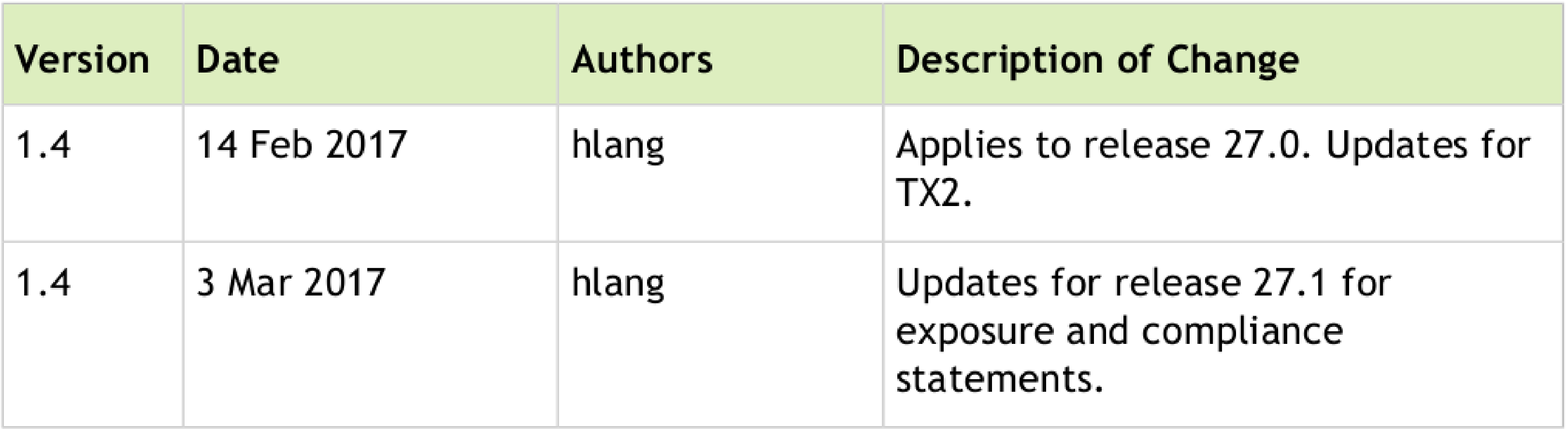
lec11-1-Webinstallation-2017-12-29

CTI One Corporation

Version: x0.1
Date: Dec.29, 2017
Project Lead: Harry Li, Ph.D.

Group Leaders: Team members:

Document Change History; Document number:

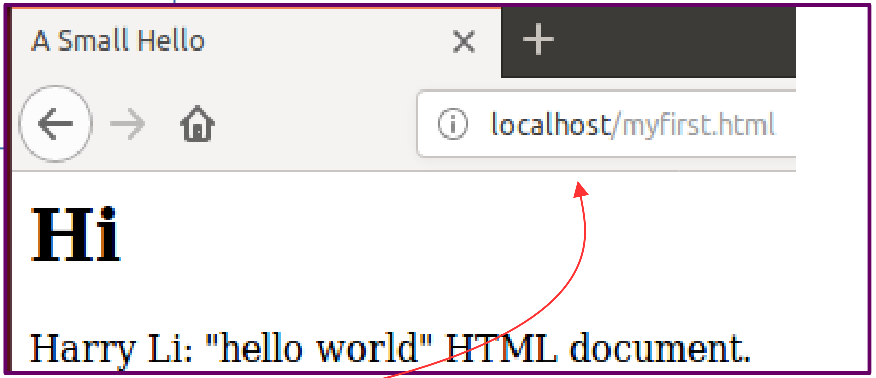


Version	Date	Authors	Description of Change
1.4	14 Feb 2017	hlang	Applies to release 27.0. Updates for TX2.
1.4	3 Mar 2017	hlang	Updates for release 27.1 for exposure and compliance statements.

Write Your HTML Local Web Content at /var/www/html

Example: write HTML local web page

```
<!DOCTYPE html PUBLIC "-//IETF//DTD HTML 2.0//EN">
<HTML>
   <HEAD>
      <TITLE>
         A Small Hello
      </TITLE>
   </HEAD>
<BODY>
   <H1>Hi</H1>
   <P>Harry Li: "hello world" HTML document.</P>
</BODY>
</HTML>
```



Hi

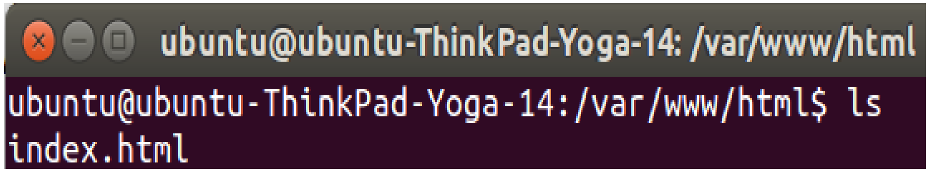
Harry Li: "hello world" HTML document.

Note: Place this html web page “myfirst.html” at /var/www/html then use your browser http://localhost/myfirst.html

Apache2 And Its Document Root

https://www.digitalocean.com/community/tutorials/how-to-install-linux-apache-mysql-php-lamp-stack-on-ubuntu-14-04

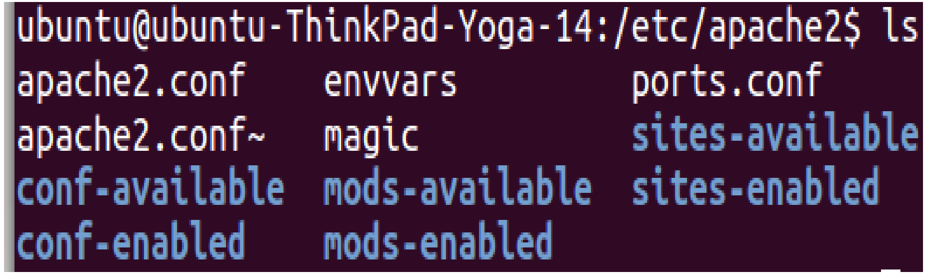
1. Document root: /var/www/html where all the web content live. By default, Ubuntu does not allow access through the web browser to any file apart of those located in /var/www, public_html directories (when enabled) and /usr/share (for web applications). If your site is using a web document root located elsewhere (such as in /srv) you may need to whitelist your document root directory in /etc/apache2/apache2.conf.



```
ubuntu@ubuntu-ThinkPad-Yoga-14: /var/www/html
ubuntu@ubuntu-ThinkPad-Yoga-14:/var/www/html$ ls
index.html
```

2. Apache2, located at /etc/apache2, note All of its configuration folders based on “available” and “enabled” categories. You will have to make sure they match up to your web configurations as shown later on this PPT.

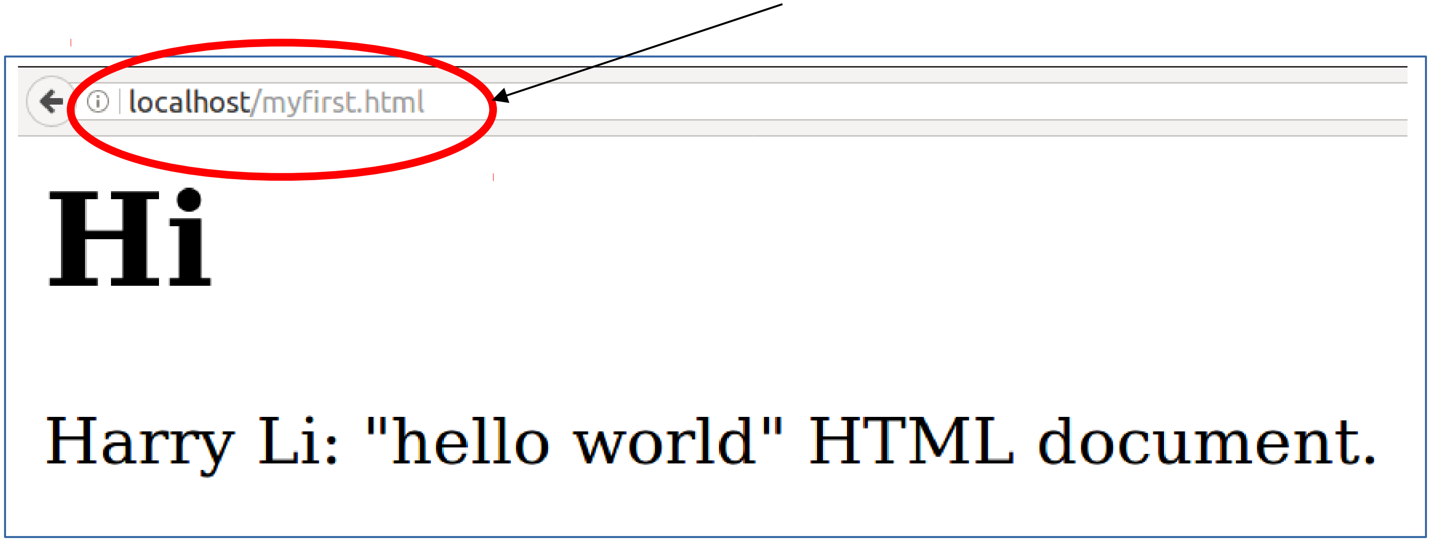
Note: configuration files



```
ubuntu@ubuntu-ThinkPad-Yoga-14:/etc/apache2$ ls
apache2.conf     envvars          ports.conf
apache2.conf~    magic            sites-available
conf-available   mods-available   sites-enabled
conf-enabled     mods-enabled
```

Browser Calling Your HTML Local Web Content

1. Use browser point to http:/localhost/myfirst.html or http://127.0.0.1/myfirst.html



Hi

Harry Li: "hello world" HTML document.

Note: From time to time, you may want to change port address, if so, you need to edit the configuration file at /etc/apache2/ports.conf and change the Listen 80 to your desired port number. After edit you need to restart the apache2 server.

Writing a C CGI Program

Example: CGI program written in C

```
/*----------------------------------------------------------------------*
 * Program: mycgi.c;    coded by: Harry Li;                             *
 * Version: x01.0;      Date: 2009                                      *
 * Note: Port this from my original implementation on                  *
 *       embedded ARM platform with BOA websever to                     *
 *       x86 64 bit platform with Apatche2.                             *
 * compilation and build:                                               *
 * sudo gcc -Wall mycgi.c -o main                                       *
 *----------------------------------------------------------------------*/
#include <stdio.h>
int main()
{
printf("Content-type: text/html\n\n");
printf("<html>\n");
printf("<body>\n");
printf("<h1>Harry Li: Hello there!</h1>\n");
printf("</body>\n");
printf("</html>\n");
return 0;
}
```

1. place this program at the default location:

/usr/lib/cgi-bin

You can check /etc/apache2/conf-available/serve-cgi-bin.conf To find out the default location.

2. Compile and build this CGI program written in C.

CGI Lives at /usr/lib/cgi-bin

So Place CGI Code there

Choose your cgi directory based on apatch2 default setting from
etc/apache2/conf-available/serve-cgi-bin.conf as:
/

Cgi-bin conf file

```
<IfDefine ENABLE_USR_LIB_CGI_BIN>
        ScriptAlias /cgi-bin/ /usr/lib/cgi-bin/
        <Directory "/usr/lib/cgi-bin">
                AllowOverride None
                Options +ExecCGI -MultiViews +SymLinksIfOwnerMatch
                Require all granted
        </Directory>
</IfDefine>
```

Any request for a
resource beginning
with /cgi-bin/

should be served from this directory and should be treated as a CGI program.

Use $service apache2 restart
to restart your apache2 server

Enable CGI

https://www.linux.com/blog/configuring-apache2-run-python-scripts

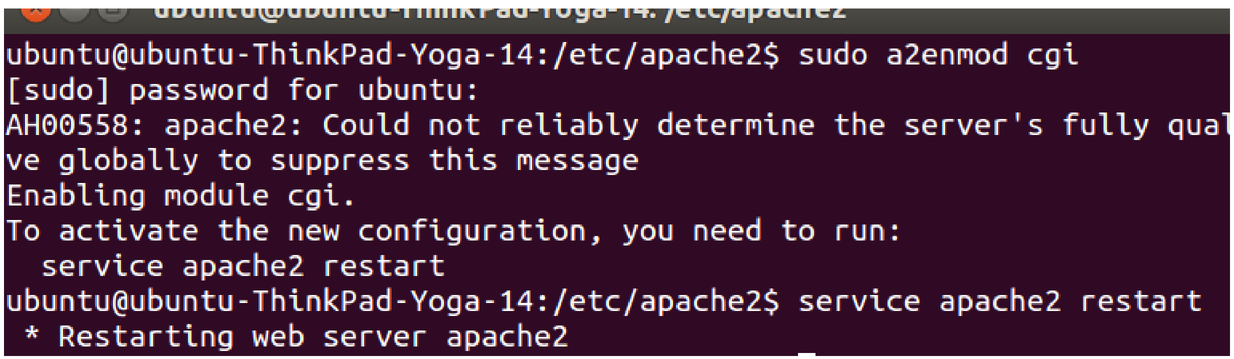
1. Enable CGI in apache (enable cgid).
$sudo a2enmod cgi

This will automatically enable mod_cgid if your server is configured with a multi-threaded MPM.

2. Start new web service by

$service apache2 restart

If $service apache2 restart failed, then ???



```
ubuntu@ubuntu-ThinkPad-Yoga-14:/etc/apache2$ sudo a2enmod cgi
[sudo] password for ubuntu:
AH00558: apache2: Could not reliably determine the server's fully qual
ve globally to suppress this message
Enabling module cgi.
To activate the new configuration, you need to run:
  service apache2 restart
ubuntu@ubuntu-ThinkPad-Yoga-14:/etc/apache2$ service apache2 restart
 * Restarting web server apache2
```

Note 1:

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

Note 2: apache2.conf is the new version of httpd.conf

Note: when googling apache2 set up, you will see mentioning of httpd.conf, in this whole process you don have to do anything about it, apach2 conf is the latest.

CGI Configuration

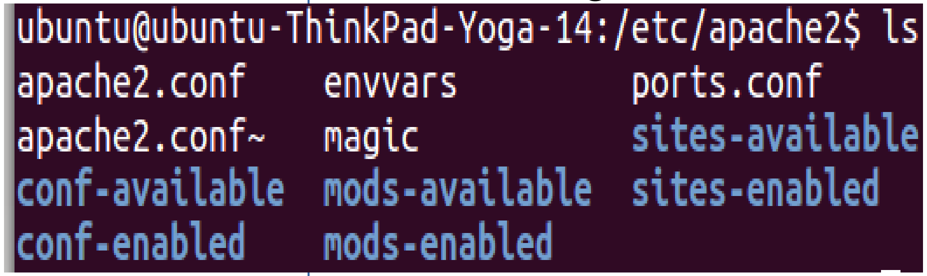
https://code-maven.com/set-up-cgi-with-apache

1. /etc/apache2 directory is the standard place to find the Apache configuration files.
2. check if /etc/apache2/conf-available/serve-cgi-bin.conf file has a symbolic link from /etc/apache2/conf-enabled/serve-cgi-bin.conf. It has a section that maps the /cgi-bin path in the URLs to the /usr/lib/cgi-bin/ directory to enable CGI execution.

/etc/apache2/conf-available/serve-cgi-bin.conf

```
<IfModule mod_alias.c>
        <IfModule mod_cgi.c>
                Define ENABLE_USR_LIB_CGI_BIN
        </IfModule>
        <IfModule mod_cgid.c>
                Define ENABLE_USR_LIB_CGI_BIN
        </IfModule>
        <IfDefine ENABLE_USR_LIB_CGI_BIN>
                ScriptAlias /cgi-bin/ /usr/lib/cgi-bin/
                <Directory "/usr/lib/cgi-bin">
                        AllowOverride None
                        Options +ExecCGI -MultiViews +SymLinksIfOwnerMatch
                        Require all granted
                </Directory>
        </IfDefine>
<Directory "/usr/lib/cgi-bin">
       Options +ExecCGI
       AddHandler cgi-script .py
</Directory>
</IfModule>
# vim: syntax=apache ts=4 sw=4 sts=4 sr noet
```

Note: configuration files



```
ubuntu@ubuntu-ThinkPad-Yoga-14:/etc/apache2$ ls
apache2.conf     envvars          ports.conf
apache2.conf~    magic            sites-available
conf-available   mods-available   sites-enabled
conf-enabled     mods-enabled
```

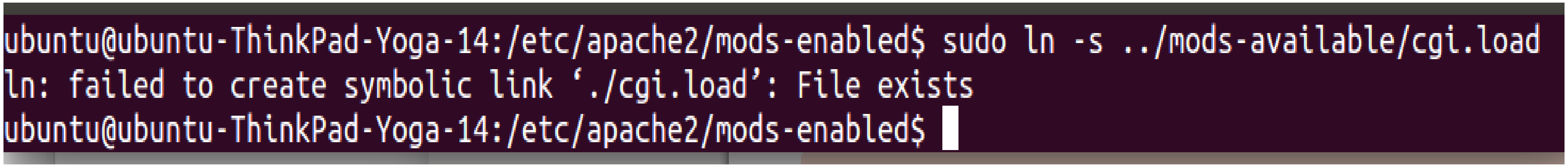
Check Symbolic Link Enabled

https://code-maven.com/set-up-cgi-with-apache

Check installed modules at /etc/apache2/mods-available directory. The cgi module is called cgi.load

The enabled modules have symbolic links in /etc/apache2/mods-enabled, check if the CGI module have a symbolic link enabled by default:

```
$ cd /etc/apache2/mods-enabled
$ sudo ln -s ../mods-available/cgi.load
```



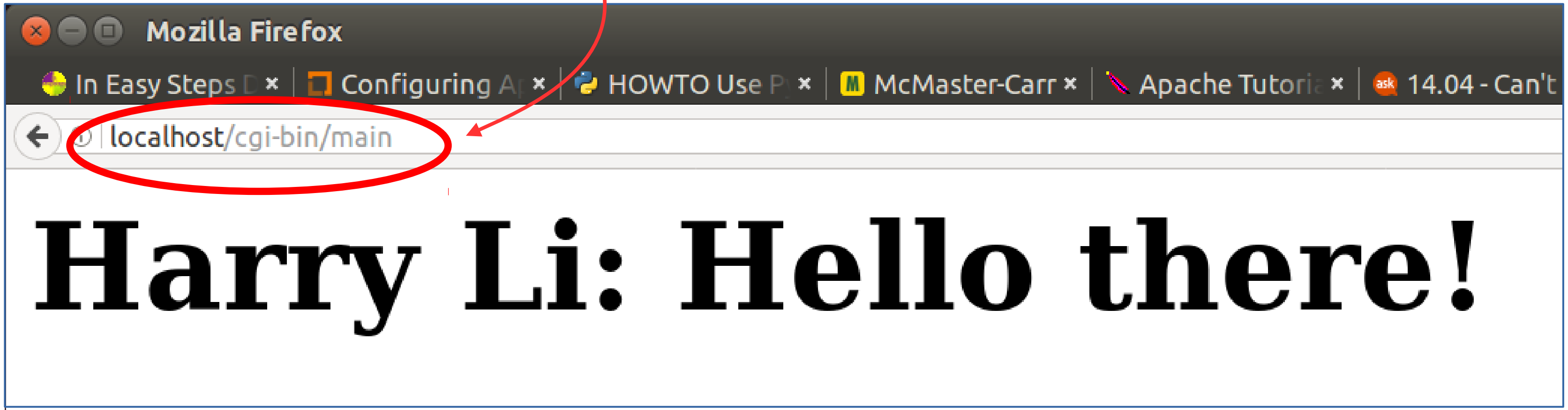
```
ubuntu@ubuntu-ThinkPad-Yoga-14:/etc/apache2/mods-enabled$ sudo ln -s ../mods-available/cgi.load
ln: failed to create symbolic link './cgi.load': File exists
ubuntu@ubuntu-ThinkPad-Yoga-14:/etc/apache2/mods-enabled$
```

Note if the symbolic link enabled when try to "ln -s", it will show "File exists", so the CGI configuration is done and is ready for you to test out your CGI program.

If check symbolic link if failed,

Browser Calling the CGI Program

Example, Calling CGI program “main” on a local Web server, type
http://localhost/cgi-bin/main



localhost/cgi-bin/main

```
Harry Li: Hello there!
```

Note: The URL for your CGI program is a virtual path. The actual CGI script on the Web server in my case lives on /usr/lib/cgi-bin/. Check the conf to find/verify its actual location
/etc/apache2/conf-enabled/serve-cgi-bin.conf

Writing a Python CGI Program

Example: CGI program written in C

```
#!/usr/bin/env python
# -*- coding: UTF-8 -*-
# enable debugging
import cgitb
cgitb.enable()

print('Content-Type: text/html\r\n\r\n')
#print()
print('<!DOCTYPE html PUBLIC "-//IETF//DTD HTML 2.0//EN">')
print('<HTML>')
print('<HEAD>')
print('<TITLE>')
print('A Small Hello')
print('</TITLE>')
print('</HEAD>')
print('<BODY>')
print('<H1>Python CGI</H1>')
print('<P>Harry Li: "hello world" HTML document.</P>')
print('</BODY>')
print('</HTML>')
```

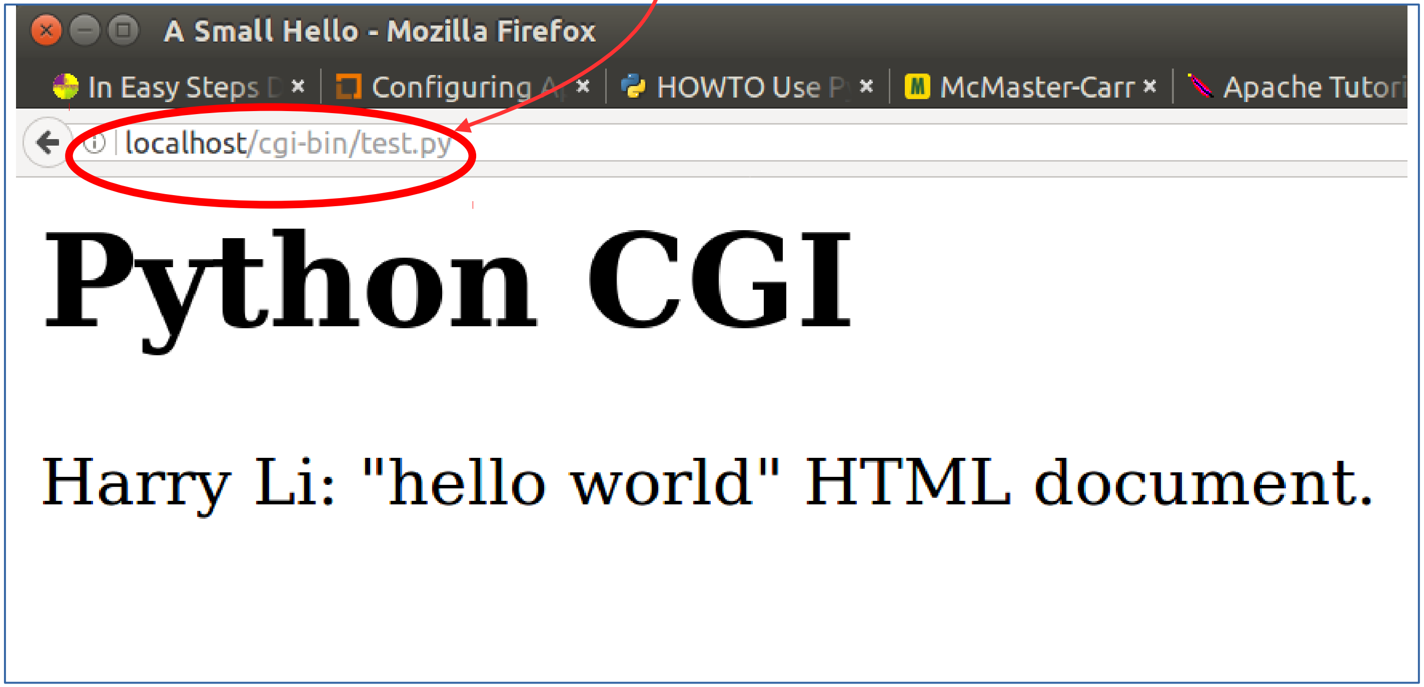
1. place this program at the default location:

/usr/lib/cgi-bin

2. before browser calling this program, change it to executable by chmod +x test.py

Browser Calling the Python CGI Program

Example, Calling CGI program “main” on a local Web server, type http://localhost/cgi-bin/test.py



Python CGI

Harry Li: "hello world" HTML document.

Find Apache2 Public IP Address

https://www.digitalocean.com/community/tutorials/how-to-install-linux-apache-mysql-php-lamp-stack-on-ubuntu-14-04

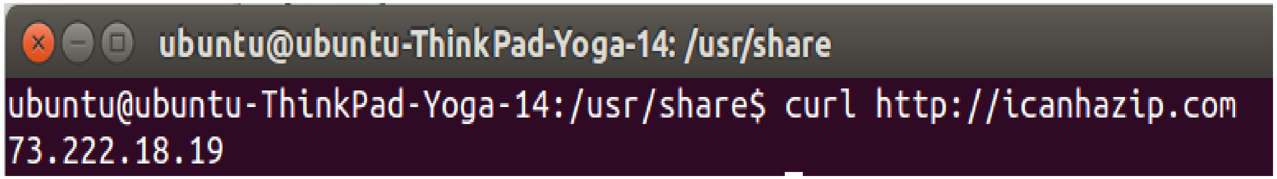
Your server's public IP address is usually the address to connect to your server through SSH. Use the iproute2 tools to get your address as:

```
ip addr show eth0 | grep inet | awk '{ print $2; }' | sed 's/\/.*$//'
```

This will give you one or two lines back. They are both correct addresses, but your computer may only be able to use one of them, try each one.

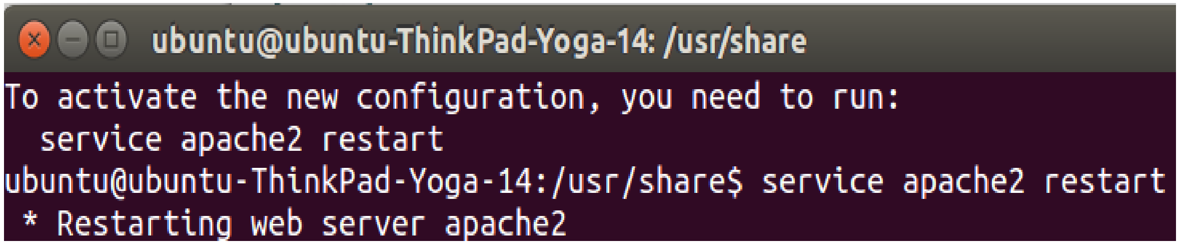
An alternative method is:

curl http://icanhazip.com



```
ubuntu@ubuntu-ThinkPad-Yoga-14:/usr/share$ curl http://icanhazip.com
73.222.18.19
```

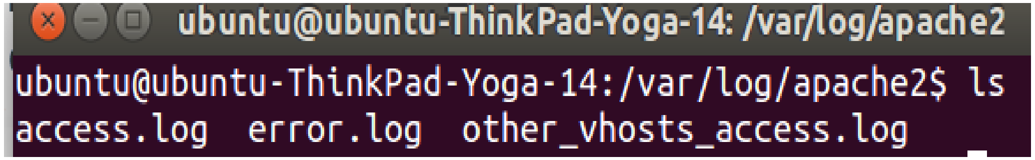
Use $service apache2 restart
to restart your apache2 server



```
To activate the new configuration, you need to run:
  service apache2 restart
ubuntu@ubuntu-ThinkPad-Yoga-14:/usr/share$ service apache2 restart
 * Restarting web server apache2
```

Error Log For Debugging CGI

1. Find error log at: /var/log/apache2.



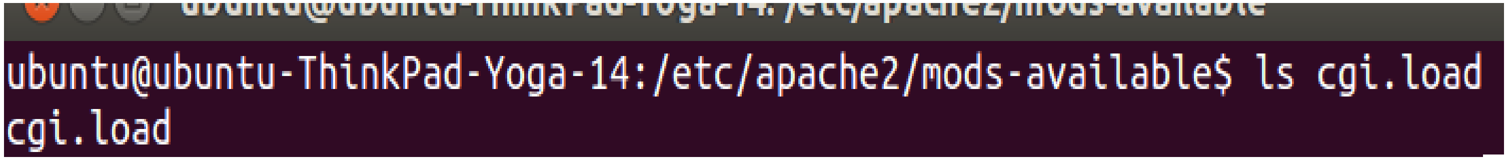
```
ubuntu@ubuntu-ThinkPad-Yoga-14: /var/log/apache2
ubuntu@ubuntu-ThinkPad-Yoga-14:/var/log/apache2$ ls
access.log  error.log  other_vhosts_access.log
```

2. Inspect error log:

```
[Sun Dec 31 22:26:43.096093 2017] [cgi:error] [pid 1926] [client 127.0.0.1:52726]
AH01215: (8)Exec format error: exec of '/usr/lib/cgi-bin/response.py' failed
[Sun Dec 31 22:26:43.096844 2017] [cgi:error] [pid 1926] [client 127.0.0.1:52726]
End of script output before headers: response.py
```

Debugging By Checking “cgi.load”

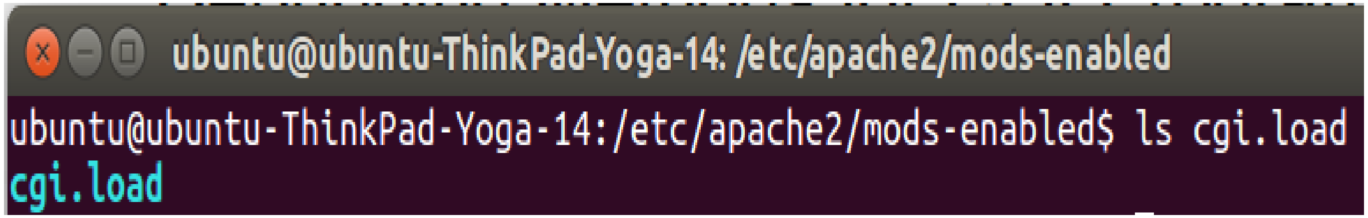
1. Check to see if at /etc/apache2/mods-available directory, the cgi module cgi.load is there



```
ubuntu@ubuntu-ThinkPad-Yoga-14:/etc/apache2/mods-available$ ls cgi.load
cgi.load
```

If cgi.load is not there, then ???

2. Then check enabled modules of cgi at /etc/apache2/mods-enabled



```
ubuntu@ubuntu-ThinkPad-Yoga-14:/etc/apache2/mods-enabled$ ls cgi.load
cgi.load
```

It is there, but it is not, then add symbolic links

```
$ cd /etc/apache2/mods-enabled
$ sudo ln -s ../mods-available/cgi.load
```