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Roll No: 242466

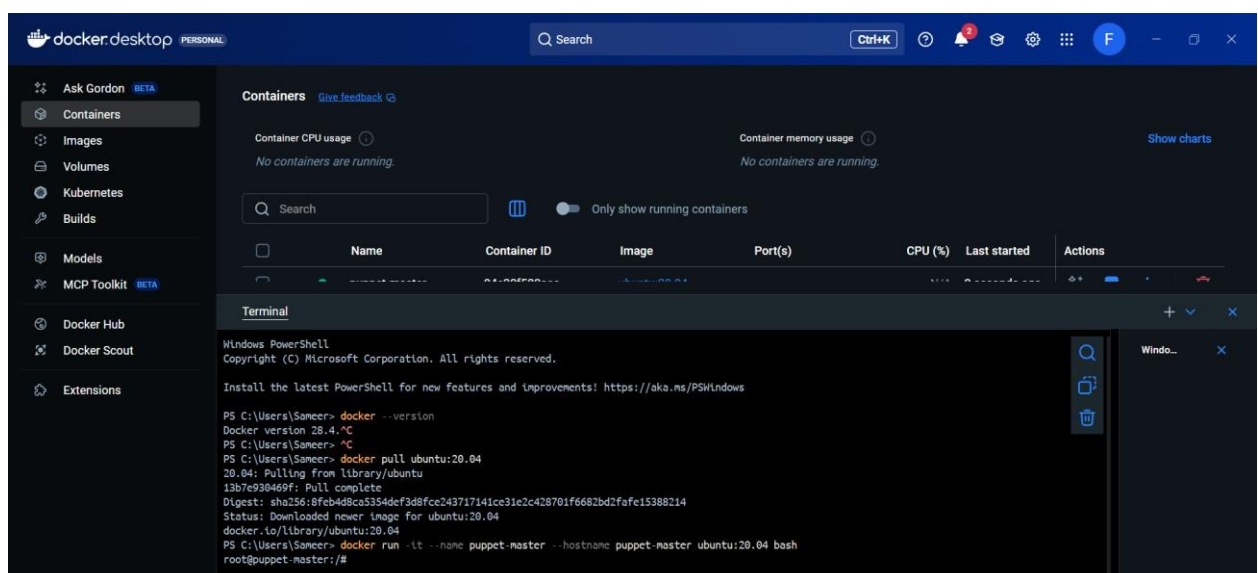
Practical No: 10

Date Of Performance: 03/10/2025

Aim: To Install and Configure, pull based software configuration management using puppet tool.

### Setup Environment

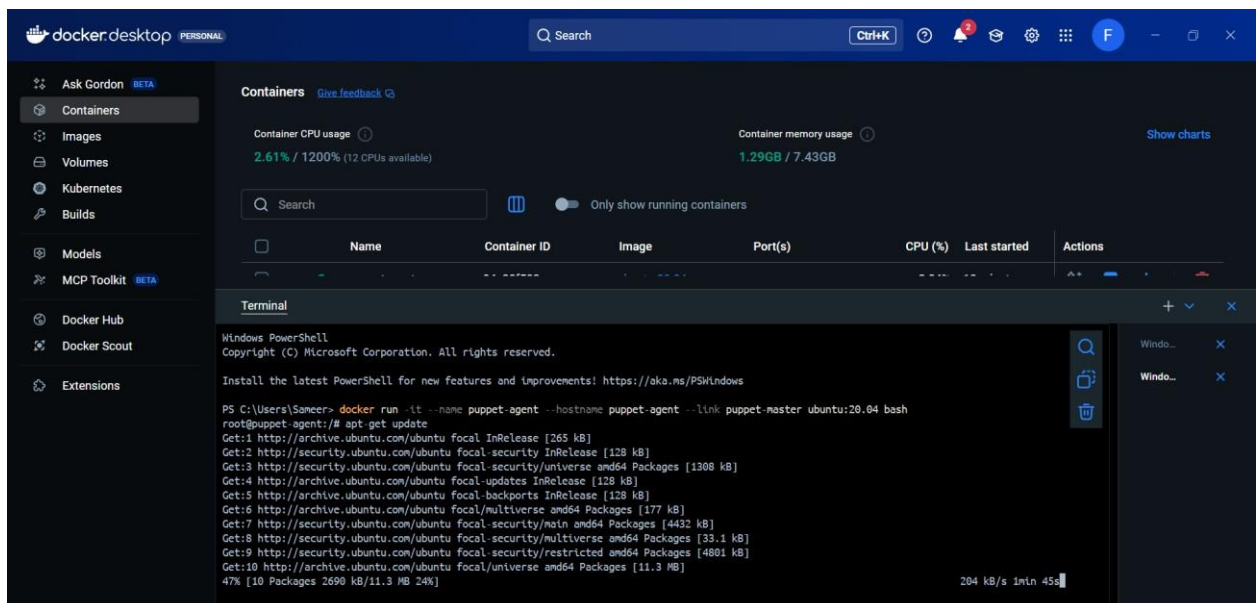
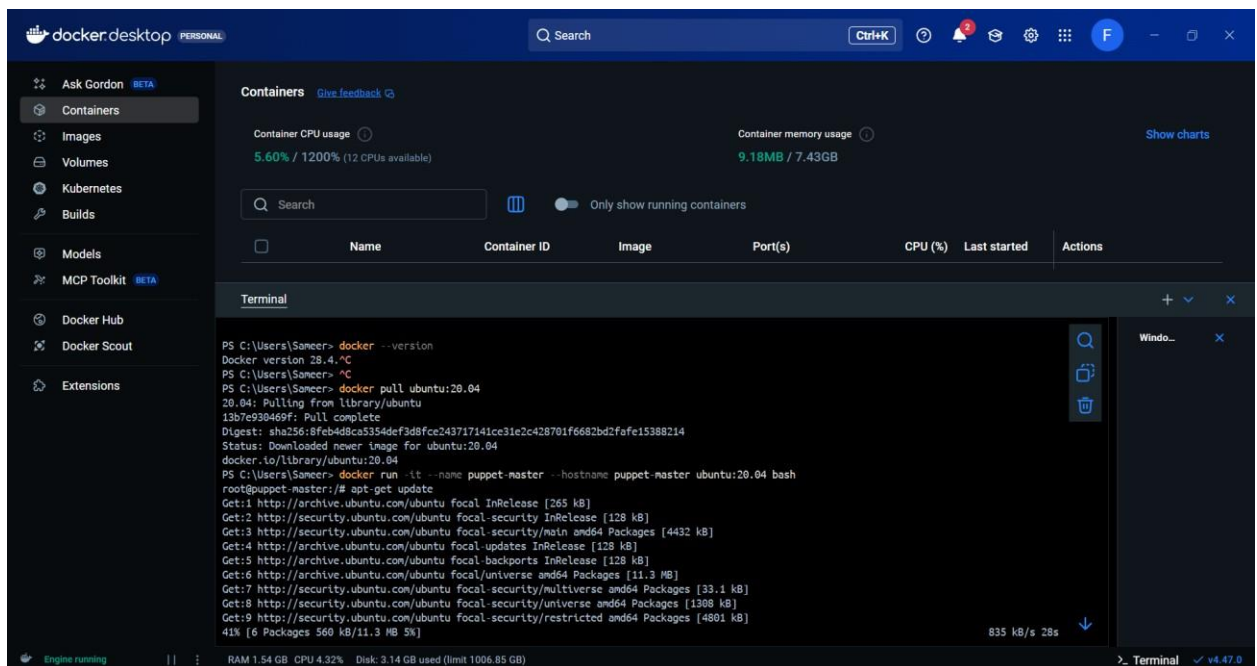
- Install Docker Desktop.
- Pull Ubuntu base image:
- `docker pull ubuntu:20.04`



Pulling Ubuntu image and running the Puppet Master

## Launch Containers:

- Start Puppet Master container:
  - `docker run -it --name puppet-master --hostname puppet-master ubuntu:20.04 bash`
- Start Puppet Agent container:
  - `docker run -it --name puppet-agent --hostname puppet-agent --link puppet-master ubuntu:20.04 bash`

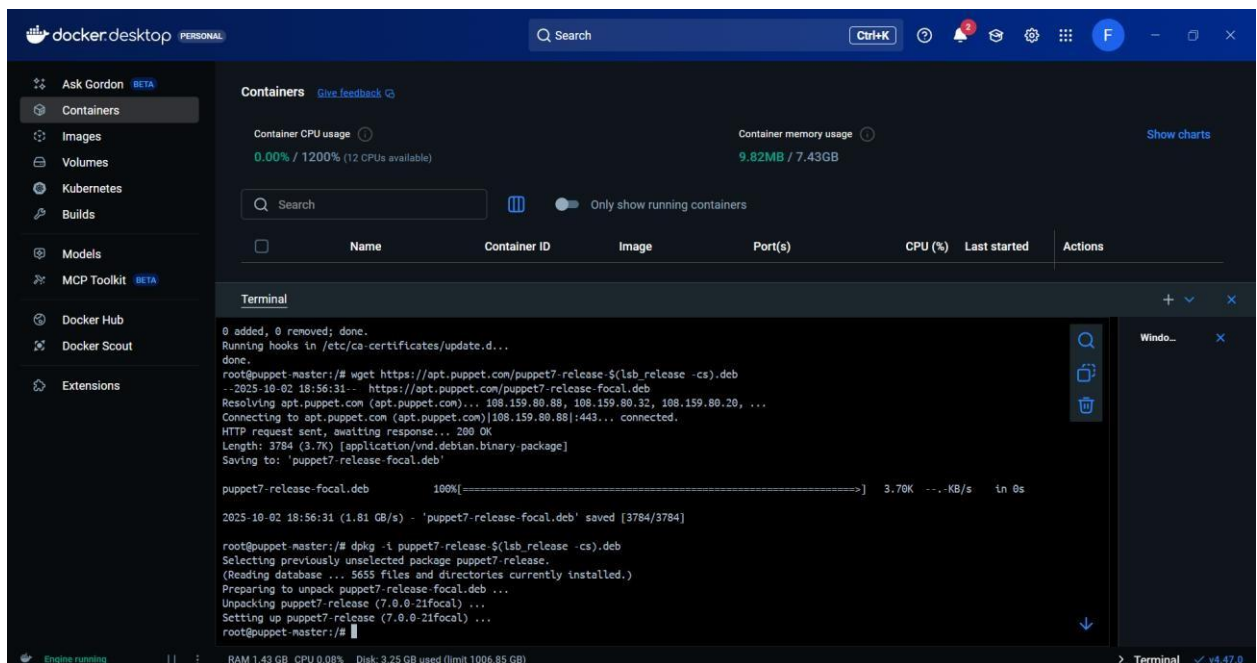


Installing packages

## Install Puppet

Inside both containers:

- apt-get update
- apt-get install -y wget gnupg lsb-release
- wget https://apt.puppet.com/puppet7-release-\$(lsb\_release -cs).deb dpkg -i puppet7-release-\$(lsb\_release -cs).deb
- apt-get update



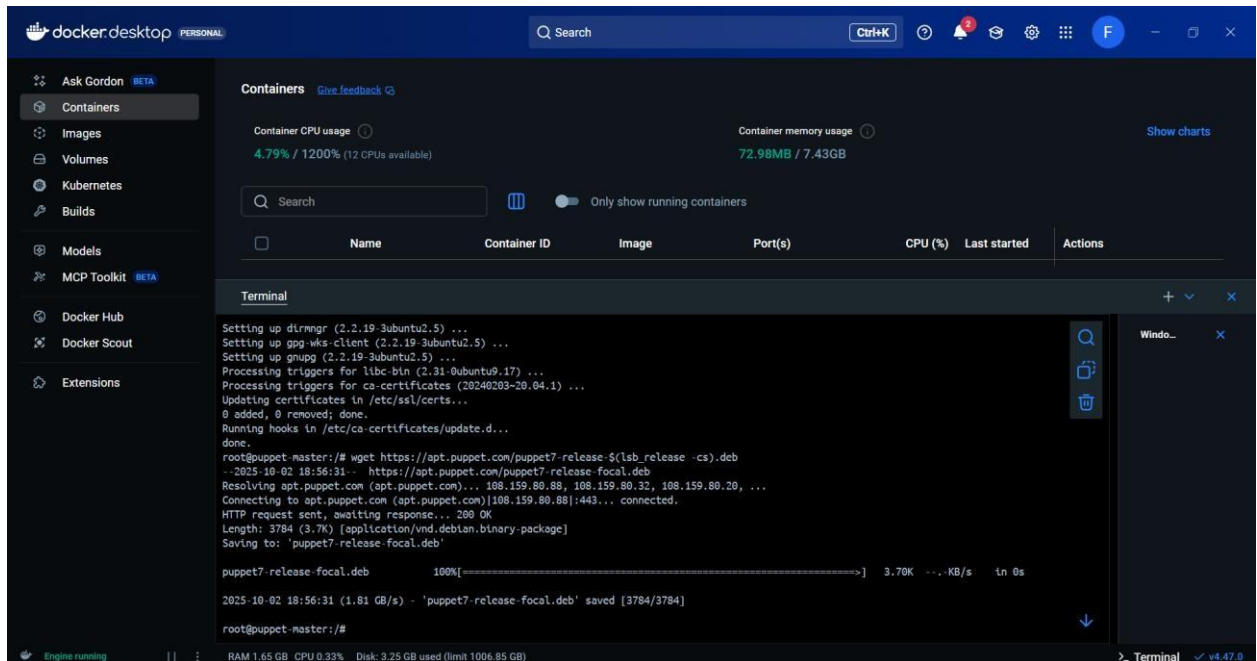
## Installing packages

### On master:

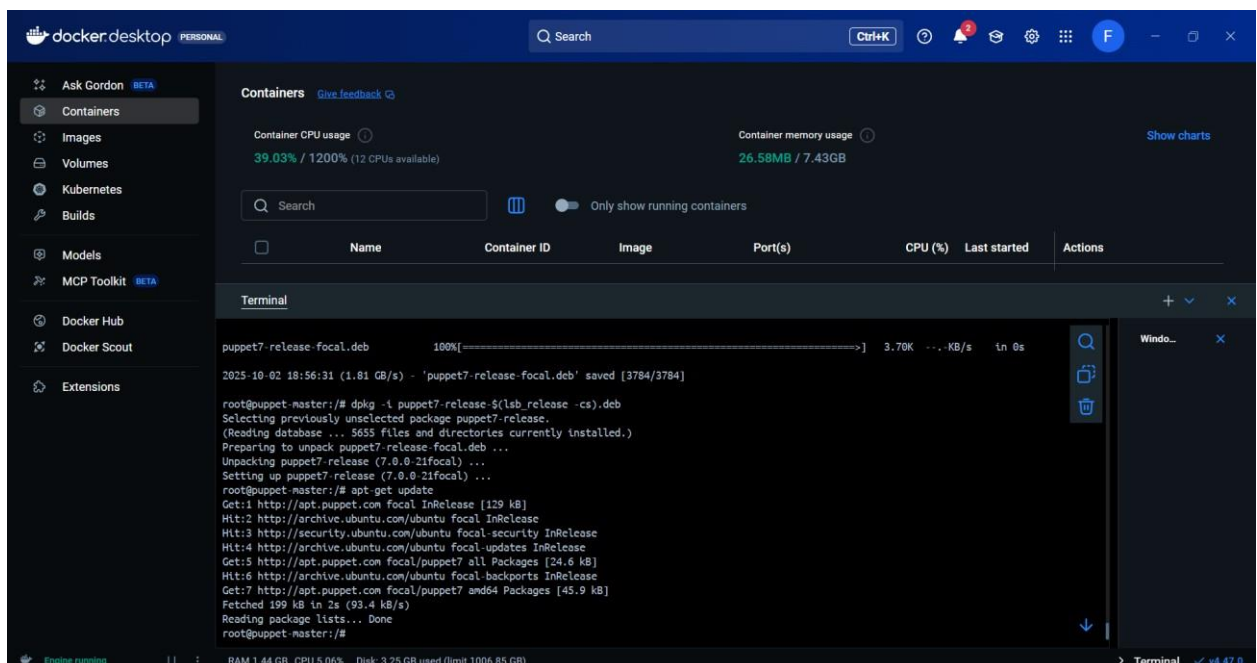
- apt-get install -y puppetserver
- service puppetserver start

## On agent:

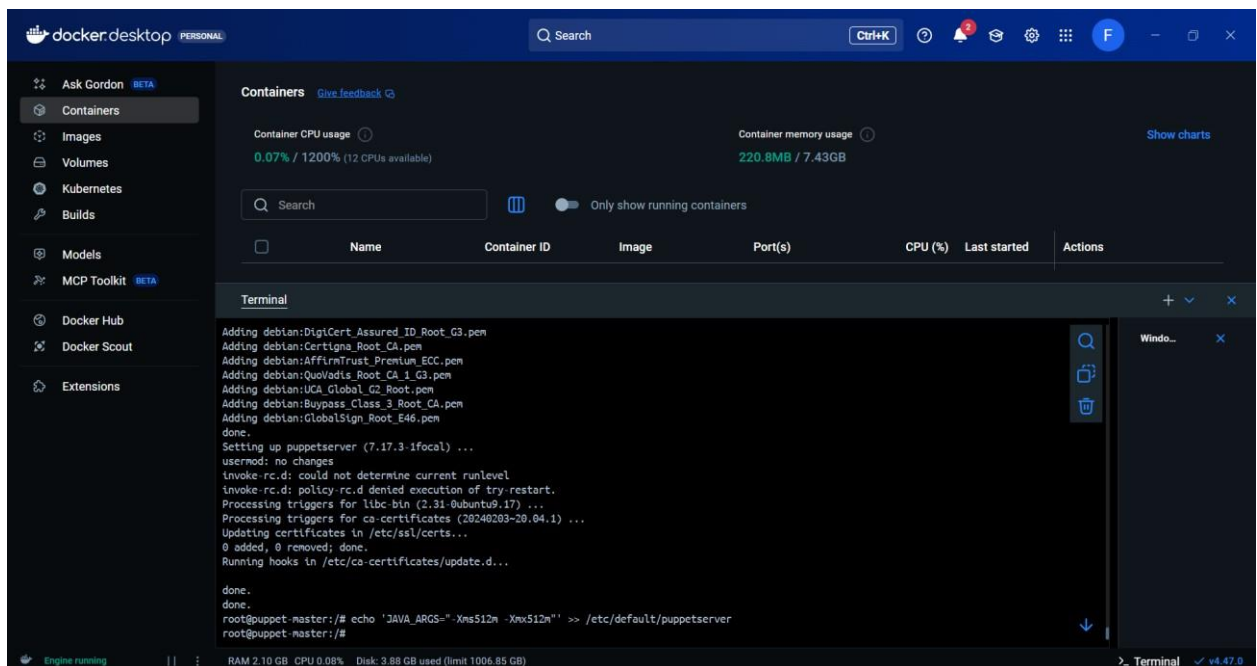
- apt-get install -y puppet-agent



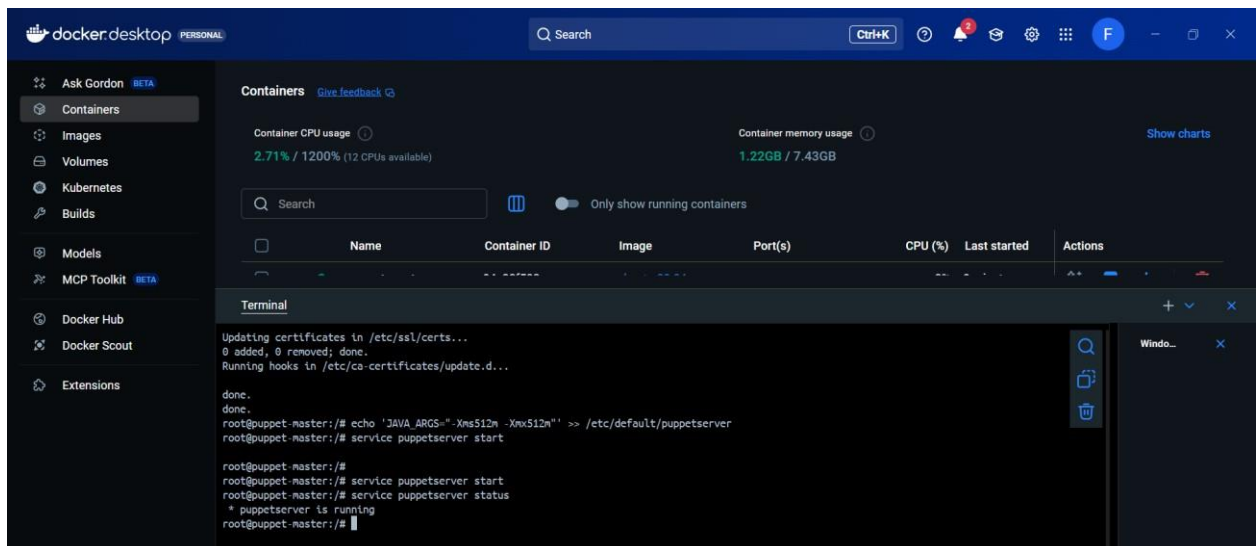
## Installing packages



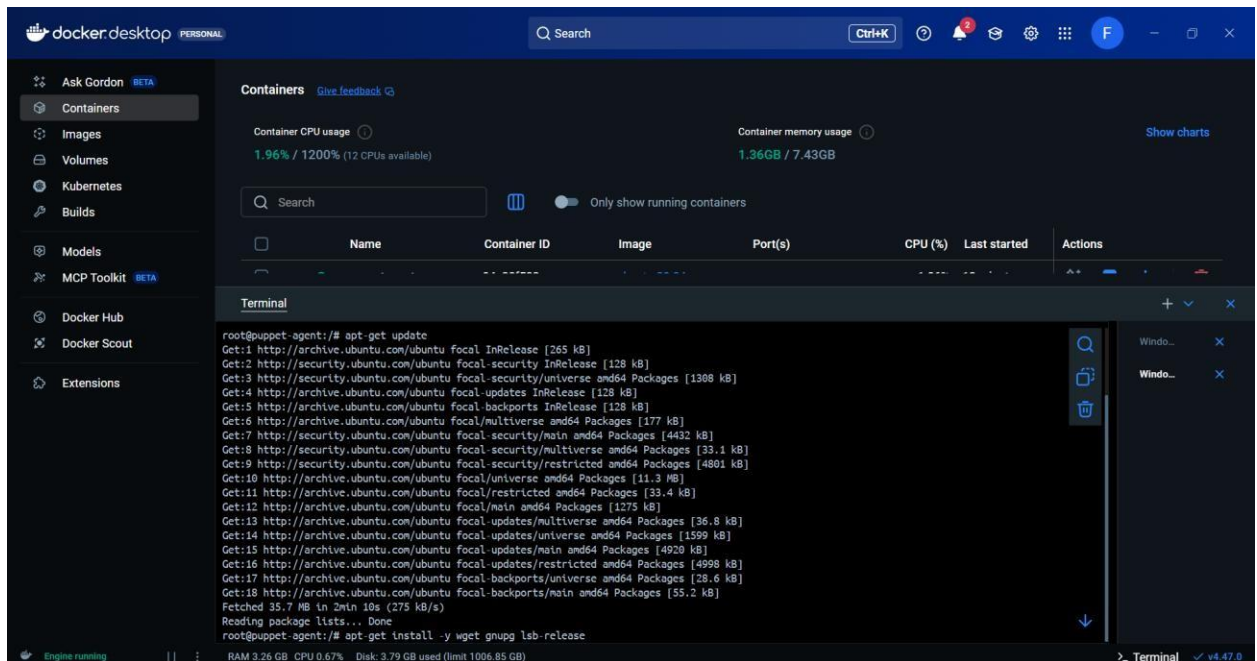
## Installing packages



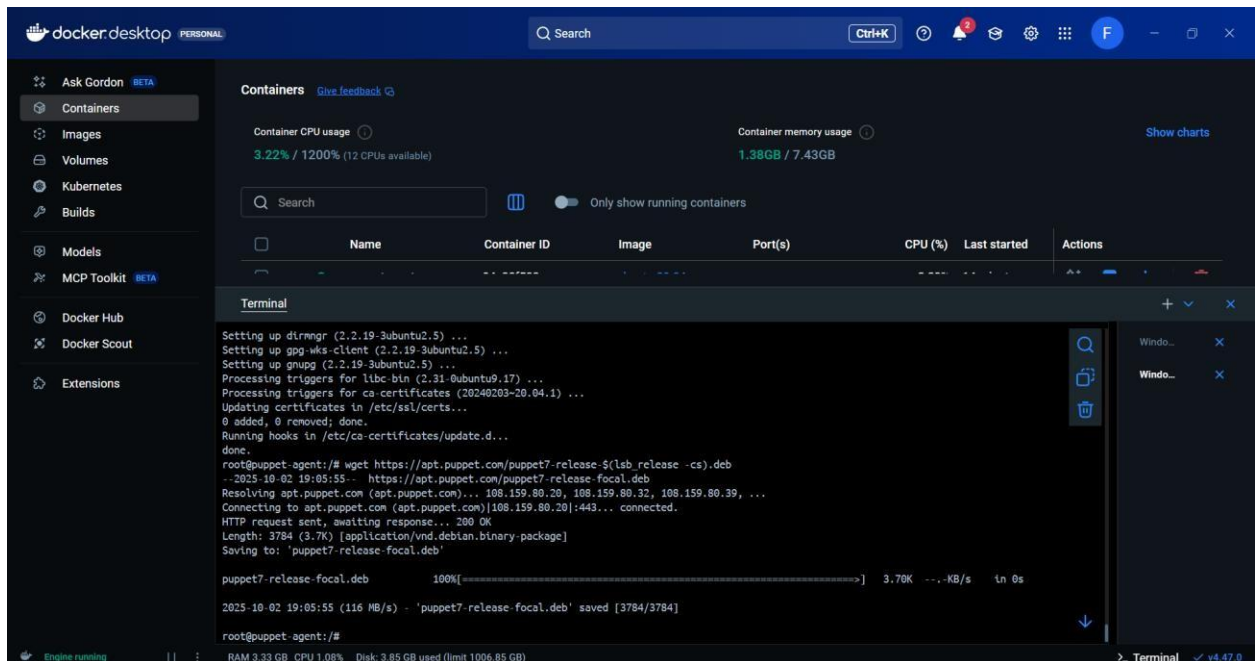
## Setting Arguments



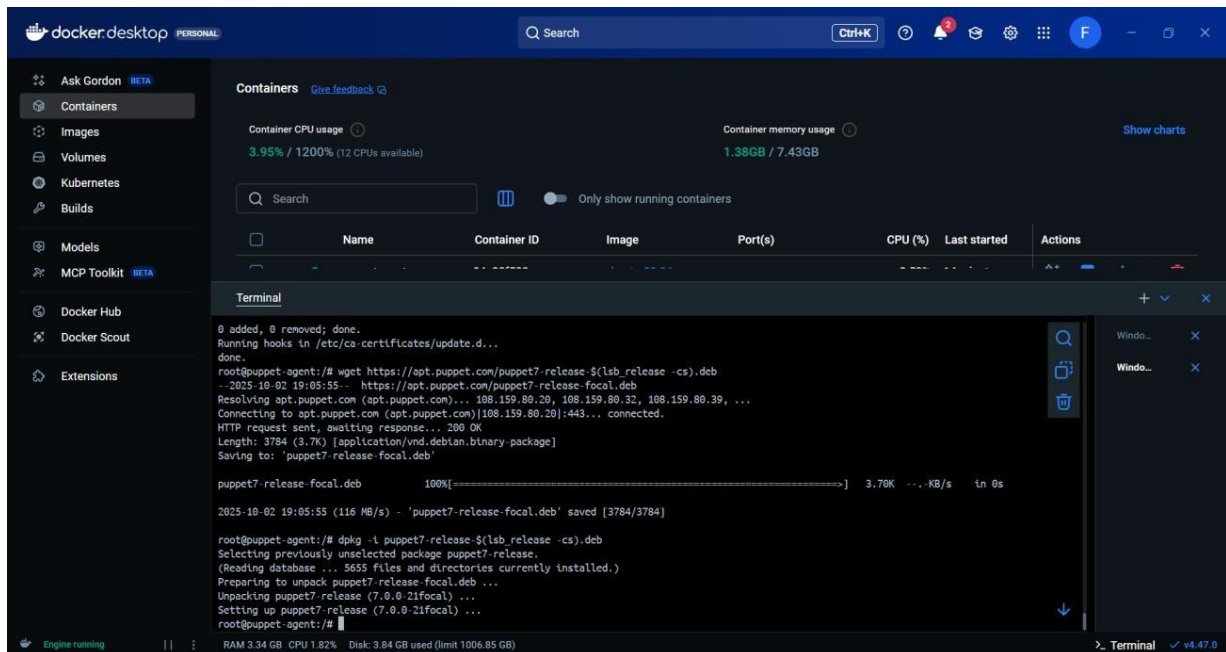
## Starting puppetserver



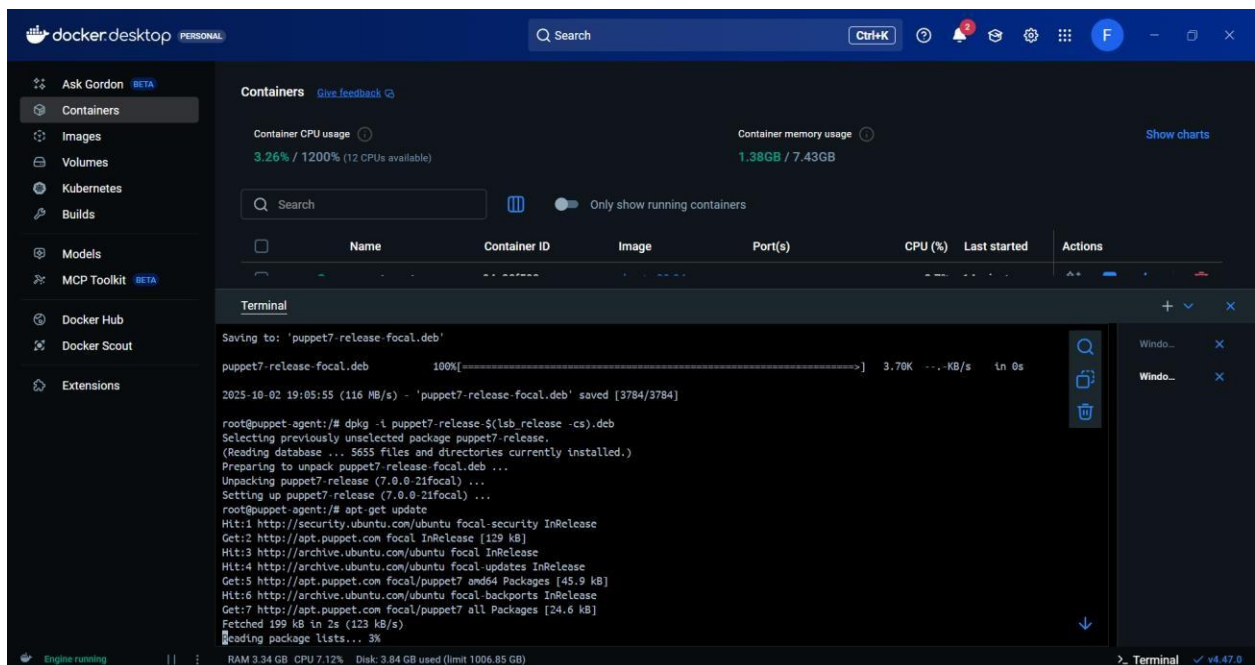
## Installing packages



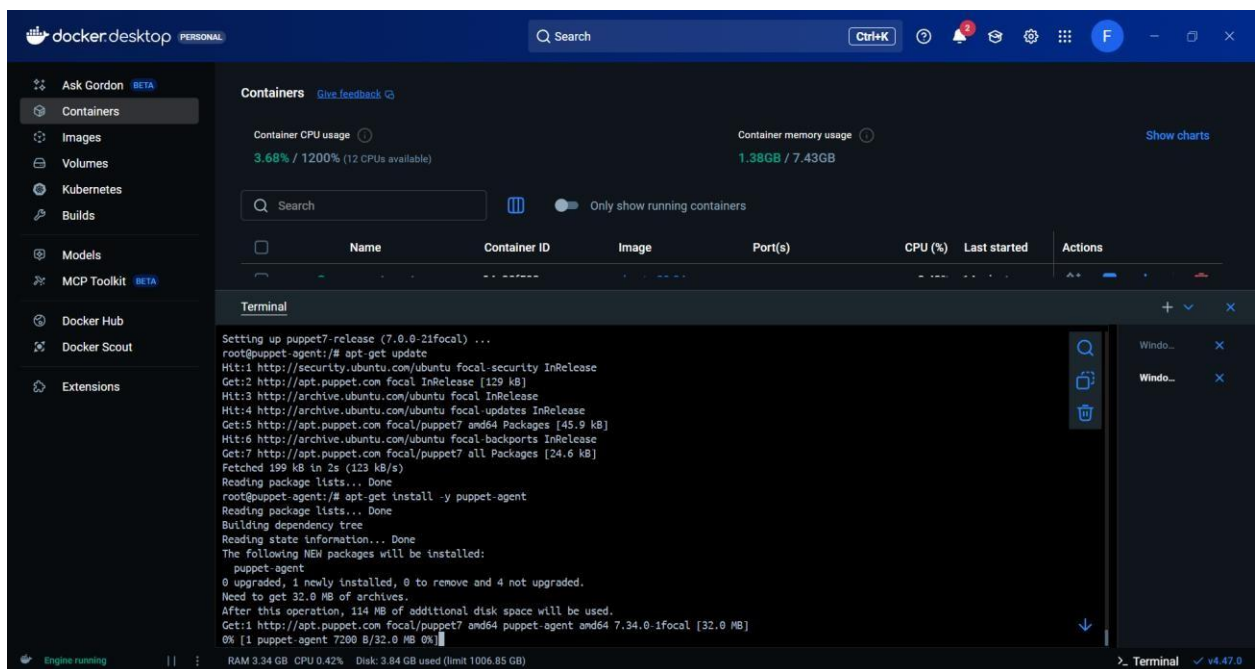
## Installing packages



## Configuring puppet



## Installing packages

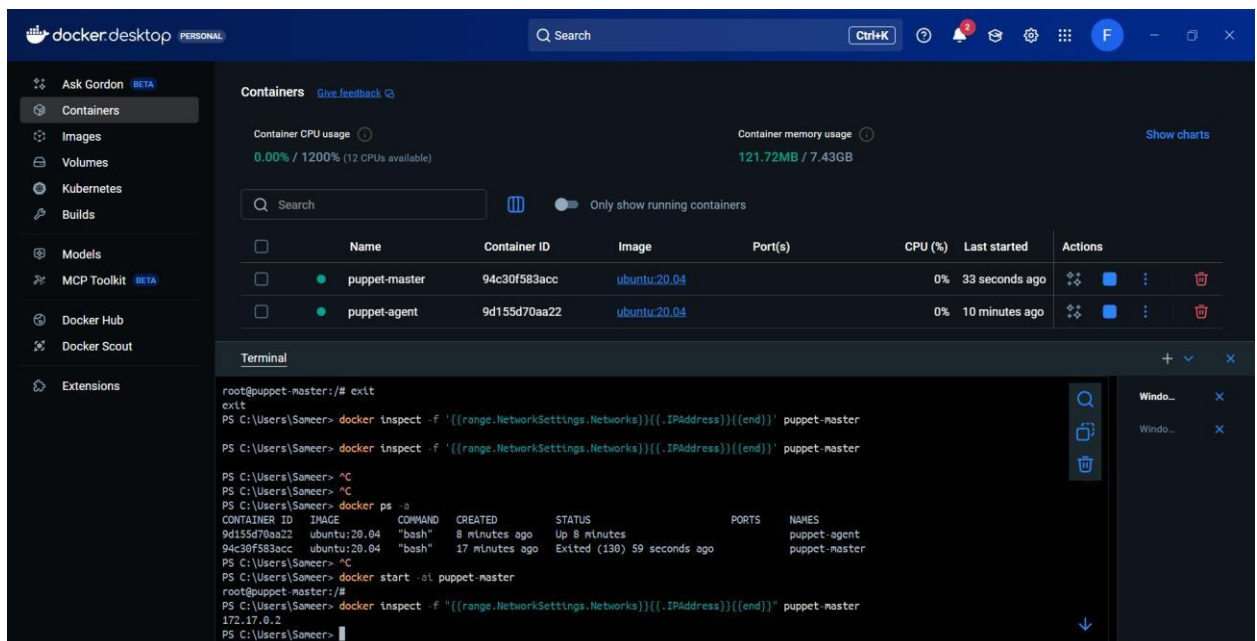


## Installing packages

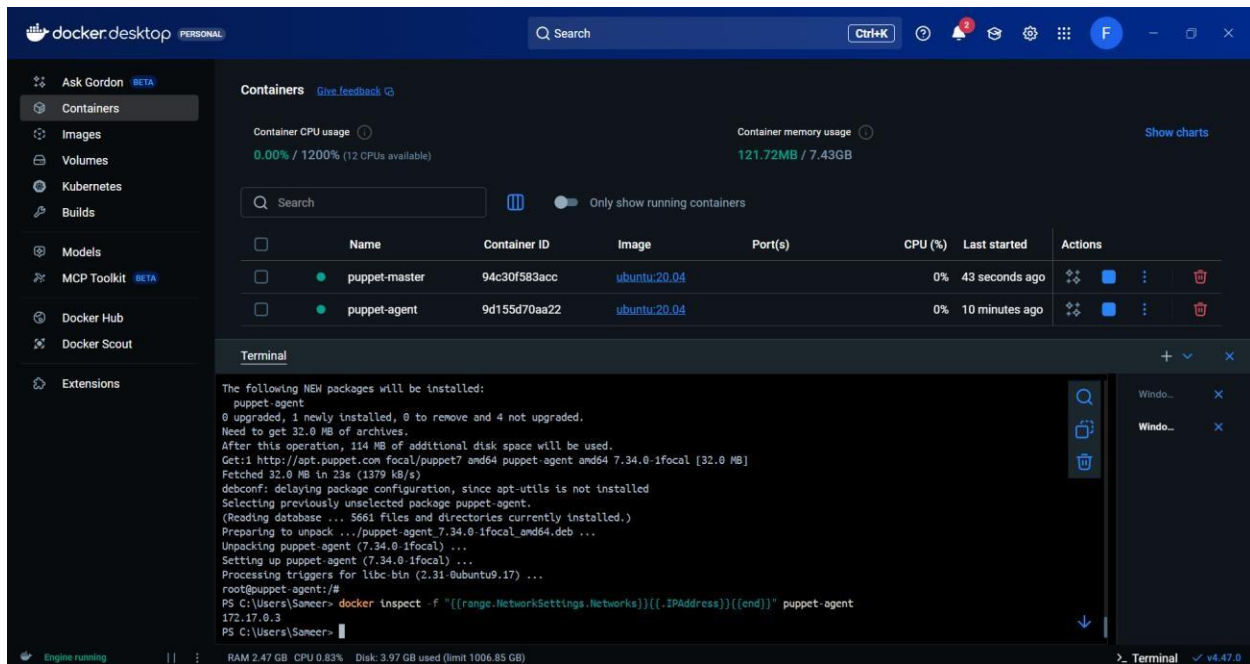
## Configure Hostnames

Add entries in /etc/hosts for both containers (using actual container IPs):

- 172.17.0.2 puppet-master
- 172.17.0.3 puppet-agent



Connected to IP Address (Master)



Connected to IP Address (Agent)

Configure Puppet

Edit /etc/puppetlabs/puppet/puppet.conf

On Master:

[main]

certname = puppet-master

server = puppet-master environment = production runinterval = 1h

On Agent:

[main]

certname = puppet-agent server = puppet-master environment = production

runinterval = 1m

The screenshot shows the Docker Desktop interface. The left sidebar contains navigation options: Ask Gordon, Containers, Images, Volumes, Kubernetes, Builds, Models, MCP Toolkit, Docker Hub, Docker Scout, and Extensions. The main panel is titled 'Containers' and shows a table of running containers. The table has columns for Name, Container ID, Image, Port(s), CPU (%), Last started, and Actions. Two containers are listed: 'puppet-master' and 'puppet-agent', both using the 'ubuntu:20.04' image. Below the table is a terminal window showing the command 'docker inspect' and its output, which includes details about the containers' network settings and IP addresses. The terminal output shows that the 'puppet-master' container has an IP address of 172.17.0.2 and the 'puppet-agent' container has an IP address of 172.17.0.3. The terminal also shows the command 'docker start' being used to start the 'puppet-agent' container.

Name	Container ID	Image	Port(s)	CPU (%)	Last started	Actions
puppet-master	94c30f583acc	ubuntu:20.04		0.05%	4 minutes ago	[Stop] [Restart] [Logs] [Delete]
puppet-agent	9d155d70aa22	ubuntu:20.04		0%	13 minutes ago	[Stop] [Restart] [Logs] [Delete]

```
PS C:\Users\Saneer> docker inspect -f '{{range.NetworkSettings.Networks}}{{.IPAddress}}{{end}}' puppet-master
PS C:\Users\Saneer> ^C
PS C:\Users\Saneer> ^C
PS C:\Users\Saneer> docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
9d155d70aa22   ubuntu:20.04   "bash"    8 minutes ago   Up 8 minutes           puppet-agent
94c30f583acc   ubuntu:20.04   "bash"    17 minutes ago   Exited (130) 59 seconds ago           puppet-master
PS C:\Users\Saneer> ^C
PS C:\Users\Saneer> docker start -i puppet-master
root@puppet-master:/#
PS C:\Users\Saneer> docker inspect -f '{{range.NetworkSettings.Networks}}{{.IPAddress}}{{end}}' puppet-master
172.17.0.2
PS C:\Users\Saneer> docker start -i puppet-agent
^C
root@puppet-master:/# echo "172.17.0.2 puppet-master" >> /etc/hosts
root@puppet-master:/# echo "172.17.0.3 puppet-agent" >> /etc/hosts
root@puppet-master:/#
```

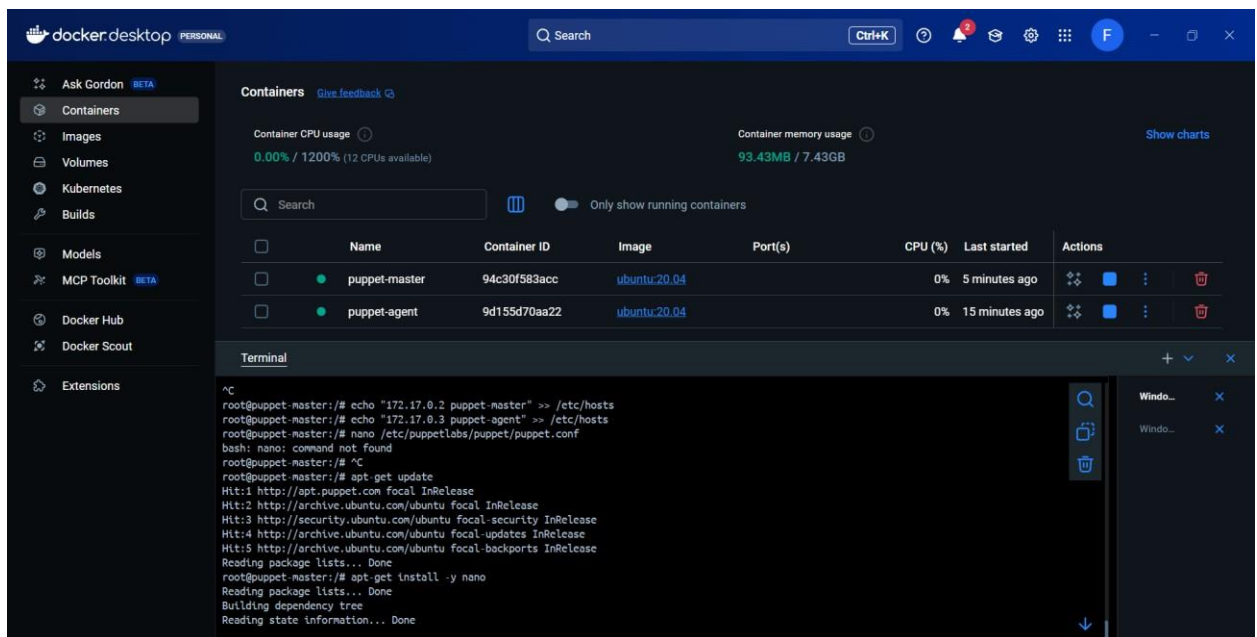
## Testing and logging (Master)

The screenshot shows the Docker Desktop interface. The left sidebar contains navigation options: Ask Gordon, Containers, Images, Volumes, Kubernetes, Builds, Models, MCP Toolkit, Docker Hub, Docker Scout, and Extensions. The main panel is titled 'Containers' and shows a table of running containers. The table has columns for Name, Container ID, Image, Port(s), CPU (%), Last started, and Actions. Two containers are listed: 'puppet-master' and 'puppet-agent', both using the 'ubuntu:20.04' image. Below the table is a terminal window showing the command 'docker inspect' and its output, which includes details about the containers' network settings and IP addresses. The terminal output shows that the 'puppet-master' container has an IP address of 172.17.0.2 and the 'puppet-agent' container has an IP address of 172.17.0.3. The terminal also shows the command 'docker start' being used to start the 'puppet-agent' container.

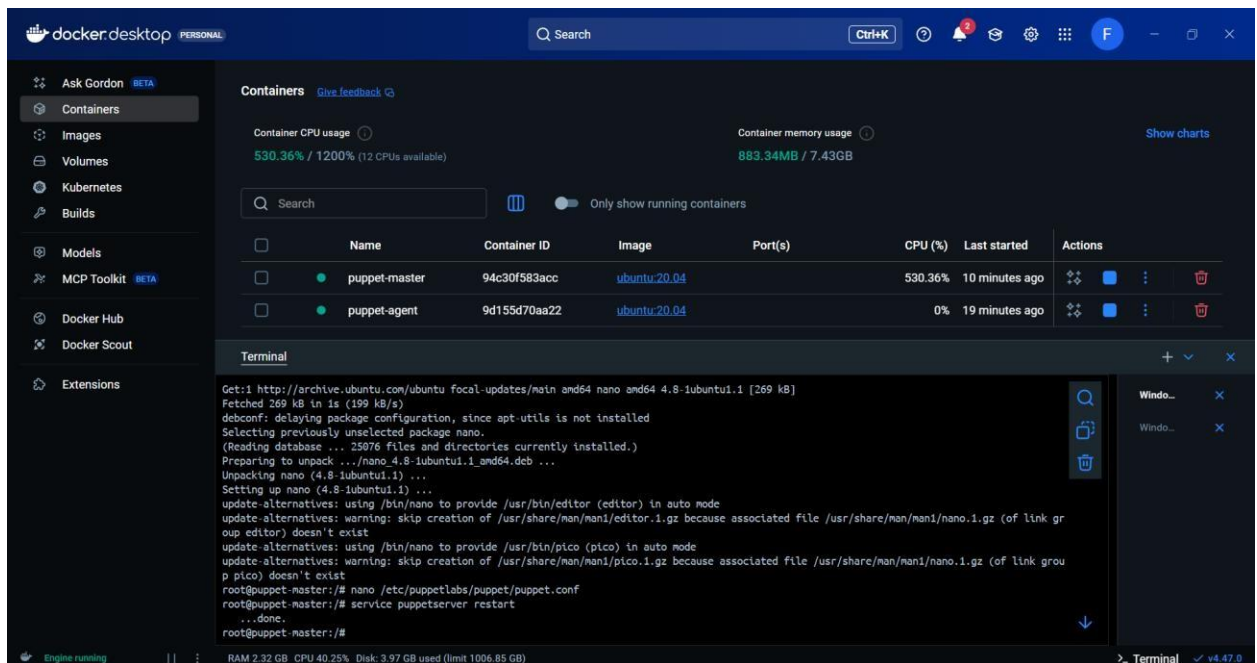
Name	Container ID	Image	Port(s)	CPU (%)	Last started	Actions
puppet-master	94c30f583acc	ubuntu:20.04		0%	4 minutes ago	[Stop] [Restart] [Logs] [Delete]
puppet-agent	9d155d70aa22	ubuntu:20.04		0.03%	14 minutes ago	[Stop] [Restart] [Logs] [Delete]

```
Fetches 32.0 MB in 23s (1379 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package puppet-agent.
(Reading database ... 5661 files and directories currently installed.)
Preparing to unpack .../puppet-agent_7.34.0-1focal_and64.deb ...
Unpacking puppet-agent (7.34.0-1focal) ...
Setting up puppet-agent (7.34.0-1focal) ...
Processing triggers for libc-bin (2.31-0ubuntu9.17) ...
root@puppet-agent:/#
PS C:\Users\Saneer> docker inspect -f '{{range.NetworkSettings.Networks}}{{.IPAddress}}{{end}}' puppet-agent
172.17.0.3
PS C:\Users\Saneer> ^C
PS C:\Users\Saneer> ^C
PS C:\Users\Saneer> docker start -i puppet-agent
^C
root@puppet-agent:/# echo "172.17.0.2 puppet-master" >> /etc/hosts
root@puppet-agent:/# echo "172.17.0.3 puppet-agent" >> /etc/hosts
root@puppet-agent:/#
```

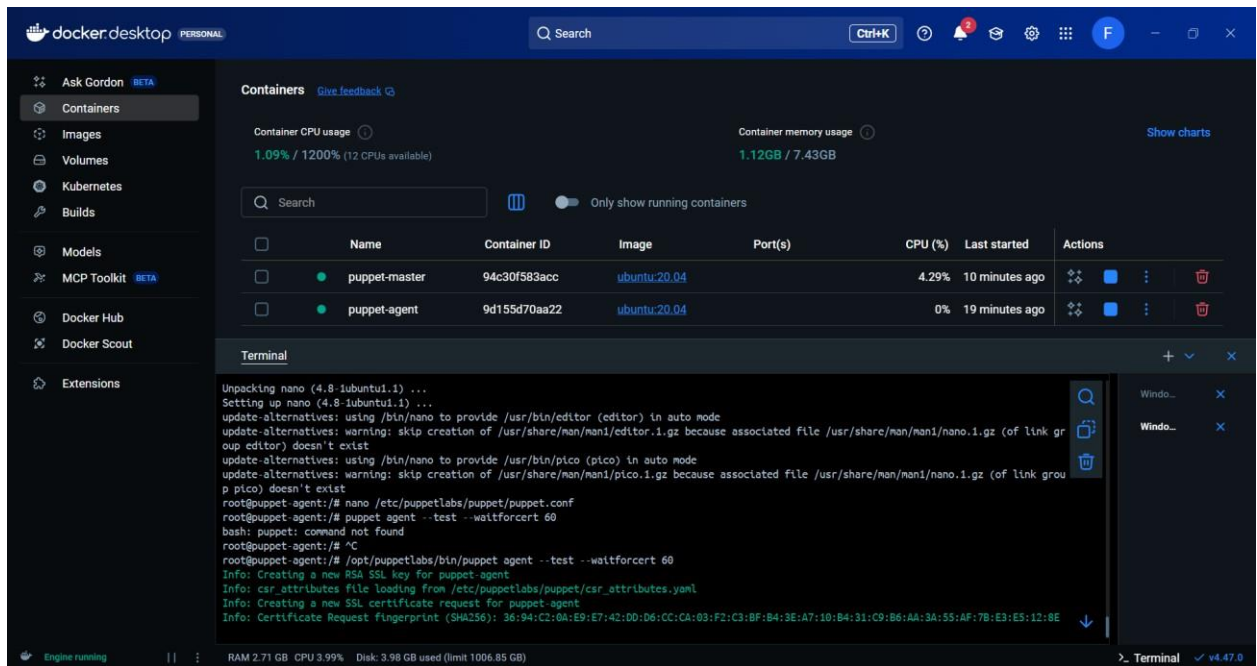
## Testing and logging (Master)



## Updating system



## Puppetserver restarted



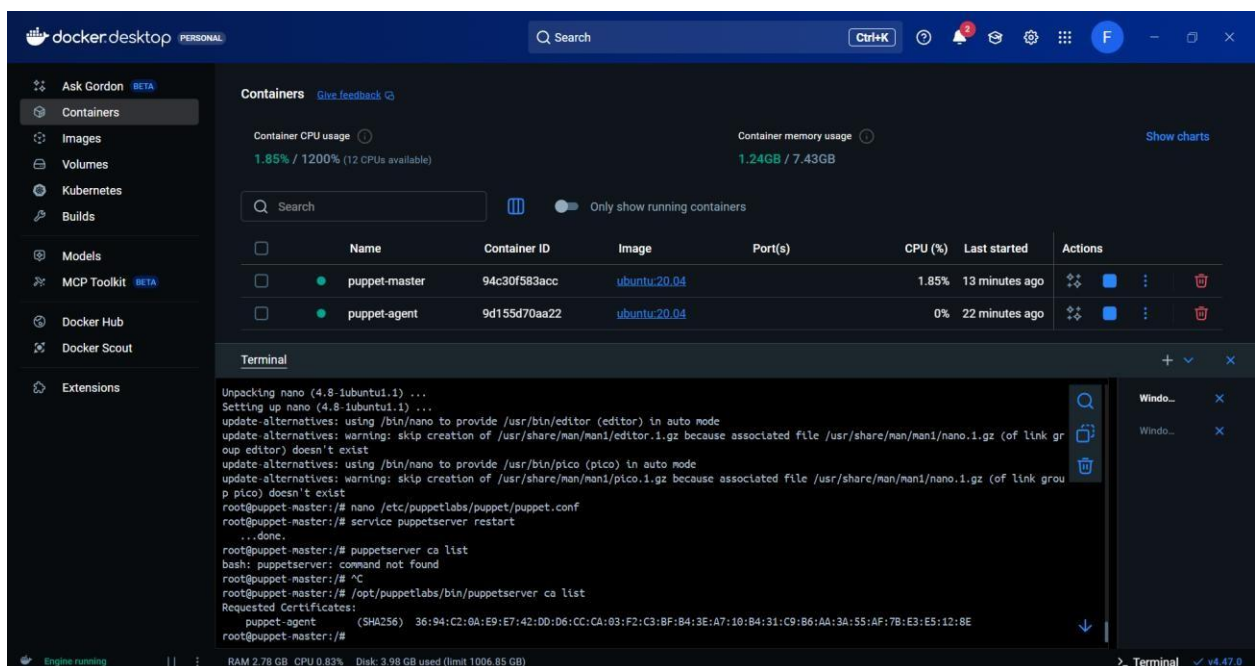
## Sending certificate from Agent

### Certificate Signing on Agent:

/opt/puppetlabs/bin/puppet agent --test --waitforcert 60 (Generates a CSR request)

Master:

- /opt/puppetlabs/bin/puppetserver ca list
- /opt/puppetlabs/bin/puppetserver ca sign --certname puppet-agent



docker desktop PERSONAL

Search

Ctrl+K

Containers

Container CPU usage 79.60% / 1200% (12 CPUs available)

Container memory usage 1.27GB / 7.43GB

Show charts

Search

Only show running containers

	Name	Container ID	Image	Port(s)	CPU (%)	Last started	Actions
<input type="checkbox"/>	puppet-master	94c30f583acc	ubuntu:20.04		79.6%	14 minutes ago	
<input type="checkbox"/>	puppet-agent	9d155d70aa22	ubuntu:20.04		0%	23 minutes ago	

Terminal

```
update-alternatives: using /bin/nano to provide /usr/bin/editor (editor) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man1/editor.1.gz because associated file /usr/share/man/man1/nano.1.gz (of link group editor) doesn't exist
update-alternatives: using /bin/nano to provide /usr/bin/pico (pico) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man1/pico.1.gz because associated file /usr/share/man/man1/nano.1.gz (of link group pico) doesn't exist
root@puppet-master:~# nano /etc/puppetlabs/puppet/puppet.conf
root@puppet-master:~# service puppetserver restart
...done.
root@puppet-master:~# puppetserver ca list
bash: puppetserver: command not found
root@puppet-master:~# ^C
root@puppet-master:~# /opt/puppetlabs/bin/puppetserver ca list
Requested Certificates:
  puppet-agent (SHA256) 36:94:C2:8A:E9:E7:42:DD:D6:CC:CA:03:F2:C3:BF:B4:3E:A7:10:B4:31:C9:B6:AA:3A:55:AF:7B:E3:ES:12:8E
root@puppet-master:~# /opt/puppetlabs/bin/puppetserver ca sign --certname puppet-agent
Successfully signed certificate request for puppet-agent
root@puppet-master:~#
```

Engine running

RAM 2.78 GB CPU 9.78% Disk 3.98 GB used (limit 1006.85 GB)

Terminal v4.47.0

Certificate signed on Master

docker desktop PERSONAL

Search

Ctrl+K

Containers

Container CPU usage 3.40% / 1200% (12 CPUs available)

Container memory usage 1.23GB / 7.43GB

Show charts

Search

Only show running containers

	Name	Container ID	Image	Port(s)	CPU (%)	Last started	Actions
<input type="checkbox"/>	puppet-master	94c30f583acc	ubuntu:20.04		3.4%	14 minutes ago	
<input type="checkbox"/>	puppet-agent	9d155d70aa22	ubuntu:20.04		0%	23 minutes ago	

Terminal

```
Info: Certificate Request fingerprint (SHA256): 36:94:C2:8A:E9:E7:42:DD:D6:CC:CA:03:F2:C3:BF:B4:3E:A7:10:B4:31:C9:B6:AA:3A:55:AF:7B:E3:ES:12:8E
Info: Certificate for puppet-agent has not been signed yet
Info: Couldn't fetch certificate from CA server; you might still need to sign this agent's certificate (puppet-agent).
Info: Will try again in 60 seconds.
Info: csr_attributes file loading from /etc/puppetlabs/puppet/csr_attributes.yaml
Info: Creating a new SSL certificate request for puppet-agent
Info: Certificate Request fingerprint (SHA256): 36:94:C2:8A:E9:E7:42:DD:D6:CC:CA:03:F2:C3:BF:B4:3E:A7:10:B4:31:C9:B6:AA:3A:55:AF:7B:E3:ES:12:8E
Info: Downloaded certificate for puppet-agent from https://puppet-master:8140/puppet-ca/v1
Info: Using environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Notice: Requesting catalog from puppet-master:8140 (172.17.0.2)
Notice: Catalog compiled by puppet-master
Info: Caching catalog for puppet-agent
Info: Applying configuration version '1759433071'
Info: Creating state file /opt/puppetlabs/puppet/cache/state/state.yaml
Notice: Applied catalog in 0.01 seconds
root@puppet-agent:~#
```

Engine running

RAM 2.77 GB CPU 0.50% Disk 3.98 GB used (limit 1006.85 GB)

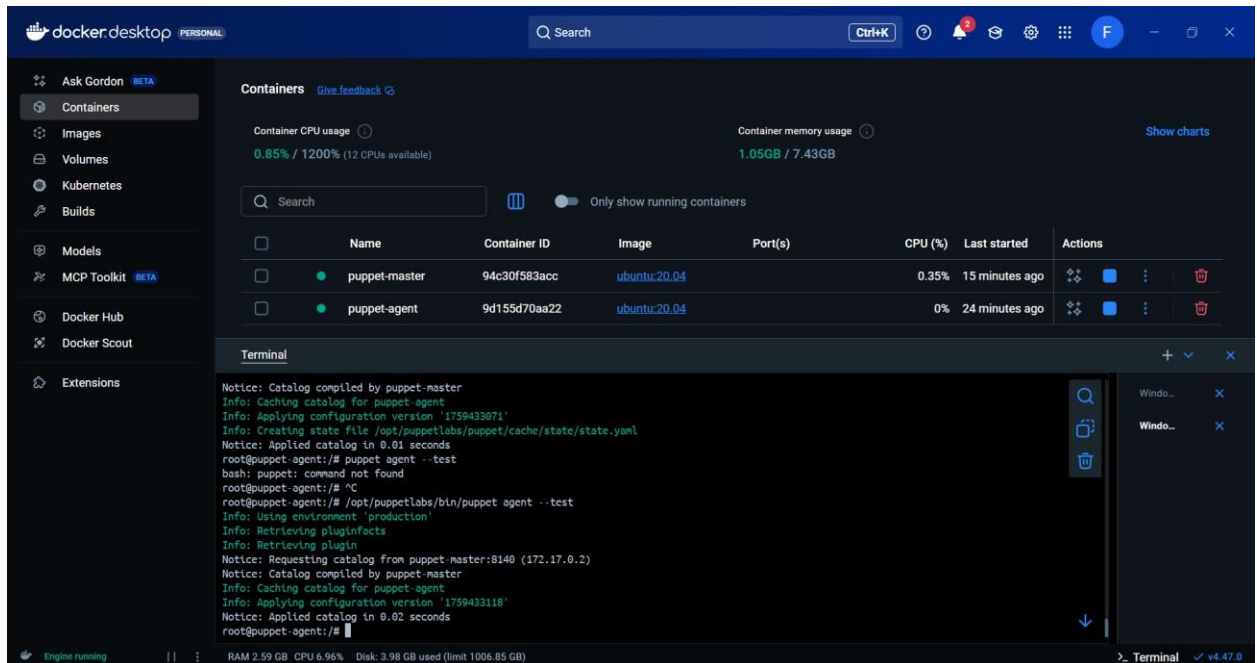
Terminal v4.47.0

Acknowledgment Received

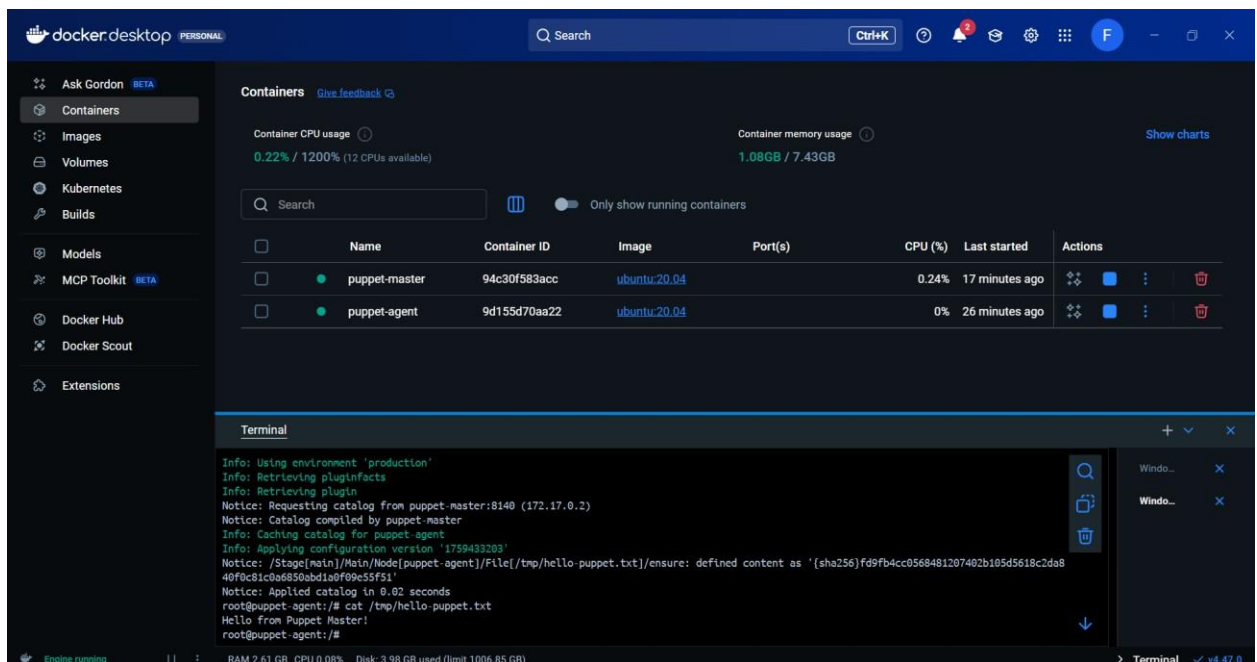
## Test Communication on Agent:

/opt/puppetlabs/bin/puppet agent --test

- The agent should now connect successfully.



## Final Testing on Agent



## Output Received

## Deploy a Sample Manifest

On Master, create a manifest file:

```
nano /etc/puppetlabs/code/environments/production/manifests/site.pp
```

Add:

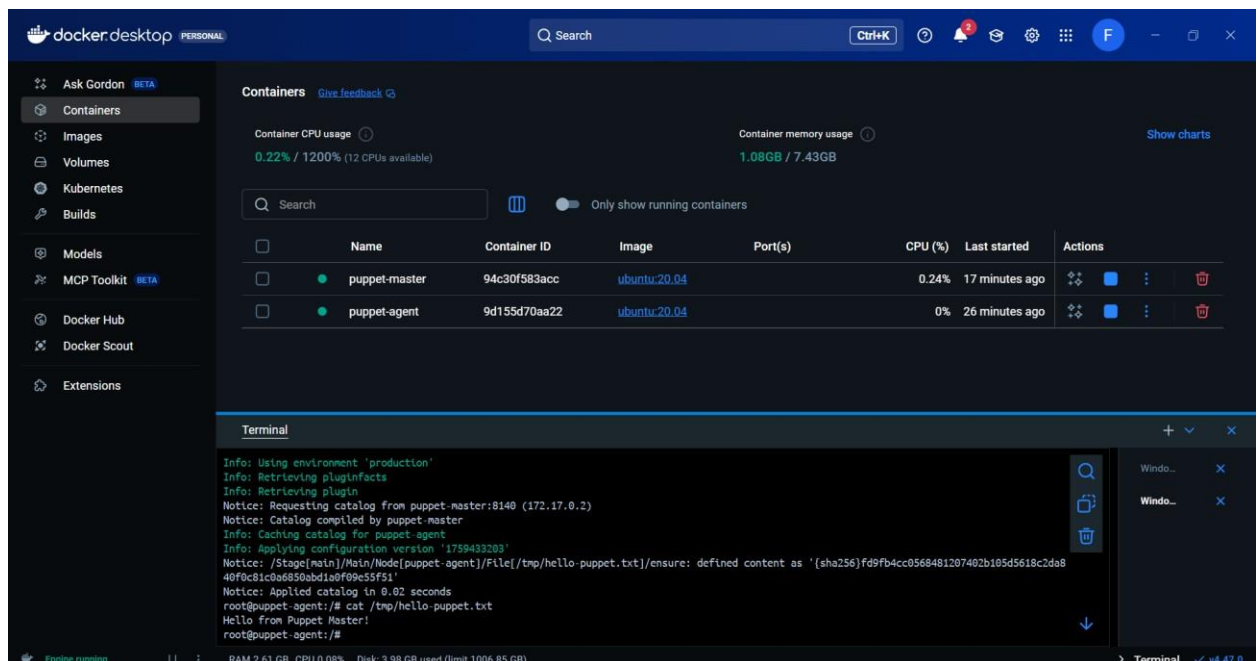
```
node 'puppet-agent' {  
    file { '/tmp/hello-puppet.txt':  
        ensure => present,  
        content => "Hello from Puppet Master!\n",  
    }  
}
```

On Agent, run: `puppet agent --test`

```
cat /tmp/hello-puppet.txt
```

Expected output:

Hello from Puppet Master!



Agents securely pulled configurations from the master and applied them automatically