Operating Systems
System Administration Task 06

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Section B

Screenshots:

Starting puppet-master container and puppetserver service:


```
momina@death-eater:~$ sudo docker start puppet-master
puppet-master
momina@death-eater:~$ sudo docker exec -it puppet-master bash
root@c656961bb37d:/# netstat -ntulp
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address          State       PID/Program name
```

```
root@c656961bb37d:/# service puppetserver start
root@c656961bb37d:/#
```

Creating agent-01:


```
                root@4dba85c8bee0: /        ×                 root@4414f0bcc1f8: /         ×
momina@death-eater:~$ sudo docker run --name puppet-agent01 -it puppet-6
[sudo] password for momina:
root@4414f0bcc1f8:/# exit
exit
momina@death-eater:~$ sudo docker start puppet-agent01
puppet-agent01
momina@death-eater:~$ sudo docker exec -it puppet-agent01 bash
root@4414f0bcc1f8:/# _
```

Installing puppet-agent:

```
momina@death-eater:~$ sudo docker exec -it puppet-agent01 bash
root@4414f0bcc1f8:/# apt install puppet-agent
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  puppet-agent
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 22.8 MB of archives.
After this operation, 134 MB of additional disk space will be used.
Get:1 http://apt.puppetlabs.com bionic/puppet6 amd64 puppet-agent amd64 6.15.0-
bionic [22.8 MB]
44% [1 puppet-agent 12.6 MB/22.8 MB 55%]                         1004 kB/s 10s
```

Writing PATH to bashrc file using echo instead of manually writing in bashrc:

```
root@4414f0bcc1f8:/# echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
root@4414f0bcc1f8:/# echo 'PATH=$PATH:/opt/puppetlabs/bin' >> ~/.bashrc
```

puppet-master's fqdn:

```
root@4dba85c8bee0:/# facter -p | grep fqdn
  fqdn => "4dba85c8bee0.Home",
```

Ping from agent 01 to master:

```
root@4414f0bcc1f8:/# ping 4dba85c8bee0.Home
ping: unknown host
root@4414f0bcc1f8:/# ping 172.17.0.2
PING 172.17.0.2 (172.17.0.2): 56 data bytes
64 bytes from 172.17.0.2: icmp_seq=0 ttl=64 time=0.147 ms
64 bytes from 172.17.0.2: icmp_seq=1 ttl=64 time=0.047 ms
64 bytes from 172.17.0.2: icmp_seq=2 ttl=64 time=0.044 ms
64 bytes from 172.17.0.2: icmp_seq=3 ttl=64 time=0.061 ms
^C--- 172.17.0.2 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.044/0.075/0.147/0.042 ms
root@4414f0bcc1f8:/# _
```

Manually mapping master's fqdn to its IP address:

```
root@4414f0bcc1f8:/# vi /etc/hosts
root@4414f0bcc1f8:/# _
```

```
127.0.0.1        localhost
::1      localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
172.17.0.3       4414f0bcc1f8

172.17.0.2       4dba85c8bee0.Home
~

~
```

Ping master's fqdn to check:

```
root@4414f0bcc1f8:/# ping 4dba85c8bee0.Home
PING 4dba85c8bee0.Home (172.17.0.2): 56 data bytes
64 bytes from 172.17.0.2: icmp_seq=0 ttl=64 time=0.197 ms
64 bytes from 172.17.0.2: icmp_seq=1 ttl=64 time=0.126 ms
64 bytes from 172.17.0.2: icmp_seq=2 ttl=64 time=0.102 ms
64 bytes from 172.17.0.2: icmp_seq=3 ttl=64 time=0.182 ms
64 bytes from 172.17.0.2: icmp_seq=4 ttl=64 time=0.127 ms
64 bytes from 172.17.0.2: icmp_seq=5 ttl=64 time=0.405 ms
_
```

Master automatically issuing certificate to all the agents, modify file:

```
root@4dba85c8bee0:/# vi /etc/puppetlabs/puppet/puppet.conf _
```

```
#i This file can be used to override the default puppet settings.
# See the following links for more details on what settings are available:
# - https://puppet.com/docs/puppet/latest/config_important_settings.html
# - https://puppet.com/docs/puppet/latest/config_about_settings.html
# - https://puppet.com/docs/puppet/latest/config_file_main.html
# - https://puppet.com/docs/puppet/latest/configuration.html
[master]
vardir = /opt/puppetlabs/server/data/puppetserver
logdir = /var/log/puppetlabs/puppetserver
rundir = /var/run/puppetlabs/puppetserver
pidfile = /var/run/puppetlabs/puppetserver/puppetserver.pid
codedir = /etc/puppetlabs/code
autosign = true
~
```

Issuing agent 01 certificate:

```
root@4414f0bcc1f8:/# puppet agent --test --server 4dba85c8bee0.Home
Info: Creating a new RSA SSL key for 4414f0bcc1f8.home
Info: csr_attributes file loading from /etc/puppetlabs/puppet/csr_attributes.yam
l
Info: Creating a new SSL certificate request for 4414f0bcc1f8.home
Info: Certificate Request fingerprint (SHA256): 93:19:D3:24:86:FB:0C:C6:B7:F3:13
:CF:5D:B8:D5:F3:55:B3:E7:D9:92:11:49:F7:CB:62:43:5B:92:16:24:28
Info: Downloaded certificate for 4414f0bcc1f8.home from https://4dba85c8bee0.Hom
e:8140/puppet-ca/v1
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Caching catalog for 4414f0bcc1f8.home
Info: Applying configuration version '1589964057'
Notice: Applied catalog in 0.02 seconds
root@4414f0bcc1f8:/# _
```

Creating a file in master to declare state of agent:

```
root@4dba85c8bee0:/# cd /etc/puppetlabs/code/environments/production/manifests/
root@4dba85c8bee0:/etc/puppetlabs/code/environments/production/manifests# vi init.pp_
```

```
class testagent{
 file { "/tmp/test.txt":
    mode => "0644",
    owner => 'root',
    group => 'root',
    content => "Hello from server . . . 01 \n",
 }
]
~
~
```

Including testagent class in site.pp:

```
root@4dba85c8bee0:/etc/puppetlabs/code/environments/production/manifests# vi site.pp
root@4dba85c8bee0:/etc/puppetlabs/code/environments/production/manifests# _
```

```
node default{
    include testagent_
}
~
~
```

Rerunning agent:

```
root@4414f0bcc1f8:/# puppet agent --test --server 4dba85c8bee0.Home
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Caching catalog for 4414f0bcc1f8.home
Info: Applying configuration version '1589965780'
Notice: /Stage[main]/Testagent/File[/tmp/test.txt]/ensure: defined content as '{md5}a0e8e921a7c
6f266c5da677ca6822939'
Notice: Applied catalog in 0.03 seconds
root@4414f0bcc1f8:/# cat /tmp/test.txt
Hello from server . . . 01
root@4414f0bcc1f8:/# _
```

Installing *cron* to automatically run *puppet agent* command after every minute:

```
root@4414f0bcc1f8:/# apt install cron
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  anacron logrotate checksecurity default-mta | mail-transport-agent
The following NEW packages will be installed:
  cron
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 71.5 kB of archives.
After this operation, 268 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal/main amd64 cron amd64 3.0pl1-136ubuntu1 [71.5 kB]
Fetched 71.5 kB in 1s (56.4 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package cron.
(Reading database ... 29272 files and directories currently installed.)
Preparing to unpack .../cron_3.0pl1-136ubuntu1_amd64.deb ...
Unpacking cron (3.0pl1-136ubuntu1) ...
Setting up cron (3.0pl1-136ubuntu1) ...
Adding group `crontab' (GID 102) ...
Done.
invoke-rc.d: could not determine current runlevel
invoke-rc.d: policy-rc.d denied execution of start.
root@4414f0bcc1f8:/#
```

Creating a cron file:

```
root@4414f0bcc1f8:/# vi /etc/cron.d/agent.cron_
```

```
* * * * * echo "Hello World" >> /var/log/cron.log 2>&1
~
~
~
```

```
root@4414f0bcc1f8:/# crontab /etc/cron.d/agent.cron
```

Running cron:

```
root@4414f0bcc1f8:/# cron
root@4414f0bcc1f8:/# ps aux | grep cron
root      1076  0.0  0.0   3816  2092 ?        Ss   09:24   0:00 cron
root      1078  0.0  0.0   3304   732 pts/1    S+   09:24   0:00 grep --color=auto cron
root@4414f0bcc1f8:/# tail -f /var/log/cron.log
Hello World
_
```

Modifying agent.cron file:

```
* * * * * echo "Running agent......." >> /var/log/cron.log 2>&1
* * * * * puppet agent --test --server 4dba85c8bee0.Home >> /var/log/cron.log 2>&1
~
~
~
```

Running cron:

```
root@4414f0bcc1f8:/# crontab /etc/cron.d/agent.cron
root@4414f0bcc1f8:/# cron
root@4414f0bcc1f8:/# tail -f /var/log/cron.log
Hello World
Hello World
Running agent.......
Running agent.......
/bin/sh: 1: puppet: not found
Running agent.......
Running agent.......
/bin/sh: 1: puppet: not found
/bin/sh: 1: puppet: not found
Running agent.......
_
```

Modifying agent.cron to omit this error:
This error is because cron doesn't know the path of puppet.

```
* * * * * echo "Running agent......." >> /var/log/cron.log 2>&1
* * * * * /opt/puppetlabs/bin/puppet agent --test --server 4dba85c8bee0.Home >> /var/log/cron.l
og 2>&1
~
~
~
```

Re-running cron:

```
root@4414f0bcc1f8:/# crontab /etc/cron.d/agent.cron
root@4414f0bcc1f8:/# cron
root@4414f0bcc1f8:/# tail -f /var/log/cron.log
/bin/sh: 1: puppet: not found
Running agent.......
Running agent.......
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Caching catalog for 4414f0bcc1f8.home
Info: Applying configuration version '1589967482'
Notice: Applied catalog in 0.02 seconds
```

Make a change in init.pp and see changes in logs:

```
class testagent{
 file { "/tmp/test.txt":
    mode => "0644",
    owner => 'root',
    group => 'root',
    content => "Hello after cron running . . . 02 \n",

 }
}
~
```

```
Running agent.......
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Caching catalog for 4414f0bcc1f8.home
Info: Applying configuration version '1589967602'
Notice: /Stage[main]/Testagent/File[/tmp/test.txt]/content:
--- /tmp/test.txt        2020-05-20 09:11:25.980605411 +0000
+++ /tmp/puppet-file20200520-1197-8w9p5e        2020-05-20 09:40:02.763909743 +0000
@@ -1 +1 @@
-Hello from server . . . 02
+Hello after cron running . . . 02
```

Creating image of agent 01:

```
momina@death-eater:~$ sudo docker commit puppet-agent01 puppet-agent
[sudo] password for momina:
sha256:a6e5fb3eaf06a08b67b9be76c36b077346c445624c929847ad825f344b2eef42
momina@death-eater:~$ sudo docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
puppet-agent        latest          a6e5fb3eaf06    5 seconds ago   395MB
puppet-6            latest          b12544d3d7bf    4 days ago      171MB
ubuntu-mysql        latest          06f08f4ac3a9    2 weeks ago     722MB
ubuntu-apache       latest          0478ca480bfa    2 weeks ago     283MB
ubuntu              latest          1d622ef86b13    3 weeks ago     73.9MB
```

Creating agent 02 from using image of agent 01:

```
momina@death-eater:~$ sudo docker run --name puppet-agent02 -it puppet-agent
root@de67e1ca2305:/# _
```

Starting agent 02 and modifying its */etc/hosts:*

```
momina@death-eater:~$ sudo docker start puppet-agent02
puppet-agent02
momina@death-eater:~$ sudo docker exec -it puppet-agent02 bash
root@de67e1ca2305:/# vi /etc/hosts
root@de67e1ca2305:/# _
```

```
127.0.0.1       localhost
::1     localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
172.17.0.4      de67e1ca2305
172.17.0.2      4dba85c8bee0.Home
~
~
```

Modifying init.pp:

```
file { "/tmp/test.txt":
    mode => "0644",
    owner => 'root',
    group => 'root',
    content => "2 agents present . . . 0000 02 \n",

}
}

class apache2{
    package { 'apache2':
        ensure => 'installed',
    }
    service{'apache2':
    ensure => true,
    enable => true,
    require => Package ['apache2']
    }
}
~
~
~
~
```

Modifying site.pp:

```
node default{
    include testagent
    include apache2_
}
~
~
```