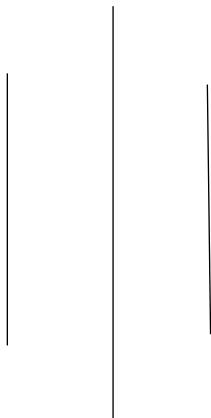


TRIBHUVAN UNIVERSITY

Institute of Science and Technology(IoST)

National College of Computer Studies

Paknajol, Kathmandu



LAB REPORT ON

Introduction to Cloud Computing

Submitted by:

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Roll no: 14

Submitted to:

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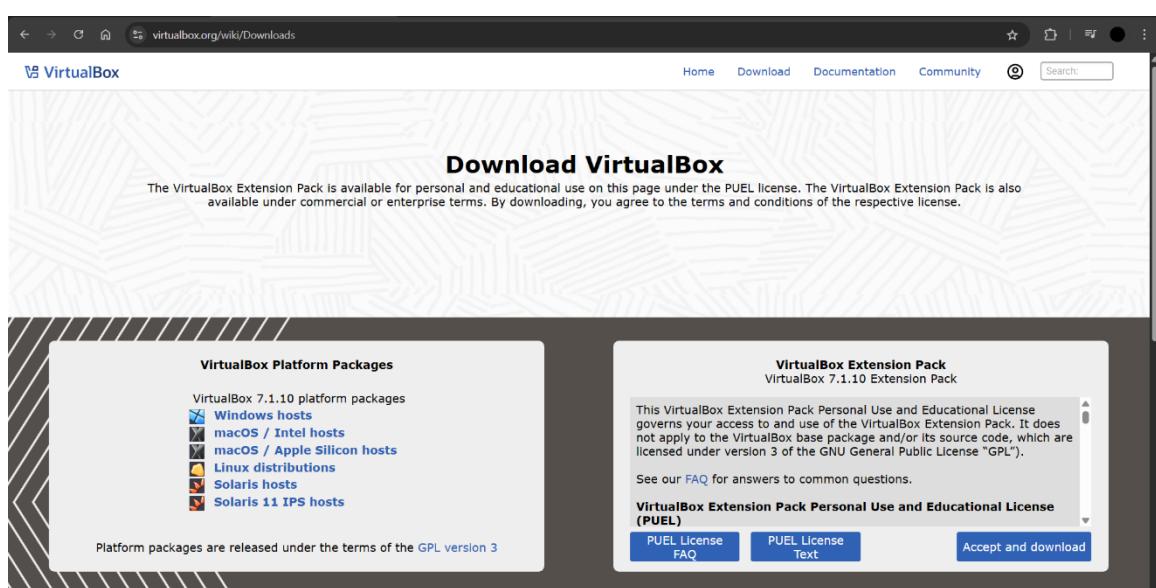
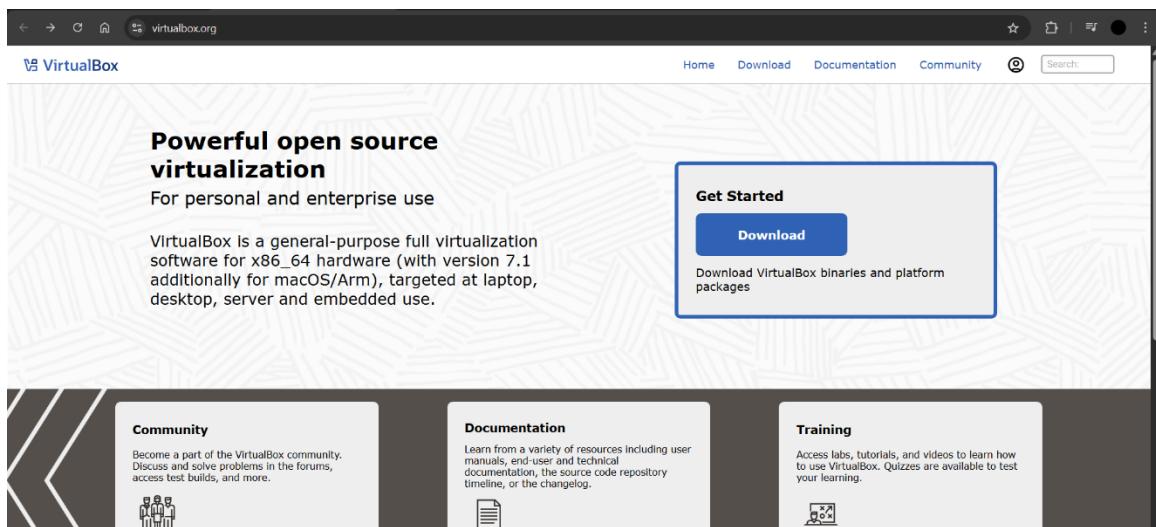
(Lecturer)

S.N.	Title	Date	Signature
1	Install VirtualBox and Set Up Workstations with different flavors of Linux or windows operating systems on top of windows 7,8, Or 10.		
2	Find a Procedure to transfer files from one Virtual Machine to another.		
3	Install a Single-Node Hadoop Cluster on Linux/Windows.		
4	Write a Word Count Program to demonstrate the use of Map and Reduce tasks in Java.		
5	Write a Multithreading Program in Java.		
6	Creating a Linux/windows virtual machine in the Microsoft Azure.		
7	Creating Web Apps and Using App Service Plans in Microsoft Azure.		
8	Creating a Function App in Microsoft Azure.		
9	Creating a Microsoft Azure SQL Database.		
10	Manage and control your cloud costs with Azure Cost Management.		

Lab 1: Install VirtualBox and Set Up Workstations with different flavors of Linux or windows operating systems on top of windows 7,8, Or 10.

Step 1: Download and Install VirtualBox

- Go to the official VirtualBox website: <https://www.virtualbox.org>
- Click on “Downloads” and choose the installer for Windows hosts.
- Run the downloaded .exe file and follow the installation prompts:
- Once installed, launch VirtualBox.



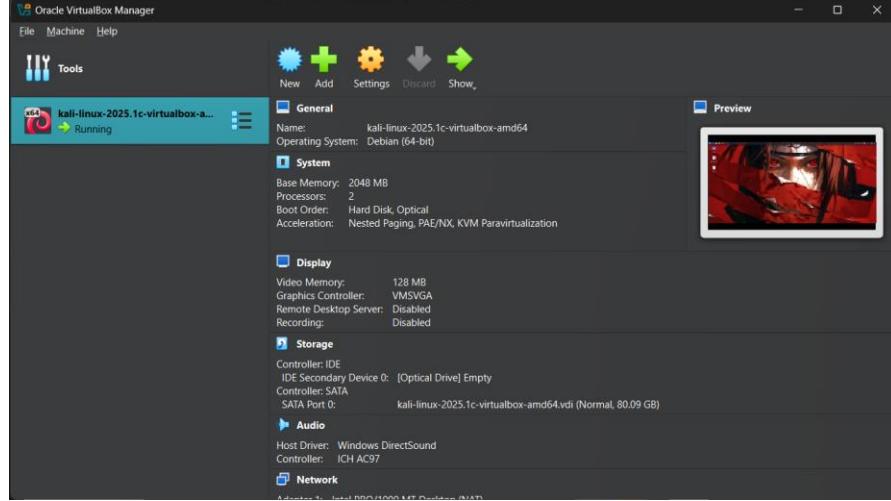
Step 2: Download ISO Files for Guest Operating Systems (I have used the kali Linux)

- Download Kali Linux VirtualBox Image (<https://www.kali.org/get-kali/#kali-virtual-machines>)
- Extract the file

Step 3: Import Kali Linux into VirtualBox

- Open Virtual Box > Machine > Add > Browse to the folder where the .vbox file is located
- Then Select file kali-linux-2025.1c-virtualbox-amd64.vbox and click open

Then Kali Linux will appear in the list of virtual Machines on the left side.



Step 4: Start the Virtual Machine

- Select Kali Linux in VirtualBox
- Click Start.
- Use login Credentials and enjoy using kali Linux in virtualBox



Conclusion

In this lab, we installed VirtualBox and created a kali Linux virtual machine. We learned how to configure VM settings, load the ISO, and start the installation. This lab showed how virtualization allows running multiple operating systems on one computer, which is useful for testing and learning.

Lab 2: Find a Procedure to transfer files from one Virtual Machine to another.

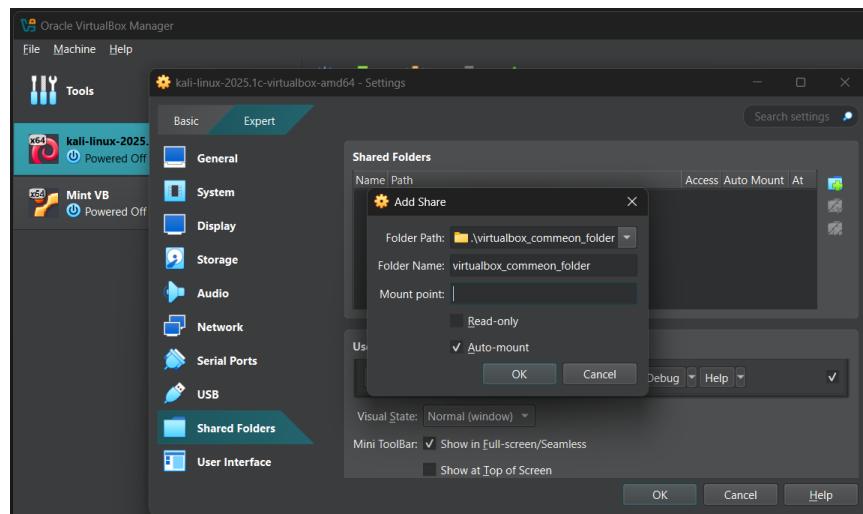
For this lab I have used two virtual machines kali Linux and Linux Mint.

Step 1: Power Off the Virtual Machines

- Shut down both Kali Linux and Linux Mint virtual machines.

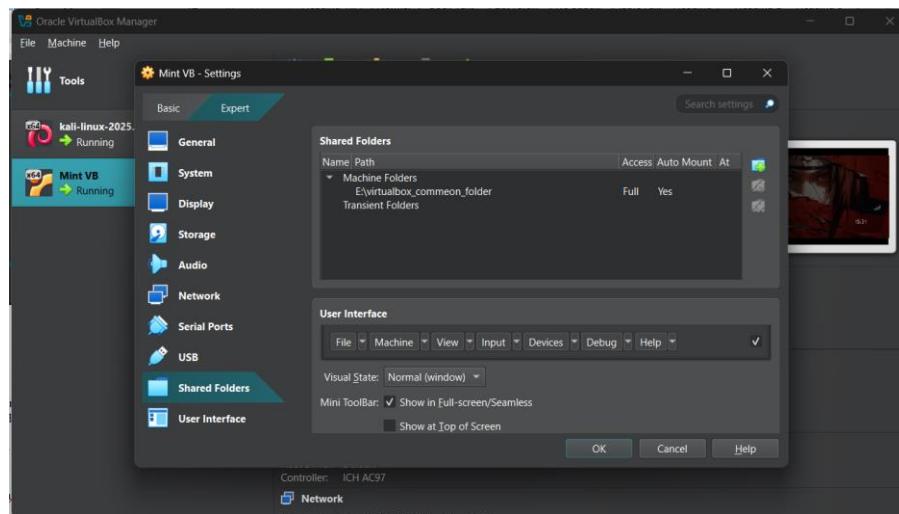
Step 2: Setup Shared Folder in VirtualBox

- Open VirtualBox.
- Select the Kali Linux VM
- Click on Settings > Shared Folders > + (Add New Shared Folder).
- Configure as follows:
 - Folder Path: Select a folder on your host system
 - Folder Name: Give it a name.(virtualbox_commeon_folder)
 - Check Auto Mount
- Click ok



Step 3: Repeat for Linux Mint

- Perform the same steps for the Linux Mint VM, selecting the same shared folder path and name.

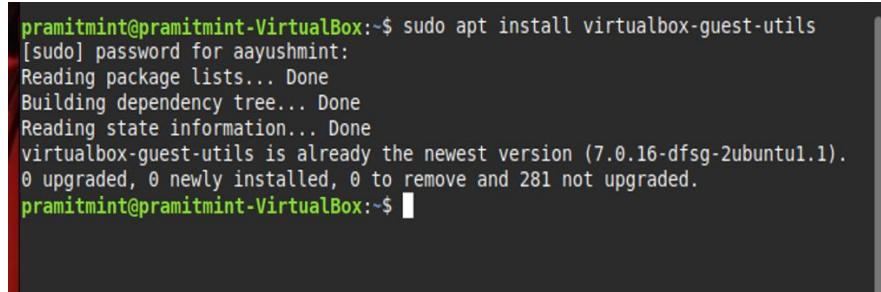


Step 4: Start the Virtual Machines

- Boot up Kali Linux and Linux Mint one by one.

Step 5: Install Guest Additions (If Needed)

- Run this on both VMs:
 - sudo apt update
 - sudo apt install virtualbox-guest-utils



```
pramitmint@pramitmint-VirtualBox:~$ sudo apt install virtualbox-guest-utils
[sudo] password for aayushmint:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
virtualbox-guest-utils is already the newest version (7.0.16-dfsg-2ubuntu1.1).
0 upgraded, 0 newly installed, 0 to remove and 281 not upgraded.
pramitmint@pramitmint-VirtualBox:~$
```

(OR)

- In virtual Box > Devices > Insert Guest Additions CD image.

Step 6: Add User to vboxsf Group

- On both VMs, run:
 - sudo usermod -aG vboxsf \$USER



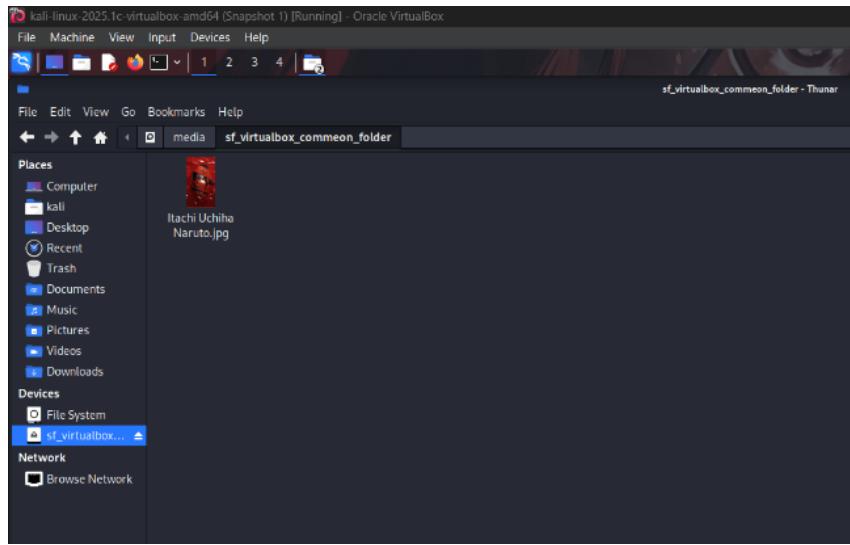
```
kali@kali: ~
File Actions Edit View Help
[(kali㉿kali)-~]
$ sudo usermod -aG vboxsf $USER
[sudo] password for kali:
[(kali㉿kali)-~]
$
```

- Then reboot VM: - reboot

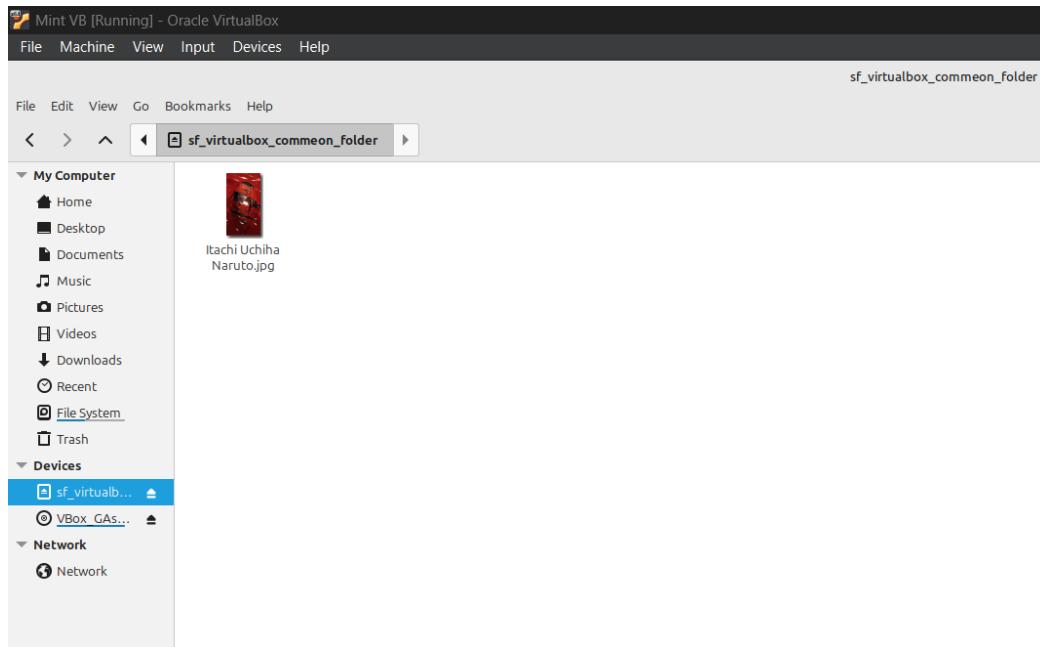
Step 7: Access the Shared Folder via File Explorer

On both Kali Linux and Linux Mint:

- Open the File Manager.
- Navigate to: “/media/sf_virtualbox_commeon_folder”.



- You can now drag and drop files to share between the two VMs.



Conclusion

This lab demonstrated how to transfer files between Kali Linux and Linux Mint using a shared folder in VirtualBox. By configuring shared folder settings, installing Guest Additions, and setting correct permissions, we enabled simple and efficient file sharing between the two VMs without using external devices or network setups.

Lab 3: Install a Single-Node Hadoop Cluster on Linux/Windows.

Step 1: Install Java

- sudo apt update
- sudo apt install openjdk-11-jdk -y

```
(kali㉿kali)-[~]
└─$ sudo apt install openjdk-11-jdk -y
[sudo] password for kali:
The following packages were automatically installed and are no longer required:
d:
  icu-devtools      python3-dunamai
  libflac12t64       python3-nfsclient
  libfuse3-3          python3-packaging-whl
  libgeos3.13.0       python3-poetry-dynamic-versioning
  libglapi-mesa       python3-pywerview
  libicu-dev          python3-requests-ntlm
  liblhfash0          python3-setproctitle
```

Step 2: Create Hadoop User

- sudo adduser hadoopuser
- sudo usermod -aG sudo hadoopuser
- su – hadoopuser

```
(kali㉿kali)-[~]
└─$ sudo adduser hadoopuser

New password:
Retype new password:
passwd: password updated successfully
Changing the user information for hadoopuser
Enter the new value, or press ENTER for the default
  Full Name []: Pramit

(kali㉿kali)-[~]
└─$ sudo usermod -aG sudo hadoopuser
```

Step 3: Download and Extract Hadoop

- wget https://downloads.apache.org/hadoop/common/hadoop-3.3.6/hadoop-3.3.6.tar.gz
- tar -xvzf hadoop-3.3.6.tar.gz
- mv hadoop-3.3.6 ~/Hadoop

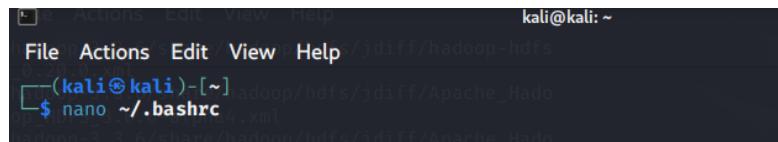
```
(hadoopuser㉿kali)-[~]
└─$ wget https://downloads.apache.org/hadoop/common/hadoop-3.3.6/hadoop-3.3.6.tar.gz
--2025-06-12 09:50:00-- https://downloads.apache.org/hadoop/common/hadoop-3.3.6/hadoop-3.3.6.tar.gz
Resolving downloads.apache.org (downloads.apache.org)... 135.181.214.104, 88.99.208.237, 2a01:4f9:3a
:2c57::2, ...
Connecting to downloads.apache.org (downloads.apache.org)|135.181.214.104|:443 ... connected.
HTTP request sent, awaiting response ... 200 OK
Length: 730107476 (696M) [application/x-gzip]
Saving to: 'hadoop-3.3.6.tar.gz'

(hadoopuser㉿kali)-[~]
└─$ tar -xvzf hadoop-3.3.6.tar.gz
hadoop-3.3.6/
hadoop-3.3.6/NOTICE-binary
hadoop-3.3.6/licenses-binary/
hadoop-3.3.6/licenses-binary/LICENSE-lz4.txt
hadoop-3.3.6/licenses-binary/LICENSE-zstd-jni.txt
```

```
|:ffff::1      ip6-allnodes  ip6-local  
|  --(hadoopuser㉿kali)-[~]  
└ $ mv hadoop-3.3.6 ~/hadoop
```

Step 4: Configure Environment Variables

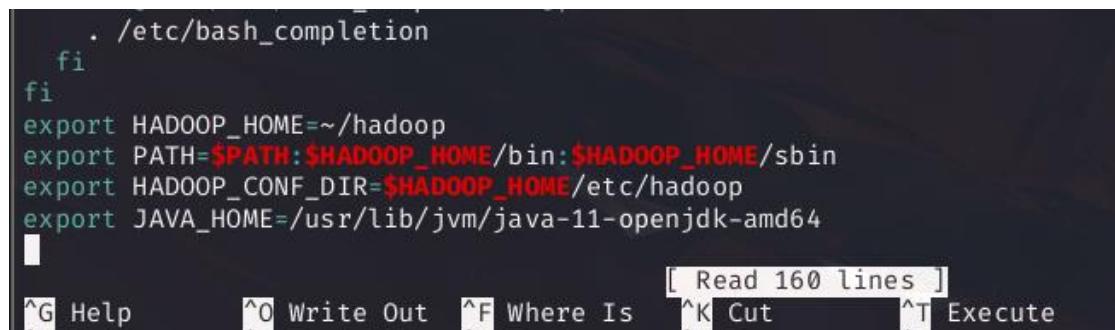
- Edit `~/.bashrc`:
 - `nano ~/.bashrc`



A screenshot of a terminal window titled "File Actions Edit View Help". The command `nano ~/.bashrc` is being run. The terminal shows the contents of the `.bashrc` file, which includes environment variable definitions for Hadoop.

```
kali@kali:~  
File Actions Edit View Help /jd1ff/hadoop-hdfs  
|(kali㉿kali)-[~] hadoop-hdfs/jd1ff/Apache_Hado  
$ nano ~/.bashrc
```

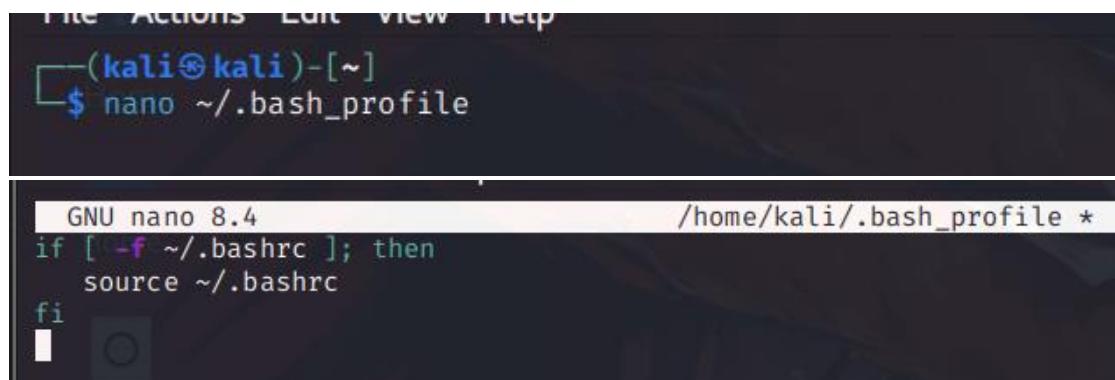
- Add at the end then save and exit.



A screenshot of a terminal window showing the `.bashrc` file being edited with new environment variables. The variables define `HADOOP_HOME`, `PATH`, `HADOOP_CONF_DIR`, and `JAVA_HOME`.

```
...  
    . /etc/bash_completion  
fi  
fi  
export HADOOP_HOME=~/hadoop  
export PATH=$PATH:$HADOOP_HOME/bin:$HADOOP_HOME/sbin  
export HADOOP_CONF_DIR=$HADOOP_HOME/etc/hadoop  
export JAVA_HOME=/usr/lib/jvm/java-11-openjdk-amd64  
[ Read 160 lines ]  
^G Help          ^O Write Out  ^F Where Is  ^K Cut        ^T Execute
```

- Create `.bash_profile` to source `.bashrc`:



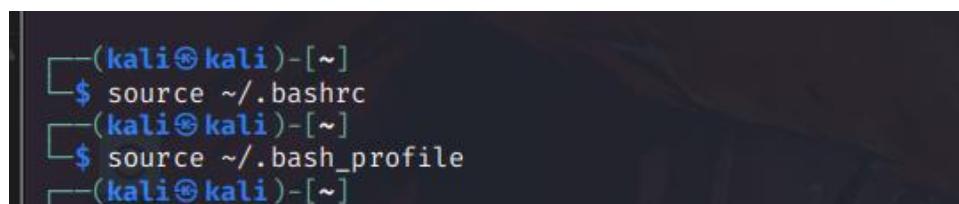
A screenshot of a terminal window showing the creation of a `.bash_profile` file. The file contains a script that checks if `.bashrc` exists and then sources it.

```
File Actions Edit View Help  
|(kali㉿kali)-[~]  
$ nano ~/.bash_profile
```



```
GNU nano 8.4                                         /home/kali/.bash_profile *  
if [ -f ~/.bashrc ]; then  
    source ~/.bashrc  
fi
```

- Apply changes:



A screenshot of a terminal window showing the application of changes. The user runs `source ~/.bashrc` and `source ~/.bash_profile` to apply the environment variables.

```
|(kali㉿kali)-[~]  
$ source ~/.bashrc  
|(kali㉿kali)-[~]  
$ source ~/.bash_profile  
|(kali㉿kali)-[~]
```

Step 5: Verify Hadoop Environment

```
(hadoopuser㉿kali)-[~]
└─$ hadoop version
Hadoop 3.3.6
Source code repository https://github.com/apache/hadoop.git -r 1be78238728da9266a4f88195058f08fd012bf9c
Compiled by ubuntu on 2023-06-18T08:22Z
Compiled on platform linux-x86_64
Compiled with protoc 3.7.1
From source with checksum 5652179ad55f76cb287d9c633bb53bbd
This command was run using /home/hadoopuser/hadoop/share/hadoop/common/hadoop-common-3.3.6.jar
```

Step 6: Format the Hadoop Filesystem

- hdfs namenode -format

```
(hadoopuser㉿kali)-[~]
└─$ hdfs namenode -format
WARNING: /home/hadoopuser/hadoop/logs does not exist. Creating.
2025-06-12 10:11:12,679 INFO namenode.NameNode: STARTUP_MSG:
/*****STARTUP_MSG: Starting NameNode
STARTUP_MSG: host = kali/127.0.1.1
STARTUP_MSG: args = [-format]
STARTUP_MSG: version = 3.3.6
*****
```

Step 7: Install OpenSSH Server and Enable It

- sudo apt install openssh-server -y
- sudo systemctl enable ssh
- sudo systemctl start ssh

```
(hadoopuser㉿kali)-[~]
└─$ sudo apt install openssh-server -y
openssh-server is already the newest version (1:10.0p1-5).
openssh-server set to manually installed.
The following packages were automatically installed and are no longer required:
  icu-devtools          libpython3.12-stdlib          python3-requests-ntlm
  libflac12+64          libpython3.12f64          python3-setuptools
(hadoopuser㉿kali)-[~]
└─$ sudo systemctl enable ssh
Synchronizing state of ssh.service with SysV service script with /usr/lib/systemd/systemd-sysll.
Executing: /usr/lib/systemd/systemd-sysv-install enable ssh
Created symlink '/etc/systemd/system/sshd.service' → '/usr/lib/systemd/system/ssh.service'.
Created symlink '/etc/systemd/system/multi-user.target.wants/ssh.service' → '/usr/lib/systemd/system/multi-user.target.wants/ssh.service'.
(hadoopuser㉿kali)-[~]
└─$ sudo systemctl start ssh
[sudo] password for hadoopuser:
```

- Verify SSH is running:

```
(hadoopuser㉿kali)-[~]
└─$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
    Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: disabled)
      Active: active (running) since Thu 2025-06-12 10:14:28 EDT; 9s ago
        Invocation: 3e66f2e9c4854a9982236b636114ba42
```

Step 7: Set Up SSH Passwordless Login for Hadoop User

- ssh-keygen -t rsa -P "" -f ~/.ssh/id_rsa
- cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys
- chmod 600 ~/.ssh/authorized_keys
- chmod 700 ~/.ssh
- ssh localhost

```
(hadoopuser㉿kali)-[~]
└─$ ssh-keygen -t rsa -P "" -f ~/.ssh/id_rsa
Generating public/private rsa key pair.
Your identification has been saved in /home/hadoopuser/.ssh/id_rsa
Your public key has been saved in /home/hadoopuser/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:CAZs0dnS/7uClK8EA00SnGyOoV/AeHUNek5XzYVfyAc hadoopuser@kali
The key's randomart image is:
+---[RSA 3072]---+
| o +++=B .o +Eo |
| . = ==B.+. + o O |
| O *O.=O+. . O |
| . . O= = . . |
| . . + S. . |
| . . oo . |
| .. o . |
| .. o . |
| .. ... |
+---[SHA256]---+
```

```
(hadoopuser㉿kali)-[~]
└─$ cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys
(hadoopuser㉿kali)-[~]
└─$ chmod 600 ~/.ssh/authorized_keys
(hadoopuser㉿kali)-[~]
└─$ chmod 700 ~/.ssh
(hadoopuser㉿kali)-[~]
└─$ ssh localhost
Linux kali 6.12.13-amd64 #1 SMP PREEMPT_DYNAMIC Kali 6.12.13-1kali1 (2025-02-11) x86_64

The programs included with the Kali GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Kali GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
└─(hadoopuser㉿kali)-[~]
```

Step 8: Format Hadoop FileSystem

```
(hadoopuser㉿kali)-[~]
└─$ hdfs namenode -format
WARNING: /home/hadoopuser/hadoop/logs does not exist. Creating.
2025-06-12 10:11:12,679 INFO namenode.NameNode: STARTUP_MSG:
/*****
STARTUP_MSG: Starting NameNode
STARTUP_MSG:   host = kali/127.0.1.1
STARTUP_MSG:   args = [-format]
```

Step 9: Start Hadoop Services

- start-dfs.sh
- start-yarn.sh

```
(hadoopuser㉿kali)-[~]
└─$ start-dfs.sh
Starting namenodes on [kali]
Starting datanodes
Starting secondary namenodes [kali]
(hadoopuser㉿kali)-[~]
└─$ start-yarn.sh
Starting resourcemanager
Starting nodemanagers
```

Step 10: Verify Hadoop Daemons are Running

```
(hadoopuser㉿kali)-[~]
└─$ jps
141027 Jps
140048 NodeManager
139941 ResourceManager
```

Lab 4: Write a Word Count Program to demonstrate the use of Map and Reduce tasks in Java.

Step 1: Login as hadoop user.

Step 2: Create directory

- mkdir wordcount
- cd wordcount

```
hadoop@pramitmint-VirtualBox:~$ mkdir ~/wordcount
cd ~/wordcount
```

Step 3: Write java code:

- nano WordCount.java

```
hadoop@pramitmint-VirtualBox:~/wordcount$ nano WordCount.java

GNU nano 7.2
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;

public class WordCount {
    public static class MapperClass extends Mapper<Object, Text, Text, IntWritable> {
        private final static IntWritable one = new IntWritable(1);
        private Text word = new Text();

        public void map(Object key, Text value, Context context) throws IOException, InterruptedException {
            StringTokenizer tokenizer = new StringTokenizer(value.toString());
            while (tokenizer.hasMoreTokens()) {
                word.set(tokenizer.nextToken());
                context.write(word, one);
            }
        }
    }

    public static class ReducerClass extends Reducer<Text, IntWritable, Text, IntWritable> {
        public void reduce(Text key, Iterable<IntWritable> values, Context context) throws IOException, InterruptedException {
            int sum = 0;
            for (IntWritable val : values) {
                sum += val.get();
            }
            context.write(key, new IntWritable(sum));
        }
    }

    public static void main(String[] args) throws Exception {
        Configuration conf = new Configuration();
        Job job = Job.getInstance(conf, "simple word count");
        job.setJarByClass(WordCount.class);

        job.setMapperClass(MapperClass.class);
        job.setReducerClass(ReducerClass.class);

        job.setOutputKeyClass(Text.class);
        job.setOutputValueClass(IntWritable.class);

        FileInputFormat.addInputPath(job, new Path(args[0]));
        FileOutputFormat.setOutputPath(job, new Path(args[1]));

        System.exit(job.waitForCompletion(true) ? 0 : 1);
    }
}
```

Step 4: Compile the code

- javac -classpath `hadoop classpath` -d . WordCount.java

Step 5: Create JAR file

- jar -cvf wordcount.jar *.class

```
hadoop@pramitmint-VirtualBox:~/wordcount$ jar -cvf wordcount.jar *.class
added manifest
adding: WordCounts$MapperClass.class(in = 1744) (out= 765)(deflated 56%)
adding: WordCounts$ReducerClass.class(in = 1655) (out= 700)(deflated 57%)
adding: WordCount.class(in = 1469) (out= 795)(deflated 45%)
```

Step 6: Create input file.

```
hadoop@pramitmint-VirtualBox:/usr/local/hadoop/etc/hadoop$ echo "aayush hadoop mapreduce test example test input data aayush" > input2.txt
```

Step 7: Create input directory

- HDFS. hdfs dfs -mkdir -p /user/\$(whoami)/input

Step 8: Put file into HDFS

- hdfs dfs -put input.txt /user/\$(whoami)/input

Step 9: Run code

- hadoop jar wordcount.jar WordCount /user/\$(whoami)/input user/\$(whoami) /output

```
hadoop@pramitmint-VirtualBox:/usr/local/hadoop/etc/hadoop$ hadoop jar ~/wordcount/wordcount.jar WordCount /user/$(whoami)/input /user/$(whoami)/output
2025-06-14 14:00:19,792 INFO client.DefaultNoHARMFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2025-06-14 14:00:20,111 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2025-06-14 14:00:20,163 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/hadoop/.staging/job_1749888503918_0003
2025-06-14 14:00:20,491 INFO input.FileInputFormat: Total input files to process : 1
2025-06-14 14:00:20,615 INFO mapreduce.JobSubmitter: number of splits:1
2025-06-14 14:00:20,847 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1749888503918_0003
2025-06-14 14:00:20,847 INFO mapreduce.JobSubmitter: Executing with tokens: []
2025-06-14 14:00:21,046 INFO conf.Configuration: resource-types.xml not found
2025-06-14 14:00:21,047 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2025-06-14 14:00:21,127 INFO impl.YarnClientImpl: Submitted application application_1749888503918_0003
2025-06-14 14:00:21,168 INFO mapreduce.Job: The url to track the job: http://aayushmint-VirtualBox:8088/proxy/application_1749888503918_0003/
2025-06-14 14:00:21,169 INFO mapreduce.Job: Running job: job_1749888503918_0003
2025-06-14 14:00:28,305 INFO mapreduce.Job: Job job_1749888503918_0003 running in uber mode : false
2025-06-14 14:00:28,306 INFO mapreduce.Job: map 0% reduce 0%
2025-06-14 14:00:33,459 INFO mapreduce.Job: map 100% reduce 0%
2025-06-14 14:00:38,549 INFO mapreduce.Job: map 100% reduce 100%
2025-06-14 14:00:40,590 INFO mapreduce.Job: Job job_1749888503918_0003 completed successfully
2025-06-14 14:00:40,705 INFO mapreduce.Job: Counters: 54
    File System Counters
        FILE: Number of bytes read=145
        FILE: Number of bytes written=552105
        FILE: Number of bytes read=0
```

Step 10: Check result

```
hadoop@pramitmint-VirtualBox:/usr/local/hadoop/etc/hadoop$ hdfs dfs -cat /user/$(whoami)/output/part-r-00000
aayush 1
aayush 1
data 1
example 1
hadoop 2
input 2
mapreduce 1
test 2
hadoop@pramitmint-VirtualBox /usr/local/hadoop/etc/hadoop$
```

Conclusion

The WordCount program helped us understand how Hadoop breaks big tasks into smaller ones using Mapper and Reducer. It showed how large amounts of data can be processed step by step in a smart and organized way. This gave us a basic idea of how big data is handled in real-world systems using distributed computing.

Lab 5: Write a Multithreading Program in Java.

Source Code:

```
class MyThread extends Thread {  
    private String threadName;  
    MyThread(String name) {  
        threadName = name;  
    }  
  
    public void run() {  
        for (int i = 1; i <= 3; i++) {  
            System.out.println(threadName + " - Count: " + i);  
            try {  
                Thread.sleep(500);  
            } catch (InterruptedException e) {  
                System.out.println(threadName + " was interrupted.");  
            }  
        }  
        System.out.println(threadName + " has finished.");  
    }  
}  
  
public class MultithreadExample {  
    public static void main(String[] args) {  
        MyThread t1 = new MyThread("Thread-1");  
        MyThread t2 = new MyThread("Thread-2");  
        t1.start();  
        t2.start();  
    }  
}
```

Output:

```
PS C:\Users\USER\Downloads> java .\MultithreadExample.java  
Thread-2 - Count: 1  
Thread-1 - Count: 1  
Thread-2 - Count: 2  
Thread-1 - Count: 2  
Thread-2 - Count: 3  
Thread-1 - Count: 3  
Thread-1 has finished.  
Thread-2 has finished.  
PS C:\Users\USER\Downloads>
```

Lab 6- Creating a Linux/windows virtual machine in the Microsoft Azure.

- Step 1. Enter virtual machines in the search.
- Step 2. Under **Services**, select **Virtual machines**.
- Step 3. In the **Virtual machines** page, select **Create** and then **Virtual machine**.

The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with the Microsoft Azure logo, a search bar, and various icons for account management. Below the navigation bar is the 'Azure services' section, which includes icons for 'Create a resource', 'Virtual machines', 'Quickstart Center', 'App Services', 'Storage accounts', 'SQL databases', 'Azure Cosmos DB', 'Kubernetes services', 'Function App', and 'More services'. An orange arrow points from the 'Virtual machines' icon towards the 'Recent' tab in the 'Resources' section. The 'Resources' section has tabs for 'Recent' (which is selected) and 'Favorite'. It displays a list of resources with columns for 'Name', 'Type', and 'Last Viewed'. A message at the bottom states 'No resources have been viewed recently' with a 'View all resources' button.

- Step 4. In the **Basics** tab, under **Project details**, make sure the correct subscription is selected and then choose to **Create new** resource group.

The screenshot shows the 'Create a virtual machine' wizard in the Microsoft Azure portal. The 'Basics' tab is selected. Under the 'Project details' section, there are dropdown menus for 'Subscription' (set to 'Azure for Students') and 'Resource group' (set to '(New) Resource group'). A note indicates that this subscription may not be eligible to deploy VMs in certain regions. At the bottom, there are buttons for 'Review + create' and 'Next : Disks >'. The status bar at the bottom right says 'Give feedback'.

Step 5. Under **Instance details**, enter ClouPC for the **Virtual machine name**, and choose Ubuntu Server 20.04 LTS - Gen2 for your **Image**. Leave the other defaults. The default size and pricing is only shown as an example.

Azure for Students

(New) Resource group

Create new

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

Name *

Rg_Cloud_Lab

OK Cancel

Ubuntu Server 20.04 LTS - Gen2

See all images | Configure VM generation

Instance details

Virtual machine name *	CloudPC
Region *	(US) West US 3
Availability options	No infrastructure redundancy required
Security type	Standard
Image *	Ubuntu Server 20.04 LTS - Gen2
See all images Configure VM generation	
Run with Azure Spot discount	<input type="checkbox"/>
Size *	Standard_D2s_v3 - 2 vcpus, 8 GiB memory (US\$85.41/month)
See all sizes	

Authentication type

SSH public key
 Password

Username *

CloudPC

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 *

HTTP (80)

Set up User name of your machine and

Step 6. Prepare for the new Disk as:

Create a new disk ...

Create a new disk to store applications and data on your VM. Disk pricing varies based on factors including disk size, storage type, and number of transactions. [Learn more](#)

Name * 

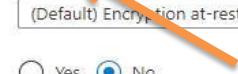
Source type * 

Size * 
Premium SSD LRS
[Change size](#)

Encryption type * 

Enable shared disk Yes No

Delete disk with VM



Step 7. Select a disk Size from the window.

Select a disk size ...

Browse available disk sizes and their features.

Disk SKU  

Size	Performance tier	Provisioned IOPS	Provisioned throughput	Max Shares 	Max burst IOPS 	Max burst throughput 
4 GiB	P1	120	25	3	3500	170
8 GiB	P2	120	25	3	3500	170
16 GiB	P3	120	25	3	3500	170
32 GiB	P4	120	25	3	3500	170
64 GiB	P6	240	50	3	3500	170
128 GiB	P10	500	100	3	3500	170
256 GiB	P15	1100	125	3	3500	170
512 GiB	P20	2300	150	3	3500	170
1024 GiB	P30	5000	200	3	-	-

Create a virtual machine ...

Basics Disks Networking Management Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

Disk options

OS disk type * Premium SSD (locally-redundant storage) 

Delete with VM

Enable encryption at host

 Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#) 

Encryption type * 

Enable Ultra Disk compatibility

Review + create

< Previous

Next : Networking >

Data disks for CloudPC

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM	⋮
0	CloudPC_C	4	Premium SSD LRS	Read-only	<input type="checkbox"/>	
1	CloudPC_DataDisk_1	16	Premium SSD LRS	Read-only	<input type="checkbox"/>	

[Create and attach a new disk](#) [Attach an existing disk](#)

Advanced

[Review + create](#)

[< Previous](#)

[Next : Networking >](#)

Step 8. Define network connectivity.

Create a virtual machine ⋮

Basics Disks Networking Management Advanced Tags Review + create

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.
[Learn more ↗](#)

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network * ⓘ

Subnet * ⓘ

Public IP ⓘ

NIC network security group ⓘ None Basic Advanced

[Review + create](#)

[< Previous](#)

[Next : Management >](#)

Step 9. Configure monitoring and management options for your VM.

Create a virtual machine ⋮

Basics Disks Networking Management Advanced Tags Review + create

[Configure monitoring and management options for your VM.](#)

Microsoft Defender for Cloud

Microsoft Defender for Cloud provides unified security management and advanced threat protection across hybrid cloud workloads. [Learn more ↗](#)

Enable basic plan for free ⓘ

This will apply to every VM in the selected subscription

Monitoring

Boot diagnostics ⓘ Enable with managed storage account (recommended) Enable with custom storage account Disable

Enable OS guest diagnostics ⓘ

[Review + create](#)

[< Previous](#)

[Next : Advanced >](#)

Step 10. Finally Review the Virtual machine.

Create a virtual machine ...

Validation passed

Basics Disks Networking Management Advanced Tags Review + create

Cost given below is an estimate and not the final price. Please use [Pricing calculator](#) for all your pricing needs.

PRODUCT DETAILS

1 X Standard D2s v3 by Microsoft **0.1170 USD/hr** Subscription credits apply ⓘ Terms of use | Privacy policy Pricing for other VM sizes

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same terms and conditions as set forth in the applicable Marketplace listing.

Create < Previous Next > Download a template for automation

Basics		Disks	
Subscription	Azure for Students	OS disk type	Premium SSD LRS
Resource group	(new) Rg_Cloud_Lab	Use managed disks	Yes
Virtual machine name	CloudPC	Delete OS disk with VM	Enabled
Region	West US 3	Data disks	2
Availability options	No infrastructure redundancy required	Delete data disks with VM	0 disks enabled
Security type	Standard	Ephemeral OS disk	No
Image	Ubuntu Server 20.04 LTS - Gen2		
Size	Standard D2s v3 (2 vcpus, 8 GiB memory)		
Authentication type	Password		
Username	CloudPC		
Public inbound ports	HTTP		
Azure Spot	No		
Networking			
Virtual network	(new) Rg_Cloud_Lab-vnet		
Subnet	(new) default (10.0.0.0/24)		
Public IP	(new) CloudPC-ip		
Accelerated networking	On		
Place this virtual machine behind an existing load balancing solution?	No		
Delete public IP and NIC when VM is deleted	Disabled		
Management			
Microsoft Defender for Cloud	Basic (free)		
Boot diagnostics	On		
Enable OS guest diagnostics	Off		
System assigned managed identity	Off		

Click on Create Button.

The screenshot shows the 'Create' button in a blue box at the bottom of the configuration page. Above it, there's a summary table of settings and an 'Advanced' section. At the very bottom, there are navigation buttons: '< Previous', 'Next >', and 'Download a template for automation'.

Click on Go to Resource Button to view our VM Details

The screenshot shows the 'Deployment' blade for a completed VM. It includes sections for 'Overview', 'Inputs', 'Outputs', and 'Template'. A large green checkmark indicates 'Your deployment is complete'. Below this, there are sections for 'Deployment details' and 'Next steps'. At the bottom, there are two buttons: 'Go to resource' (highlighted with an orange arrow) and 'Create another VM'. On the right side, there are promotional cards for 'Cost Management', 'Microsoft Defender for Cloud', and 'Free Microsoft tutorials'.

To connect this VM to Remote Desktop, click in connect menu.

The screenshot shows the 'Virtual machine' blade for a specific VM named 'CloudPC'. The left sidebar has sections like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Settings', 'Networking', 'Connect' (highlighted with an orange arrow), 'Disks', 'Size', 'Microsoft Defender for Cloud', 'Advisor recommendations', 'Extensions + applications', and 'Continuous delivery'. The main area shows 'Essentials' details and tabs for 'Properties', 'Monitoring', 'Capabilities (7)', 'Recommendations', and 'Tutorials'. Under 'Virtual machine', it lists 'Computer name', 'Health state', 'Operating system', 'Publisher', and 'Offer'. Under 'Networking', it lists 'Public IP address', 'Public IP address (IPv6)', 'Private IP address', 'Private IP address (IPv6)', and 'Virtual network/subnet'.

 To improve security, enable just-in-time access on this VM. →

RDP SSH Bastion

Connect with RDP

To connect to your virtual machine via RDP, select an IP address, optionally change the port number, and download the RDP file.

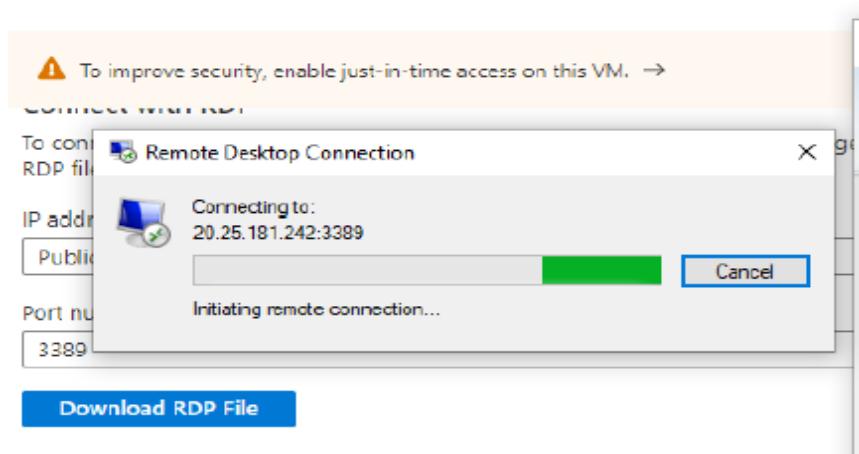
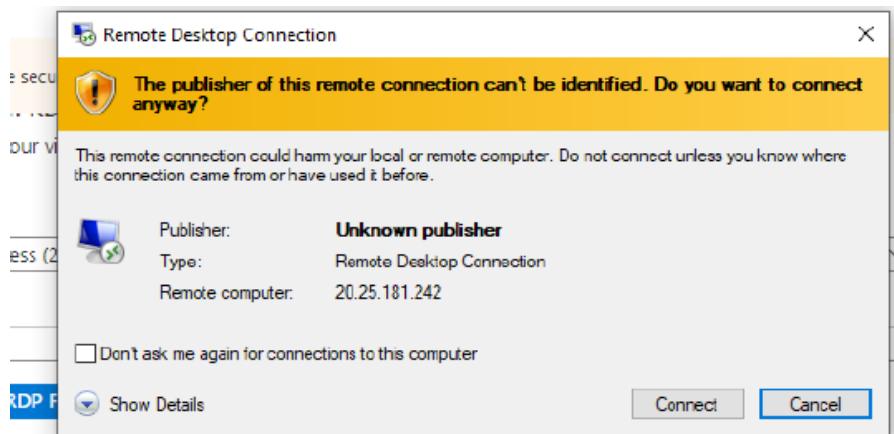
IP address *

Public IP address (20.25.181.242)

Port number *

3389

Download RDP File



Lab 7- Creating Web Apps and Using App Service Plans in Microsoft Azure.

The screenshot shows the Azure App Services dashboard. At the top, there's a search bar with placeholder text: "Save the current columns, sorting, filtering and summary as a view and access your saved views here." Below the search bar are several filter options: "resource group equals all", "Location equals all", "Add filter", "No grouping", "List view", "Subscription", and "App Type".



No app services to display

Create, build, deploy, and manage powerful web, mobile, and API apps for employees or customers using a single back-end. Build standards-based web apps and APIs using .NET, Java, Node.js, PHP, and Python.

[Create app service](#)

Create Web App ...

App Service Web Apps lets you quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform. Meet rigorous performance, scalability, security and compliance requirements while using a fully managed platform to perform infrastructure maintenance. [Learn more](#)

Project Details

Select a 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

Need a database? Try the new Web + Database experience. [?](#)

Name *

Web App name.

.azurewebsites.net

Publish *

Code Docker Container Static Web App

Runtime stack *

Select a runtime stack

[Review + create](#)

[< Previous](#)

[Next : Deployment >](#)

Create Web App ...

App Service Web Apps lets you quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform. Meet rigorous performance, scalability, security and compliance requirements while using a fully managed platform to perform infrastructure maintenance. [Learn more](#)

Project Details

Select a 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 * [?](#)

Rg_Cloud_Lab

[Create new](#)

Instance Details

Need a database? Try the new Web + Database experience. [?](#)

Name *

CloudComputingLab123

.azurewebsites.net

Publish *

Code Docker Container Static Web App

[Review + create](#)

[< Previous](#)

[Next : Deployment >](#)

Create Web App ...

Basics Deployment Networking Monitoring Tags **Review + create**

Summary

 **Web App**
by Microsoft

Free sku
Estimated price - Free

Details

Subscription	083a232b-e349-4bd7-9986-88276952d0a9
Resource Group	Rg_Cloud_Lab
Name	CloudComputingLab123
Publish	Code
Runtime stack	ASP.NET V4.8

 **Microsoft.Web-WebApp-Portal-c07b769b-a38f | Overview** ⚡ ...

Deployment

Search (Ctrl+ /) « Delete Cancel Redeploy Refresh

Overview We'd love your feedback! →

Your deployment is complete

Deployment name: Microsoft.Web-WebApp-Portal-c07b769b-a38f... Start time: 7/30/2022, 11:26:04 PM
Subscription: Azure for Students Correlation ID: 30047c1c-7d27-4394-b1b3-136c8f744e72 ↗

Deployment details (Download)

Next steps

Manage deployments for your app. Recommended
Protect your app with authentication. Recommended

Go to resource

 **CloudComputingLab123** ⚡ ⭐ ...

App Service

Search (Ctrl+ /) « Browse Stop Swap Restart Delete Refresh Get publish profile Reset publish profile Share to mobile ...

Overview Essentials JSON View

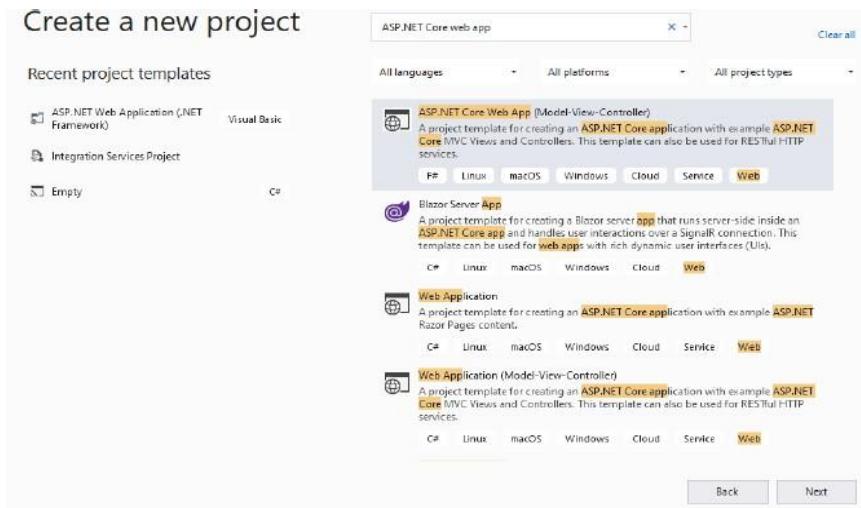
Resource group (move) : Rg_Cloud_Lab URL : <https://cloudcomputinglab123.azurewebsites.net>
Status : Running App Service Plan : ASP-RgCloudLab-b487 (F1:Free)
Location : Central US FTP/deployment username : No FTP/deployment user set
Subscription (move) : Azure for Students FTP hostname : <ftp://waws-prod-dm1-307.ftp.azurewebsites.windows.net>
Subscription ID : 083a232b-e349-4bd7-9986-88276952d0a9 FTPS hostname : <ftps://waws-prod-dm1-307.ftp.azurewebsites.windows.net>
Tags (edit) : Click here to add tags

Diagnose and solve problems Our self-service diagnostic and troubleshooting experience helps you identify and resolve issues with your web app.

Application Insights Application Insights helps you detect and diagnose quality issues in your app, and helps you understand what your users actually do with it.

Http 5xx 100 **Data In** 1008 **Data Out** 1008

Open Visual Studio and Create Project on ASP.NET Core Web App



Configure your new project

ASP.NET Web Application (.NET Framework) Visual Basic Windows Cloud Web

Project name

MyCloudLabApp

Location

C:\Users\dell\source\repos



Solution name

MyCloudLabApp

Place solution and project in the same directory

Framework

.NET Framework 4.7.2

Configure your new project

ASP.NET Core Web App (Model-View-Controller) F# Linux macOS Windows Cloud Service Web

Project name

WebApplication2

Location

C:\Users\dell\source\repos

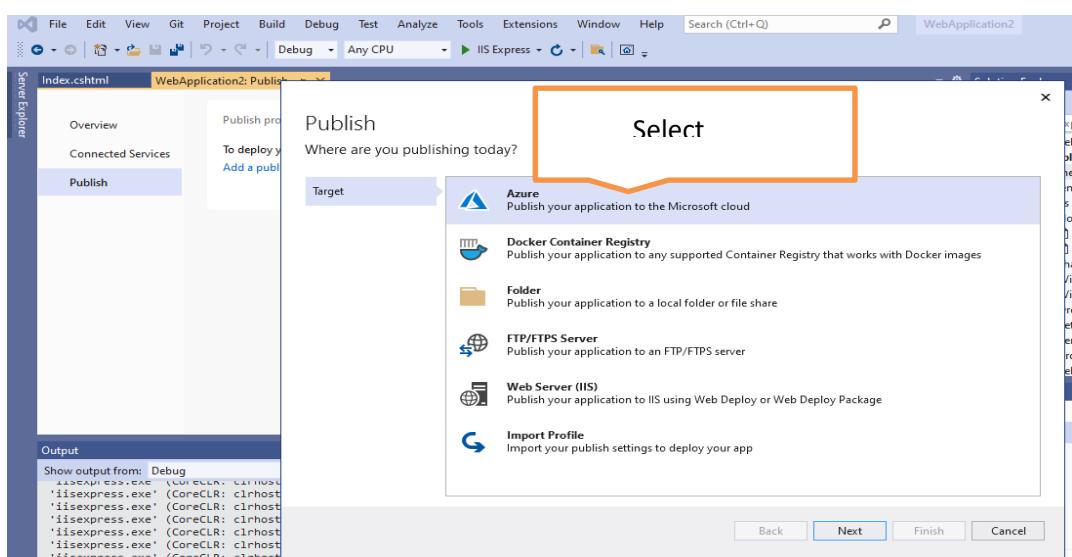
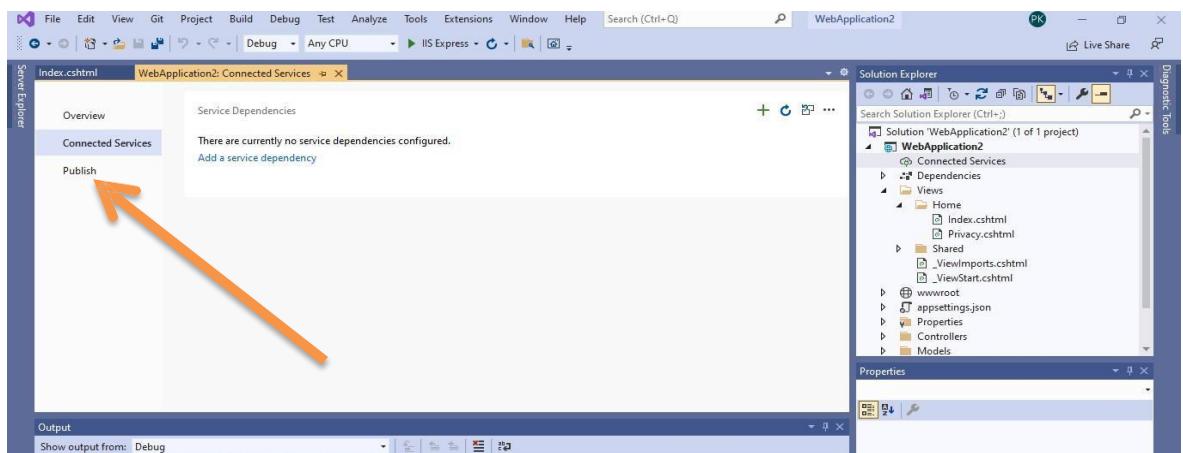
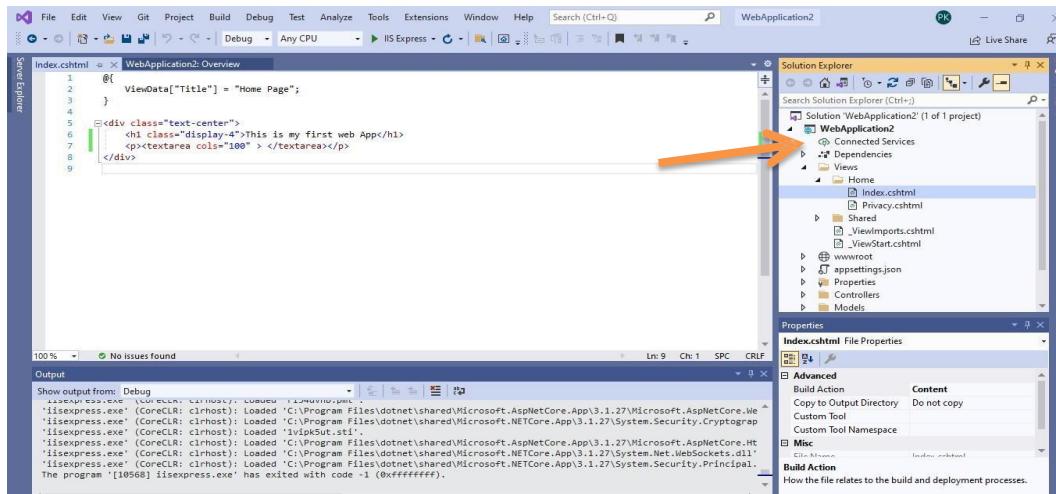


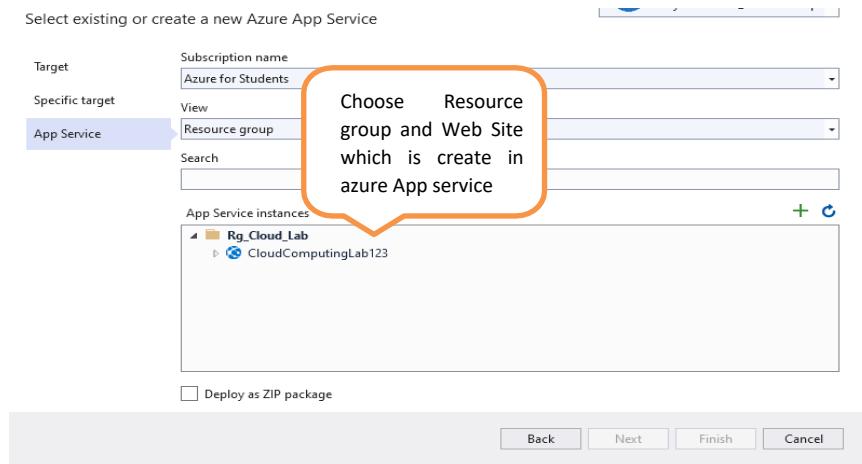
Solution name

WebApplication2

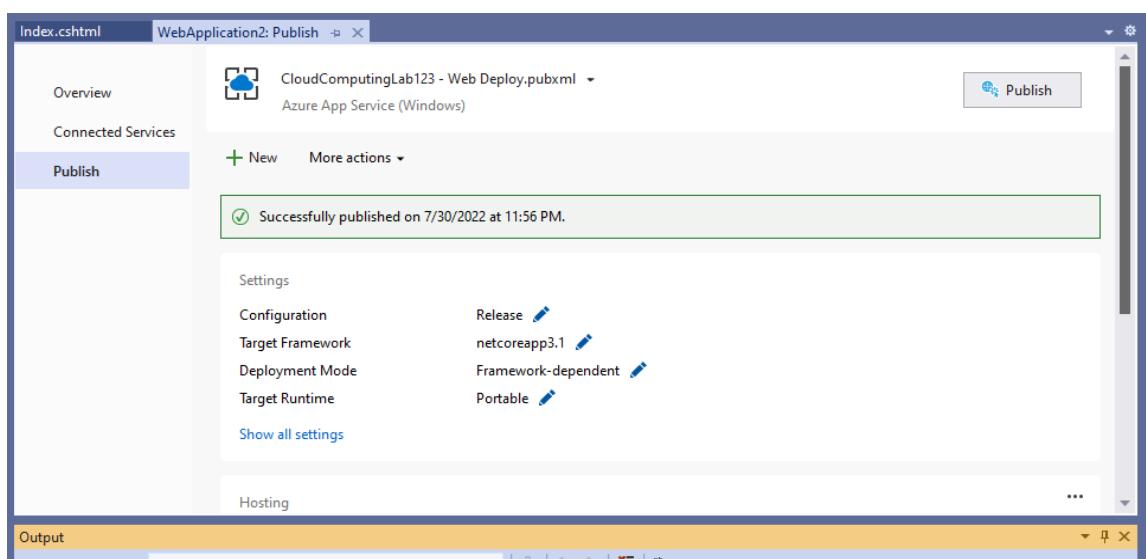
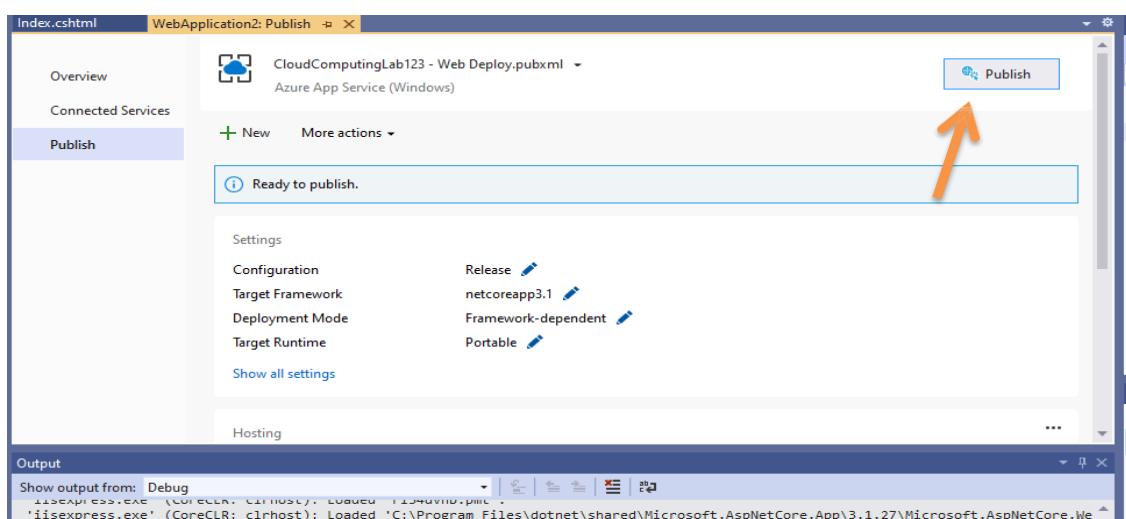
Place solution and project in the same directory

Click on Connected Services option in Solution Explorer:





Click on Publish button to host our App:

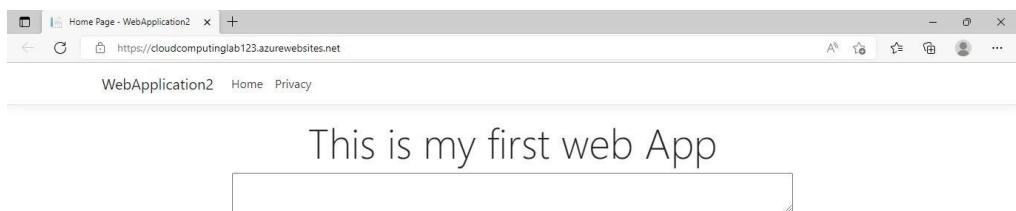


The screenshot shows the Azure portal's publish blade for a web application. The 'publish' tab is selected. The 'Hosting' section displays the following details:

- Subscription: 083a232b-e349-4bd7-9986-88276952d0a9
- Resource group: Rg_Cloud_Lab
- Resource name: CloudComputingLab123

The 'Site' URL is listed as <https://cloudcomputinglab123.azurewebsites.net>. Below this, the 'Service Dependencies' section indicates "There are currently no service dependencies configured." and provides a link to "Add a service dependency".

After Clicking Our Site, Our Web App will be Displayed in browser.



Lab 8- Creating a Function App in Microsoft Azure.

Azure services

Create a resource App Services Virtual machines Quickstart Center Storage accounts SQL databases Azure Cosmos DB Kubernetes services Function App More services

Resources

Recent Favorite

Name	Type	Last Viewed
CloudComputingLab123	App Service	a few seconds ago
Rg_Cloud_Lab	Resource group	52 minutes ago
CloudPC	Virtual machine	an hour ago

See all

Navigate

Function App ...

Tribhuvan University

+ Create Manage view Refresh Export to CSV Open query Assign tags Start Restart Stop Delete

Filter for an Save the current columns, sorting, filtering and summary as a view and access your saved views here. resource group equals all Location equals all Add filter

Name	Location	Pricing Tier	App Service Plan	
1	NEXT	Location ↑↓	Pricing Tier ↑↓	App Service Plan ↑↓

Project Details

Select a 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 * Rg_Cloud_Lab Create new

Instance Details

Function App name * Xyz1234 .azurewebsites.net

Publish * Code Docker Container

Runtime stack * .NET

Version * 6

Region * Central US

Review + create < Previous Next : Hosting >



Home >

Microsoft.Web-FunctionApp-Portal-65596b92-8038 | Overview

Deployment

Search (Ctrl+ /) Delete Cancel Redeploy Refresh

Overview Inputs Outputs Template

We'd love your feedback! →

*** Deployment is in progress

Deployment name: Microsoft.Web-FunctionApp-Portal-65596b92... Start time: 7/31/2022, 12:23:18 AM
Subscription: Azure for Students Correlation ID: 25303977-56db-4cbe-a34a-3d893ef04632

Deployment details (Download)

Resource	Type	Status	Operation details
No results.			

Microsoft.Web-FunctionApp-Portal-65596b92-8038 | Overview

Deployment

Search (Ctrl+ /) Delete Cancel Redeploy Refresh

Overview Inputs Outputs Template

We'd love your feedback! →

✓ Your deployment is complete

Deployment name: Microsoft.Web-FunctionApp-Portal-65596b92... Start time: 7/31/2022, 12:23:18 AM
Subscription: Azure for Students Correlation ID: 25303977-56db-4cbe-a34a-3d893ef04632

Deployment details (Download)

Next steps

Create a function. Recommended
Manage deployments for your app. Recommended

Go to resource

Xyz1234 | Function App

Search (Ctrl+ /) Browse Refresh Stop Restart Swap Get publish profile Reset publish profile Download app content Delete ...

Click here to access Application Insights for monitoring and profiling for your app. → JSON View

Overview Activity log Access control (IAM) Tags Diagnose and solve problems Microsoft Defender for Cloud Events (preview)

Functions Functions App keys App files

Essentials

Resource group (move)	: Rg_Cloud_Lab	URL	: https://xyz1234.azurewebsites.net
Status	: Running	Operating System	: Windows
Location	: Central US	App Service Plan	: ASP-RgCloudLab-859f (Y1: 0)
Subscription (move)	: Azure for Students	Properties	: See More
Subscription ID	: 083a232b-e349-4bd7-9986-88276952d0a9	Runtime version	: 4.8.0.18714
Tags (edit)	: Click here to add tags		

Metrics Features (9) Notifications (1) Quickstart

Create New project in Visual Studio:

Configure your new project

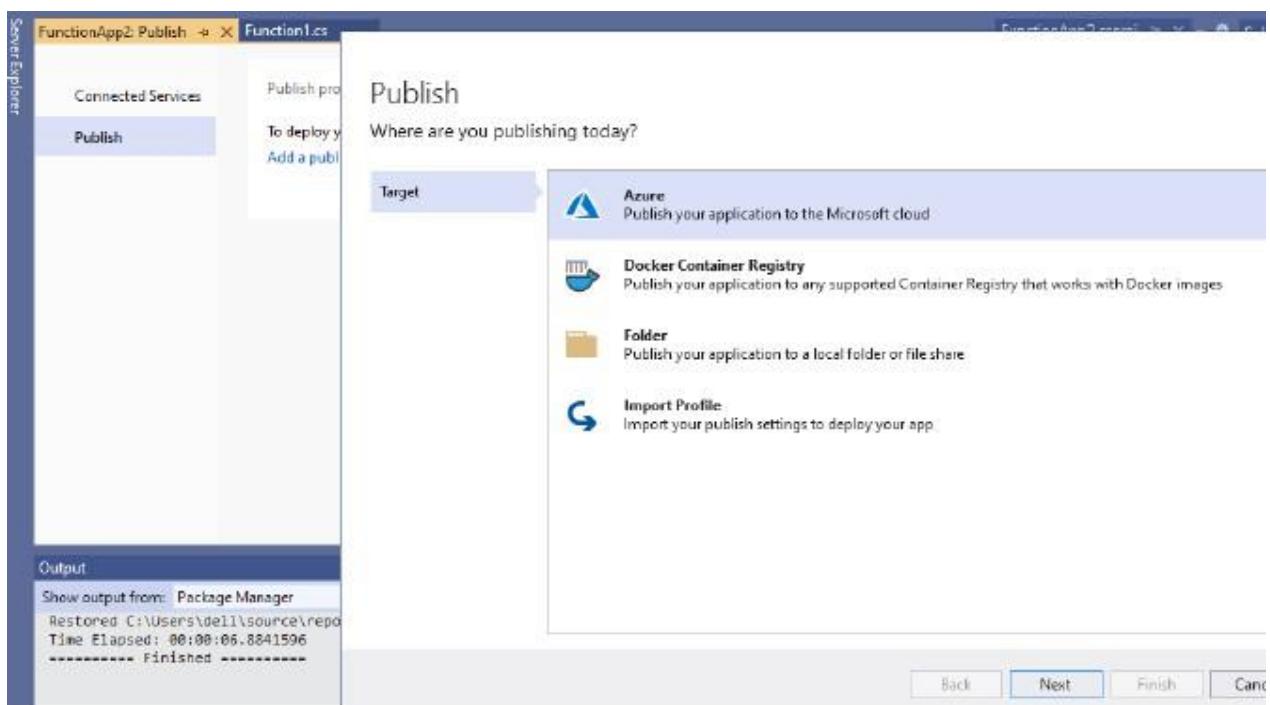


Create a new project

The screenshot shows the 'Create a new project' dialog with the search bar containing 'func'. The 'All platforms' filter is selected. The 'Recent project templates' section includes 'ASP.NET Core Web App (Model-View-Controller)', 'ASP.NET Web Application (.NET Framework)', 'Integration Services Project', and 'Empty'. The 'Azure Functions' template is highlighted, showing its description: 'A template to create an Azure Function project.' It has 'C#' and 'Cloud' options selected. A note at the bottom right says 'Not finding what you're looking for? Install more tools and features.' The 'Empty' template is expanded, showing its details: 'Creates an Azure Function project with no triggers. Function triggers can be added during development.' Other trigger options like 'Service Bus Queue trigger', 'Http trigger', 'Http trigger with OpenAPI', 'Timer trigger', and 'Queue trigger' are listed below. On the right, configuration options for 'Storage account (AzureWebJobsStorage)' and 'Authorization level' are shown. At the bottom, a note says 'Making sure all templates are up to date...' and there are 'Back' and 'Create' buttons.

The screenshot shows the Visual Studio IDE with the following details:

- Title Bar:** Function.cs, FunctionApp2.Function1, Run(HttpRequest req, ILogger log)
- Code Editor:** The code for `Function1.cs` is displayed. It contains C# code for an Azure Functions HTTP trigger. The code includes imports for System, System.IO, System.Threading.Tasks, Microsoft.AspNetCore.Mvc, Microsoft.Azure.WebJobs, Microsoft.Azure.WebJobs.Extensions.Http, Microsoft.AspNetCore.Http, Microsoft.Extensions.Logging, and Newtonsoft.Json. It defines a `Function1` class with a `Run` method that logs information, reads a name from the query string or request body, and returns a success response message.
- Status Bar:** Shows 91%, No issues found, Ln: 18 Ch: 25 SPC CRLF



Publish

Which Azure service would you like to use to host your application?

Target Specific target

-  **Azure Function App (Windows)**
Publish your application code to a serverless compute that scales dynamically and runs code on-demand
-  **Azure Function App (Linux)**
Publish your application code to a serverless compute that scales dynamically and runs code on-demand
-  **Azure Function App Container**
Publish your application as a Docker image to Azure Container Registry and run it on Azure Function App
-  **Azure Container Registry**
Publish your application as a Docker image to Azure Container Registry

Back **Next** **Finish** **Cancel**

Select existing or create a new Azure Function

Target Subscription name

Specific target View

Functions instance Functions instance
Search
Function Apps

-  Rg_Cloud_Lab
 -  Xyz1234 (Consumption)

Run from package file (recommended)

Back **Next** **Finish** **Cancel**

Connected Services

 Xyz1234 - Zip Deploy.pubxml -
Azure Function App (Windows)

 Ready to publish.

Settings

Configuration
Target Runtime

Show all settings

Hosting

Subscription

Resource group

Lab 9- Creating a Microsoft Azure SQL Database.

The screenshot shows the Azure portal interface. At the top, there's a navigation bar with icons for creating a resource, SQL databases, Cost Management, Function App, App Services, Virtual machines, Quickstart Center, Storage accounts, Azure Cosmos DB, and More services. Below this is a 'Resources' section with tabs for 'Recent' and 'Favorite'. Under 'Recent', there are four items listed: 'Xyz1234' (Function App), 'CloudComputingLab123' (App Service), 'Rg_Cloud_Lab' (Resource group), and 'CloudPC' (Virtual machine). Each item has a small icon, its name, type, and last viewed time. At the bottom of this section is a 'See all' link. The main content area is titled 'SQL databases' with a 'Create' button. It shows a table of databases with columns for Name, Type, and Last Viewed. A tooltip for the 'Filter for an' button says: 'Save the current columns, sorting, filtering and summary as a view and access your saved views here.' There are also buttons for Reservations, Manage view, Refresh, Export to CSV, Open query, Assign tags, and Delete. The table includes filters for Resource group, Location, and Add filter. At the bottom are sorting options for Name, Server, Replica type, Pricing tier, and Location.

The screenshot shows the 'Create SQL Database Server' wizard. The first step is 'Server details'. It asks for a 'Server name *' which is set to 'myserver'. A red error message says: 'The specified server name is already in use.' Below it, a 'Location *' dropdown is set to '(US) East US'. The next step in the wizard is visible at the bottom.

Authentication

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Azure AD authentication [Learn more](#) using an existing Azure AD user, group, or application as Azure AD admin [Learn more](#), or select both SQL and Azure AD authentication.

Create SQL Database Server

Microsoft

Server details

Enter required settings for this server, including providing a name and location. This server will be created in the same subscription and resource group as your database.

Server name *

cloudlabserver1
.database.windows.net

- ✓ Server name should contain only lowercase letters, numbers, and hyphens.
- ✓ The specified server name is available.
- ✓ Your server name can't contain 'sql' in third and fourth position.

Location *

(US) East US

Authentication

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Azure AD authentication [Learn more](#) using an existing Azure AD user, group, or application as Azure AD admin [Learn more](#), or select both SQL and Azure AD authentication.

Authentication

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Azure Active Directory (Azure AD) authentication [Learn more](#) using an existing Azure AD user, group, or application as Azure AD admin [Learn more](#), or select both SQL and Azure AD authentication.

Authentication method

- Use SQL authentication
- Use only Azure Active Directory (Azure AD) authentication
- Use both SQL and Azure AD authentication

Server admin login *

cloud

Password *

.....

Confirm password *

.....

Password and confirm password must match.

Database details

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name *

Mydb

Server * ⓘ

(new) cloudlabserver (East US)

[Create new](#)

Want to use SQL elastic pool? ⓘ

- Yes
- No

Workload environment

- Development
- Production

i Default settings provided for Production workloads. Configurations can be modified as needed.

Create SQL Database

Microsoft

Basics Networking Security Additional settings Tags Review + create

Product details

SQL database
by Microsoft
[Terms of use](#) | [Privacy policy](#)

Estimated cost per month

372.97 USD

Terms

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. For additional details see [Azure Marketplace Terms](#).

Basics

Subscription: Azure for Students
Resource group: Ra_Cloud_Lab


Cost summary
Gen5 - General Purpose (GP_Gen5_2)
Cost per vCore (in USD) 184.09
vCores selected x 2
Cost per GB (in USD) 0.12
Max storage selected (in GB) x 41.6
ESTIMATED COST / MONTH 372.97 USD

Create

< Previous

Download a template for automation

 Microsoft.SQLDatabase.newDatabaseNewServer_981ad77d4f3a4cef903c7 | Overview ↗ ...

Deployment

Search (Ctrl+ /) « Delete Cancel ↑ Redeploy ⟳ Refresh

Overview We'd love your feedback! →

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name: Microsoft.SQLDatabase.newDatabaseNewServer_981ad77d4f3a4cef903c7
Subscription: Azure for Students
Resource group: Ra_Cloud_Lab

Start time: 7/31/2022, 12:57:55 AM
Correlation ID: da5c323e-f887-4038-aaa0-d5ff8a5cd7bf

Deployment details (Download)

Next steps

Go to resource

Lab 10- Manage and control your cloud costs with Azure Cost Management.

1. Create one management group and assign subscriptions to it, if you haven't already.

The screenshot shows the 'Nabaraj Negi | Overview' page. The left sidebar includes sections for Access control (IAM), Billing scopes, Diagnose and solve problems, Cost Management (Cost analysis, Cost alerts, Budgets, Advisor recommendations), Billing (Invoices, Payment methods, Payment history, Reservation transactions, Billing profiles, Benefits (preview)), and Products + services (All billing subscriptions). The main content area features a summary message: 'Manage billing for products and services in your billing account. Analyze costs, view invoices, and control billing access. Customize your billing account to meet your needs. Learn more'. Below this are four cards: 'Give access to your account', 'Monitor with budgets', 'Configure billing details', and 'Transfer to your account'. Each card has a 'Learn more' link.

2. In cost analysis, set the scope to your management group and select this management group.

