



TCSS 562:  
SOFTWARE ENGINEERING  
FOR CLOUD COMPUTING

MS Azure Demo  
Cloud Technology Sharing - I

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L9.2

FEEDBACK – 4/25


Can you give Microsoft Azure tutorial / demo . . .

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L9.2

AZURE IAAS  
DEMO



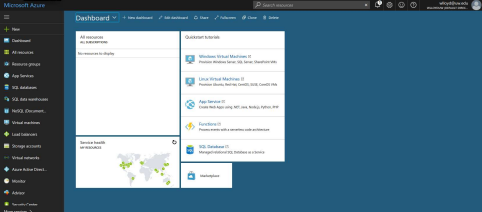
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L9.3

MS AZURE DEMO

Log into your account  
Navigate to the "Azure Portal",  
equivalent to the AWS management console



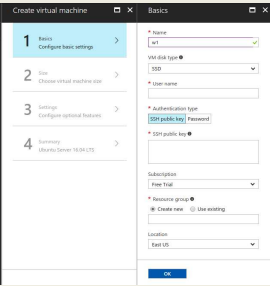
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L9.4

CREATE A NEW VM

Click "Virtual machine"  
Click "Add"  
Search for "Ubuntu"  
Select "Ubuntu Server 16.04 LTS"  
Deployment type:  
Resource manager  
The Create VM dialog  
is presented:

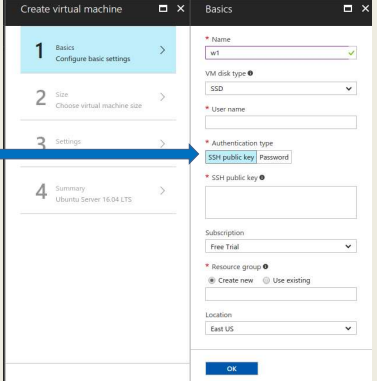


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L9.5

Let's create a  
public/private  
ssh keypair



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L9.6

```
wlloyd@Dione:~/Dropbox/azure/myvms$ ssh-keygen -t rsa -f ./uw_azure_2
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in ./uw_azure_2.
Your public key has been saved in ./uw_azure_2.pub.
The key fingerprint is:
SHA256:qpiZaM9a3Y4t86/03SyChsgLX56n3YN6CH1XK5qM0 wlloyd@Dione
The key's randomart image is:
+-----[RSA 2048]-----+
|.00  O +|.
|+.. S +|.
|+O  +O +|.
|+*+.+|.
|+ =@+ +Eo|.
|..+B+ =+ +|.
|-----[SHA256]-----+

wlloyd@Dione:~/Dropbox/azure/myvms$ ls -l
total 16
-rw-r--r-- 1 wlloyd wlloyd 1679 Apr 26 23:21 uw_azure_2
-rw-r--r-- 1 wlloyd wlloyd 394 Apr 26 23:21 uw_azure_2.pub
wlloyd@Dione:~/Dropbox/azure/myvms$
```

Use ssh-keygen from the command line to create your key pair.  
And provide the public key to Azure.

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L9.7

Copy public ssh key

Create a new resource group

Like a region

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L9.8

Choosing the cheapest type

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L9.9

Unable to enable ICMP for ping for Linux VMs

Suggested workaround:  
Use TCP based pings

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L9.10

Validation passed

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L9.11

Starts the launch sequence

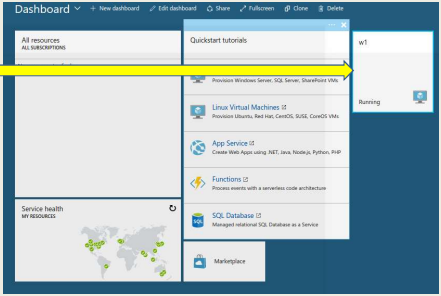
Appears to have 1-minute status updates

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L9.12

After awhile dashboard shows running VM

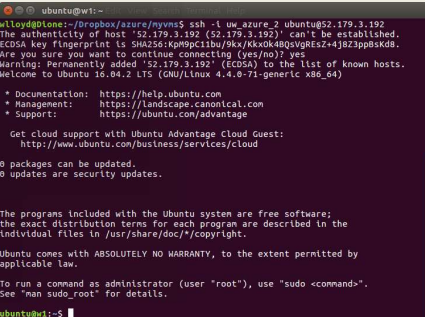


The screenshot shows the AWS Management Console dashboard. A yellow arrow points from the text 'After awhile dashboard shows running VM' to the 'Running' status of a VM instance in the 'Quickstart tutorials' section.

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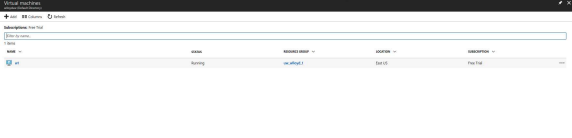
The screenshot shows a terminal window with the following output:  
lloyd@lone:~/Dropbox/azure/myvm\$ ssh -l uw\_azure-2 ubuntu@52.179.3.192  
The authenticity of host '52.179.3.192 (52.179.3.192)' can't be established.  
ECDSA key fingerprint is SHA256:Kgm9Pc1bu/9Ks/Kx0k48QvG8sz+4j82jpp8sK8.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '52.179.3.192' (ECDSA) to the list of known hosts.  
Welcome to Ubuntu 16.04.2 LTS (GNU/Linux 4.4.0-71-generic x86\_64)  
  
 \* Documentation: https://help.ubuntu.com  
 \* Management: https://landscape.canonical.com  
 \* Support: https://ubuntu.com/advantage  
  
Get cloud support with Ubuntu Advantage Cloud Guest:  
http://www.ubuntu.com/business/services/cloud  
  
0 packages can be updated.  
0 updates are security updates.  
  
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/\*/\*-copyright.  
  
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.  
  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo\_root" for details.  
  
ubuntu@lone:~\$

Connecting is straightforward using the private ssh key you've created...

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L9.14



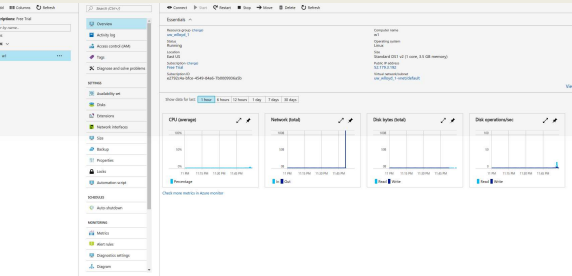
The screenshot shows the 'Virtual Machines' page in the AWS Management Console. It displays a table with columns for Name, Status, Image, Size, and Location. The table shows one VM instance with a status of 'Running'.

Going to "Virtual Machines" shows running VMs...

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L9.15



The screenshot shows the detailed view of a virtual machine in the AWS Management Console. It includes sections for Overview, Network, Storage, and Monitoring. The Monitoring section shows graphs for CPU usage, Network I/O, and Disk I/O.

Drilling down provides a detailed view of the virtual machine...

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## INSTALL AMAZON CLI 2.0

```
echo "deb [arch=amd64]
https://packages.microsoft.com/repos/azure-cli/ wheezy
main" | \
sudo tee /etc/apt/sources.list.d/azure-cli.list

sudo apt-key adv --keyserver packages.microsoft.com --
recv-keys 417A0893

sudo apt-get install apt-transport-https

sudo apt-get update && sudo apt-get install azure-cli
```

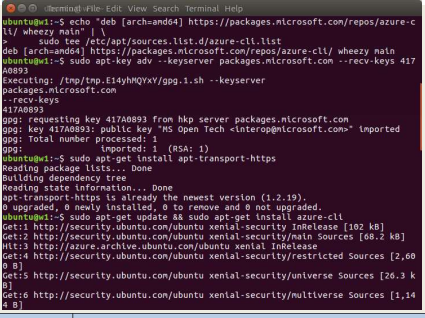
From:  
<https://docs.microsoft.com/en-us/cli/azure/install-azure-cli>

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L9.17

## INSTALL AMAZON CLI 2.0 - 2



The screenshot shows a terminal window with the following output:  
ubuntu@lone:~\$ echo "deb [arch=amd64] https://packages.microsoft.com/repos/azure-cl  
/ wheezy main" | \  
sudo tee /etc/apt/sources.list.d/azure-cli.list  
deb [arch=amd64] https://packages.microsoft.com/repos/azure-cli/ wheezy main  
ubuntu@lone:~\$ sudo apt-key adv --keyserver packages.microsoft.com --recv-keys 417  
A0893  
Executing: /tmp/tmp.E14yhMQV/gpg.1.sh --keyserver  
packages.microsoft.com  
--recv-keys  
417A0893  
gpg: requesting key 417A0893 from hkp server packages.microsoft.com  
gpg: key 417A0893: public key "MS Open Tech <interop@microsoft.com>" imported  
gpg: Total number processed: 1  
gpg: Imported: 1 (RSA: 1)  
ubuntu@lone:~\$ sudo apt-get install apt-transport-https  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
apt-transport-https is already the newest version (1.2.19).  
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.  
ubuntu@lone:~\$ sudo apt-get update && sudo apt-get install azure-cli  
Get:1 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]  
Get:2 http://security.ubuntu.com/ubuntu xenial-security Sources [68.2 kB]  
Hit:3 http://azure.archive.ubuntu.com/ubuntu xenial InRelease  
Get:4 http://security.ubuntu.com/ubuntu xenial-security/restricted Sources [2.60  
kB]  
Get:5 http://security.ubuntu.com/ubuntu xenial-security/universe Sources [26.3 k  
B]  
Get:6 http://security.ubuntu.com/ubuntu xenial-security/multiverse Sources [1.14  
kB]

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## REGISTER THE VM FOR CLI USE

- From the ubuntu bash command line:
- Type “az login”
- One time operation
- Special code provided which needs to be entered into web page

The image shows a screenshot of a web-based application interface for logging into a device. At the top, there's a title bar that says "Device Login". Below that, a text prompt reads "Enter the code that you received from the application on your device". A text input field contains the code "AJINP3JGD". Below the input field is a "Cancel" button. On the left side of the interface, there is a blue vertical sidebar with a "Continue" button. The entire interface is set against a solid blue background.

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## REGISTER THE VM FOR CLI USE - 2

- Select an Azure account
- And be fast...

**Alternative:**  
az login -u <your azure email addr>  
Azure will prompt for password

Sorry, but the code you entered earlier has expired. Please get a new code from the application on your device.

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L9.20

## AZURE CLI ISSUE

- Since your UW email account is already a Microsoft account, I had trouble using this email account as a Azure username that **could be authenticated for the CLI...**
- Received error:

[illegible]

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19.21

## AZURE CLI ISSUE - WORK AROUND

- Went to Active Directory
- Created a fake domain:
  - "wllloydw"
- Created a new user within active directory for original Microsoft uw.edu account using the new domain
- Logged out of azure using uw account
- Logged into azure using new account with fake domain
- Registered for free trial
- Got \$200 free credit – 30 days, again !
- Launched VM
- CLI authentication worked!

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Example JSON output from "az vm list -o jsonc"

```

# 1. Import the necessary libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')

# 2. Load the dataset
url = "https://raw.githubusercontent.com/jbrownlee/Datasets/master/sonar.csv"
sonar = pd.read_csv(url)

# 3. Explore the data
print(sonar.shape)
print(sonar.head())
print(sonar.columns)

# 4. Data Preprocessing
# Split the data into training and testing sets
X = sonar.drop('class', axis=1)
y = sonar['class']

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# 5. Feature Scaling
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

# 6. Model Training
from sklearn.neighbors import KNeighborsClassifier
knn = KNeighborsClassifier(n_neighbors=5)
knn.fit(X_train, y_train)

# 7. Model Evaluation
y_pred = knn.predict(X_test)
accuracy = knn.score(X_test, y_test)
print(f'Accuracy: {accuracy}')

# 8. Confusion Matrix
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_test, y_pred)
print(cm)

# 9. ROC Curve
from sklearn.metrics import roc_curve
fpr, tpr, _ = roc_curve(y_test, y_pred)
plt.plot(fpr, tpr)
plt.xlabel('False Positive Rate')
plt.ylabel('True Positive Rate')
plt.title('ROC Curve')
plt.show()

```

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L9.2

## IMAGING A VM

- Detailed instructions: <https://docs.microsoft.com/en-us/azure/virtual-machines/linux/capture-image>
- Need to generalize the VM
- Deprovision the VM using Azure VM agent
  - This deletes files and data (temporary?)
  - **sudo waagent -deprovision+user**
  - Then exit out of the ssh session...

```
ubuntu@ubuntu18:~$ sudo waagent -deprovision-user
WARNING: the password service will be stopped.
WARNING: cached apt keys will be deleted.
WARNING: root password will be disabled. You will not be able to login as root.
WARNING: /etc/resolvconf/resolv.conf.d/tail and /etc/resolvconf/resolv.conf.d/original will be deleted.
WARNING: ubuntu account and entire home directory will be deleted.
Do you want to proceed (y/n)?
ubuntu@ubuntu18:~$ exit
logout
Connection to 52.168.26.228 closed.
```

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IMAGING A VM - 2

- Launch a second VM, use the command line to image the first
- Support for imaging Linux VM's from the UI - - - ???
- From the other VM:

```
az vm list
az vm deallocate --resource-group myResourceGroup --name myVM
az vm generalize --resource-group myResourceGroup --name myVM
az image create --resource-group myResourceGroup --name myImage --source myVM
```

- Create a new VM from the image:

```
az vm create --resource-group myResourceGroup --name myVMDeployed --image myImage --admin-username azureuser --ssh-key-value ~/.ssh/id_rsa.pub
```

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```
ubuntu@ubuntu2:~$ az vm list -n table
Name ResourceGroup Location
-----
ubidtest2 MLOVD_RC_1 eastus
vm2 MLOVD_RC_1 eastus
ubuntu@ubuntu2:~$ az vm deallocate --resource-group MLOVD_RC_1 --name ubidtest2
{"endTime": "2017-04-27T09:45:09.973430-08:00",
 "error": null,
 "name": "F802aa9-24c6-4919-981e-75dc1a8d8069",
 "startTime": "2017-04-27T09:42:29.315794-08:00",
 "status": "Succeeded"}
ubuntu@ubuntu2:~$ az vm generalize --resource-group MLOVD_RC_1 --name ubidtest2
ubuntu@ubuntu2:~$ az image create --resource-group MLOVD_RC_1 --name ubidtest2 --source ubidtest2
{"id": "/subscriptions/c841b2-8d94-497a-9a8f-667d338a725b/resourceGroups/MLOVD_RC_1/providers/Microsoft.Compute/images/ubidtest2",
 "location": "eastus",
 "name": "ubidtest2",
 "provisioningState": "Succeeded",
 "resourceGroup": "MLOVD_RC_1",
 "sourceVirtualMachine": {
  "id": "/subscriptions/c841b2-8d94-497a-9a8f-667d338a725b/resourceGroups/MLOVD_RC_1/providers/Microsoft.Compute/virtualMachines/ubidtest2",
  "resourceGroup": "MLOVD_RC_1"
},
 "storageProfile": {
  "dataDisks": [],
  "osDisk": {
    "blobUri": "https://wllloydgitdsk116.blob.core.windows.net/vhds/ubidtest20170427014545.vhdx",
    "caching": "ReadWrite",
    "diskSizeGB": null,
    "managedBy": null,
    "osState": "Generalized",
    "osType": "Linux",
    "snapshot": null
  }
},
 "tags": null,
 "type": "Microsoft.Compute/images"
}
ubuntu@ubuntu2:~$ az vm create --resource-group MLOVD_RC_1 --name ubidtest2 --image ubidtest2 --ad
min-username ubuntu --ssh-key-value w_eazure_2.pub
image: az [h] [-output {json,tsv,table,jsonc}] [--verbose] [--debug]
[query JMESPATH]
ubuntu@ubuntu2:~$ az vm create --resource-group MLOVD_RC_1 --name ubidtest2 --image ubidtest2 --ad
min-username ubuntu --ssh-key-value w_eazure_2.pub
```

OOPS

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```
wllloyd@ubuntu2:~/projects/azure/mynms$ ssh -t ow_azure_2 ubuntu@40.71.249.110
wllloyd@ubuntu2:~$ az vm list -n table
Name ResourceGroup Location
-----
ubidtest2 MLOVD_RC_1 eastus
vm2 MLOVD_RC_1 eastus
ubuntu@ubuntu2:~$ az login -u wllloyd@wllloyd.wu.onmicrosoft.com
Password:
{
  "cloudName": "AzureCloud",
  "id": "c841b2-8d94-497a-9a8f-667d338a725b",
  "isDefault": true,
  "name": "Free Trial",
  "state": "Enabled",
  "tenantId": "9b1a8e3c-4399-4a45-b987-27906d6caabb",
  "user": {
    "name": "wllloyd@wllloyd.wu.onmicrosoft.com",
    "type": "user"
  }
}
```

CONCLUSION


New VM Image works...  
We've been able to Install the CLI, relimage, relaunch, and now have a Ubuntu 16.04 VM with the Azure CLI Installed "out of the box" ...

Need to Login to the CLI on the new VM

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QUESTIONS



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