SENG 462 Tutorial #2

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Project Deadlines

- Due tonight:
  - First log book entries
  - Validations are due Sunday night
- Due in one week (Jan 28):
  - Documentation:
    - Project Plan
    - Initial Requirements
    - Architecture
  - Demonstrated end-to-end capability
    - Demos in the tutorial Jan 28
- Due in two weeks (Feb 4):
  - Group project web site

Quick Stuff

- ~~Dedicated lab~~ Shared lab
  - You have priority on all the Linux workstations
  - Inform me if there are ANY problems with priority
- You do NOT have to use multiple servers until later
- You WILL lose 1% of your project mark for each missed logbook week

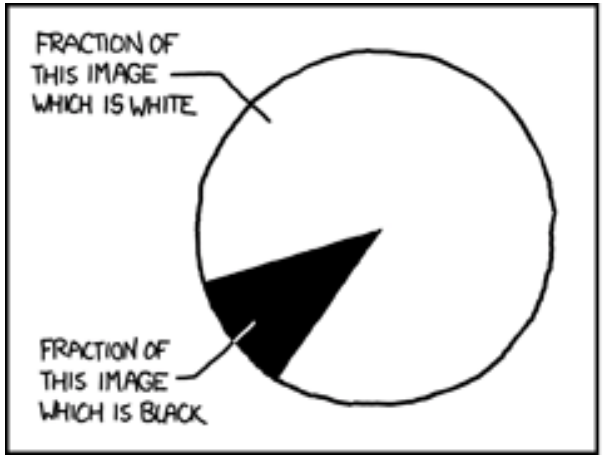
Quick Stuff (2)

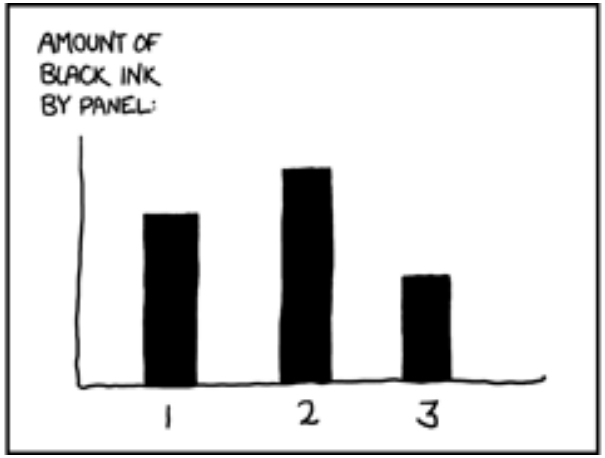
- You are responsible for reading your UVic email
  - UVic mail forwarding: https://netlink.uvic.ca/

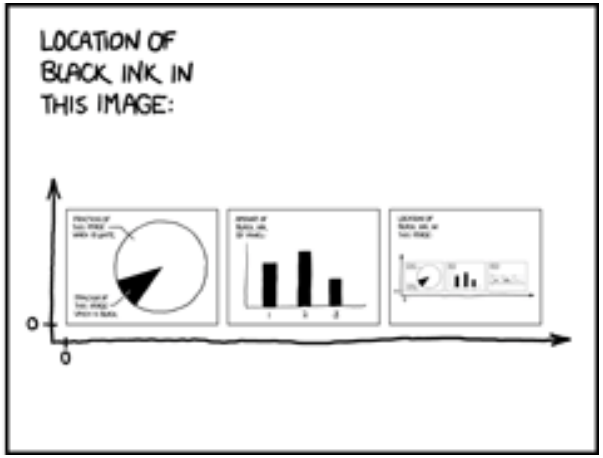
- RSS feed
  - The link may have not worked for some
  - http://www.ece.uvic.ca/~seng462/ProjectWebSite/seng462tutorialfeed.xml

Quick Stuff (3)

- Suggested reading: *Programmers Need To Learn Statistics Or I Will Kill Them All*
  - http://zedshaw.com/essays/programmer_stats.html
  - Do not read it if naughty language offends you



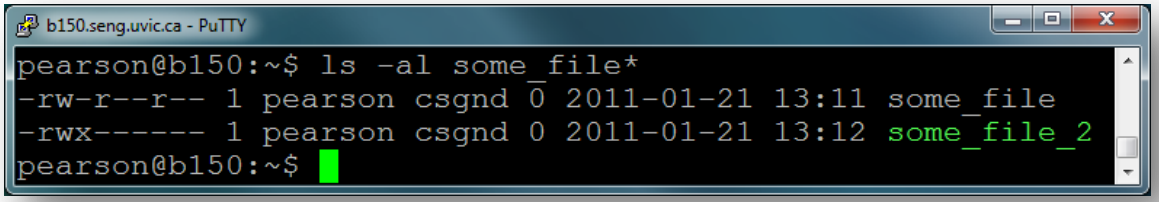




Cartoon source: xkcd.com

umask

- `umask`:
  - Sets the default permissions when editing files.
  - You want your group to be able to edit your files.
  - Group files must be accessible to all for SVN
  - See: http://www.linuxforums.org/articles/file-permissions_94.html



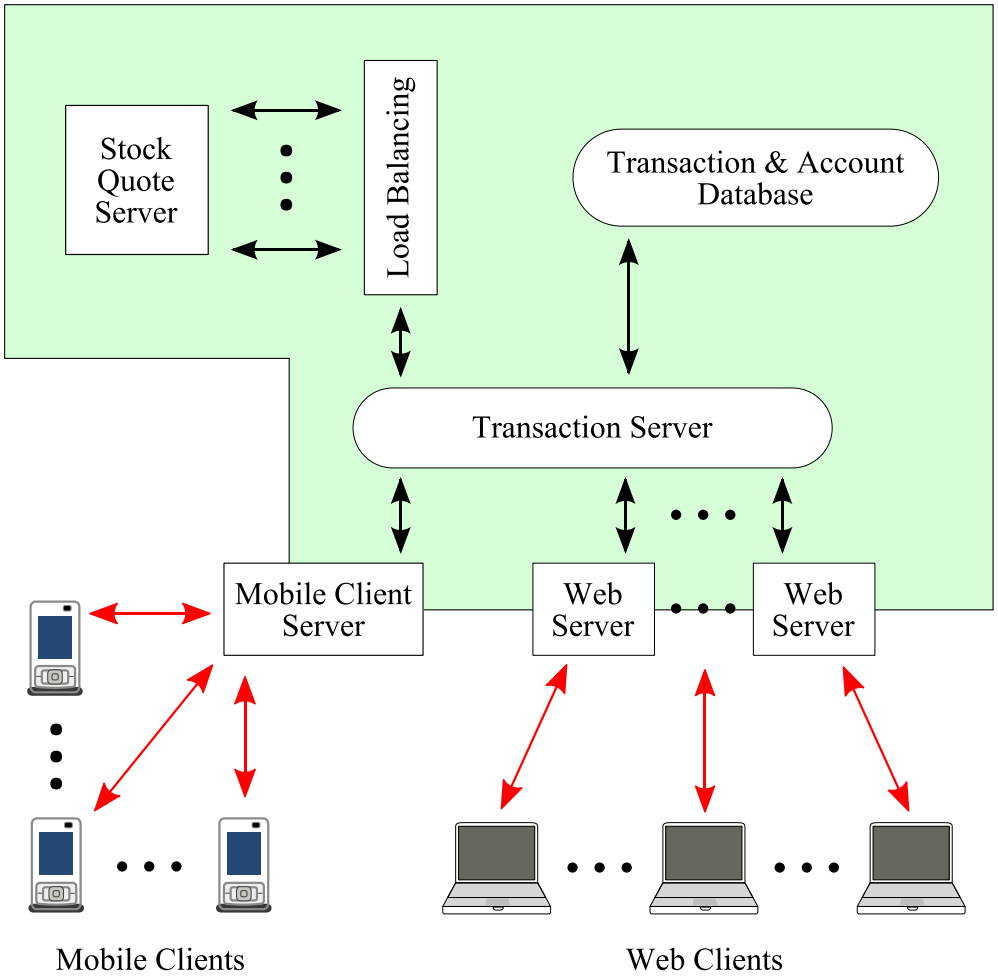
- How-to:
  - Edit your `.bashrc` file
    - Ie: `pico /home/pearson/.bashrc`
  - Add the umask command: `umask 770`
    - User: full rights (7)
    - Group: full rights (7)
    - Everyone else: no rights (0)
  - **Make sure you do this for your group account**

Marks, Marks, Marks

- Why to I recommend Python?
  - The marks are in the documentation
  - Python is easy to work with and easy to debug

- "Transaction and cost performance relative to the other groups"
  - Why this shouldn't worry you…
    (No, seriously, this shouldn't worry you!)

The System


Stock Quote Server
Load Balancing
Transaction & Account Database
Transaction Server
Mobile Client Server
Web Server
Web Server
Mobile Clients
Web Clients

Sockets

```
import socket
# Create the socket
s = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
# Connect the socket
s.connect(('www.uvic.ca',80))
# Do a simple HTTP request (use httplib in actual code.)
s.send("GET / HTTP/1.0\nHost: www.uvic.ca\n\n")
# Read and print up to 1k of data.
data = s.recv(1024)
print data
# close the connection, and the socket
s.close()
```

Sockets are Nothing Special....

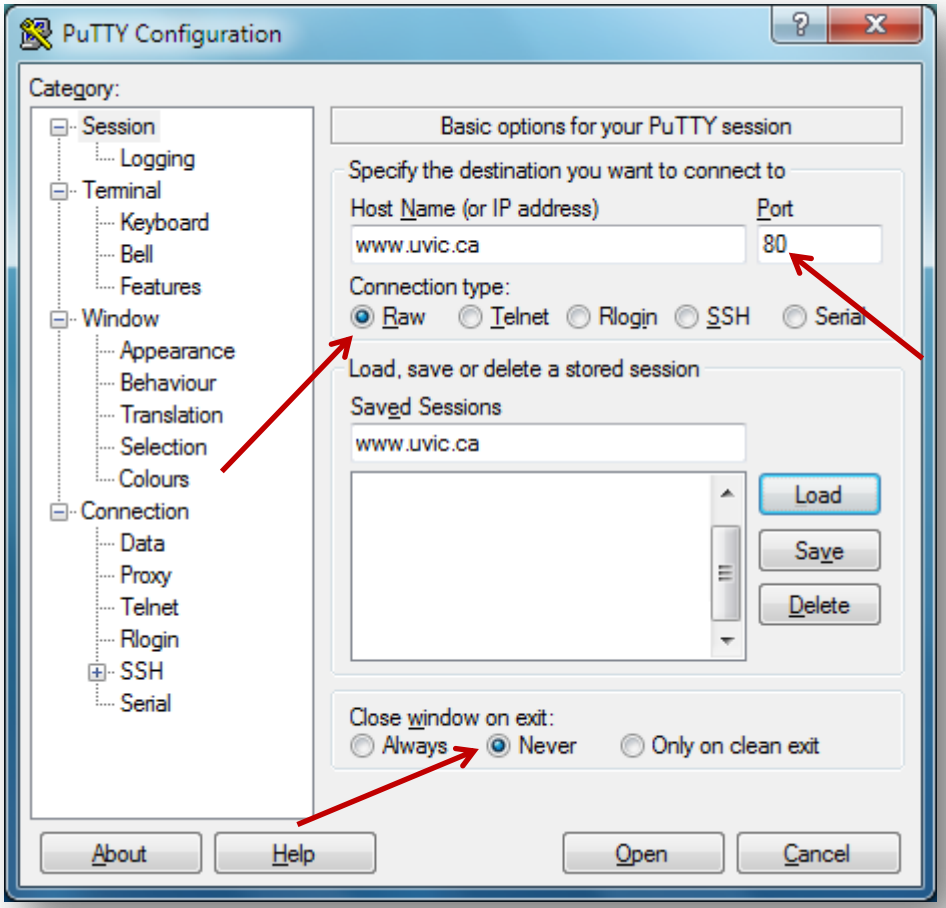
- You can connect to any unencrypted socket using PuTTY
  - Raw connection
  - Keep window open

```
GET / HTTP/1.0
Host: www.uvic.ca

HTTP/1.1 200 OK
Date: Fri, 15 Jan 2010 00:35:51 GMT
Server: Apache/2.2.13 (Unix) mod_ssl/2.2.13 O
Connection: close
Content-Type: text/html
Set-Cookie: BIGipServerPOOL_www.uvic.ca_prod_

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0
g/TR/xhtml1/DTD/xhtml1-transitional.dtd">


<html xmlns="http://www.w3.org/1999/xhtml" la
<head>
<meta http-equiv="X-UA-Compatible" content="I
<meta http-equiv="Content-Type" content="text
<title>
University of Victoria
-
```



Sockets are Nothing Special....

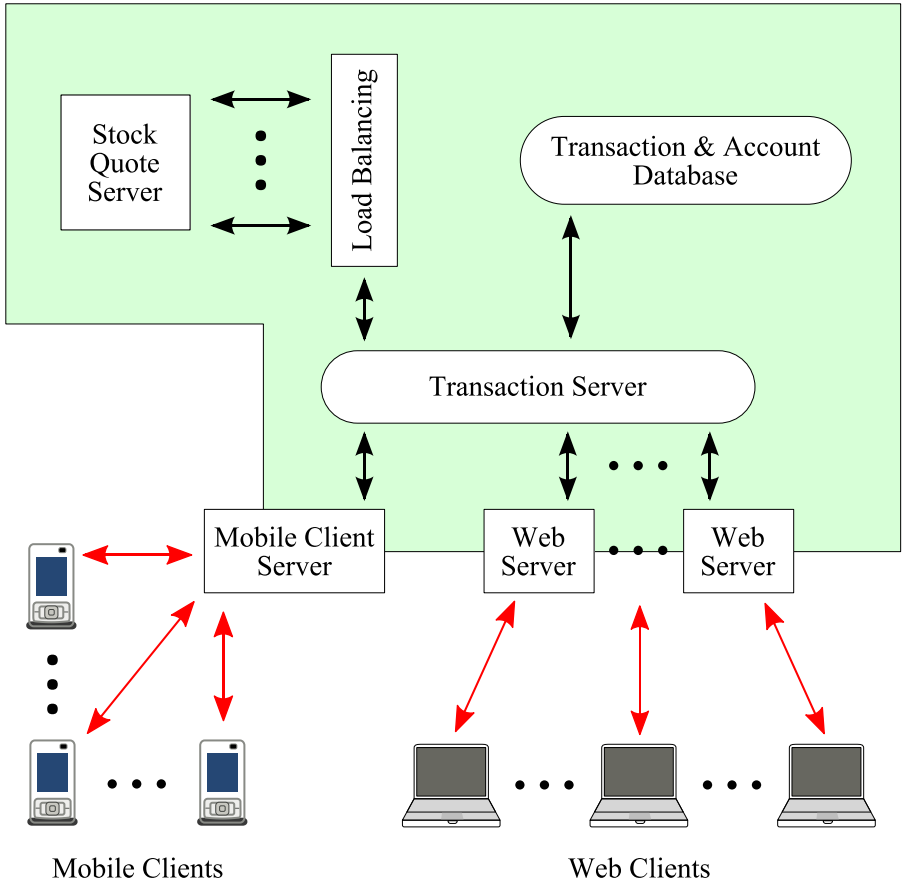
- So what about the quote server…?

```
b150.seng.uvic.ca - PuTTY
pearson@b150:~$ telnet quoteserve.seng.uvic.ca 4445
Trying 142.104.90.11...
Connected to quoteserve.seng.uvic.ca.
Escape character is '^]'.
ABC, user105
159.93,ABC,user105,1295544616106,1Y05AtMZwOKtsVz95xDd2K
Connection closed by foreign host.
pearson@b150:~$
```

- Yep, it's exactly the same!
  - Note that the quote server will only reply to requests from within the SENG network

Secure Socket Layer (SSL)

- Some network traffic must be secured:
  - Between web browsers and web servers
  - Between N95 and its server



Apache and SSL

- See other instructions at:
  - `http://www.devside.net/guides/linux/apache-ssl-deflate`
- First download OpenSSL
  - `wget http://www.openssl.org/source/openssl-1.0.0c.tar.gz`
- Unpack
  - `tar -xvzf openssl-1.0.0c.tar.gz`

Apache and SSL

- Not root access
  - Without root access, you must tell it where to install using "`--prefix`"
  - This demo will use `/home/pearson/local`
- Make a "local" directory
  - `mkdir /home/pearson/local`
- Build OpenSSL
  - `cd ~`
  - `mkdir local`
  - `cd openssl-1.0.0c`
  - `./config --prefix=/home/pearson/local/openssl`
  - `make -j 2`
  - `make install`

Apache

- Download Apache
  - `wget http://apache.mirror.rafal.ca//httpd/httpd-2.2.17.tar.gz`
- Unpack
  - `tar -xvzf httpd-2.2.17.tar.gz`

Apache

- Build Apache
  - `cd httpd-2.2.17`
  - `./configure --prefix=/home/pearson/local/apache --enable-ssl --with-ssl=/home/pearson/local/openssl`
  - `make -j 2`
  - `make install`

modwsgi (for Python)

- Download modwsgi
  - `wget http://modwsgi.googlecode.com/files/mod_wsgi-3.3.tar.gz`

- Unpack
  - `tar -xvzf mod_wsgi-3.3.tar.gz`

modwsgi (for Python)

- Build modwsgi
  - `cd mod_wsgi-3.3`
  - `./configure --with-apxs=/home/pearson/local/apache/bin/apxs`
  - `make -j 2`
    - Ignore these warnings:
      - `warning: "_POSIX_C_SOURCE" redefined`
      - `warning: "_XOPEN_SOURCE" redefined`
  - `make install`

modwsgi (for Python)

- Create a modwsgi test file:
  - /home/pearson/local/apache/htdocs/test.wsgi

- It should contain the following Python code:

```
def application(environ, start_response):
    status = '200 OK'
    output = 'Hello World!'

    response_headers = [('Content-type', 'text/plain'),
                        ('Content-Length', str(len(output)))]
    start_response(status, response_headers)

    return [output]
```

Configure Apache

- Make encryption keys
  - `cd ~/local/apache/conf`
  - `~/local/openssl/bin/openssl req -new -out server.csr`
    - Any temp passphrase will do
    - Do not make "A challenge password" at the end of Distinguished Name
  - `~/local/openssl/bin/openssl rsa -in privkey.pem -out server.key`
    - This removes the passphrase from the private key
  - `~/local/openssl/bin/openssl x509 -in server.csr -out server.crt -req -signkey server.key -days 365`
    - Generates the certificate / public key

Configure Apache

- `cd ~/local/apache/conf`
- `vi httpd.conf`

- Remove comment from SSL include line:
  - `# Secure (SSL/TLS) connections`
  - `Include conf/extra/httpd-ssl.conf`
- Comment out the existing listen line:
  - `#Listen 80`
- Add two lines for modwsgi:
  - `LoadModule wsgi_module modules/mod_wsgi.so`
  - `WSGIScriptAlias /test /home/pearson/local/apache/htdocs/test.wsgi`

Configure Apache

- `vi extra/httpd-ssl.conf`
  - Configure this to be the port you wish to use
    - ie: `Listen 44443`
  - Edit the Virtual Host
    - `<VirtualHost _default_:44443>`
    - `ServerName b150.seng.uvic.ca:44443`

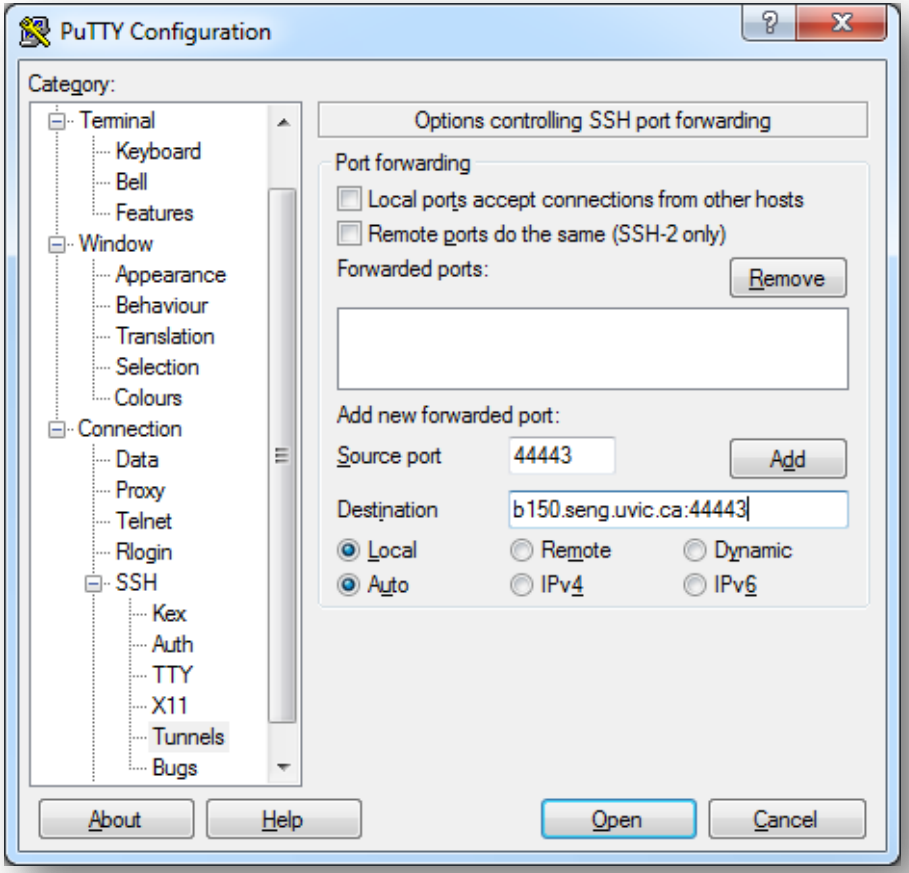
Start Apache

- The standard start command:
  - `~/local/apache/bin/apachectl start`

- Other commands:
  - `~/local/apache/bin/apachectl restart`
    - Tells Apache to restart, but not to interrupt any pages being sent.
  - `~/local/apache/bin/apachectl stop`
    - Forces Apache to immediately stop

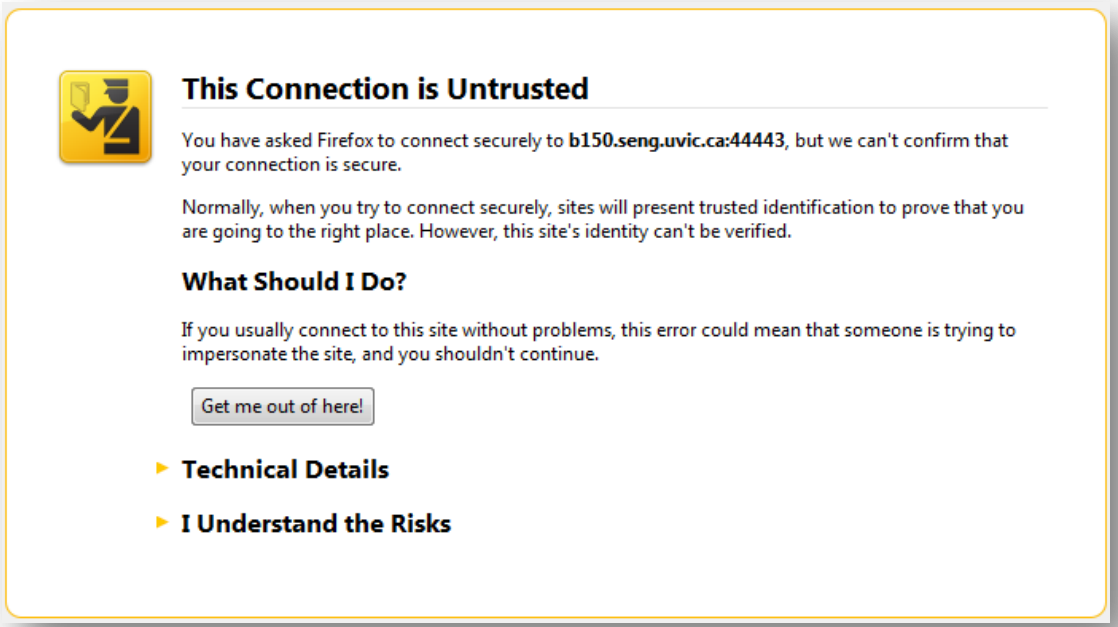
Test Apache

- From the Engineering network:
  - `https://b150.seng.uvic.ca:44443`
- From a non-Engineering network, use tunnels
  - `http://putty.org/`
  - Set up port forwarding in Putty
  - `https://127.0.0.1:44443`

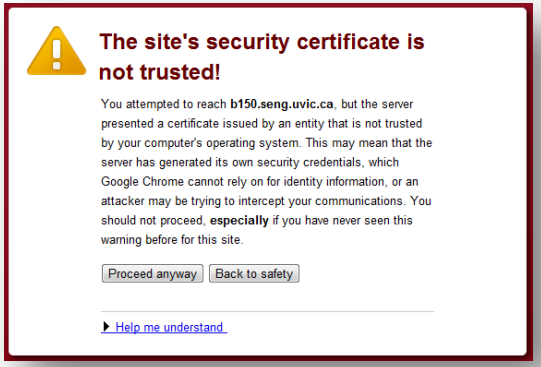


Test Apache

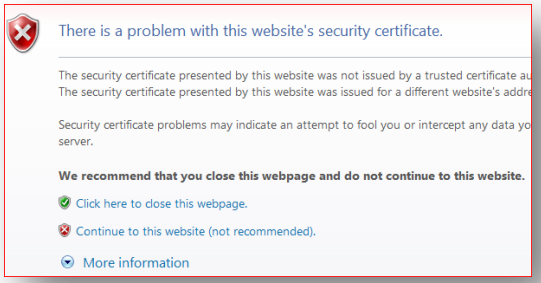
- Add an exception for this warning:



Firefox

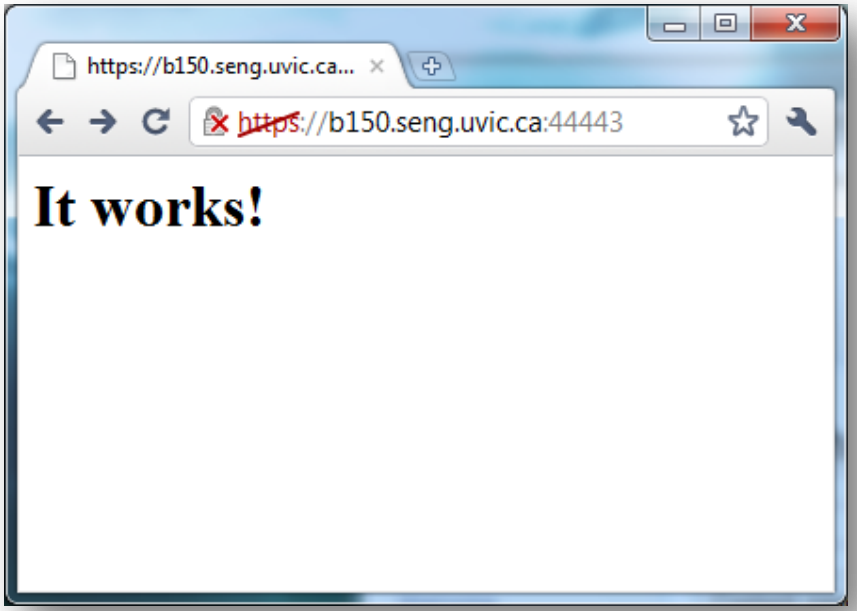


Google Chrome

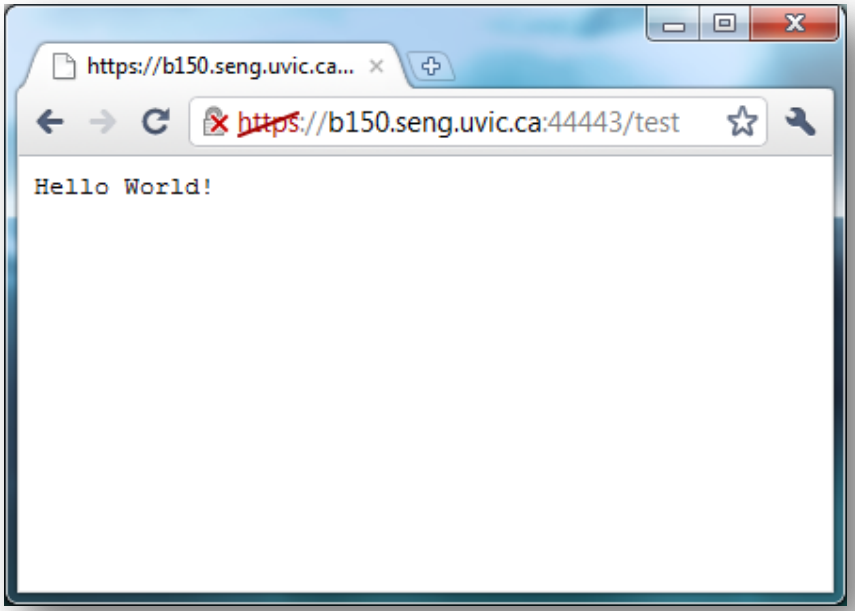


Internet Explorer

Test Apache



The Apache test page



The modwsgi quick start app

Future Tutorials

- Approximate schedule – this is flexible:

1. Intro
2. Discuss the system as a whole
3. Building custom servers on the lab systems
   - Apache web server
   - OpenSSL for secure (https) web pages
   - Databases
   - Whatever else you need to custom build
4. Sockets, moving data between systems securely, etc
5. Using the command files with a workload generator
6. Log files – what data you need to submit for the deadlines
7. Testing, collecting data and statistics
   - Possibly talk about jUnit/PyUnit testing, if requested
8. PyS60 – Python on the Nokia N95 phones
9. Optimizations – databases and the quote server

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