f7521 (64-bit Arm)

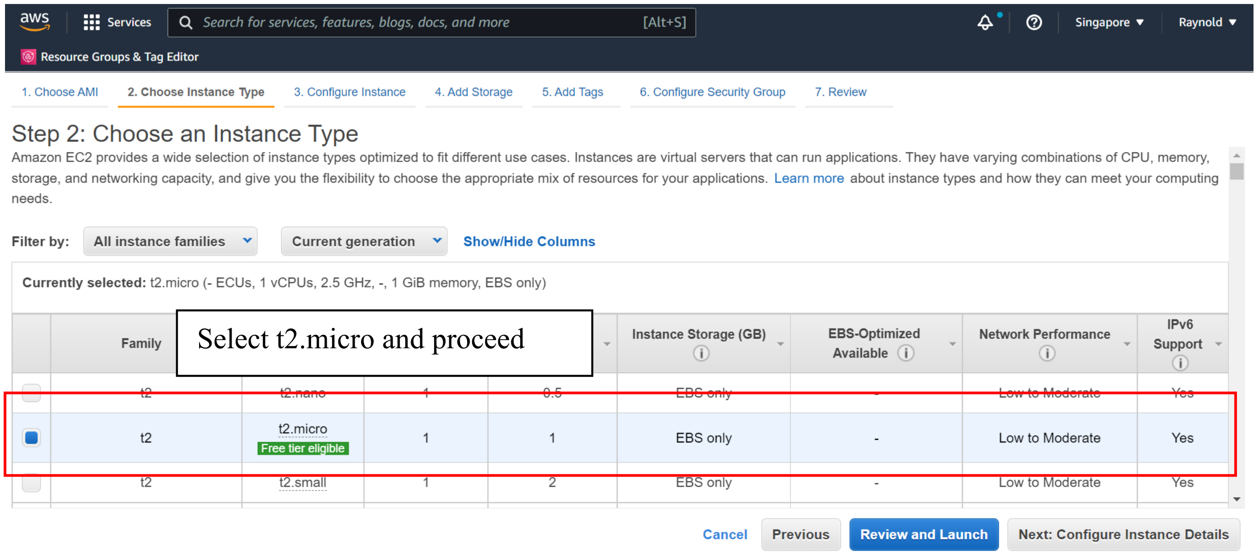
Amazon Linux 2 comes with five years support. It provides Linux kernel 5.10 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras. This AMI is the successor of the Amazon Linux AMI that is now under maintenance only mode and has been removed from this wizard.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

● 64-bit (x86)
○ 64-bit (Arm)

Amazon Linux 2 AMI (HVM) - Kernel 4.14, SSD Volume Type - ami-024221a59c9020e72 (64-bit x86) / ami-

Select the linux 2 AMI free tier eligible option



Step 2: Choose an Instance Type

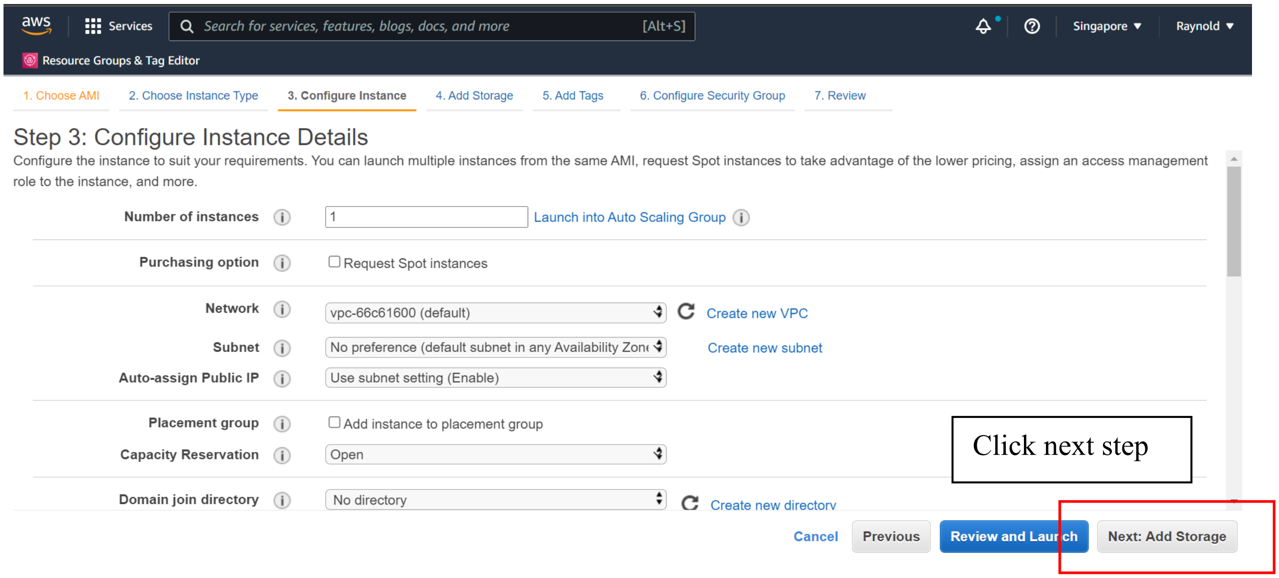
Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. Learn more about instance types and how they can meet your computing needs.

Filter by: All instance families, Current generation

Currently selected: t2.micro (- ECUs, 1 vCPUs, 2.5 GHz, -, 1 GiB memory, EBS only)

	Family				Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
□	t2	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
■	t2	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
□	t2	t2.small	1	2	EBS only	-	Low to Moderate	Yes

Select t2.micro and proceed

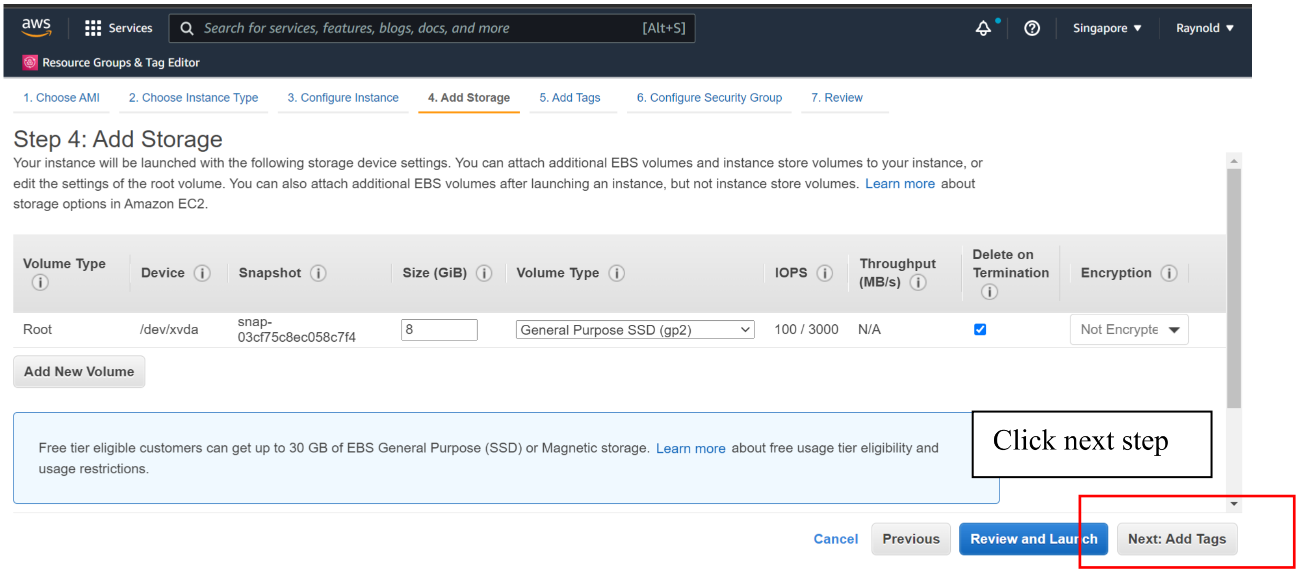


Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances	1 Launch into Auto Scaling Group
Purchasing option	□ Request Spot instances
Network	vpc-66c61600 (default) Create new VPC
Subnet	No preference (default subnet in any Availability Zone Create new subnet
Auto-assign Public IP	Use subnet setting (Enable)
Placement group	□ Add instance to placement group
Capacity Reservation	Open
Domain join directory	No directory Create new directory

Click next step



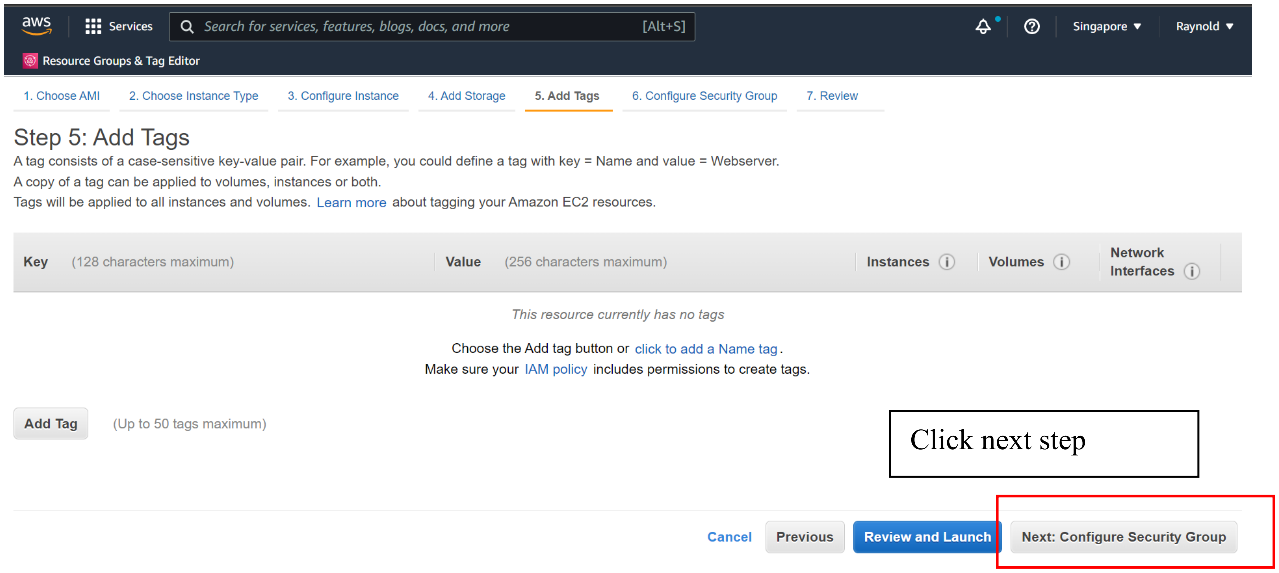
Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. Learn more about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encryption
Root	/dev/xvda	snap-03cf75c8ec058c7f4	8	General Purpose SSD (gp2)	100 / 3000	N/A	☑	Not Encrypte

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. Learn more about free usage tier eligibility and usage restrictions.

Click next step



Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver.
A copy of a tag can be applied to volumes, instances or both.
Tags will be applied to all instances and volumes. Learn more about tagging your Amazon EC2 resources.

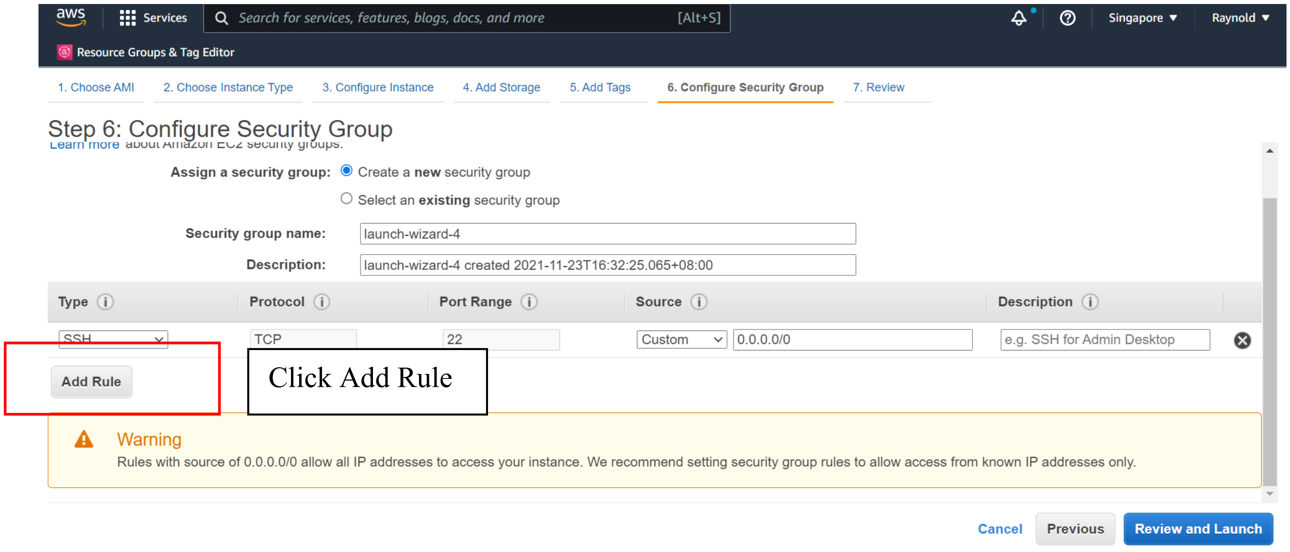
Key (128 characters maximum)	Value (256 characters maximum)	Instances	Volumes	Network Interfaces

This resource currently has no tags

Choose the Add tag button or click to add a Name tag.
Make sure your IAM policy includes permissions to create tags.

(Up to 50 tags maximum)

Click next step



Step 6: Configure Security Group

Learn more about Amazon EC2 security groups.

Assign a security group: ● Create a **new** security group
○ Select an **existing** security group

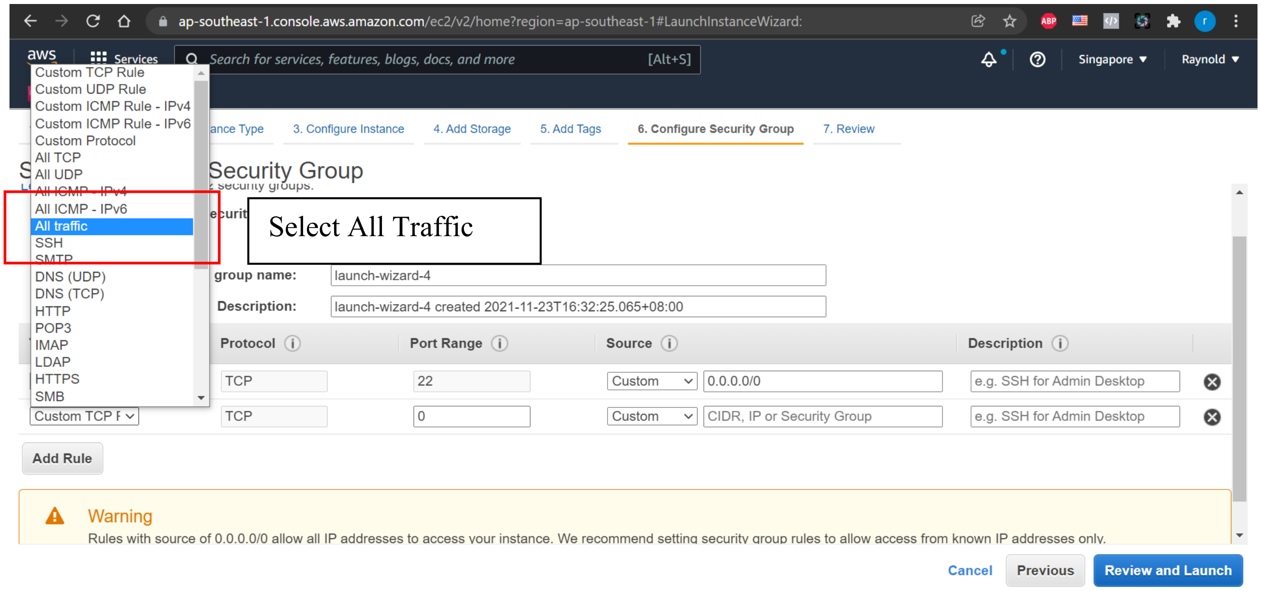
Security group name: launch-wizard-4

Description: launch-wizard-4 created 2021-11-23T16:32:25.065+08:00

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop

Warning
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Click Add Rule



ap-southeast-1.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-1#LaunchInstanceWizard:

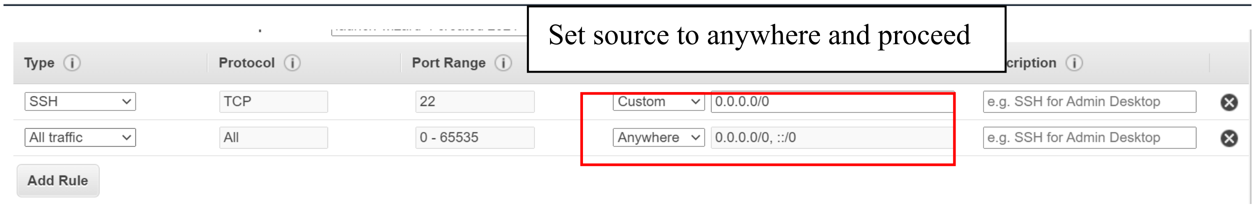
Security group name: launch-wizard-4

Description: launch-wizard-4 created 2021-11-23T16:32:25.065+08:00

Type	Protocol	Port Range	Source	Description
	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop
Custom TCP R	TCP	0	Custom CIDR, IP or Security Group	e.g. SSH for Admin Desktop

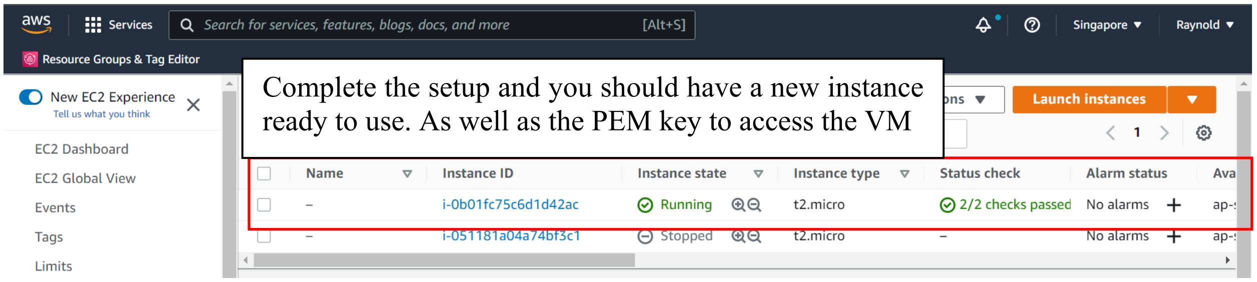
Warning
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Select All Traffic



Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop
All traffic	All	0 - 65535	Anywhere 0.0.0.0/0, ::/0	e.g. SSH for Admin Desktop

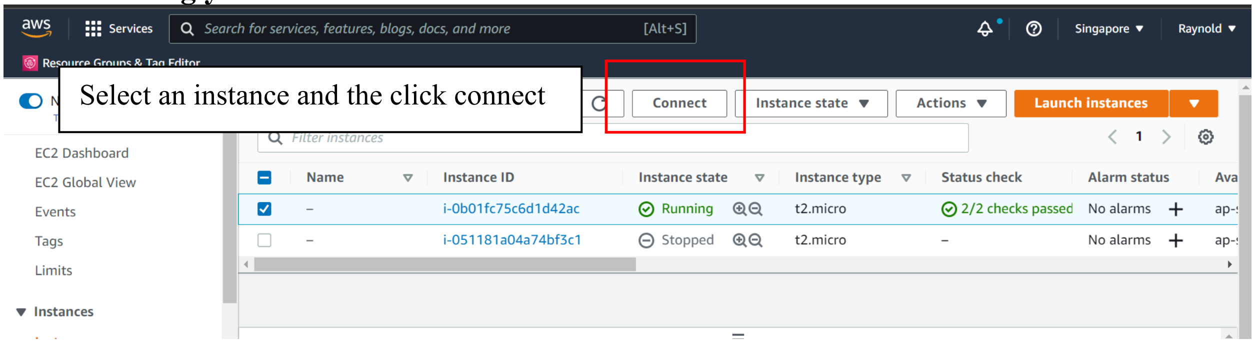
Set source to anywhere and proceed



Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Ava
–	i-0b01fc75c6d1d42ac	Running	t2.micro	2/2 checks passed	No alarms	ap-s
–	i-051181a04a74bf3c1	Stopped	t2.micro	–	No alarms	ap-s

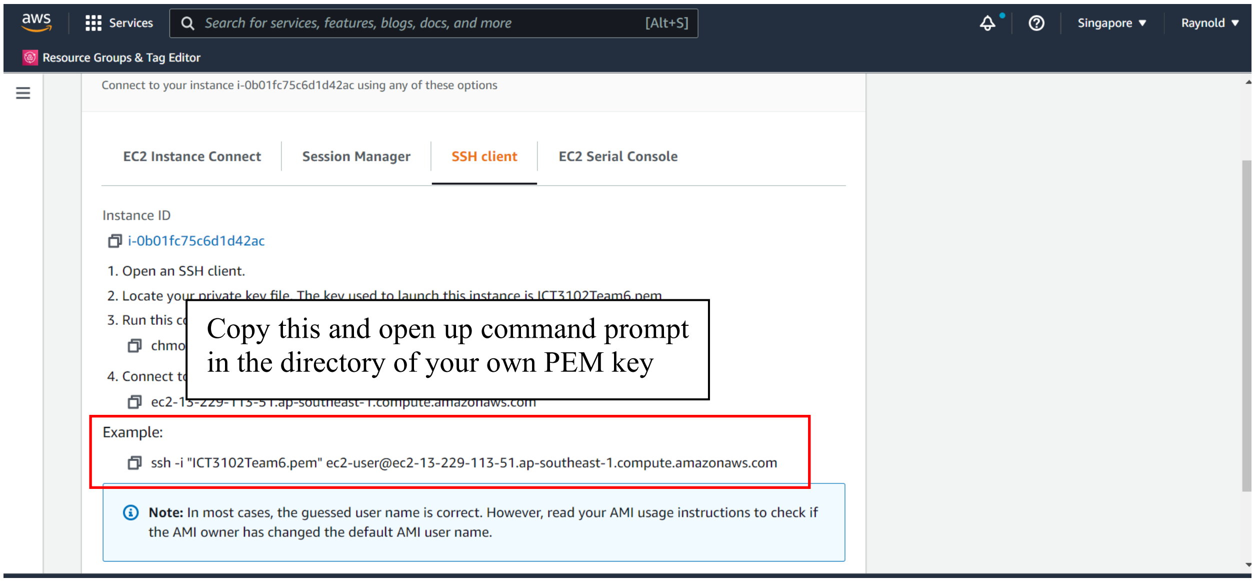
Complete the setup and you should have a new instance ready to use. As well as the PEM key to access the VM

1.2 Accessing your AWS Instance



Select an instance and the click connect

☐	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Ava
☑	–	i-0b01fc75c6d1d42ac	Running	t2.micro	2/2 checks passed	No alarms	ap-
☐	–	i-051181a04a74bf3c1	Stopped	t2.micro	–	No alarms	ap-



Connect to your instance i-0b01fc75c6d1d42ac using any of these options

Instance ID

i-0b01fc75c6d1d42ac

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is ICT3102Team6.pem.
3. Run this c
   chmo
4. Connect t
   ec2-13-229-113-51.ap-southeast-1.compute.amazonaws.com

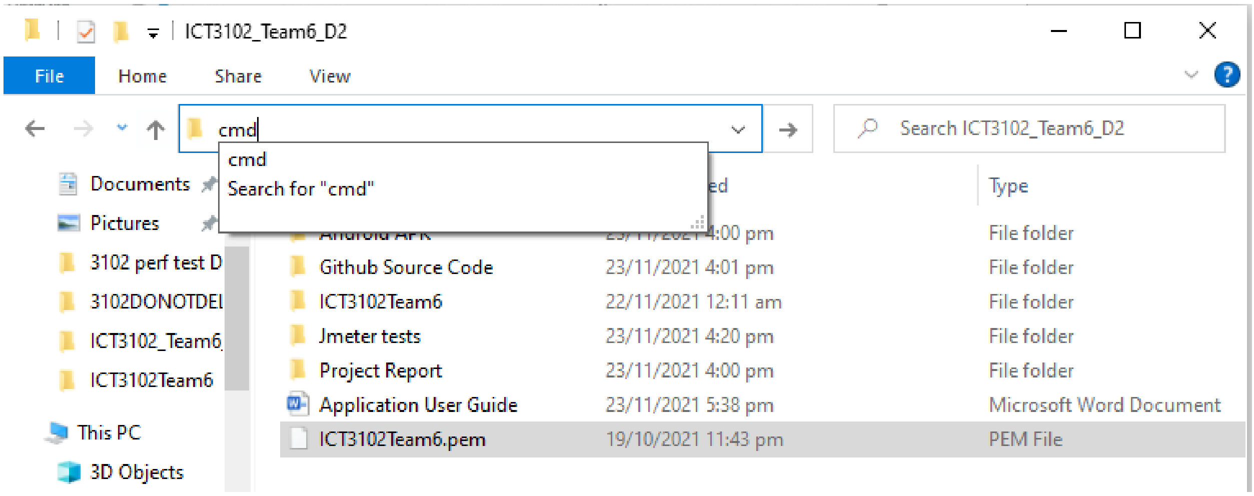
Copy this and open up command prompt in the directory of your own PEM key

Example:

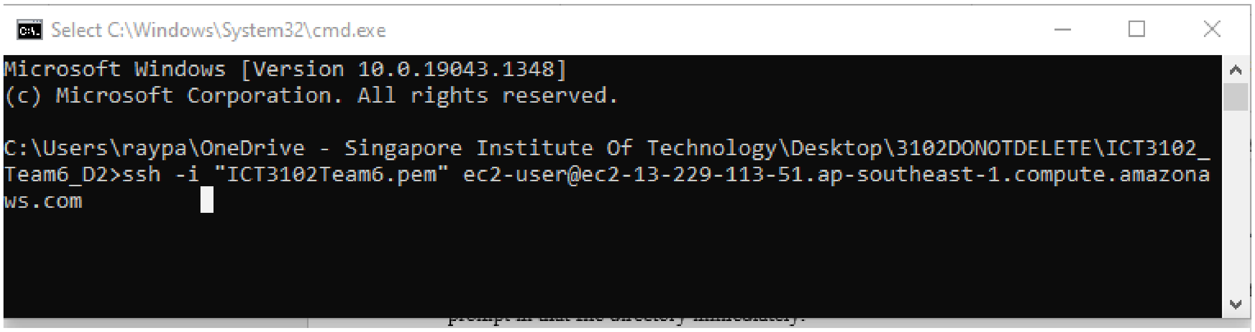
```
ssh -i "ICT3102Team6.pem" ec2-user@ec2-13-229-113-51.ap-southeast-1.compute.amazonaws.com
```

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

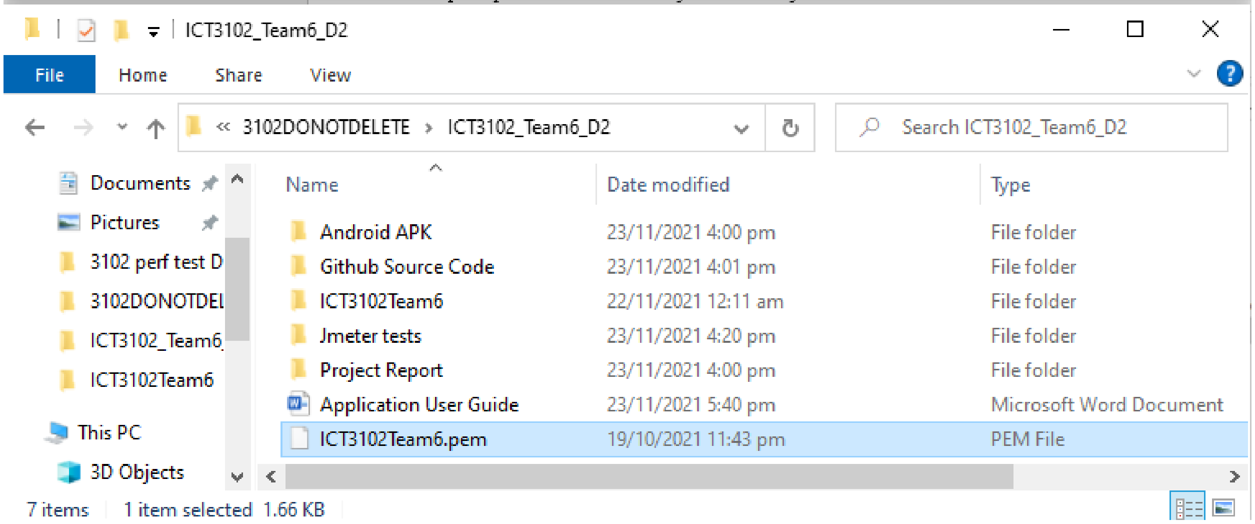
Alternatively, your can run cmd in the directory of your window with the PEM key to open the command prompt in that file directory immediately.



Name	ed	Type
Android APK	23/11/2021 4:00 pm	File folder
Github Source Code	23/11/2021 4:01 pm	File folder
ICT3102Team6	22/11/2021 12:11 am	File folder
Jmeter tests	23/11/2021 4:20 pm	File folder
Project Report	23/11/2021 4:00 pm	File folder
Application User Guide	23/11/2021 5:38 pm	Microsoft Word Document
ICT3102Team6.pem	19/10/2021 11:43 pm	PEM File

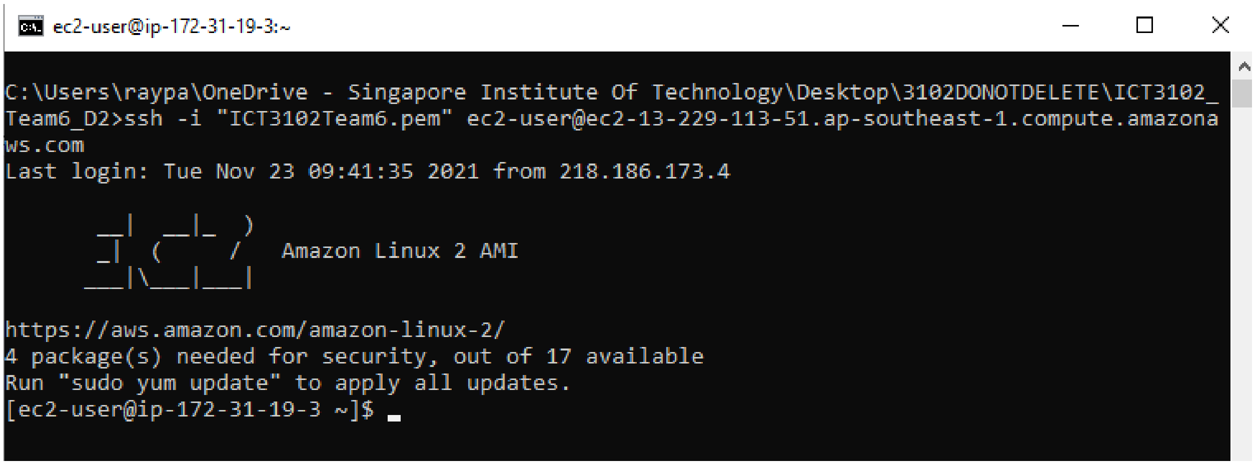


```
Microsoft Windows [Version 10.0.19043.1348]
(c) Microsoft Corporation. All rights reserved.

C:\Users\raypa\OneDrive - Singapore Institute Of Technology\Desktop\3102DONOTDELETE\ICT3102_
Team6_D2>ssh -i "ICT3102Team6.pem" ec2-user@ec2-13-229-113-51.ap-southeast-1.compute.amazona
ws.com
```



Name	Date modified	Type
Android APK	23/11/2021 4:00 pm	File folder
Github Source Code	23/11/2021 4:01 pm	File folder
ICT3102Team6	22/11/2021 12:11 am	File folder
Jmeter tests	23/11/2021 4:20 pm	File folder
Project Report	23/11/2021 4:00 pm	File folder
Application User Guide	23/11/2021 5:40 pm	Microsoft Word Document
ICT3102Team6.pem	19/10/2021 11:43 pm	PEM File

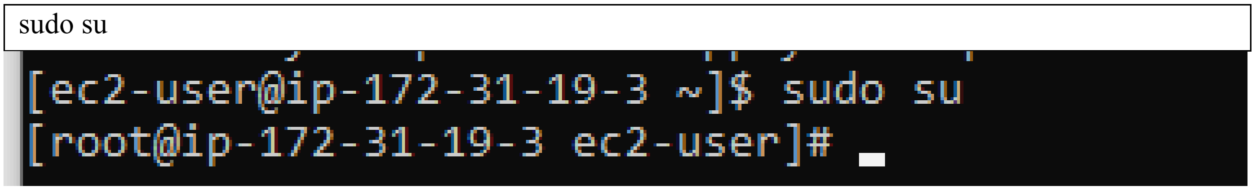
You should see the following screen.



```
C:\Users\raypa\OneDrive - Singapore Institute Of Technology\Desktop\3102DONOTDELETE\ICT3102_
Team6_D2>ssh -i "ICT3102Team6.pem" ec2-user@ec2-13-229-113-51.ap-southeast-1.compute.amazona
ws.com
Last login: Tue Nov 23 09:41:35 2021 from 218.186.173.4

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
4 package(s) needed for security, out of 17 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-19-3 ~]$
```

Do enable the following command to perform as admin. **All following instructions should be run with admin permission.**

```
sudo su
```



```
[ec2-user@ip-172-31-19-3 ~]$ sudo su
[root@ip-172-31-19-3 ec2-user]#
```

1.3 Install Git

Git is required in the project for our bash script to pull the GitHub repository files

```
sudo yum update -y
yum install git
```

1.4 Installing Docker Engine and Docker Compose

If your system already has Docker Engine and Docker Compose installed, you may skip this steps

Update Yum and install docker

```
sudo yum update -y
sudo yum install docker
```

To start Docker you can run the following command

```
sudo service docker start
```

Installation steps for Linux on https://docs.docker.com/compose/install/

Follow the 3 steps to add docker compose configurations into the VM. If that doesn't work, you can try copy directly from the link provided for linux setups.

```
sudo curl -L "https://github.com/docker/compose/releases/download/1.29.2/docker-compose-$(uname -s)-$(uname -m)" -o /usr/local/bin/docker-compose
```

```
sudo chmod +x /usr/local/bin/docker-compose
```

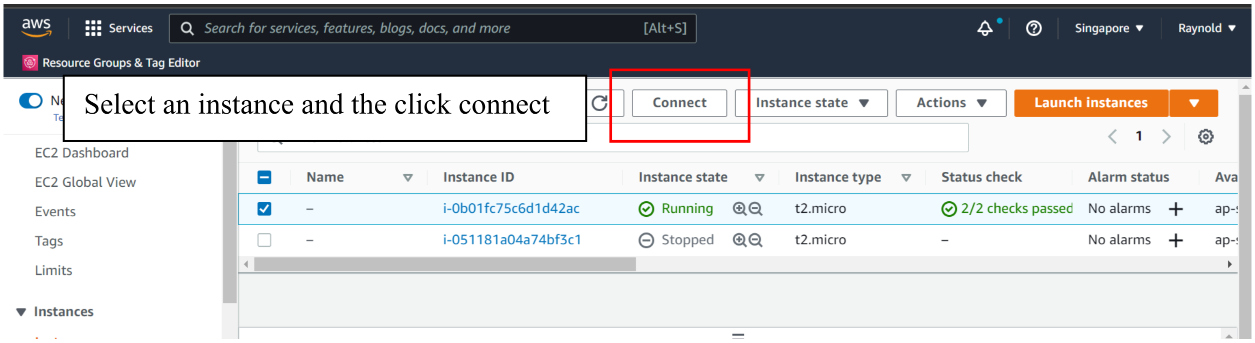
```
sudo ln -s /usr/local/bin/docker-compose /usr/bin/docker-compose
```

Check if docker compose is correctly installed into the system

```
docker-compose --version
```

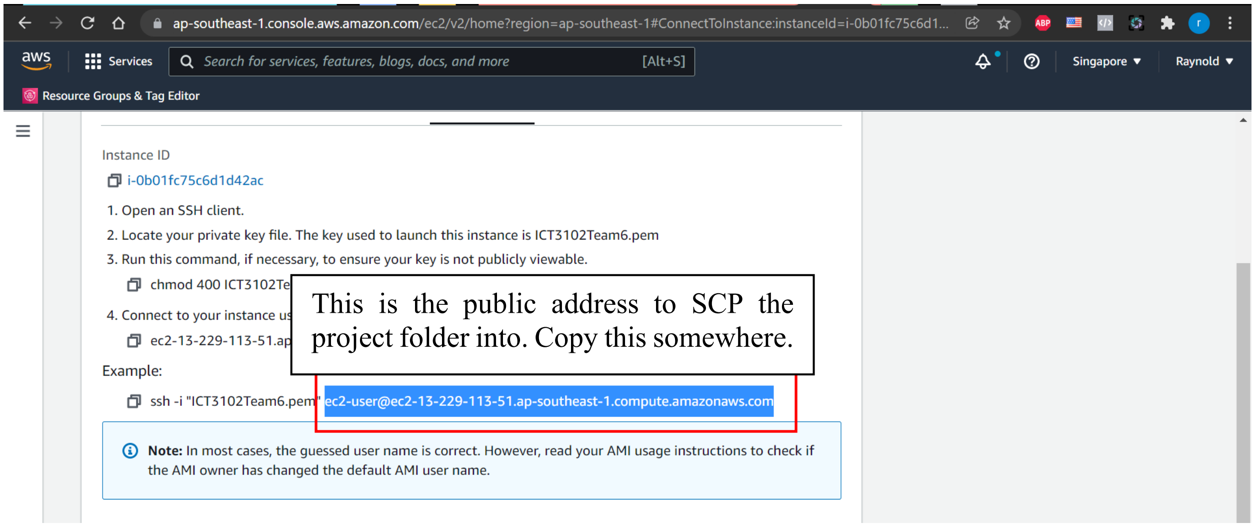
1.5 How to copy project folder into AWS instance

You will need to copy over the **ICT3102Team6** folder into the AWS instance. To do that you will need to have your PEM key as well as your AWS instance public address. Follow the steps to know what is your public addres.



Select an instance and the click connect

☐	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Ava
☑	–	i-0b01fc75c6d1d42ac	Running	t2.micro	2/2 checks passed	No alarms	ap-s
☐	–	i-051181a04a74bf3c1	Stopped	t2.micro	–	No alarms	ap-s



ap-southeast-1.console.aws.amazon.com/ec2/v2/home?region=ap-southeast-1#ConnectToInstance:instanceId=i-0b01fc75c6d1...
aws
Services
Search for services, features, blogs, docs, and more [Alt+S]
Singapore
Raynold
Resource Groups & Tag Editor

Instance ID

i-0b01fc75c6d1d42ac

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is ICT3102Team6.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.

```
chmod 400 ICT3102Te
```

4. Connect to your instance us

```
ec2-13-229-113-51.ap
```

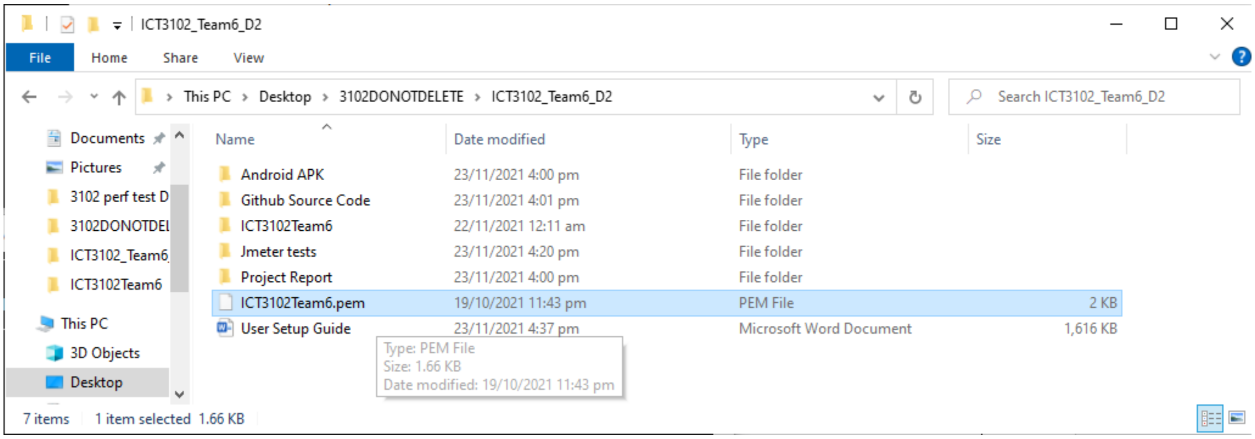
Example:

```
ssh -i "ICT3102Team6.pem" ec2-user@ec2-13-229-113-51.ap-southeast-1.compute.amazonaws.com
```

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

This is the public address to SCP the project folder into. Copy this somewhere.

Next, add your PEM access key used to access your AWS instance into the project folder containing the ICT3102Team6 folder.

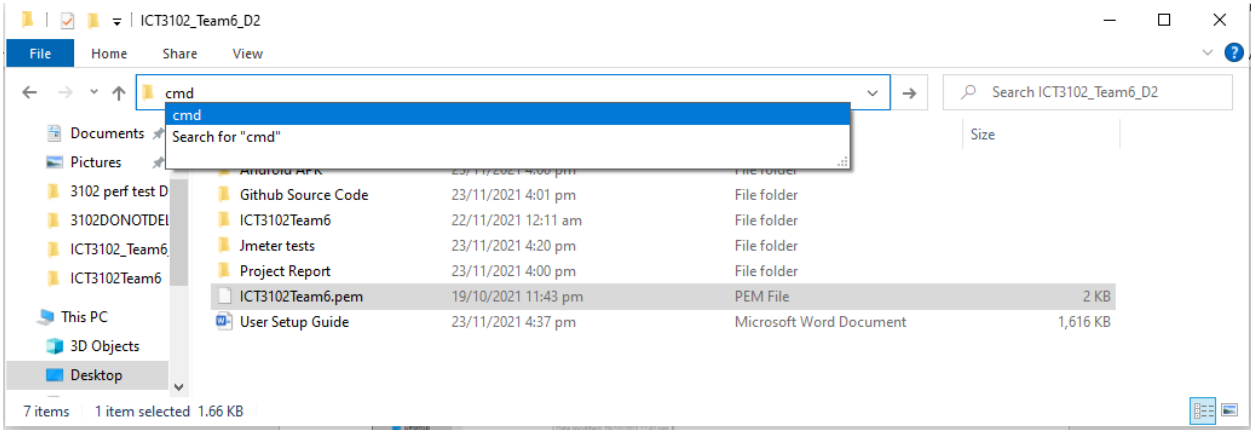


Name	Date modified	Type	Size
Android APK	23/11/2021 4:00 pm	File folder	
Github Source Code	23/11/2021 4:01 pm	File folder	
ICT3102Team6	22/11/2021 12:11 am	File folder	
Jmeter tests	23/11/2021 4:20 pm	File folder	
Project Report	23/11/2021 4:00 pm	File folder	
ICT3102Team6.pem	19/10/2021 11:43 pm	PEM File	2 KB
User Setup Guide	23/11/2021 4:37 pm	Microsoft Word Document	1,616 KB

Type: PEM File
Size: 1.66 KB
Date modified: 19/10/2021 11:43 pm

7 items 1 item selected 1.66 KB

In the directory, type in cmd to open the command prompt in this folder



Android APK	23/11/2021 4:00 pm	File folder	
Github Source Code	23/11/2021 4:01 pm	File folder	
ICT3102Team6	22/11/2021 12:11 am	File folder	
Jmeter tests	23/11/2021 4:20 pm	File folder	
Project Report	23/11/2021 4:00 pm	File folder	
ICT3102Team6.pem	19/10/2021 11:43 pm	PEM File	2 KB
User Setup Guide	23/11/2021 4:37 pm	Microsoft Word Document	1,616 KB

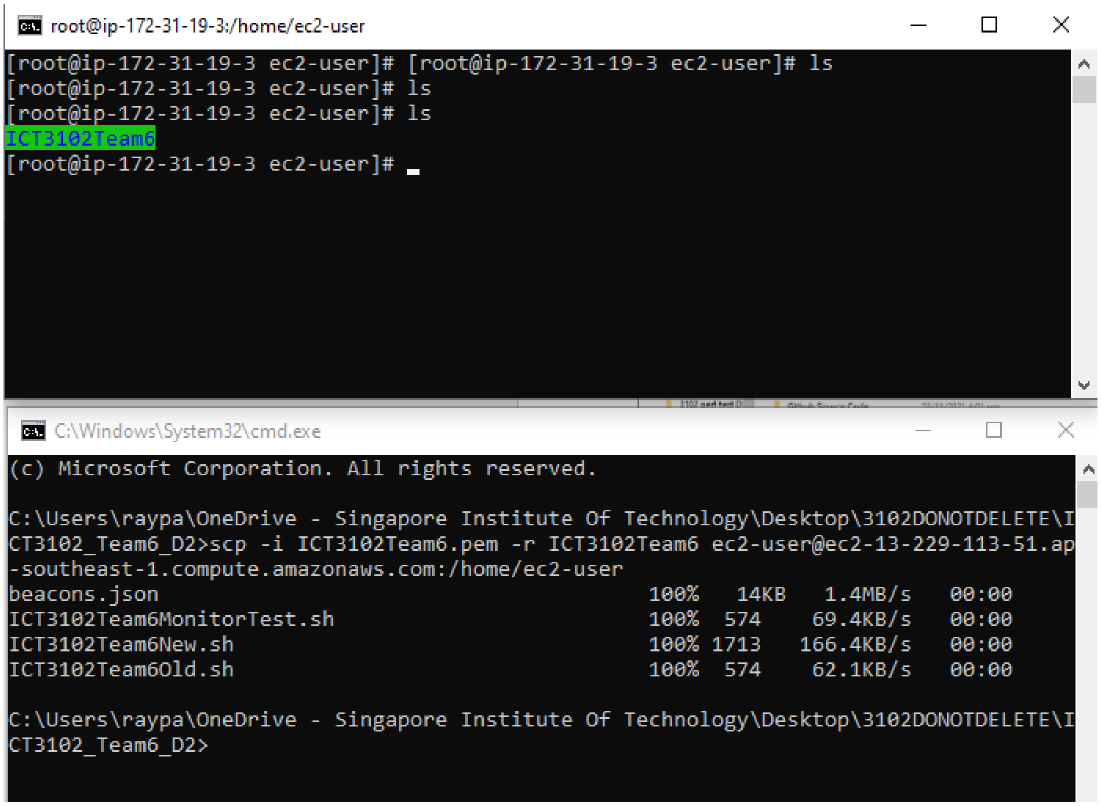
Run the following command with your public address and PEM. This will copy over the ICT3102Team6 project folder into the AWS instance.

Example:

scp -i ICT3102Team6.pem -r ICT3102Team6 ec2-user@ec2-13-229-113-51.ap-southeast-1.compute.amazonaws.com:/home/ec2-user

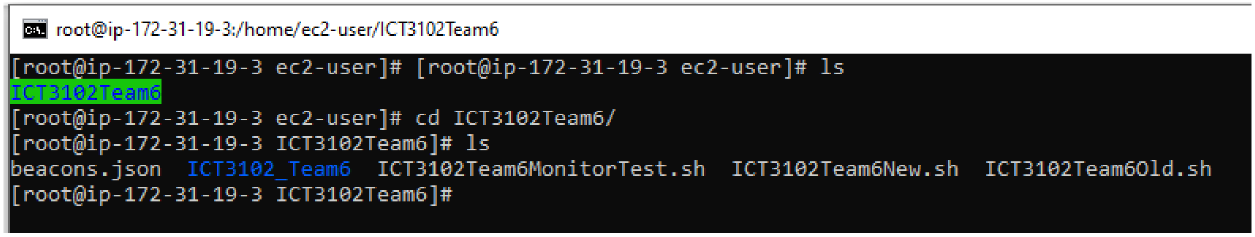
scp -i <<**your AWS access key**>> -r ICT3102Team6 <<**your AWS public address**>>:/home/ec2-user

After running the command successfully, you should be able to see the folder in your VM.


root@ip-172-31-19-3:/home/ec2-user
C:\Windows\System32\cmd.exe

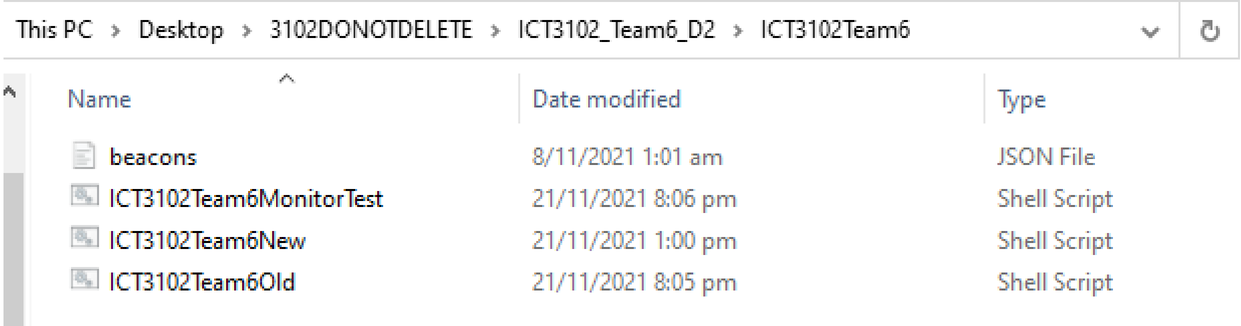
```
[root@ip-172-31-19-3 ec2-user]# [root@ip-172-31-19-3 ec2-user]# ls
[root@ip-172-31-19-3 ec2-user]# ls
[root@ip-172-31-19-3 ec2-user]# ls
ICT3102Team6
[root@ip-172-31-19-3 ec2-user]#
```

```
(c) Microsoft Corporation. All rights reserved.

C:\Users\raypa\OneDrive - Singapore Institute Of Technology\Desktop\3102DONOTDELETE\I
CT3102_Team6_D2>scp -i ICT3102Team6.pem -r ICT3102Team6 ec2-user@ec2-13-229-113-51.ap
-southeast-1.compute.amazonaws.com:/home/ec2-user
beacons.json                                       100%   14KB   1.4MB/s   00:00
ICT3102Team6MonitorTest.sh                         100%  574    69.4KB/s   00:00
ICT3102Team6New.sh                                 100% 1713   166.4KB/s   00:00
ICT3102Team6Old.sh                                 100%  574    62.1KB/s   00:00

C:\Users\raypa\OneDrive - Singapore Institute Of Technology\Desktop\3102DONOTDELETE\I
CT3102_Team6_D2>
```



```
root@ip-172-31-19-3:/home/ec2-user/ICT3102Team6
[root@ip-172-31-19-3 ec2-user]# [root@ip-172-31-19-3 ec2-user]# ls
ICT3102Team6
[root@ip-172-31-19-3 ec2-user]# cd ICT3102Team6/
[root@ip-172-31-19-3 ICT3102Team6]# ls
beacons.json  ICT3102_Team6  ICT3102Team6MonitorTest.sh  ICT3102Team6New.sh  ICT3102Team6Old.sh
[root@ip-172-31-19-3 ICT3102Team6]#
```

Change directory into the ICT3102Team6 folder and it should consist of the beacons.json file and 3 bash files to build our application.



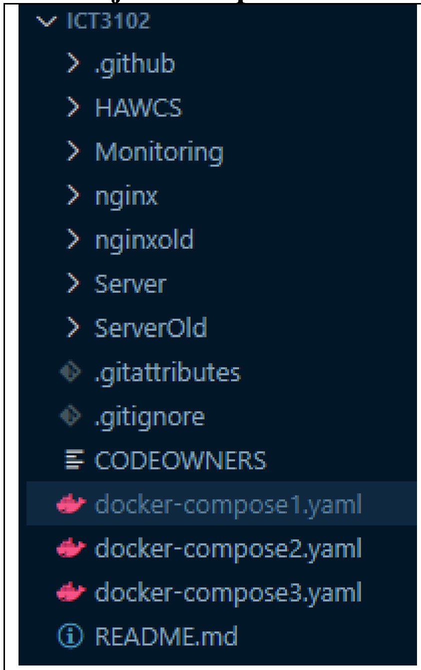
This PC › Desktop › 3102DONOTDELETE › ICT3102_Team6_D2 › ICT3102Team6

Name	Date modified	Type
beacons	8/11/2021 1:01 am	JSON File
ICT3102Team6MonitorTest	21/11/2021 8:06 pm	Shell Script
ICT3102Team6New	21/11/2021 1:00 pm	Shell Script
ICT3102Team6Old	21/11/2021 8:05 pm	Shell Script

These are the files in the project folder. We will be running each bash file individually in the following step.

2. Flask Server Setup

2.1 Project Components

 ICT3102 .github HAWCS Monitoring nginx nginxold Server ServerOld .gitattributes .gitignore CODEOWNERS docker-compose1.yaml docker-compose2.yaml docker-compose3.yaml README.md	The docker compose files will build the respective project folders and as well as add the specific MongoDB setup for each project. New Architecture (docker-compose1.yaml) • nginx • Server • Monitoring Old Architecture (docker-compose2.yaml) • nginxOld • ServerOld Modified Architecture for Monitoring Page (docker-compose3.yaml) • nginxOld • ServerOld

2.2 Running Docker Compose with Bash Files

In the AWS project folder, run the following command to build the new architecture setup

```
bash ICT3102Team6New.sh
```

Bash Script Summary:

1. Pulls GitHub Repository
2. Change directory into ICT3102_Team6
3. Run docker compose for docker-compose1.yaml (Builds New Architecture)
4. Setup MongoDB Shard Cluster
5. Insert Beacons into database

In the AWS project folder, run the following command to build the old architecture setup

```
bash ICT3102Team6Old.sh
```

Bash Script Summary:

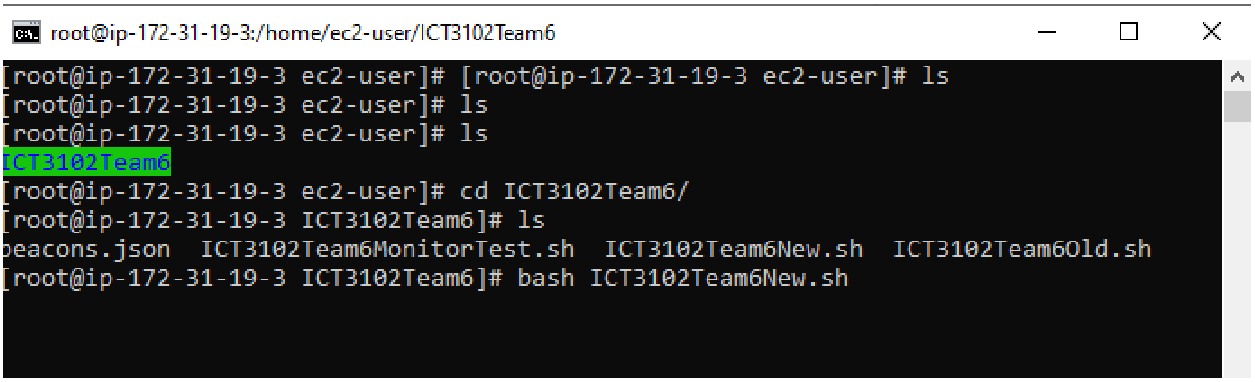
1. Pulls GitHub Repository
2. Change directory into ICT3102_Team6
3. Run docker compose for docker-compose2.yaml (Builds Old Architecture)
4. Insert Beacons into database

In the AWS project folder, run the following command to build the custom monitoring architecture setup

```
bash ICT3102Team6MonitorTest.sh
```

Bash Script Summary:

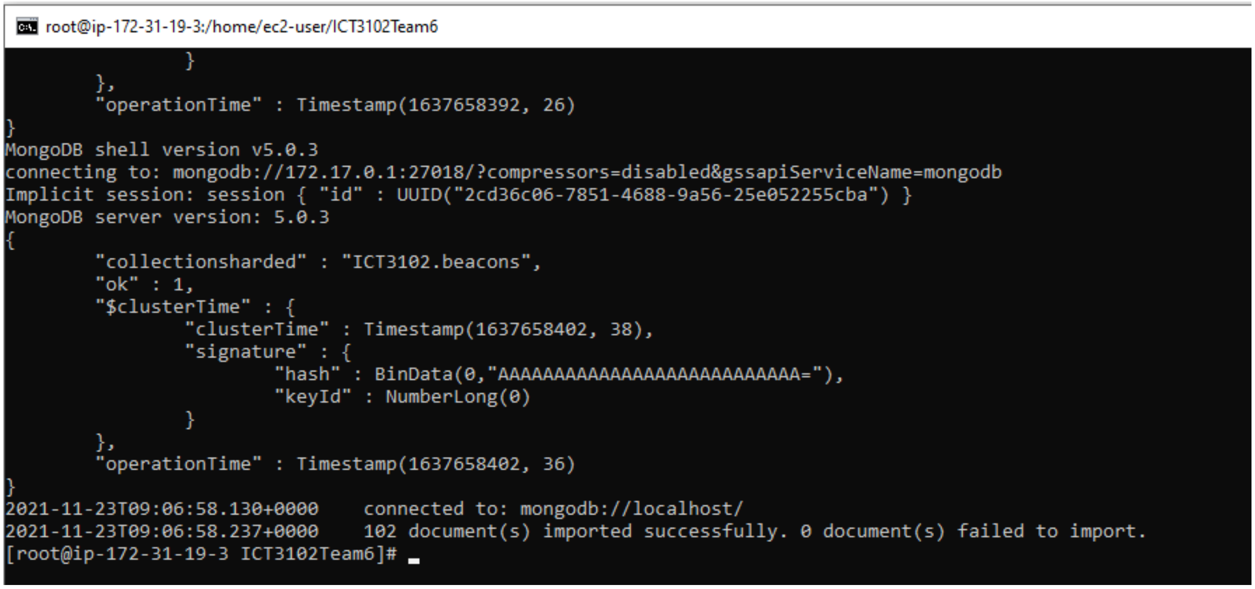
1. Pulls GitHub Repository
2. Change directory into ICT3102_Team6
3. Run docker compose for docker-compose3.yaml (Builds Monitoring Test Architecture)
4. Insert Beacons into database



root@ip-172-31-19-3:/home/ec2-user/ICT3102Team6

```
[root@ip-172-31-19-3 ec2-user]# [root@ip-172-31-19-3 ec2-user]# ls
[root@ip-172-31-19-3 ec2-user]# ls
[root@ip-172-31-19-3 ec2-user]# ls
ICT3102Team6
[root@ip-172-31-19-3 ec2-user]# cd ICT3102Team6/
[root@ip-172-31-19-3 ICT3102Team6]# ls
beacons.json  ICT3102Team6MonitorTest.sh  ICT3102Team6New.sh  ICT3102Team6Old.sh
[root@ip-172-31-19-3 ICT3102Team6]# bash ICT3102Team6New.sh
```

Upon running the bash script, the application will take some time to build. Do give it some time to run. It should not take more than 5-10 minutes.



```
                }
        },
        "operationTime" : Timestamp(1637658392, 26)
}
MongoDB shell version v5.0.3
connecting to: mongodb://172.17.0.1:27018/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("2cd36c06-7851-4688-9a56-25e052255cba") }
MongoDB server version: 5.0.3
{
        "collectionsharded" : "ICT3102.beacons",
        "ok" : 1,
        "$clusterTime" : {
                "clusterTime" : Timestamp(1637658402, 38),
                "signature" : {
                        "hash" : BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAA="),
                        "keyId" : NumberLong(0)
                }
        },
        "operationTime" : Timestamp(1637658402, 36)
}
2021-11-23T09:06:58.130+0000    connected to: mongodb://localhost/
2021-11-23T09:06:58.237+0000    102 document(s) imported successfully. 0 document(s) failed to import.
[root@ip-172-31-19-3 ICT3102Team6]# _
```

Only once you see the above line, this means that the beacons are successfully added to the database and the last step of the setup is complete.

It is recommended to perform the following operations after every test for the most accurate results:

Stop all running containers

docker kill $(docker ps -q)

Delete all containers

docker rm $(docker ps -a -q)

Delete all volumes force

docker volume prune --force

After doing so, run whichever bash script setup you require ~

3. Monitoring Page

The monitoring page has been changed in the new architecture to be assigned to it's own port

3.1 Old Architecture Endpoint

In the old architecture, the root page is the monitoring page.

AWSIP/

Example: http://**13.229.113.51/**

3.2 New Architecture / Monitoring Architecture Endpoint

In the new architecture, as well as the monitoring test setup, the monitoring page runs on port 4000 with the following endpoint

AWSIP:4000/monitoring

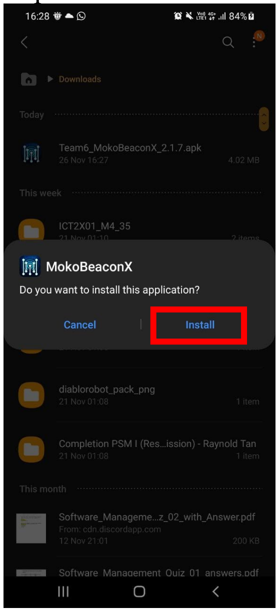
Example: http://**13.229.113.51**:4000/monitoring

4. Mobile Application User Guide

This section will go through the process of installation and the usage of the application.

4.1 Installation of the APK file

1. Go to your phone's Settings
2. Go to Security & privacy > More settings. Tap on Install apps from external sources.
3. Enable Developer mode on the Android phone (For Android Studio Debugging)
4. Transfer the APK file on to Android phone
5. Locate the APK file on the Android phone's file directory
6. Tap on the APK file to install



Downloads

Today

Team6_MokoBeaconX_2.1.7.apk 26 Nov 16:27 4.02 MB

This week

ICT2X01_M4_35

MokoBeaconX

Do you want to install this application?

Cancel | Install

diablorobot_pack_png 21 Nov 01:08 1 item

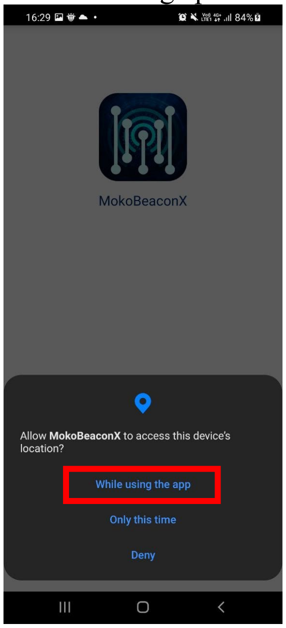
Completion PSM I (Res...ission) - Raynold Tan 21 Nov 01:08 1 item

This month

Software_Manageme...z_02_with_Answer.pdf From: cdn.discordapp.com 12 Nov 21:01 200 KB

Software_Management_Quiz_01_answers.pdf

7. Allow all usage permission (Images not in order)



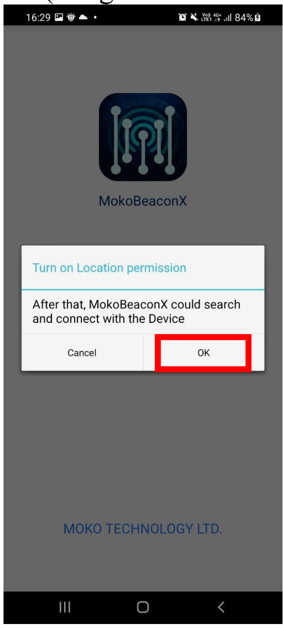
MokoBeaconX

Allow **MokoBeaconX** to access this device's location?

While using the app

Only this time

Deny



MokoBeaconX

Turn on Location permission

After that, MokoBeaconX could search and connect with the Device

Cancel | OK

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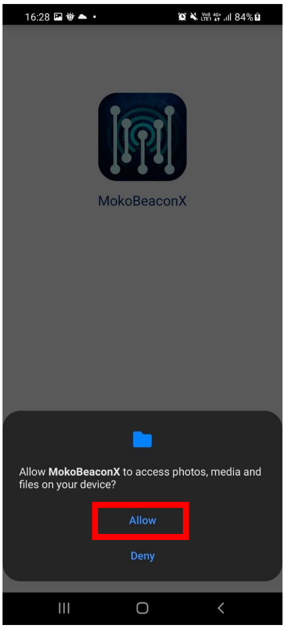
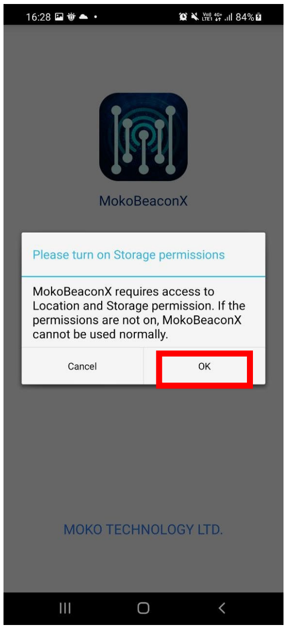


MokoBeaconX

Allow **MokoBeaconX** to access photos, media and files on your device?

Allow

Deny



MokoBeaconX

Please turn on Storage permissions

MokoBeaconX requires access to Location and Storage permission. If the permissions are not on, MokoBeaconX cannot be used normally.

Cancel | OK

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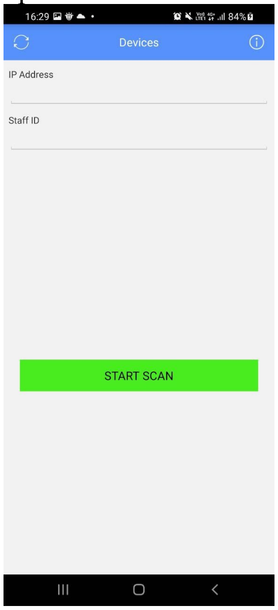
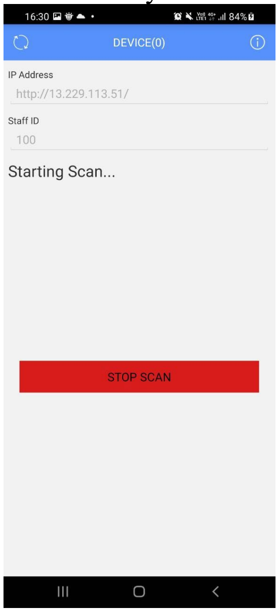
4.2 Usage of the Optimized MokoBeaconX Application

1. Initial starting screen, you will be presented with a stripped-down version of the application after optimization



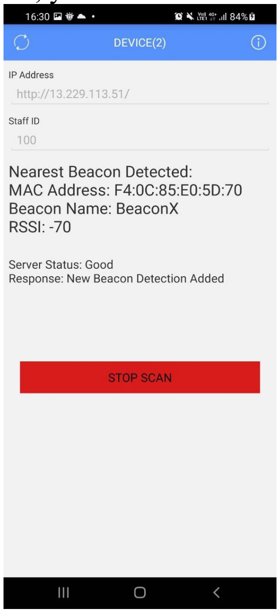
2. Enter the IP Address and numeric Staff ID in the textboxes e.g., IP Address: http://13.229.113.51/, Staff ID: 100
   Note: You are not able to start the scan with empty fields
3. Tap on "Start Scan"
   Note: After you start the scan, you are not able to edit the fields unless you stop scan



IP Address
http://13.229.113.51/
Staff ID
100

Starting Scan...

→



IP Address
http://13.229.113.51/
Staff ID
100

Nearest Beacon Detected:
MAC Address: F4:0C:85:E0:5D:70
Beacon Name: BeaconX
RSSI: -70

Server Status: Good
Response: New Beacon Detection Added