2020

The UNIX Operating System (Module 5)
Report Submitted To :- Karnig Sir

A. Comparison between three web site platforms: apache, nginx, Microsoft IIS.

- ✓ Cost   (2 points)
- ✓ Speed and performance   (2 points)
- ✓ Security   (2 points)
- ✓ Community support   (2 points)
- ✓ Supported operating systems   (2 points)

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7/4/2020

Task-A

❖ **Presently, three web servers are the dominant forces in the web server market, namely:**

- **Apache.**
- **NGINX.**
- **Microsoft IIS**

➢ This infographic will shed some light on the usage statistics of web servers for websites. As is very evident Apache, NGINX and IIS leads the pack.

❖ Apache

➢ Apache is an open-source and free web server software that **powers around 40% of websites** around the world. The official name is **Apache HTTP Server**, and it's maintained and developed by the Apache Software Foundation.

➢ It allows website owners to serve content on the web — hence the name "web server." It's one of the oldest and most reliable web servers, with the first version released more than 20 years ago, in 1995.

➢ When someone wants to visit a website, they enter a domain name into the address bar of their browser. Then, the web server delivers the requested files by acting as a virtual delivery man.

➢ With the market share of 42% (according to a NetCraft survey in April 2014), Apache is the most widely-used Web server. It is free and open-source software that can be used on any operating system, including Linux, Unix, Windows and Mac OS.

➢ Bug fixing and the development of new features is handled by the developer community and managed by the Apache Software Foundation, a nonprofit corporation which supports the Apache Web server.

➢ Apache is a very feature-rich Web server. Features are introduced as modules that extend the core functionality. Some of the modules come with Apache itself, while others can be manually installed. Since the code is open, anyone can create and publish a new module with additional functionalities.

➢ Apache Web server is part of the LAMP stack — it is usually installed on Linux operating systems, while the applications are developed in PHP with MySQL databases.

➢ Although Apache Web server has generally good performance, it consumes a lot of CPU and memory because of the two main reasons. One reason is a big number of included features which are not being used, while the other is the fact that it is a process-based server. That means that each connection requires a separate thread.

- Besides Apache, there are many other popular web servers. Each web server application has been created for a different purpose. While Apache is the most widely used, it has quite a few alternatives and rivals.

❖ NGINX

- NGINX is a robust web server which was developed by Russian developer Igor Sysoev. It is a free open-source HTTP server which can be used as a mail proxy, reverse proxy server when required. Most importantly, it can take care of a huge number of concurrent users with minimal resources in an efficient manner. NGINX, is particularly of great help when the situation of handling massive web traffic arises.
- You shall like NGINX if you are on the lookout for a web server which has a lightweight architecture and is highly efficient. This is probably the only web server which can handle huge traffic with very limited hardware resources. It might surprise you to know that NGINX acts as a sort of shock absorber which protects Apache servers when faced with security vulnerabilities and sudden traffic spikes.
- NGINX was created in response to the C10K challenge of handling at least 10,000 simultaneous client connections on a single server. NGINX uses an asynchronous, event-driven architecture to handle these massive amounts of connections. This architecture makes handling high and fluctuating loads much more predictable in terms of RAM usage, CPU usage, and latency.
- The main difference between NGINX and Apache, in terms of the event models, is that NGINX does not set up extra worker processes per connection. In most cases, the recommended NGINX configuration is running one worker process per CPU, maximizing the hardware's efficiency.
- NGINX also has a rich set of features and can perform various server roles:
    - A reverse proxy server for the HTTP, HTTPS, SMTP, POP3, and IMAP protocol
    - A load balancer and an HTTP cache
    - A frontend proxy for Apache and other web servers, combining the flexibility of Apache with the good static content performance of NGINX
- NGINX supports FastCGI and SCGI handlers for serving dynamic content scripts such as PHP and Python. It uses the LEMP stack: a variation of LAMP using the phonetic spelling of NGINX (Linux, "*En-juhn-ex*," MySQL, PHP).

❖ Microsoft IIS

- The IIS web server comes from the Microsoft stable and runs only on the Microsoft Windows operating system. It is actually not free, since it comes as a part of the Windows operating system. You might feel comfortable with IIS if you have already used the Windows OS ecosystem and that is the advantage IIS has as a lot of people have been using Windows for quite some time. It also comes with the support of the .NET framework

which was released by Microsoft and support services for IIS are provided directly by Microsoft, which is in itself a huge bonus.

➢ IIS is a proprietary software, meaning that the code is closed and not available to public. New features, bug fixes and support is provided by Microsoft. Although the development is not as quick as with the community support, it can be more reliable.

➢ Microsoft IIS handles has a good number of features. Similar to Apache, features are included as extensions. However, IIS extensions are developed only by Microsoft.

➢ Unlike Apache, IIS is installed on Windows operating systems and its applications are using ASP.NET | Open-source web framework for .NET and MSSQL databases.

➢ According to some tests, IIS is faster than Apache (though still slower than nginx). It consumes less CPU, has better response time and can handle more requests per second. However, it should be noted that the tests are not 100% reliable, as they are usually running on a different software stacks (IIS applications are using .NET framework on Windows, while Apache is usually running PHP applications on Linux operating systems).

➢ According to some post with **benchmarks**, **IIS** consistently outperforms **nginx** in **speed**. Specifically, **IIS** uses 2.3x less CPU power than **nginx**, processes more than double the requests, and responds in less than half the time. ... **IIS**, when used in conjunction with a Windows OS is fast and reliable.

❖ Comparison between Apache, NGINX and Microsoft IIS.

Parameters / Server Type	Apache	NGINX	Microsoft IIS
Cost	Completely free	Completely Free	Free but only with Windows
Speed/Performance	Good	High(2.5 times faster than Apache)	Highest
Security	Good	Good	Excellent - Highest
Community Support	Strong	Less support from developer community	Corporate support only
Supported Operating system	All Unix (e.g. Linux, BSD), MacOS and Windows	Several Unix flavors, Windows, MacOS	Windows only

Note: In terms of comparison for parameters such as Speed, Performance and Security, as referred from some resources, the comparison might get change based on project requirements and needed configurations.

Source: https://www.hostinger.com/tutorials/what-is-apache

http://www.devx.com/webdev/performance-comparison-apache-vs.-iis.html

https://www.vyrazu.com/iis-vs-apache-vs-nginx/

https://stackshare.io/stackups/apache-httpd-vs-microsoft-iis-vs-nginx

https://www.google.com/search?q=nginx+versus+iis+performance+comparison&rlz=1C1CHBF_enCA876CA876&oq=nginx+versus+iis+performance+comparison&aqs=chrome..69i57.22386j0j8&sourceid=chrome&ie=UTF-8