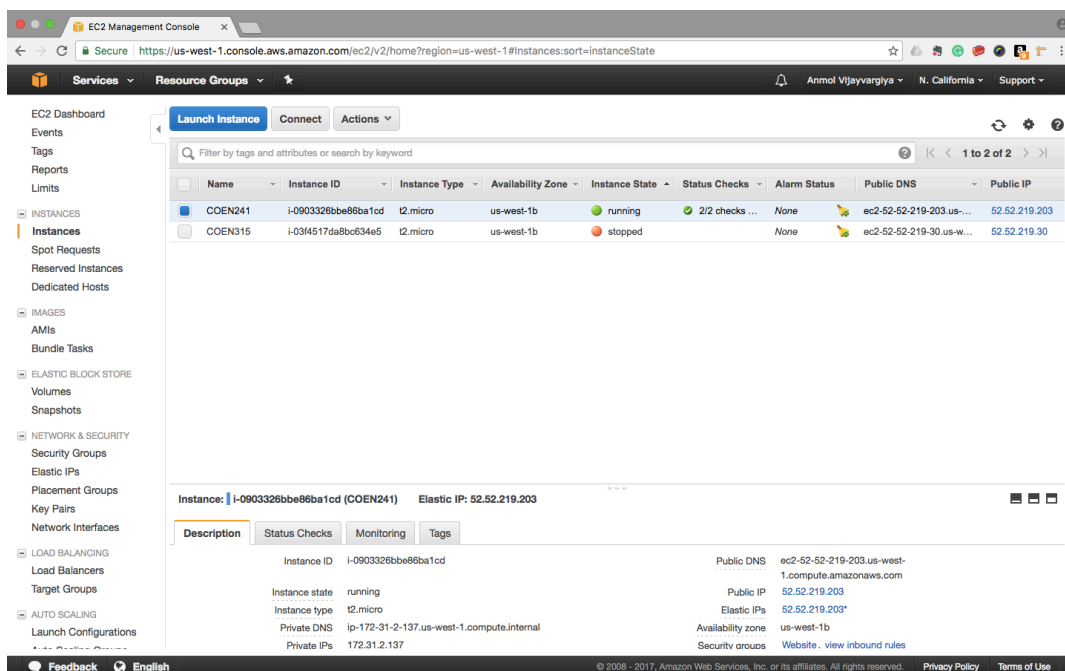


COEN 241 HW-1B

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Steps Performed to Launch an Amazon EC2 Instance:

1. Login to amazon AWS console and choose the EC2 option under Services tab on the top left corner.
2. Click Instance under INSTANCES in the menu on the left.
3. Click Launch Instance
4. Chose one of the free machine images under free tier (Ubuntu 16.04) by clicking select to the right of its name.
5. On next page chose instance type as t2.micro which is free tier eligible. Then click button named "Next: Configure Instance Detail".
6. Leave the settings as they are and click the button named "Next: Add Storage".
7. Leave settings as they are and click the button named "Next: Add Tags".
8. Type the name for your EC2 machine in the text field titled Value. Then click the button named "Next: Configure Security Group".
9. Give a name and definition for your security group in the respective text field (Note: Here, "Create a new security Group" must be the selected radio button). "SSH" would be selected as a default rule here. Use add rule button under it to add rule for HTTP and HTTPS. Then click the button named "Review and Launch".
10. Click "Launch" on next page. A pop-up will open asking "Select an existing key pair or create a new key pair". In the first drop down choose create a new key pair. Give a name for your key pair in the text box that shows up under it. Now select download key pair. A file with the name you gave your key pair with an extension of ".pem" will be downloaded. Next click Launch Instance. Wait till all the checks on the Instance are completed before you proceed.



Screenshot 1: EC2 instance (COEN241) in running state

Steps Performed to start an SSH connection with the EC2 Instance created in the previous step:

1. Open terminal and change directory to the location where you stored the key pair file with the extension of “.pem”
2. To start SSH session type the following command and press enter-

```
$ ssh -i <keypairfile.pem> <hostname>@<Public IP of Instance>
```

Here-

Keypairfile:	The file you downloaded with the extension “.pem”
Hostname:	“Ubuntu” is the hostname for Ubuntu Linux EC2 Instance
Public IP of the Instance:	This can be found in the bottom right corner of the amazon EC2 console when you click on your instance

```
Last login: Sun Jan 15 01:17:04 on ttys000
~ $ cd desktop
desktop $ cd cloudkeys
cloudkeys $ ssh -i coen241.pem ubuntu@52.52.219.203
The authenticity of host '52.52.219.203 (52.52.219.203)' can't be established.
ECDSA key fingerprint is SHA256://2JsmSii29+pRNQ0+TyjJN2mGEJ62YwTpA89Pz/CbY.
Are you sure you want to continue connecting (yes/no)? Yes
Warning: Permanently added '52.52.219.203' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 16.04.1 LTS (GNU/Linux 4.4.0-53-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@ip-172-31-2-137:~$
```

Screenshot 2: Successful SSH connection to the EC2 Instance

Steps performed to install Apache2, PHP7.0 and MySQL onto the EC2 instance created in preceding steps:

1. Type the following command after the dollar symbol and click enter-
\$ sudo apt-get update
It downloads the package lists from the repositories and "updates" them to get information on the newest versions of packages and their dependencies.
2. Next, type the following command and click enter-
\$ sudo apt-get upgrade
It will fetch new versions of packages existing on the machine if APT knows about these new versions by way of apt-get update in the last command.
3. Type 'y' when prompted and press enter again.
4. Next type the following command to install Apache2, MySQL as well as PHP7.0 dependencies all in one command.

\$ Sudo apt-get install apache2 libapache2-mod-php7.0 mysql-server php7.0-mysql php7.0

Here:

libapache2-mod-php7.0 is a package that provide php7.0 module for apache2 server

Php7.0-mysql is a package that connects MySQL-server to php7.0

```
ubuntu@ip-172-31-2-137:~$ sudo apt-get install apache2 libapache2-mod-php7.0 mysql-server php7.0-mysql php7.0
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libaio1 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libcgi-fast-perl libcgi-pm-perl libencode-locale-perl
  libevent-core-2.0-5 libfcgi-perl libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl liblua5.1-0
  liblwp-mediatypes-perl libtimedate-perl liburi-perl mysql-client-5.7 mysql-client-core-5.7 mysql-common mysql-server-5.7 mysql-server-core-5.7 php-common php7.0-cli
  php7.0-common php7.0-json php7.0-opcache php7.0-readline ssl-cert
Suggested packages:
  www-browser apache2-doc apache2-suexec-pristine | apache2-suexec-custom php-pear libdata-dump-perl libipc-sharedcache-perl libwww-perl mailx tinycsa openssl-blacklist
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libaio1 libapache2-mod-php7.0 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libcgi-fast-perl libcgi-pm-perl
  libencode-locale-perl libevent-core-2.0-5 libfcgi-perl libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl
  liblua5.1-0 liblwp-mediatypes-perl libtimedate-perl liburi-perl mysql-client-5.7 mysql-client-core-5.7 mysql-common mysql-server mysql-server-5.7 mysql-server-core-5.7
  php-common php7.0-cli php7.0-common php7.0-json php7.0-mysql php7.0-opcache php7.0-readline ssl-cert
0 upgraded, 40 newly installed, 0 to remove and 4 not upgraded.
Need to get 24.0 MB of archives.
After this operation, 183 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libapr1 amd64 1.5.2-3 [86.0 kB]
Get:2 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libaprutil1 amd64 1.5.4-1build1 [77.1 kB]
Get:3 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libaprutil1-dbd-sqlite3 amd64 1.5.4-1build1 [10.6 kB]
Get:4 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libaprutil1-ldap amd64 1.5.4-1build1 [8,720 B]
Get:5 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 liblua5.1-0 amd64 5.1.5-8ubuntu1 [102 kB]
Get:6 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 apache2-bin amd64 2.4.18-2ubuntu3.1 [923 kB]
Get:7 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 apache2-utils amd64 2.4.18-2ubuntu3.1 [81.3 kB]
Get:8 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 apache2-data all 2.4.18-2ubuntu3.1 [162 kB]
Get:9 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 apache2 amd64 2.4.18-2ubuntu3.1 [86.7 kB]
Get:10 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libevent-core-2.0-5 amd64 2.0.21-stable-2 [69.4 kB]
Get:11 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 mysql-common all 5.7.16-0ubuntu0.16.04.1 [15.0 kB]
Get:12 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libaio1 amd64 0.3.110-2 [6,356 B]
Get:13 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 mysql-client-core-5.7 amd64 5.7.16-0ubuntu0.16.04.1 [6,365 kB]
Get:14 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 mysql-client-5.7 amd64 5.7.16-0ubuntu0.16.04.1 [1,739 kB]
Get:15 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 mysql-server-core-5.7 amd64 5.7.16-0ubuntu0.16.04.1 [7,395 kB]
Get:16 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 mysql-server-5.7 amd64 5.7.16-0ubuntu0.16.04.1 [2,597 kB]
Get:17 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 php-common all 1:35ubuntu6 [10.8 kB]
Get:18 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 php7.0-common amd64 7.0.13-0ubuntu0.16.04.1 [833 kB]
Get:19 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 php7.0-json amd64 7.0.13-0ubuntu0.16.04.1 [16.9 kB]
Get:20 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 php7.0-opcache amd64 7.0.13-0ubuntu0.16.04.1 [76.1 kB]
Get:21 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 php7.0-readline amd64 7.0.13-0ubuntu0.16.04.1 [12.9 kB]
Get:22 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 php7.0-cli amd64 7.0.13-0ubuntu0.16.04.1 [1,282 kB]
Get:23 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libapache2-mod-php7.0 amd64 7.0.13-0ubuntu0.16.04.1 [1,224 kB]
Get:24 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libhtml-tagset-perl all 3.20-2 [13.5 kB]
Get:25 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 liburi-perl all 1.71-1 [76.9 kB]
Get:26 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libhtml-parser-perl amd64 3.72-1 [86.1 kB]
Get:27 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libcgi-pm-perl all 4.26-1 [185 kB]
Get:28 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libcgi-fast-perl amd64 0.77-1build1 [32.3 kB]
Get:29 http://us-west-1.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libcgi-fast-perl all 1:2.10-1 [10.2 kB]
```

Screenshot 3: Apache2,MySQL & PHP7.0 installed in single command

```

Creating config file /etc/php/7.0/mods-available/tokenizer.ini with new version
Setting up php7.0-json (7.0.13-0ubuntu0.16.04.1) ...

Creating config file /etc/php/7.0/mods-available/json.ini with new version
Setting up php7.0-opcache (7.0.13-0ubuntu0.16.04.1) ...

Creating config file /etc/php/7.0/mods-available/opcode.ini with new version
Setting up php7.0-readline (7.0.13-0ubuntu0.16.04.1) ...

Creating config file /etc/php/7.0/mods-available/readline.ini with new version
Setting up php7.0-cli (7.0.13-0ubuntu0.16.04.1) ...
update-alternatives: using /usr/bin/php7.0 to provide /usr/bin/php (php) in auto mode
update-alternatives: using /usr/bin/phar7.0 to provide /usr/bin/phar (phar) in auto mode
update-alternatives: using /usr/bin/phar.phar7.0 to provide /usr/bin/phar.phar (phar.phar) in auto mode

Creating config file /etc/php/7.0/cli/php.ini with new version
Setting up libapache2-mod-php7.0 (7.0.13-0ubuntu0.16.04.1) ...

Creating config file /etc/php/7.0/apache2/php.ini with new version
Module mpm_event disabled.
Enabling module mpm_prefork.
apache2_switch_mpm Switch to prefork
apache2_invoke: Enable module php7.0
Setting up libhtml-tagset-perl (3.20-2) ...
Setting up liburi-perl (1.71-1) ...
Setting up libhtml-parser-perl (3.72-1) ...
Setting up libcgi-pm-perl (4.26-1) ...
Setting up libfcgi-perl (0.77-1build1) ...
Setting up libcgi-fast-perl (1:2.10-1) ...
Setting up libencode-locale-perl (1.05-1) ...
Setting up libhtml-template-perl (2.95-2) ...
Setting up libtimedate-perl (2.3000-2) ...
Setting up libhttp-date-perl (6.02-1) ...
Setting up libio-html-perl (1.001-1) ...
Setting up liblwp-mediatypes-perl (6.02-1) ...
Setting up libhttp-message-perl (6.11-1) ...
Setting up mysql-server (5.7.16-0ubuntu0.16.04.1) ...
Setting up php7.0 (7.0.13-0ubuntu0.16.04.1) ...
Setting up php7.0-mysql (7.0.13-0ubuntu0.16.04.1) ...

Creating config file /etc/php/7.0/mods-available/mysqlnd.ini with new version

Creating config file /etc/php/7.0/mods-available/mysql.ini with new version

Creating config file /etc/php/7.0/mods-available/pdo_mysql.ini with new version
Setting up ssl-cert (1.0.37) ...
Processing triggers for libc-bin (2.23-0ubuntu5) ...
Processing triggers for systemd (229-4ubuntu13) ...
Processing triggers for ureadahead (0.100.0-19) ...
Processing triggers for ufw (0.35-0ubuntu2) ...
Processing triggers for libapache2-mod-php7.0 (7.0.13-0ubuntu0.16.04.1) ...
ubuntu@ip-172-31-2-137:~$


```

Screenshot 4: LAMP stack installation successfully completed

- Follow on screen commands to setup root password for mysql when prompted.
- Once the installation in the previous step is over, restart Apache2 using the following command-
`$ sudo service apache2 restart`
- Login to amazon EC2 console in the browser and click the instance that you create in the previous steps. Find the public IP associated with your instance in the bottom right corner of the screen. Copy and paste this IP in a new browser tab and press enter. Since everything went right, we are greeted with the Apache2 page as shown below.

EC2 Management Console x Apache2 Ubuntu Default Page x

52.52.219.203



Apache2 Ubuntu Default Page

ubuntu

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in `/usr/share/doc/apache2/README.Debian.gz`**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
-- apache2.conf
-- ports.conf
-- mods-enabled
-- conf-enabled
-- sites-enabled
-- *.load
-- *.conf
-- *.conf
-- *.conf
-- *.conf
```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.
- `ports.conf` is always included from the main configuration file. It is used to determine the listening ports for incoming connections, and this file can be customized anytime.
- Configuration files in the `mods-enabled/`, `conf-enabled/` and `sites-enabled/` directories contain particular configuration snippets which manage modules, global configuration fragments, or virtual host configurations, respectively.

Screenshot 5: Apache2 default page shown at IP 52.52.219.203