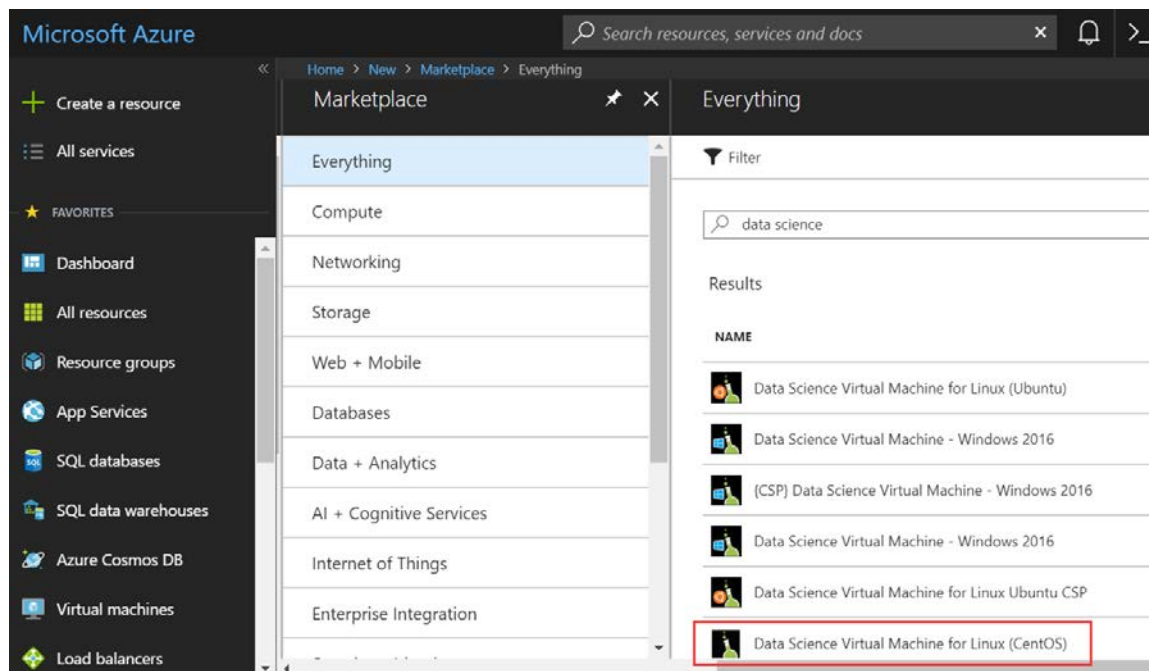
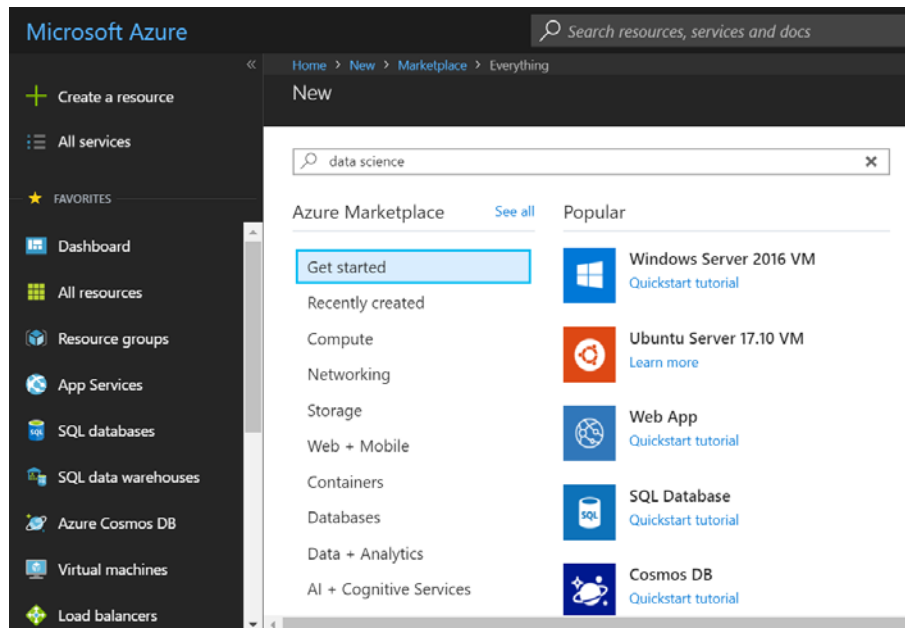


Using Jupyter Notebook Remotely in Azure VM

If you are on Windows, please first install an SSH client. The tutorial below works on the Linux Subsystem of Windows 10. Other SSH clients, like Cygwin, Git Bash, PuTTY and SecureCRT, should work well similarly.

1. Create a resource at <https://portal.azure.com/>. Type “data science” in search box and choose **Data Science Virtual Machine for Linux (CentOS)**.



2. In basic settings, if you choose SSH public key as authentication type, you need to provide an

RSA public key.

3. As for VM size, basic configuration is enough to accomplish task 1. For example, you can choose DS3_V2.

Choose a size

Browse the available sizes and their features

SSD

1

0

★ Recommended | [View all](#)

DS2_V2 Standard ★	DS3_V2 Standard ★	DS4_V2 Standard ★
2 vCPUs	4 vCPUs	8 vCPUs
7 GB	14 GB	28 GB
8 Data disks	16 Data disks	32 Data disks
6400 Max IOPS	12800 Max IOPS	25600 Max IOPS
14 GB Local SSD	28 GB Local SSD	56 GB Local SSD
Premium disk support	Premium disk support	Premium disk support
Load balancing	Load balancing	Load balancing
135.41 USD/MONTH (ESTIMATED)	271.56 USD/MONTH (ESTIMATED)	543.12 USD/MONTH (ESTIMATED)

4. When configuring optional features, it is recommended to assign a public static IP address to your VM so that you can connect to it via SSH. Alternatively, you can configure networking after creating the VM.

Create virtual machine

Settings

Choose public IP address

Dynamic public IP addresses that are not in use won't have an IP address assigned to them.

1 Basics Done ✓

2 Size Done ✓

3 Settings: Configure optional features >

4 Summary Data Science: Virtual Machine f... >

Network

* Virtual network (new) hw3-vnet >

* Subnet default (10.0.1.0/24) >

* Public IP address (new) hands-on-ip >

* Network security group (firewall) (new) hands-on-nsg >

Extensions

Extensions No extensions >

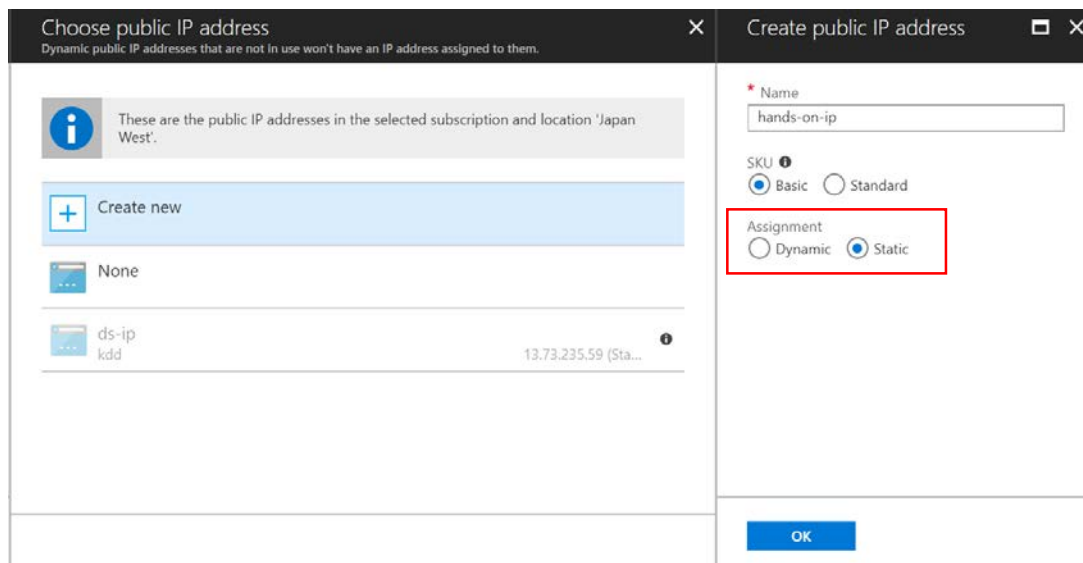
OK

These are the public IP addresses in the selected subscription West.

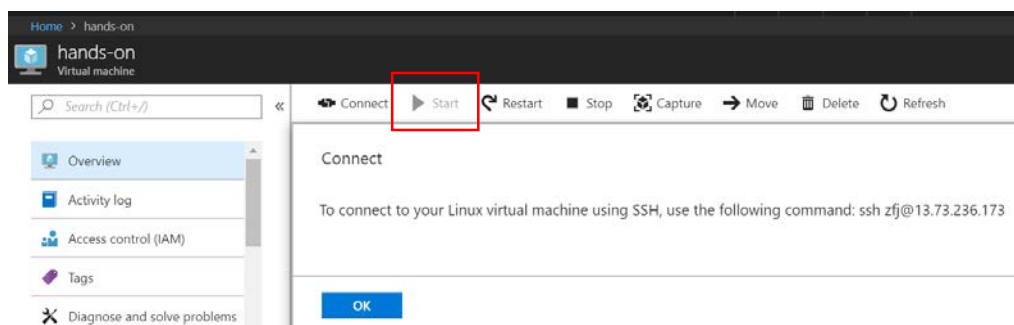
Create new

None

ds-ip kdd



- After creating the VM, you will see the Public IP address in the **Overview** tab. Before executing SSH command, you should start the machine first. Then execute `ssh <user_name>@<public_ip>` to connect to the remote VM. (If you are using other SSH clients, you should use the corresponding method to configure SSH session.)



- Setup for assignment2. You could download the source code via:

```
wget http://cs231n.stanford.edu/assignments/2017/spring1617_assignment2.zip
unzip spring1617_assignment2.zip
```

Then you could configure the environment described in assignment2.pdf.

Please note that you are recommended to **install python package locally** without root. You can replace all `pip install <package>` with `pip install --user <package>`.

When installing virtualenv (pip install --user virtualenv), you may encounter this problem:

```
[zfj@hands-on assignment2]$ python3 -m venv .env
Error: Command '['/home/zfj/assignment2/.env/bin/python3', '-Im', 'ensurepip', '--upgrade', '--default-pip']' returned non-zero exit status 1
```

You can solve this problem by the solution provided [here](#).

Please finish all configuration except executing `jupyter notebook` command in assignment2.pdf.

7. In order to connect to jupyter notebook running on remote VM, you should open an **available** port for VM (The port number CAN'T be the same as other PORTS in inbound port rules). In the Azure portal, we can see the resource group for the virtual machine. You could select networking tab and add inbound port rule to allow *destination port* for the TCP protocol.

Home > hands-on - Networking

hands-on - Networking
Virtual machine

Search (Ctrl+J)

Tags

Diagnose and solve problems

SETTINGS

Networking

Disks

Size

Security (Preview)

Extensions

Attach network interface Detach network interface

Network Interface: hands-on607 Effective security rules Topology ⓘ

Virtual network/subnet: hw3-vnet/default Public IP: 13.73.236.173 Private IP: 10.0.1.4

INBOUND PORT RULES ⓘ

Network security group hands-on-nsg (attached to network interface: hands-on607)
Impacts 0 subnets, 1 network interfaces

Add inbound port rule

PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
1010	Jupyter	9999	TCP	Any	Any	✓ Allow ...
1020	JupyterHub	8000	TCP	Any	Any	✓ Allow ...
1030	RStudioServer	8787	TCP	Any	Any	✓ Allow ...

Add inbound security rule
hands-on-nsg

Basic

* Source ⓘ
Any

* Source port ranges ⓘ
*

* Destination ⓘ
Any

* Destination port ranges ⓘ
10070 ✓

* Protocol
Any TCP UDP

* Action
Allow Deny

OK

Add inbound security rule
hands-on-nsg

Basic

* Protocol
Any TCP UDP

* Action
Allow Deny

* Priority ⓘ
1050 ✓

* Name
jupyter-notebook ✓

Description

OK

8. After that, you should connect to VM via:

```
ssh -L 8080:localhost:10070 <user_name>@<public_ip>
```

where 8080 can be replaced with other available port in local machine.

This means you need enable SSH tunnel (local port forwarding in this case) in your SSH session. You need figure out an appropriate way to setup local port forwarding if you use a GUI SSH client (like putty(link), xshell)

Then in assignment2 directory on the VM, you could start jupyter notebook via:

```
jupyter notebook --no-browser --port=10070
```

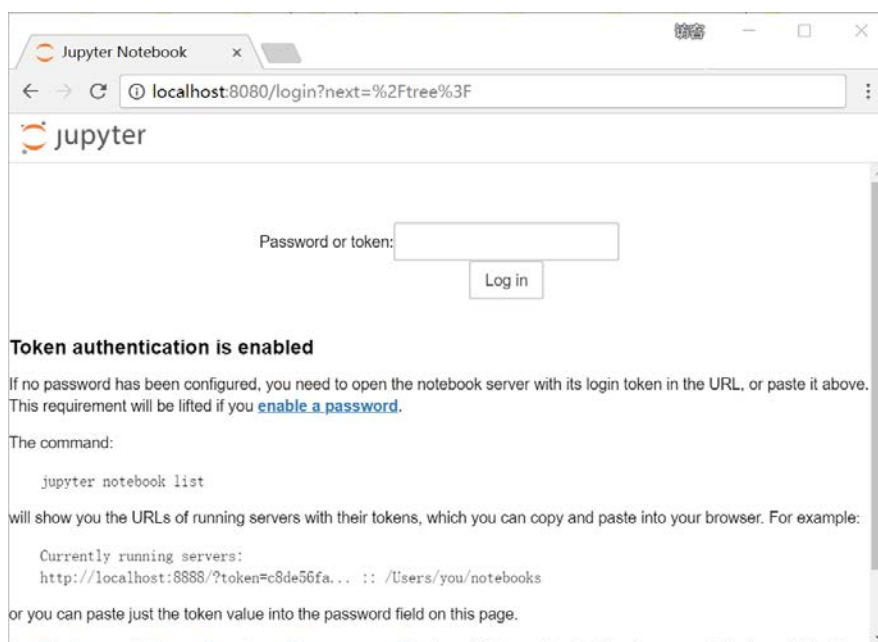
where 10070 is the open port of VM.

```
(.env) [zffj@hands-on assignment2]$ jupyter notebook --no-browser --port=10070
[I 08:15:43.479 NotebookApp] Writing notebook server cookie secret to /run/user/1003/jupyter/notebook_cookie_secret
[I 08:15:45.032 NotebookApp] Serving notebooks from local directory: /home/zffj/assignment2
[I 08:15:45.033 NotebookApp] 0 active kernels
[I 08:15:45.033 NotebookApp] The Jupyter Notebook is running at: http://localhost:10070/?token=3281f483838dc844e4e6c74758c79d489c629bde16cd6a4b
[I 08:15:45.033 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).

Copy/paste this URL into your browser when you connect for the first time,
to login with a token:
http://localhost:10070/?token=3281f483838dc844e4e6c74758c79d489c629bde16cd6a4b
```

Next, you could use the token in the debugging message to access jupyter notebook running on the VM.

Please note that you should enter *localhost:8080* in the browser locally instead of *localhost:10070*, where 8080 is the open port of your local machine.



Finally you can run the notebooks successfully. Please check this by running the first two cells in FullyConnectedNets.ipynb.

```
The autoreload extension is already loaded. To reload it, use:
%reload_ext autoreload

In [3]: # Load the (preprocessed) CIFAR10 data.
data = get_CIFAR10_data()
for k, v in list(data.items()):
    print('%s: ' % k, v.shape)

('X_train:', (49000, 3, 32, 32))
('X_test:', (1000, 3, 32, 32))
('y_train:', (49000,))
('y_val:', (1000,))
('X_val:', (1000, 3, 32, 32))
('y_test:', (1000,))

Affine laver: foward
```

Important reminder: you should stop Azure VM in portal.azure.com when you finish your lab every time. Closing SSH session doesn't mean the VM is stopped.

References:

[1] <http://www.vickyfu.com/2017/04/using-jupyter-notebook-remotely-in-azure-vm/>