Course Name: Virtualization and Cloud Computing Assignment No: 01 Class No: 01, 02, 03

1. Creating two container's :

Container-1: ruhul

\$ sudo lxc-create -t download -n ruhul

```
File Edit View Search Terminal Help
    wrong@ruhulamin-ict:~$ sudo lxc-create -t download -n ruhul
Setting up the GPG keyring
Downloading the image index
      DIST
                                                                     RELEASE ARCH
                                                                                                                                                                                                                        VARIANT BUILD
  alpine 3.10
alpine 3.10
alpine 3.10
alpine 3.10
alpine 3.10
alpine 3.11
alpine 3.11
                                                                                                                                           amdo4 default 20200918 13:00
arm64 default 20200918 13:00
i386 default 20200918 13:00
ppc64el default 20200918 13:00
amd64 default 20200918 13:00
amd64 default 20200918 13:00
arm64 default 20200918 13:00
      alpine
alpine
                                                                                                                                                   armhf
i386
                                                                                                                                                                                                                        default 20200918_13:00
default 20200918_13:00
alpine 3.11 alpine 3.11 alpine 3.11 alpine 3.12 alpine 3.9 alpine 3.9 alpine 3.9 alpine 3.9 alpine dege alpine edge salpine edge salpine edge salpine edge alpine edge alpine edge salpine edg
                                                                                                                                               i386 default 20200918 13:00 ppc64el default 20200918 13:00 amd64 default 20200918 13:00 arm64 default 20200918 13:00 arm64 default 20200918 13:00 i386 default 20200918 13:00 i386 default 20200918 13:00 s390x default 20200918 13:00 amd64 default 20200918 13:00 arm64 default 20200918 13:00 arm64 default 20200918 13:00
                                                                                                                                                   arm64
armhf
                                                                                                                                                                                                              default 20200918_13:00
default 20200918_13:00
                                                                                                                                             armhf default 20200918 13:00

1386 default 20200918 13:00

ppc64el default 20200918 13:00

390x default 20200918 13:00

amd64 default 20200918 13:00

arm64 default 20200918 13:00

default 20200918 13:00

default 20200918 13:00

default 20200918 13:00
                                                                                                                                             arm04 default 20200918 13:00
arm64 default 20200918 13:00
i386 default 20200918 13:00
ppc64el default 20200918 13:00
s390x default 20200918 13:00
s amd64 default 30200918
                                                                                                                                                                                                                                                                                                  default 20200918_01:17
```

```
File Edit View Search Terminal Help

ubuntu groovy and64
ubuntu groovy and64
ubuntu groovy and64
ubuntu groovy and64
ubuntu groovy aran64
ubuntu trusty 1386
default 20200918, 07:42
ubuntu xental aran64
default 20200918, 07:42
ub
```

Container-2: test

\$ sudo lxc-create -t download -n test

```
File Edit View Search Terminal Help
wrong@ruhulamin-ict:~$ sudo lxc-create -t download -n test
Setting up the GPG keyring
Downloading the image index
DIST RELEASE ARCH VARIANT BUILD
                                                          amd64 default 20200918_13:00
arm64 default 20200918_13:00
armhf default 20200918_13:00
default 20200918_13:00
alpine 3.10
alpine 3.10
alpine
alpine
                                                           1386 default 20200918 13:00 ppc64el default 20200918 13:01 s390x default 20200918 13:00 amd64 default 20200918 13:00 arm64 default 20200918 13:00 arm6f default 20200918 13:00 1386 default 20200918 13:00 ppc64el default 20200918 13:00 s390x default 20200918 13:00 amd64 default 20200918 13:00 amd64 default 20200918 13:00 amd64 default 20200918 13:00
                            3.10
3.10
3.11
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alpine
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3.11
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3.12
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alpine
                                                         amd64 default 20200918_13:00
arm64 default 20200918_13:00
i386 default 20200918_13:00
ppc64el default 20200918_13:00
amd64 default 20200918_13:00
arm64 default 20200918_13:00
arm64 default 20200918_13:00
arm66 default 20200918_13:00
i386 default 20200918_13:00
ppc64el default 20200918_13:00
amd64 default 20200918_13:00
amd64 default 20200918_13:00
arm64 default 20200918_13:00
arm64 default 20200918_13:00
default 20200918_13:00
default 20200918_13:00
default 20200918_13:00
default 20200918_13:00
alpine
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                             3.12
3.12
                            3.12
3.12
3.12
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alpine
alpine
alpine
alpine edge
alpine edge
alpine edge
alpine edge
                                                             S390X default 20200918_13:00

arm64 default 20200918_13:00

arm64 default 20200918_13:00

default 20200918_13:00

ppc64el default 20200918_13:00

s390X default 20200918_13:00
alpine
alpine
                                                                                            amd64 default 20200918 01:17
```

```
File Edit View Search Terminal Help

ubuntu groovy andd4
ubuntu groovy andd4
ubuntu groovy arm64
ubuntu groovy saposa
ubuntu groovy saposa
ubuntu trusty arm64
ubuntu trusty issa
default 20200918, 07:42
ubuntu trusty issa
default 20200918, 07:42
ubuntu trusty arm64
ubuntu trusty issa
default 20200918, 07:42
ubuntu trusty issa
default 20200918, 07:42
ubuntu xental arm64
default 20200918, 07:42
```

Both of the containers are on running state.

- \$ sudo lxc-ls —fancy
- \$ sudo lxc-start -n ruhul
- \$ sudo lxc-start -n test
- \$ sudo lxc-ls --fancy

```
wrong@ruhulamin-ict:~

File Edit View Search Terminal Help
wrong@ruhulamin-ict:~

[Sudo] password for wrong:
NAME STATE AUTOSTART GROUPS IPV4 IPV6 UNPRIVILEGED
ruhul STOPPED 0 - - - false
test STOPPED 0 - - - false
wrong@ruhulamin-ict:~$ sudo lsc-start -n ruhul
sudo: lsc-start: command not found
wrong@ruhulamin-ict:~$ sudo lxc-start - n ruhul
wrong@ruhulamin-ict:~$ sudo lxc-start - n test
wrong@ruhulamin-ict:~$ sudo lxc-start - n ruhul
```

2. Installing web server (apache) in container-1(ruhul):

apt-get install apache2

```
File Edit View Search Terminal Help

rootgruhul:/# apt-get install apache2
Reading package lists... Done

Building dependency tree
Reading state information... Done

The following additional packages will be installed:
    apache2-bin apache2-data apache2-utils libaprillibaprutill libaprutill-dbd-sqlite3 libaprutill-ldap libgdbm3 libicu55 liblua5.1-0

libperl5.22 libmnl2 perl perl-modules-5.22 rename sgml-base ssl-cert xml-core

Suggested packages:
    www-browser apache2-doc apache2-suexec-pristine | apache2-suexec-custom ufw perl-doc libterm-readline-gnu-perl
    | libterm-readline-perl-perl make sgml-base-doc openssl-blacklist debbelper

The following NEW packages will be installed:
    apache2 apache2-bin apache2-data apache2-utils libapri libaprutill libaprutill-dbd-sqlite3 libaprutill-ldap libgdbm3 libicu55 liblua5.1-0

libperl5.22 libsml2 perl perl-modules-5.22 rename sgml-base ssl-cert xml-core

0 upgraded, 19 newly installed, 0 to remove and 0 not upgraded.

Need to get 10.2 MB of archives.

After this operation, 79.1 MB of additional disk space will be used.

Do you want to continue? [Y/n] y

Get:1 http://archive.ubuntu.com/ubuntu xental-ymain and64 sgml-base all 1.26+nmu4buntul [12.5 kB]

Get:3 http://archive.ubuntu.com/ubuntu xental-ymain and64 sgml-base all 1.26+nmu4buntul [12.5 kB]

Get:4 http://archive.ubuntu.com/ubuntu xental-updates/main and64 libperl3 and64 1.5.2-3 l80.6 kB]

Get:5 http://archive.ubuntu.com/ubuntu xental-updates/main and64 libperl3 and64 1.5.2-3 l80.6 kB]

Get:6 http://archive.ubuntu.com/ubuntu xental-wale and64 libperl3 and64 1.5.2-3 l80.6 kB]

Get:7 http://archive.ubuntu.com/ubuntu xental-wale and64 libperl3 and64 1.5.2-3 l80.6 kB]

Get:6 http://archive.ubuntu.com/ubuntu xental-wale and64 libperl3 and64 1.5.3-1 buntutu [19.6 kB]

Get:7 http://archive.ubuntu.com/ubuntu xental-wale and64 libperl3 and64 1.5.3-8 ubuntu0.6 [237 kB]

Get:1 http://archive.ubuntu.com/ubuntu xental-wale and64 libperl3 and64 1.5.4-1 buld4 [1.6.6 kB]

Get:1 http://archive.ubuntu.com/ubuntu xental-wale
```

```
File Edit View Search Terminal Help

Setting up apache2-bin (2.4.18-2ubuntu3.17) ...

Setting up apache2-bin (2.4.18-2ubuntu3.17) ...

Setting up apache2-data (2.4.18-2ubuntu3.17) ...

Enabling nodule and provide a
```

Configuration of web server (apache):

```
# apt-get install ufw
```

ufw status

ufw enable

ufw app list

ufw allow 'apache'

ufw status

```
File Edit View Search Terminal Help

Creating config file /etc/ufw/before.rules with new version

Creating config file /etc/ufw/before6.rules with new version

Creating config file /etc/ufw/after6.rules with new version

Creating config file

Creating
```

3. Creating an html page containing following information:

Name: Md. Ruhul Amin

Institute: Mawlana Bhashani Science and Technology University

Country: Bangladesh

E-mail: hmruhul16.mbstu@gmail.com

- # cd /var/www/html
- # apt-get install nano
- # nano introduction.html

```
File Edit View Search Terminal Help
Suggested packages:
spell
The following NEW packages will be installed:
The following NEW packages will be installed:
nano

0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 191 kB of archives.
After this operation, 700 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 nano amd64 2.5.3-2ubuntu2 [191 kB]
Fetched 191 kB in 1s (115 kB/s)
perl: warning: Setting locale failed.
perl: warning: Please check that your locale settings:

LANGUAGE = "en_U5:en",
LC_ALL = (unset),
LC_TIME = "bn_BD.UTF-8",
LC_MONETARY = "bn_BD.UTF-8",
LC_MONETARY = "bn_BD.UTF-8",
LC_TELEPHONE = "bn_BD.UTF-8",
LC_TELEPHONE = "bn_BD.UTF-8",
LC_IDENTIFICATION = "bn_BD.UTF-8",
LC_NMERET = "bn_BD.UTF-8",
LC_NMERET = "bn_BD.UTF-8",
LC_PAPER = "bn_BD.UTF-8",
LC_PAPER = "bn_BD.UTF-8",
LC_PAPER = LC_ALL to default locale: No such file or directory
selecting previously unselected package nano.
(Reading database ... 16499 files and directories currently installed.)
Preparing to unpack .../nano_2.5.3-2ubuntu2_amd64.deb ...
Unpacking nano (2.5.3-2ubuntu2) ...
setting up nano (2.5.3-2ubuntu2) ...
setting up nano (2.5.3-2ubuntu2) ...
setting up nano (2.5.3-2ubuntu2) ...
update-alternatives: using /bin/nano to provide /usr/bin/editor (editor) in auto mode
update-alternatives: using /bin/nano to provide /usr/bin/pico (pico) in auto mode
root@ruhul:/var/www/html# ls
root@ruhul:/var/www/html# ls
root@ruhul:/var/www/html# ls
introduction.html
   root@ruhul:/var/www/html# ls
introduction.html
root@ruhul:/var/www/html#
      GNU nano 2.5.3
                                                                                                                                                                  File: introduction.html
                                                                                                                                                                                                                                                                                                                                                                                                                                                         Modified
                 <title>Virtualization and Cloud Computing</title>
               gy>
<h1>Introduction</h1>

\table 1. Institute: 

                             ^K Cut Text ^J Justify
^U Uncut Text ^T To Spell
                                                     AC Cur Pos AY Prev Page M-\ First Line M-W WhereIs Next
A Go To Line AV Next Page M-\ Last Line M-] To Bracket
   ^G Get Help
^X Exit
```

4. Installing curl on container-2 (test) and browse container-1's (ruhul) web page using container-1's (ruhul) ip address:

Current status of these two containers:

```
wrong@ruhulamin-ict:~

File Edit View Search Terminal Help
wrong@ruhulamin-ict:~$ sudo lxc-ls --fancy
[sudo] password for wrong:
NAME STATE AUTOSTART GROUPS IPV4 IPV6 UNPRIVILEGED
ruhul RUNNING 0 - 10.0.3.232 - false
test RUNNING 0 - 10.0.3.8 - false
wrong@ruhulamin-ict:~$
```

Curl installing on conainer-2 (test):

apt-get install curl

```
File Edit View Search Terminal Help

To enable SSH, run: apt install openssh:server
No default root or user password are set by LKC.
wrong@ruhulamin-ict:-5 sudo lxc-attach -n test
root@test:// apt-get install curl
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following BKH packages will be installed:
curl
ougraded, 1 newly installed, 0 to renove and 0 not upgraded.
Need to get 139 kB of archives.
After this operation, 340 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.con/ubuntu xental-updates/main amd64 curl amd64 7.47.0-1ubuntu2.16 [139 kB]
Fetched 139 kB in is (74.2 kB/s)
perl: worning: Stiting locale failed.
perl: worning: Stiting locale failed.
perl: worning: Stiting locale failed.
LC_ALL = (unset).
LC_ALL = (unset).
LC_ALL = (unset).
LC_ALL = (unset).
LC_ARLE = "bn BD.UTF-8",
LC_MONETARY = "bn BD.UTF-8",
LC_MONETARY = "bn BD.UTF-8",
LC_MONETARY = "bn BD.UTF-8",
LC_MERSY = "bn BD.UTF-8",
LC_NUMERIC = "
```

Curl installed in container-2 (test):

```
wrong@ruhulamin-ict: ~

File Edit View Search Terminal Help

root@test:/# curl --version

curl 7.47.0 (x86_64-pc-linux-gnu) libcurl/7.47.0 GnuTLS/3.4.10 zlib/1.2.8 libidn

/1.32 librtmp/2.3

Protocols: dict file ftp ftps gopher http https imap imaps ldap ldaps pop3 pop3s

rtmp rtsp smb smbs smtp smtps telnet tftp

Features: AsynchDNS IDN IPv6 Largefile GSS-API Kerberos SPNEGO NTLM NTLM_WB SSL

libz TLS-SRP UnixSockets

root@test:/#
```

Web server (apache) active in container-1 (ruhul):

Browse container-1's (ruhul) web page through container-2 by using curl container-1's ip address:

curl 10.0.3.232

```
File Edit View Search Terminal Help

Protocols: dict file ftp ftps gopher http https inap inaps idap idaps pop3 pop3s rtmp rtsp smb smbs smtp smtps telnet tftp

Features: Asyncholds ION IPvs Largefile GSS-API Kerberos SPNEGO NTLM NTLM_WB SSL libz TLS-SRP UnixSockets

rootigtest:/# curl 10.0.3.1.232
chtml>

<head>

</head>
</head>

<th color="b
```