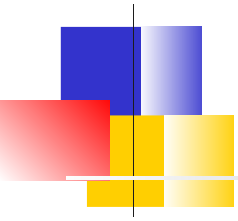


Web Servers and Web Apps

Overview of what web servers and web application servers do.

Different Types of Web Server

- Web Server
  - usually serves static content and some scripts
  - designed for low-latency and high throughput
- Web Application Server
  - hosts web applications in a particular language
  - provides services such as parsing and validating HTTP requests, thread management, access to resources

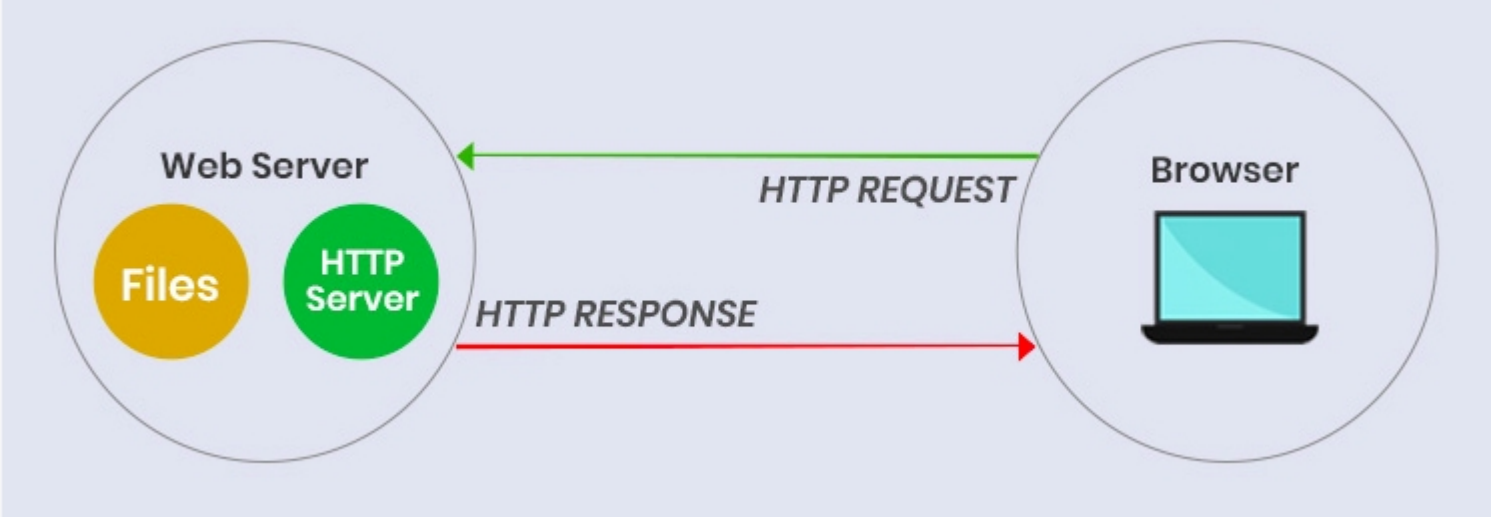
What a Web Server Does

- Receives web requests & sends replies
- Can serve static content (web pages, images, etc), dynamic content (PHP, scripts, ASP), or both
- Handles security certificates and secure sessions
- session management
- May perform authentication, but most web apps and web frameworks do this themselves.

Web Server for Static Content

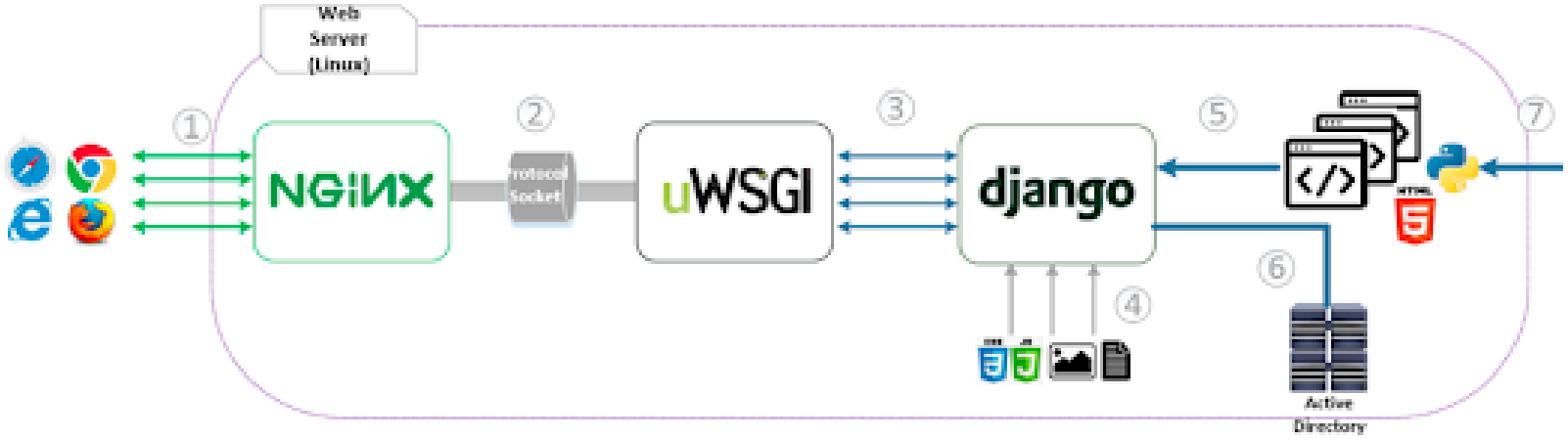
Just provides content. May check authorization.

Very little processing involved.



Web Server for Application

Web application server must pass request to running application (Django app) for processing, then return response to web.



Web app server may convert HTTP request to a standard protocol (WSGI for Python), manage threads, and provide other services to web apps.

Web Server Can Do Both

Apache HTTP Server or nginx

- serve static content - web pages, images, audio
- process PHP using a PHP processor (mod_php)
- run Python apps using mod_uwsgi
- run scripts in Perl using mod_perl
- multi-hosting, URL filtering & rewriting, ... etc.
- highly configurable!

Example Requests:

https://yoursite.com/index.html - return a static file

https://yoursite.com/media/logo.png - return a static file

https://yoursite.com/index.php - dynamic page with PHP

Most Popular Web Servers?

nginx

Apache httpd

Microsoft IIS

LightSpeed

These sites survey the internet and post statistics:

- *Netcraft Web Server Survey*

  https://news.netcraft.com/archives/2020/06/25/june-2020-web-server-survey.html

- https://www.datanyze.com/market-share/web-and-application-servers/

What Software Does SCB Use?

1. Go to SCB EasyNet web site at: www.scbeasy.com
2. Choose English or Thai.
3. Look at the URL on the logon page.

Can you tell what software SCB is using,
just from the URL?

Many experts say that you should not expose implementation in URLs. A better URL would be:

https://www.scbeasy.com/login

Other Thai banks also expose their implementation!

Web Application Server

Hosts web applications in a particular language, and provides services to them.

Apache Tomcat, Jetty - web apps written in Java

Gunicorn - web apps written in Python

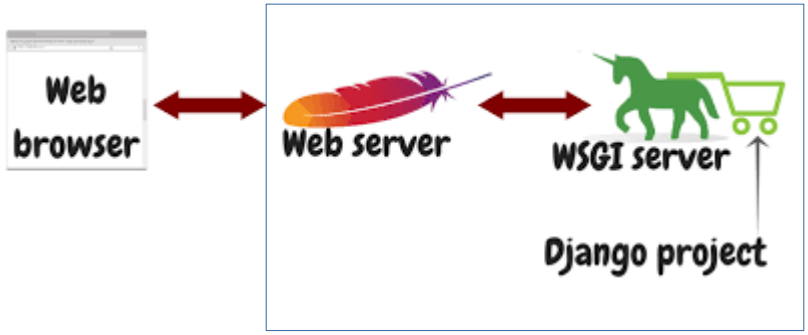
Microsoft IIS - web apps written in ASP and .Net

Embedded Servers - server is part of the web app.

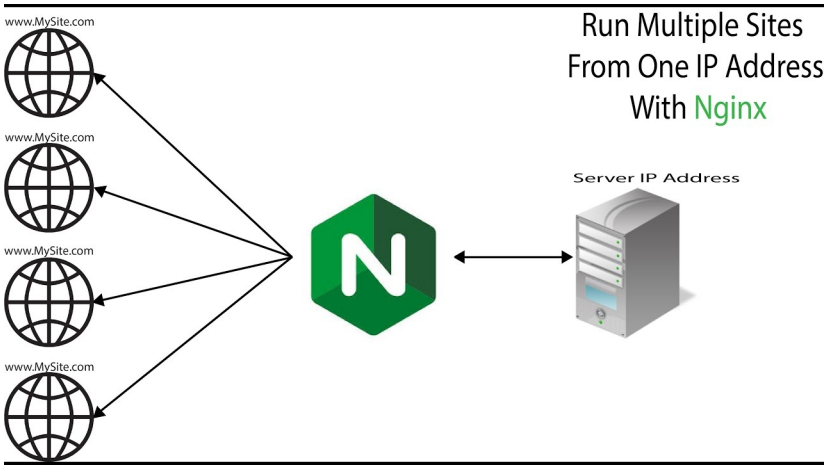
- Jetty for Java
- Django includes an embedded server

Different Deployments

1. One web app in one web server.



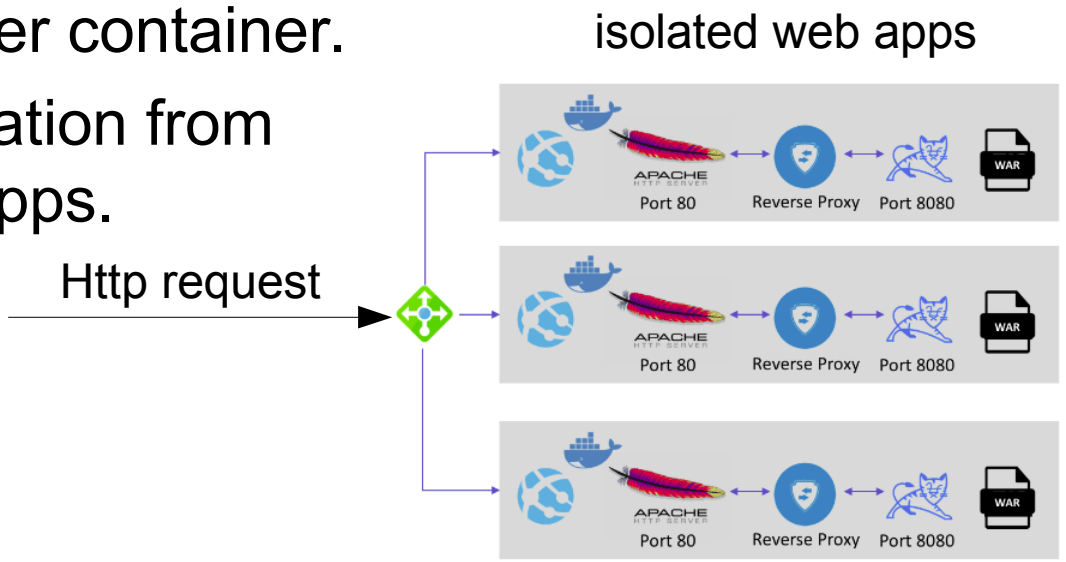
2. One web server can host many web apps.
   The classic deployment.



Containers and VMs

3. Web app in a Docker container.

   Provides some isolation from the OS and other apps.
   Deploys quickly.



4. Deploy in a Virtual Machine.

   Even stronger isolation.

Content Delivery Networks

- Akamai, Digital Island, etc.
- A network of servers that replicates content (such as images and video) at many different sites around the world.
- When a web browser requests content (image, video), the CDN delivers it from the closest site!
- It does this by cleverly directing your web browser to a CDN host that is closest to your location.

CDN Example

You visit www.cnn.com & the web page contains images. Each image has a URL like this:

<img src="https://cdn.cnn.com/assets/images/sports.gif">

- "cdn.cnn.com" refers to a CDN provider like Akamai.
- Your web browser sends a DNS request to get the IP address of "cdn.cnn.com".
  (It does this the first time only, then remembers the IP address for a while.)
- "cdn.cnn.com" has many IP addresses -- their DNS server returns the IP address of the server **closest to your location**.
- Your browser gets the images from the CDN server closest to you. All the CDN servers have identical copies of all the content.

Web Caching

- Caching is critical to performance of the web
- Multiple levels of caching:
  - client (web browser caches content)
  - server (manually configured cache)
  - gateway (uses a transparent Cache Engine)
  - network (CDN, cooperating caches)

Cache Engines

- Harvest (free)
- Squid (free)
- Cisco Cache Engine (based on Harvest)

Why Web Caching?

- Decrease use of network bandwidth
- Faster response time
- Decrease server load
- Security and web access controls (auth, blocking)