

Operating Systems Lab

System Administration Task Part 2

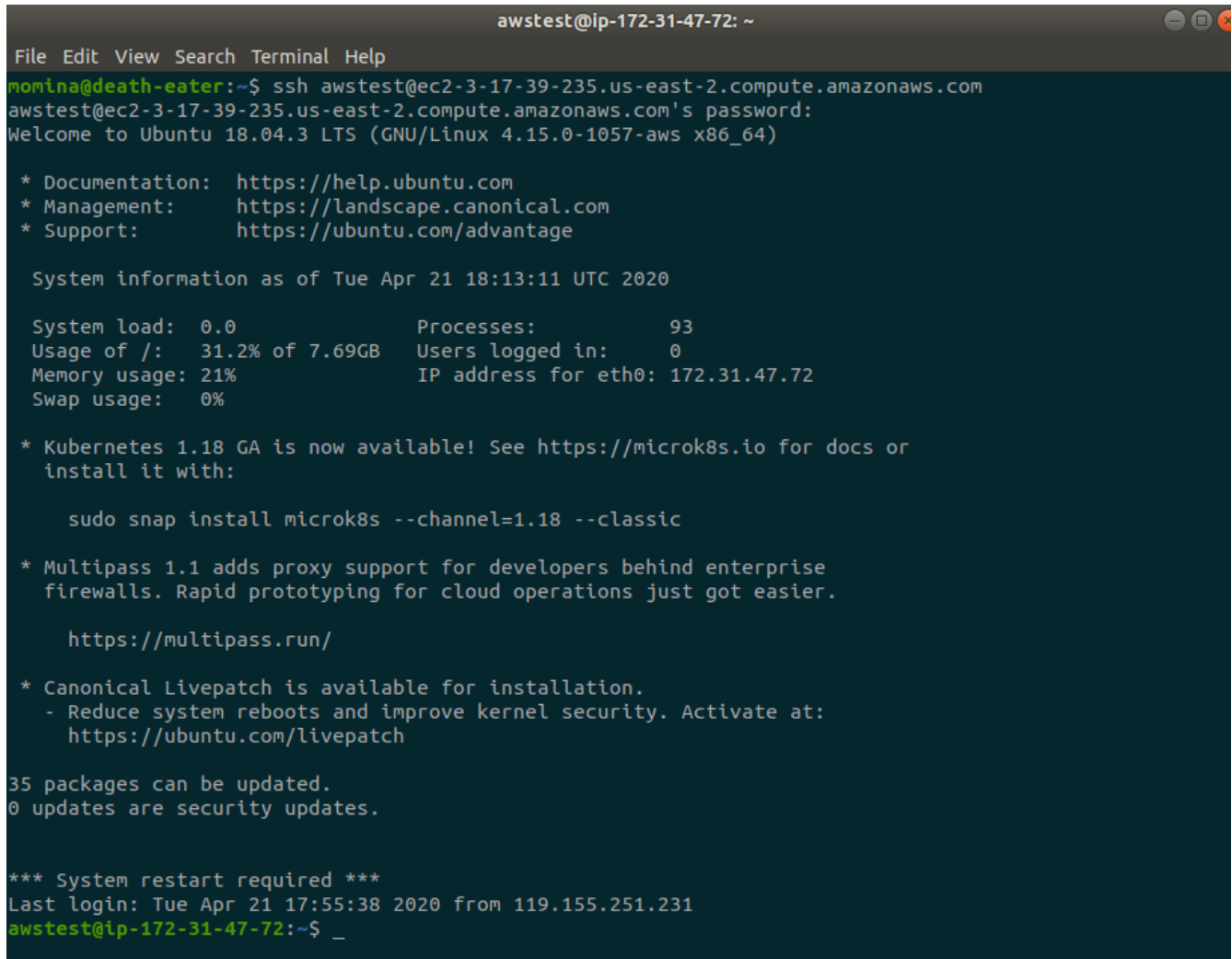
Momina Atif Dar

P18-0030

Section B

Screenshots:

Logged in:

A terminal window titled 'awstest@ip-172-31-47-72: ~' showing an SSH session. The user 'momina@death-eater' has successfully logged in as 'awstest' to an Ubuntu 18.04.3 LTS instance. The terminal displays system information, including system load, processes, memory usage, and IP address. It also lists several updates and announcements, such as Kubernetes 1.18 GA availability and Canonical Livepatch. The session ends with a system restart requirement and a last login timestamp.

```
awstest@ip-172-31-47-72: ~
File Edit View Search Terminal Help
momina@death-eater:~$ ssh awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com
awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com's password:
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-1057-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Tue Apr 21 18:13:11 UTC 2020

System load:  0.0               Processes:    93
Usage of /:   31.2% of 7.69GB   Users logged in: 0
Memory usage: 21%              IP address for eth0: 172.31.47.72
Swap usage:  0%

 * Kubernetes 1.18 GA is now available! See https://microk8s.io for docs or
   install it with:

   sudo snap install microk8s --channel=1.18 --classic

 * Multipass 1.1 adds proxy support for developers behind enterprise
   firewalls. Rapid prototyping for cloud operations just got easier.

   https://multipass.run/

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

35 packages can be updated.
0 updates are security updates.

*** System restart required ***
Last login: Tue Apr 21 17:55:38 2020 from 119.155.251.231
awstest@ip-172-31-47-72:~$ _
```

Created directory and .py file:

```
awstest@ip-172-31-47-72: ~/p180030
File Edit View Search Terminal Help
awstest@ip-172-31-47-72:~$ mkdir p180030
awstest@ip-172-31-47-72:~$ cd p180030
awstest@ip-172-31-47-72:~/p180030$ vi p180030.py
awstest@ip-172-31-47-72:~/p180030$ _
```

.py file:

```
awstest@ip-172-31-47-72: ~/p180030
File Edit View Search Terminal Help
import time

for i in range(1000):
    print("i: ",i, flush=True)
    time.sleep(1)
~
~
~
~
~
~
~
```

Executed .py file:

```
awstest@ip-172-31-47-72: ~/p180030
File Edit View Search Terminal Help
awstest@ip-172-31-47-72:~$ mkdir p180030
awstest@ip-172-31-47-72:~$ cd p180030
awstest@ip-172-31-47-72:~/p180030$ vi p180030.py
awstest@ip-172-31-47-72:~/p180030$ python3 p180030.py
i: 0
i: 1
i: 2
i: 3
i: 4
i: 5
i: 6
i: 7
i: 8
i: 9
i: 10
i: 11
i: 12
_
```

Interrupted the process, logged in again to check whether process is still running or not:

```
awstest@ip-172-31-47-72:~/p180030$ exit
logout
Connection to ec2-3-17-39-235.us-east-2.compute.amazonaws.com closed.
nomina@death-eater:~$ ssh awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com
awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com's password:
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-1057-aws x86_64)

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 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Tue Apr 21 18:19:02 UTC 2020

System load:  0.02               Processes:    91
Usage of /:   31.2% of 7.69GB    Users logged in:  0
Memory usage: 20%               IP address for eth0: 172.31.47.72
Swap usage:   0%

 * Kubernetes 1.18 GA is now available! See https://microk8s.io for docs or
   install it with:

   sudo snap install microk8s --channel=1.18 --classic

 * Multipass 1.1 adds proxy support for developers behind enterprise
   firewalls. Rapid prototyping for cloud operations just got easier.

   https://multipass.run/

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

35 packages can be updated.
0 updates are security updates.

*** System restart required ***
Last login: Tue Apr 21 18:13:12 2020 from 39.35.241.103
awstest@ip-172-31-47-72:~$ ps aux | grep p180030
awstest 12570  0.0  0.0 14856 1004 pts/0    S+   18:19   0:00 grep --color=auto p180030
awstest@ip-172-31-47-72:~$ _
```

nohup is used when we want child process to stay alive when parent process is killed and & is used when we want a process to continue running in background:

```
awstest@ip-172-31-47-72: ~/p180030
File Edit View Search Terminal Help
awstest@ip-172-31-47-72:~$ clear

awstest@ip-172-31-47-72:~$ cd p180030
awstest@ip-172-31-47-72:~/p180030$ nohup python3 p180030.py > p180030.log &
[1] 12585
awstest@ip-172-31-47-72:~/p180030$ nohup: ignoring input and redirecting stderr to stdout
awstest@ip-172-31-47-72:~/p180030$ tail -f p180030.log
i: 36
i: 37
i: 38
i: 39
i: 40
i: 41
i: 42
i: 43
i: 44
i: 45
i: 46
i: 47
i: 48
i: 49
i: 50
i: 51
i: 52
i: 53
i: 54
_
```

Process running in background (before exiting):

```
awstest@ip-172-31-47-72:~/p180030$ ps aux | grep p180030
awstest 12585  0.0  0.8 30160 9060 pts/0    S   18:20   0:00 python3 p180030.py
awstest 12604  0.0  0.0 14856 1000 pts/0    S+  18:21   0:00 grep --color=auto p180030
awstest@ip-172-31-47-72:~/p180030$ _
```

Process still running in background even after exiting:

```
awstest@ip-172-31-47-72:~/p180030$ exit
logout
Connection to ec2-3-17-39-235.us-east-2.compute.amazonaws.com closed.
nomina@death-eater:~$ ssh awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com
awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com's password:
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-1057-aws x86_64)

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 * Support:       https://ubuntu.com/advantage

System information as of Tue Apr 21 18:21:59 UTC 2020

System load:  0.0               Processes:           92
Usage of /:   31.2% of 7.69GB   Users logged in:    0
Memory usage: 21%              IP address for eth0: 172.31.47.72
Swap usage:   0%

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   install it with:

   sudo snap install microk8s --channel=1.18 --classic

 * Multipass 1.1 adds proxy support for developers behind enterprise
   firewalls. Rapid prototyping for cloud operations just got easier.

   https://multipass.run/

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

35 packages can be updated.
0 updates are security updates.

*** System restart required ***
Last login: Tue Apr 21 18:19:03 2020 from 39.35.241.103
awstest@ip-172-31-47-72:~$ ps aux | grep p180030
awstest 12585  0.0  0.8 30160 9060 ?        S    18:20   0:00 python3 p180030.py
awstest 12714  0.0  0.1 14856 1052 pts/0    S+   18:22   0:00 grep --color=auto p180030
awstest@ip-172-31-47-72:~$ _
```

Checking where our process has gone so far:

```
awstest@ip-172-31-47-72:~/p180030$ tail -f p180030.log
i: 128
i: 129
i: 130
i: 131
i: 132
i: 133
i: 134
i: 135
i: 136
i: 137
i: 138
i: 139
i: 140
i: 141
i: 142
i: 143
i: 144
i: 145
i: 146
i: 147
i: 148
i: 149
i: 150
i: 151
i: 152
```

Killing the process manually:

```
awstest@ip-172-31-47-72:~/p180030$ ps aux | grep p180030
awstest 12585 0.0 0.8 30160 9060 ?        S    18:20   0:00 python3 p180030.py
awstest 12749 0.0 0.1 14856 1108 pts/0    S+   18:25   0:00 grep --color=auto p180030
awstest@ip-172-31-47-72:~/p180030$ kill -9 12585
awstest@ip-172-31-47-72:~/p180030$ ps aux | grep p180030
awstest 12751 0.0 0.1 14856 1088 pts/0    S+   18:25   0:00 grep --color=auto p180030
awstest@ip-172-31-47-72:~/p180030$ _
```


Creating a private and public key pair using ssh-keygen:

```
momina@death-eater: ~  
File Edit View Search Terminal Help  
momina@death-eater:~$ ssh-keygen  
Generating public/private rsa key pair.  
Enter file in which to save the key (/home/momina/.ssh/id_rsa): p180030  
p180030 already exists.  
Overwrite (y/n)? y  
Enter passphrase (empty for no passphrase):  
Enter same passphrase again:  
Your identification has been saved in p180030.  
Your public key has been saved in p180030.pub.  
The key fingerprint is:  
SHA256:Eb8n5IUdyDGMho9tKesPMn4Ch6ley2kErGqo10cnYMQ momina@death-eater  
The key's randomart image is:  
+---[RSA 2048]-----+  
|      ..+oo.      |  
|      . oo++ .    |  
|. .      =..+ o    |  
| o E  o  =+ o      |  
|. oo   +S + .      |  
|. =+. .   o        |  
|ooo=+o.           |  
|=..oo*+oo         |  
|=..+.+o..         |  
+---[SHA256]-----+  
momina@death-eater:~$ ls  
Desktop      Downloads      Firefox_wallpaper.png  p180030      Pictures      snap      Videos  
Documents    examples.desktop  Music                  p180030.pub  Public        Templates  
momina@death-eater:~$ vi p180030  
momina@death-eater:~$ _
```


Private key that will remain with us:

```
momina@death-eater: ~  
File Edit View Search Terminal Help  
-----BEGIN RSA PRIVATE KEY-----  
MIIEpAIBAAKCAQEA2iEdeERpWQ2EbzxTvyUjNQr3CoGBfw1aJB93yUYeyCzd5ZCk  
jqaCx2fzhGjM9+nqpbfyV1FcHCG5NuMoNUmWFTo3npRoimIGh89zEd3SUXCbkdd5  
v1NYoNDttHsX23VoYI4WQRed1AXThHmaeiBGXtIIL017FHDxh0sXJpjYuwpwbex9  
BOgvpWsdnU0/1RcNTHu2T/38/KBy/09T2RHQEZ4mWfeINyBIjNdtwWBXZFPdmqNw  
LcSwE+2Er1Z7TWmt1T0IT7XSXYekBa1rDjx3dqpH3B0Y+HFhMvr834j5nM4dMSZL  
W39khLlZZ9GZdB1v9Q9s9EuagHNpLkTKEVbEpwIDAQABAOIBAHUWb4Y+WrpVujAk  
GayyF6sCXseB6uwzU56uUZn2E1HqW5Y9xUdZdDvrvdjmlJfDNZSNIAXLA2eKZqxi  
1RN9k5WDcZWkHk6h/dVq8t61To8uviNUIemkrx9r5x0JMi44YlXrr2Bzd+H22qpy  
yAwnwjXl0nt22qmHUu8HzL6IL1Z+bsEcSqZtaDfAUr1MmzAv6qaE2DgR7HkYnr5M  
K+KqHJaGUMR4c1MspHODscIdx05rG1XYS8pKo7gPhwyS0DLEy6uWev5yPJmuS5co  
/d9XGVAmilTzDzA2vdWKNBREPAr8GGQBWacYL+FSNCOrTsBLU66aJSDKM7Gmw29  
VrwHplkCgYEA/PRYIk9Tr0lvGco8gNlkGS484FuP0Chjf+XqCG7o33N+SEUm9mod  
Sffsjb+WCTbz3N+HzX7XzFXXBYmNqWaoRUef9TI03axpq1/R+zmj4uFFbxgZsBE/  
+qaiZMgnj4M1AZkQaM6w7S7jeDjI2HSJ10orx9xIoPW5kLIsxkqJQ3UCgYEA3MFu  
1ePprUKfedFeChz4Eoad6Z45pTE0cWpH6m1XC6zvrPwHIHvsblWikW46rpyNELAJ  
LRxXGS4jbV51kml50VY2T5p1oasbYs1s9qK/kPF256iEiHgSmKvrNSfh8oDWq+FR  
qLjKbL2ZVPwgpWQ3KaQfenVBLUSM2HCJS8FIsCsCgYEA5DevrITVgZ06vuavX7DC  
1tUYp3L0dWF7I9FTLPijsbaJoLqDRJ7IfgvoqJrJytaBfi10YOCn4fswXBaWcnfl  
yVutvZLERstfKvbwhDck4/VKp8iepHNrvcDJkxPiXWCLWj22yFhy2AsNv1G8I05B  
bI85oL/l5xLLsPiP3PcykGECgYAqqTL7IL1S31IkX4KV371NDzjLIemv88f/wPM+  
6Xxt5DC5NEdITsqFFAWDP1Kt1dEpXdA4KIboddMg2qVL8xgbLX73aTkUg3LzTkM  
fJMatp8s65MZMGmfN/GnZxqyG5Xgx31ZZsSvuQA9vS+t5q0GX1PMfYZn8hxp422U  
9zhN2wKBgQCMip019I49Q+DvGbSysflL2DkGI95MdLMmez+e9d4bvhEZfoULZH0T  
wcVzqPc9+0EojicHnawg72YX9AVbzhexQVqannpJh22sNE7YjK4MTDJKJveJ+J1r  
qtsSCEit/Dz7xlX9D6kN+Y7qK/FbufT44ddZhKHL+15d5EiLPygLyg==  
-----END RSA PRIVATE KEY-----
```

Viewing public key:

```
momina@death-eater:~$ vi p180030.pub_
```

Public key that will be sent to AWS:

```
momina@death-eater: ~  
File Edit View Search Terminal Help  
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDAIR14RGLZDYRvNd0/JSM1CvcKgYF/DVokH3fJRh7ILN3lkKS0poLHZ/0EaMz36e  
qlt/JXUVwcIbk24yg1SZYV0jeeLGiKYgaHz3MR3dJRCJuR13m/U1ig0020exfbdWhgjhZBF53UBd0EeZp6JsZe0giU7XsUcPGHSxcm  
mNi7CnBt7H0E6C+lZJ2dTT/VFw1Me7ZP/fz8oHL/T1PZEdATPiZZ96I3IEiM123BYFdkU92ao3AtxLAT7YSvVntNaa3VPqhPtdJdh6  
QFrWsOPHD2qkfcHRj4cWExWvzfiPmczh0xJktbf2SEuVln0Zl0HW/1D2z0S5qAc2ksq0oRVsSn momina@death-eater  
~  
~
```

Copying public key to AWS and giving password for the last time:

```
momina@death-eater: ~  
File Edit View Search Terminal Help  
momina@death-eater:~$ ssh-copy-id -i p180030 awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com  
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "p180030.pub"  
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed  
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys  
awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com's password:  
  
Number of key(s) added: 1  
  
Now try logging into the machine, with: "ssh 'awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com'"  
and check to make sure that only the key(s) you wanted were added.  
momina@death-eater:~$ _
```

Logging in with private key instead of password:

```
momina@death-eater:~$ ssh -i p180030 awstest@ec2-3-17-39-235.us-east-2.compute.amazonaws.com
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-1057-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Tue Apr 21 18:34:21 UTC 2020

System load:  0.0           Processes:      94
Usage of /:   31.2% of 7.69GB Users logged in:  0
Memory usage: 21%          IP address for eth0: 172.31.47.72
Swap usage:   0%

 * Kubernetes 1.18 GA is now available! See https://microk8s.io for docs or
   install it with:

   sudo snap install microk8s --channel=1.18 --classic

 * Multipass 1.1 adds proxy support for developers behind enterprise
   firewalls. Rapid prototyping for cloud operations just got easier.

   https://multipass.run/

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

35 packages can be updated.
0 updates are security updates.

*** System restart required ***
Last login: Tue Apr 21 18:22:00 2020 from 39.35.241.103
awstest@ip-172-31-47-72:~$ _
```

Checking the authorized keys:

```
awstest@ip-172-31-47-72:~$ vi ~/.ssh/authorized_keys
awstest@ip-172-31-47-72:~$ _
```

My public key that is given to AWS:

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDaIR14RGLZDYRvNd0/JSM1CvcKgYF/DVokH3fJRh7ILN3lkKS0poLHZ/0EaMz36e
qlt/JXUVwcIbk24yg1SZYV0jeeLGiKYgaHz3MR3dJRCJuR13m/U1ig0020exfbdWhgjhZBF53UBd0EeZp6JsZe0giU7XsUcPGHSxcm
mNi7CnBt7H0E6C+lZJ2dT/VFw1Me7ZP/fz8oHL/T1PZEdATPiZZ96I3IEiM123BYFdkU92ao3AtxLAT7YSvVntNaa3VPqhPtdJdh6
QFrWsOPHD2qkfCHRj4cWExWvzfIPmczh0xJktbf2SeuVln0Zl0HW/1D2z0S5qAc2ksq0oRVsSn momina@death-eater
~
```
