

2011 Mock Summer Answers [Web Servers]

1. Internet Infrastructure & Protocols

(a) Specify the essential principles of the TCP/IP protocol. [5 Marks]

- The function of a TCP/IP protocol is to transmit data between two hosts in one network where you need two network adapters which consist of a network interface card and a NIC. Here one adapter sends a data packet and the other one receives it.
- The IP Address is assigned to each network adapter and is unique for identifying the sender and the receiver in a network with multiple hosts.
- The IP Name defines how the network adapter is known to the network. An IP Name is assigned to each IP Address.
- The host name is a logical name for the host itself and is set in the operating system.

(b) What are the strengths and weaknesses of TCP/IP? [5 Marks]

- Strengths
 - The ability to add networks without interrupting existing services
 - Provides high error-rate handling
 - Packet loss is minimised using reliable data transfer.

Weaknesses

- Much planning and costs involved in setting up a network
- Overhead on each packet is quite large

(c) How is TCP/IP related to protocols such as SMTP and FTP? [5 Marks]

- SMTP and FTP are protocols build on top of TCP/IP. TCP is the underlying transport layer that supports protocols such as SMTP and FTP.

(d) What are *ports* in modern computer systems, and how are they implemented? [5 Marks]

- The port field in a modern computer is used to identify processes running network applications such as an Apache web server on port 80. A demon listens on port 80 for incoming requests and then forwards them to the process running the Apache we server. A demon is a small piece of code running in a loop querying the network connection on a specified port.

2. Installing Apache

(a) What methods of installation can be employed for the Apache webserver? What benefits does each method have? [5 Marks]

- From source

- The benefit of source packages is that they are tailored to the system and will give better performance which is vital for an Apache server.
- From binaries
 - Quick and easy to install but are usually larger than source files meaning less file storage space.
- From a package manager
 - Package managers usually have extra modules already installed which are helpful for quickly setting up a web server.

(b) If you wished to install an experimental Apache webserver alongside a fully functioning version, how would you go about it? [5 Marks]

- You would install the version of Apache in a sub directory and then configure the server to listen on a different port (or IP address if you have multiple network cards on the server). This will then allow both to accept connections.

(c) How would you check that an installed Apache webserver is properly running? [5 Marks]

- In linux you can type in `ps -a` which will display an Apache process, if the process is running then browse to `localhost :port_number` to check if Apache is online. Port_number would be configured in `httpd.conf` to allow two servers on the same IP i.e. 80, 8080.

(d) What function do the *httpd.conf* and *.htaccess* files serve? How do they differ? Why do some webserver administrators frown on the use of *.htaccess* files? [5 Marks]

- `Httpd.conf` is the main configuration file of Apache, where as `.htaccess` can only be used if `AllowOverride` directive is set to allow. `.htaccess` can only configure the directory it is currently in and is loaded every time the directory is requested. According the Apache documentation `.htaccess` gives performance issues due to Apache searching every directory for a `.htaccess` file which is why administrators might frown on it. As well as that, `.htaccess` gives users a lot more control over their directory which could be unsafe.

3. Configuring Apache

(a) What different strategies exist for supporting multiple hosts? [5 Marks]

- We can group all websites under one controlling hostname.
- We can also use separate servers for each host.
- We can also use IP-Based Virtual Hosting.
- We can also use Name-Based Virtual Hosting but only if all requests have a host in the header of the http packet.

(b) Suppose an enterprise wished to have a publically-available website on the internet, with a set of intranet pages available only from within that enterprise. How might this be achieved? [5 Mark]

- Firstly you would set up an instance of Apache listening on port 80 to accept a request to their public site. As well as this you could have a directory on the site called /private which can be configured in the httpd.conf to only allow connections from the internal enterprise network.

(c) How can a webserver be made browser-aware, i.e. be aware of which browser is sending it a request for service? [5 Marks]

- The webserver can read the http_user_agent value from the header of the http request. ???

(d) What is the difference between directives that are *core*, *MPM*, *extension*? [5 Marks]

- Core – in all Apache installations
- MPM – in an OS-native installation
- Extension – part of a module that is optional

4. Installing from Source

(a) What are the primary steps involved in installing Apache from source? [5 Marks]

- Download the latest source file.
- Become the root user, change to the directory of the download, unpack the tarball.
- Configure the installation using ./configure an optional prefix can be added to change the directory of the installation ./configure --prefix=/software/apache2
- Compile the source code by typing make and then make install.

(b) What advantages/disadvantages does this installation method have? [5 Marks]

- Only advanced users can install in this way but it's a quick and easy method for installing a basic Apache server. It can easily be installed remotely, so an administrator can update to the latest version without being near the server.

(c) What are the primary steps involved in installing an Apache module?. [5 Marks]

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(d) What Apache modules would you consider to be necessary in a webserver? [5 Marks]

- php

- mysql
- perl
- python