DEPLOYING WEB SERVERS & REVERSE PROXY

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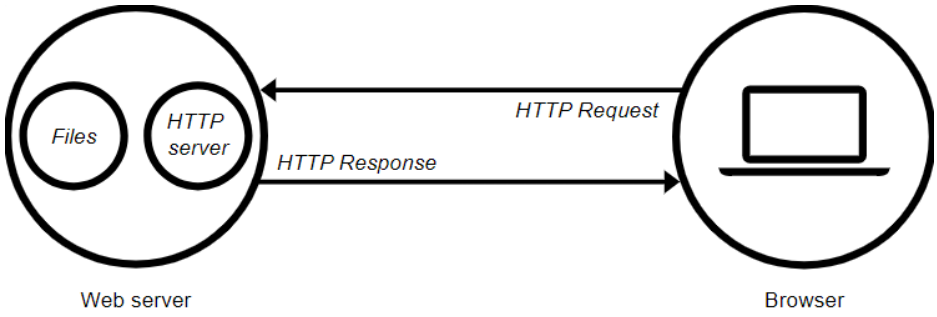
WEB SERVERS:

- A web server is a network service that **serves content (web pages)** to a client over the web.
- Web servers are also known as **HTTP (Hypertext Transport Protocol)** servers.
- **The Popular web servers are:** Apache HTTP and NGINX Server.



- To publish a website, you need either a static or a dynamic web server.

STATIC WEB SERVER:

- A static web server, or stack, consists of a computer (hardware) with an HTTP server (software). We call it "static" because the server sends its hosted files as-is to your browser.

DYNAMIC WEB SERVER:

- A dynamic web server consists of a static web server plus extra software, most commonly an application server and a database.
- We call it "dynamic" because the application server updates the hosted files before sending content to your browser via the HTTP server.


APACHE
HTTP SERVER

APACHE HTTP WEB SERVER:

- Apache is an **open-source** web server developed by the **Apache Software Foundation (ASF).**
- A web server is a network service that serves content to a client over the web. This typically means web pages.
- This is a **solid and stable** web server that has been around for years.
- It is also an option to use the **SSL protocol**, making **website safe** and **secure.**

MAIN CONFIGURATION FILES (PRE-REQUISITES)

Package	**:** httpd
Document root location	**:** /var/www/html
Configuration Files	**:** /etc/httpd/conf/httpd.conf /etc/httpd/conf.d/ssl.conf
Auxiliary Directory	**:** /etc/httpd/conf.d/
Default web page	**:** /etc/httpd/conf.d/welcome.conf
Modules Location	**:** /usr/lib64/httpd/modules
Log Files Location	**:** /var/log/httpd/
Log Files	**:** access_log, error_log
Service / Daemon	**:** httpd
Ports	**:** http-80 https/ssl-443

INSTALLING APACHE-HTTPD ON CENTOS / RHEL 9:

STEP 1: Setting Hostname (FQDN)

#hostname webserver.example.com

#vim /etc/hostname

webserver.example.com

#vim /etc/hosts

Ip-Address webserver.example.com webserver

#bash

STEP2: Security-Enhanced Linux is being disabled or in permissive mode.

#sed -i 's/SELINUX=.*/SELINUX=disabled/g' /etc/selinux/config

#setenforce 0

STEP 3: Installing HTTPD Server

#yum update -y

#yum install httpd -y

#yum installed httpd

#httpd -v

STEP 4: Start & Enable HTTPD Service

#systemctl start httpd

#systemctl enable httpd

#systemctl status httpd

STEP 5: Testing default web page

Connect with a web browser to

http://server_IP_/_host_name

NOTE:

- If the **/var/www/html/** directory is empty or does not contain an **index.html or index.htm** file, Apache displays the Red Hat Enterprise Linux Test Page.
- If **/var/www/html/** contains HTML files with a different name, you can load them by entering the URL to that file, such as **http://server_IP_/_host_name/example.html**

VIEWING LOG FILES:

- Log files can be very useful when trying to troubleshoot a problem with the system.
- **Apache log file location is:**

  #cd /var/log/httpd

  #ls

  access_log: A log file that records all events related to client applications and user access to a resource on a computer.

  #tail -f access_log

  error_log: A file that contains detailed records of error conditions a computer software encounters when it's running.
  #tail -f error_log

Making Sample Web page:

Create a sample html file in the document root location

#cd /var/www/html

#vim index.html

```
<html>
<body bgcolor=red text=blue>
<marquee><H1> WELCOME TO SYSGEEKS...! </H1></marquee>
</body>
</html>
```

#apachectl configtest

#apachectl graceful

NOTE: Apache Graceful Restart means, Reloading the Apache Configuration (httpd. conf) without restarting the Web Server.

Testing a web page:

Connect with a web browser to

http://server_IP_/_host_name


NGINX

NGINX SERVER:

- NGINX is **open-source software** for **web serving, reverse proxying, caching, load balancing, media streaming**, and more.
- It is faster than Apache webserver!
- NGINX is a high performance, high Concurrency and Low Resource Usage
- NGINX is a high performance and modular server that you can use, as a:
  - Web server
  - Reverse proxy
  - Load balancer

NOTE: By default, NGINX act as a Web Server.

NGINX AS A WEB SERVER:

- It is a fastest web server; the scalable underlying architecture has proved ideal for many web tasks beyond serving content.
- It supports all the components of the modern Web, including WebSocket, HTTP/2, gRPC, and streaming of multiple video formats (HDS, HLS, RTMP, and others).

MAIN CONFIGURATION FILES (PRE-REQUISITES)

Package	**:** nginx
Document root location	**:** /usr/share/nginx/html/
Configuration Files	**:** /etc/nginx/nginx.conf
Log Files Location	**:** /var/log/nginx/
Log Files	**:** access_log, error_log
Service / Daemon	**:** nginx
Ports	**:** httpd-80

INSTALLING NGINX ON CENTOS / RHEL 9:

STEP 1: Setting Hostname (FQDN)

#hostname webserver.example.com

#vim /etc/hostname

webserver.example.com

#vim /etc/hosts

Ip-Address webserver.example.com webserver

#bash

STEP2: Security-Enhanced Linux is being disabled or in permissive mode.

#sed -i 's/SELINUX=.*/SELINUX=disabled/g' /etc/selinux/config

#setenforce 0

STEP 3: Installing NGINX Server

#yum update -y

#yum install nginx -y

STEP 4: Start & Enable NGINX Service

#systemctl start nginx

#systemctl enable nginx

#systemctl status nginx

STEP 5: Testing default web page

Connect with a web browser to **http://server_IP_/_host_name**

CONFIGURING NGINX AS A WEB SERVER:

It provides different content for different domains.

STEP 1: Edit the /etc/nginx/nginx.conf file:

```
server {
    server_name  example.com;
    root         /var/www/example.com/;
    access_log   /var/log/nginx/example.com/access.log;
    error_log    /var/log/nginx/example.com/error.log;
}
```

NOTE:

The **access_log** directive defines a separate access log file for this domain.

The **error_log** directive defines a separate error log file for this domain.

STEP 2: Create the root directories for both domains:

```
# mkdir -p /var/www/example.com/
#cd /var/www/example.com/
#vim index.html
    <html>
    <body bgcolor=blue text=red>
    <marquee><H1> WELCOME TO SYSGEEKS...! </H1></marquee>
    </body>
    </html>
```

STEP 3: Create a log directory for the domain:

mkdir /var/log/nginx/example.com/

STEP 4: Restart the nginx service:

systemctl restart nginx

Testing a web page

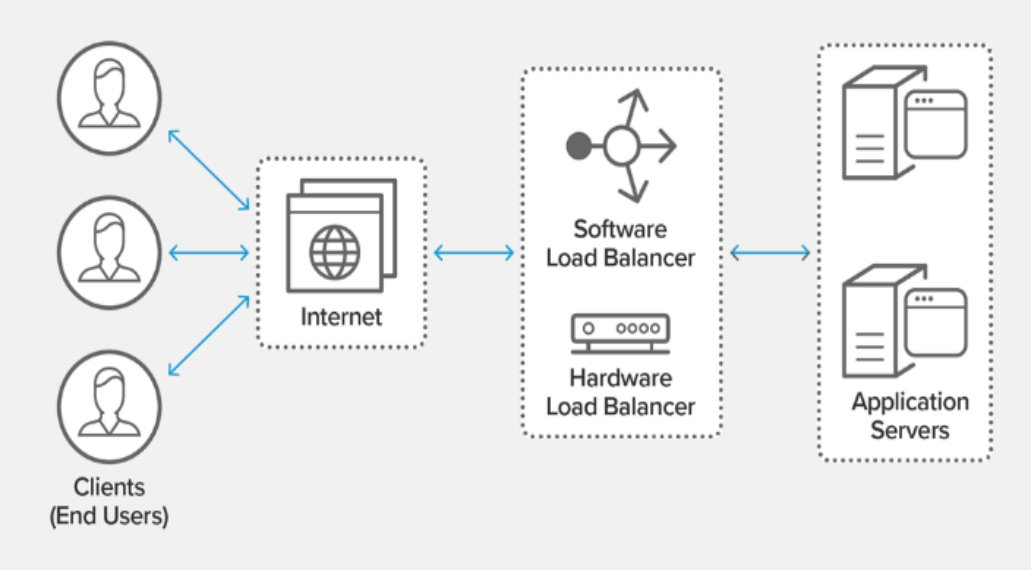
Connect with a web browser to **http://server_IP_/_host_name**

NGINX AS A REVERSE PROXY:

- A reverse proxy is a type of proxy server that typically sits behind the firewall in a private network and directs client requests to the appropriate backend server.
- It provides additional level of abstraction and control to ensure the smooth flow of network traffic between clients and servers.
- Common uses for a reverse proxy server include:
  - Load balancing
  - Web acceleration
  - Security and anonymity

NGINX AS A LOAD BALANCER:

- It is used to efficiently distributing incoming network traffic across a group of backend servers.
- It maximizes speed and capacity utilization and ensures that no one server is overworked.
- A load balancer performs the following functions:
  - Distributes client requests or network load efficiently across multiple servers
  - Ensures high availability and reliability by sending requests only to servers that are online
  - Provides the flexibility to add or subtract servers as demand dictates



LOAD BALANCING ALGORITHMS:

ROUND ROBIN:

- Requests are distributed across the group of servers sequentially.

LEAST CONNECTIONS:

- A new request is sent to the server with the fewest current connections to clients. The relative computing capacity of each server is factored into determining which one has the least connections.

LEAST TIME:

- Sends requests to the server selected by a formula that combines the fastest response time and fewest active connections. Exclusive to NGINX Plus.

HASH:

- Distributes requests based on a key you define, such as the client IP address or the request URL. NGINX Plus can optionally apply a consistent hash to minimize redistribution of loads if the set of upstream servers' changes.

IP HASH:

- The IP address of the client is used to determine which server receives the request.

RANDOM WITH TWO CHOICES:

- Picks two servers at random and sends the request to the one that is selected by then applying the Least Connections algorithm (or for NGINX Plus the Least Time algorithm, if so configured).