

Lanka Education and Research Network

Web Applications and LAMP Stack

Sri Lanka

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Campus Systems Linux Essentials

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World Wide Web

- Leading information retrieval service of the Internet.
- How it influence the World
 - The Internet and Education
 - The Internet and Social and Political Activism
 - The Internet and Consumer Trends
 - The Internet and Personal Relationships
 - The Internet and Culture

Web Stack

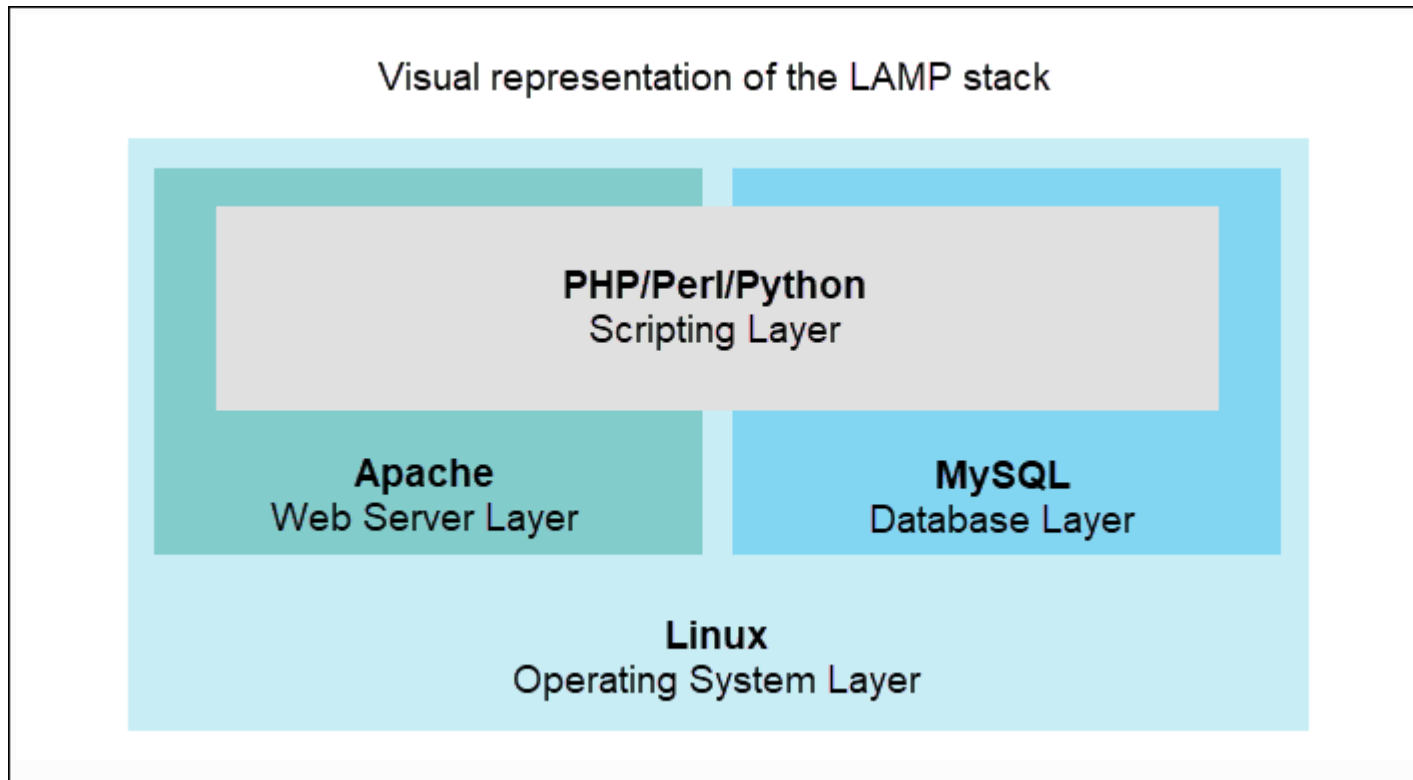
- A collection of software required for Web development
- A web stack is usually comprised of
 - Operating system
 - Linux, Windows
 - Database application
 - MySQL, Oracle, MongoDB
 - Programming language
 - Backend – PHP, Node.js, Python, Perl, ASP.NET
 - Frontend – HTML, CSS, React, JavaScript,
 - Web server
 - Apache, Tomcat, Nginx, IIS

Common Web Stacks

- Open source
 - LAMP – (Linux, Apache, MySQL, PHP/Perl/Python)
 - MEAN - (MongoDB, Express, Angular, Node.js)
 - LEMP (Linux, NGINX, MySQL/MariaDB, PHP/Perl/Python)
 - LAPP (Linux, Apache, PostgreSQL, PHP)
 - XAMPP (Cross-platform, Apache, MariaDB, PHP, Perl)
- Non-open source
 - WAMP - (Windows, Apache, MySQL/MariaDB, PHP/Perl/Python)
 - MAMP - (macOS, Apache, MySQL/MariaDB, PHP/Perl/Python)
 - WIMP - (Windows, IIS, MySQL/MariaDB, PHP/Perl/Python)
 - WISA: Windows, IIS, SQL & ASP.net

LAMP Stack

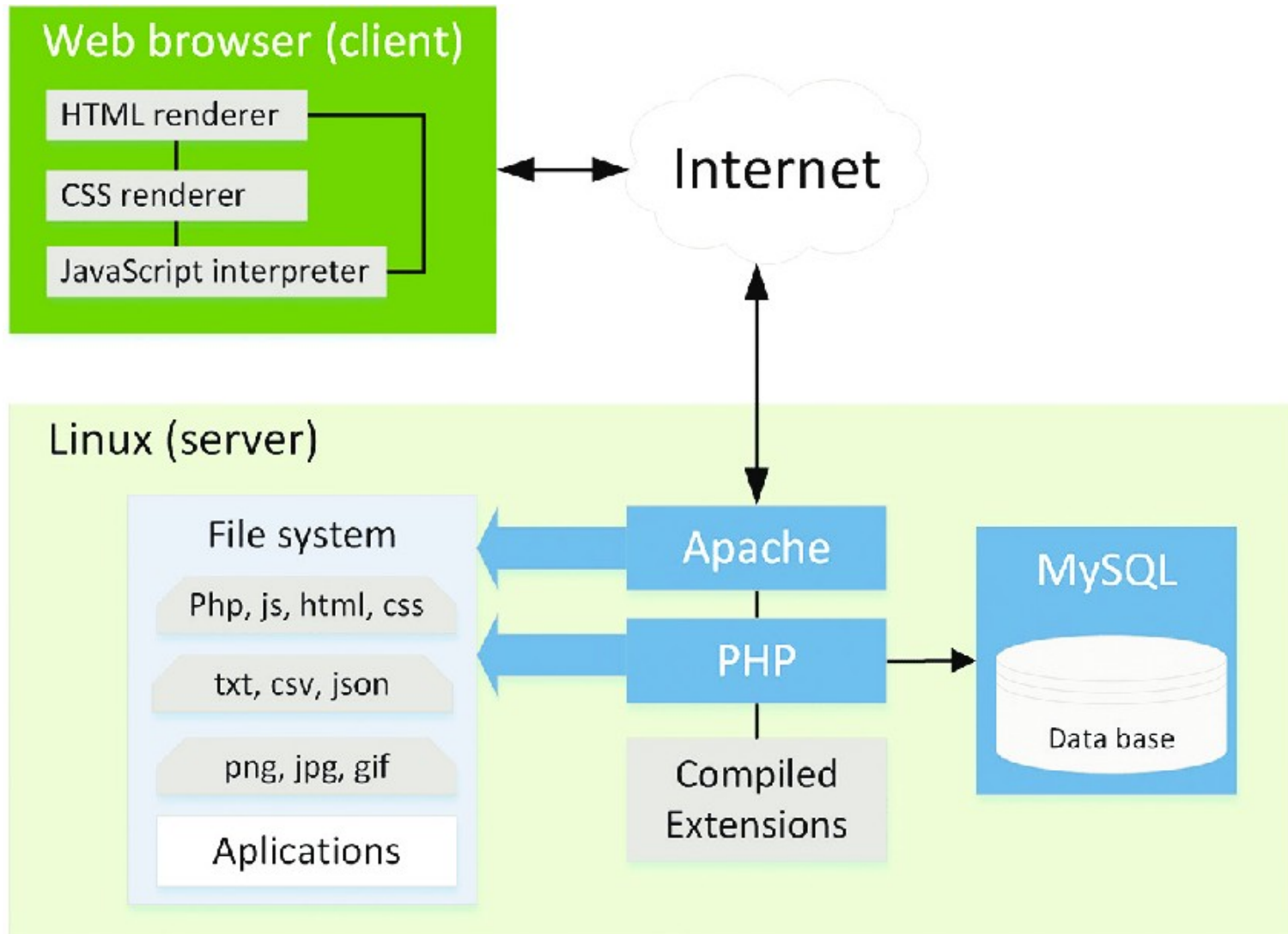
- Linux, Apache, MySQL/MariaDB, PHP/Perl/Python



Why LAMP/AMP

- Cost
 - Open source (free)
- Efficiency
 - Tried and tested solutions for years by experts, so just focus on application development
- Maintenance
 - Software experts develop, test, comment and review
- Support
 - Large community and number of public IT forums
- Flexibility
 - Layered design and choices of technologies

How it works



Why Apache ?

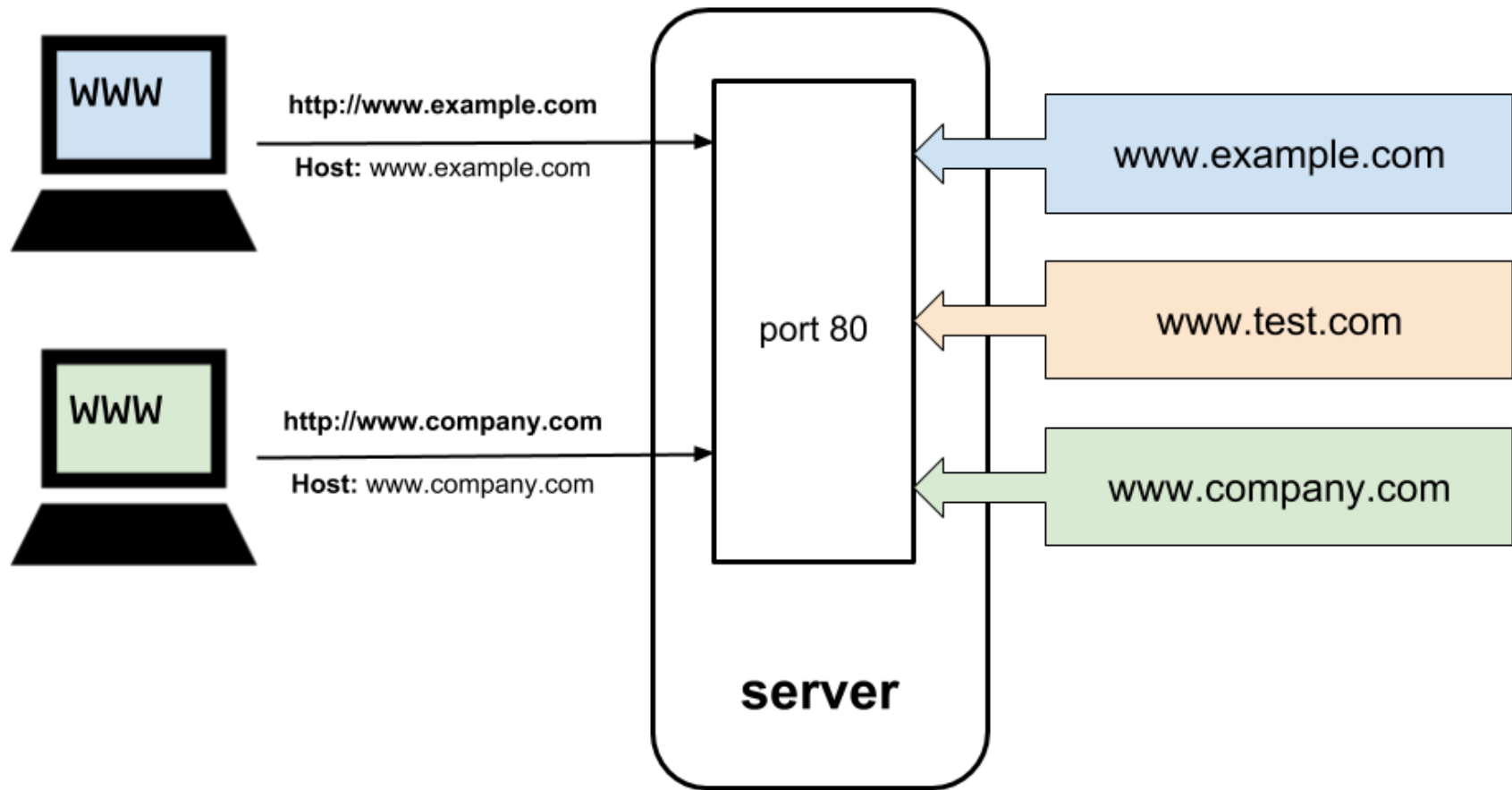
- Apache is open-source, and anyone can get it for free
- Customizable code can be adjusted to the needs
- Ability to add more features and modules to improve functions
- Highly reliable and excellent performance
- Apache is straightforward to install
- Can be run on every operating system
- Actively maintained and upgraded by a community
- Highly flexible Web Server
- Impressive Documentation that is quite extensive and helpful

Apache features

- Loadable Dynamic Modules
- .htaccess per-directory configuration support
- Apache is compatible with IPv6
- Apache Server supports HTTP/2
- Gzip compression makes improves performance
- Reverse proxy / Load balancing functionality
- Strong SSL/TLS encryption support
- AAA authentication through RADIUS server
- URL rewriting
- Auto-indexing

Virtual Hosting

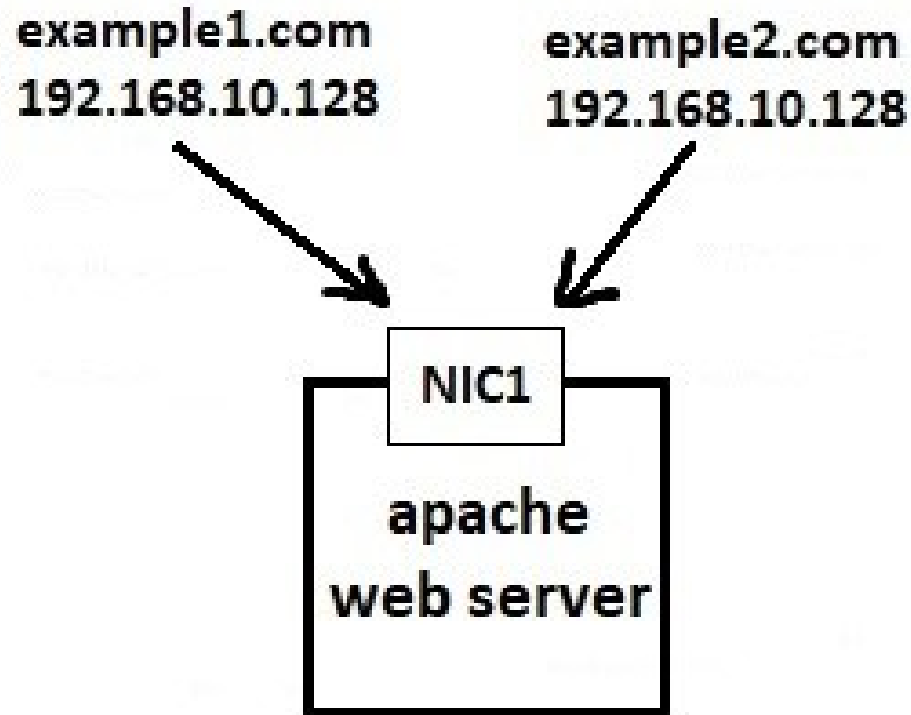
- A method for hosting multiple domain names on a single server



Virtual Hosting

- A method for hosting multiple domain names on a single server
- Single server shares resources for multiple domains/web sites
- This term normally refers to web servers like Apache, Nginx, IIS
- Lower cost due to shared infrastructure
- Widely used in Shared Web Hosting
- Web/Virtual hosting automation tools
 - cPanel, Plesk, Webmin, Virtualmin
 - Often comes with server management tools

Name-based Virtual Hosting



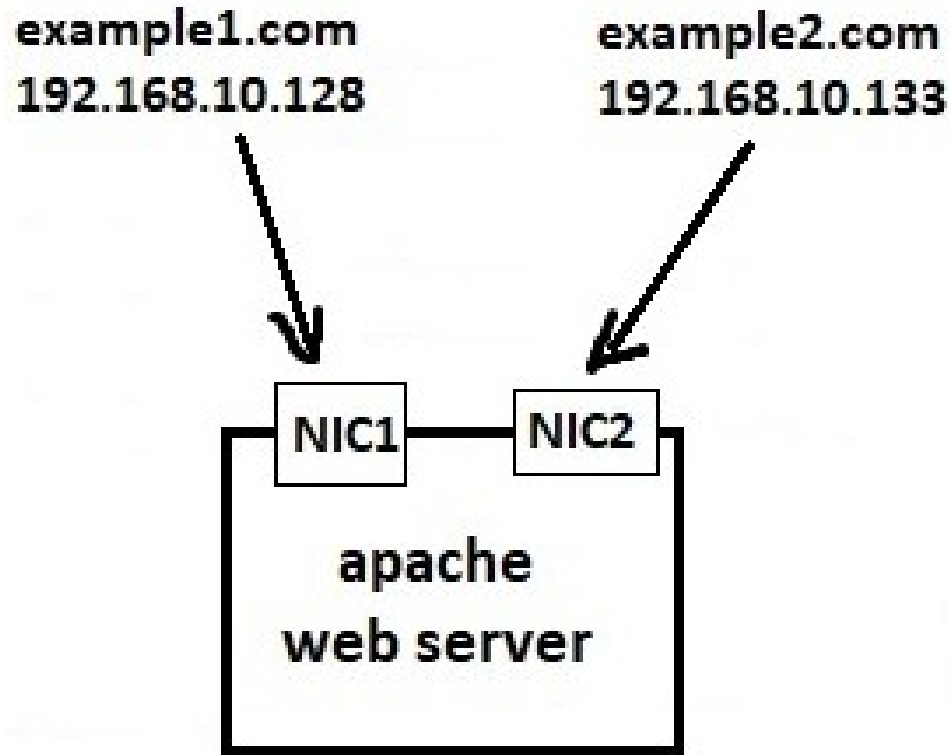
all domain shares single IP

Name Based Virtual Hosting

Name-based Virtual Hosting

- Multiple hostnames for the same IP address
- Saves IP addresses
- Reduces administrative overhead
- Server search for the domain name in HTTP Header
- Client should support HTTP/1.1
- Difficulty with SSL/TLS handling
 - Solution Server Name Indication (SNI)

IP-based Virtual Hosting



IP Based Virtual Hosting

IP-based Virtual Hosting

- Each domain points to a unique IP address
- Dedicated IP address for each domain/site
- More IPs required and contribute to IPv4 exhaustion.
- Server should have
 - Multiple physical interfaces
 - Virtual network interfaces on the same physical interface
 - Multiple IP addresses on a single interface
- Client compatibility is not an issue

Web server attack types

- Cross-Site Scripting
- SQL injection
- Path/Directory Traversal
- Information Leakage
- OS Commanding
- Denial-of-Service (DoS) / Distributed Denial-of-service (DDoS)
- Website Defacement
- Brute Force attacks

Securing Apache

- Keep web server up to date
- Configuring your server correctly
 - Avoid running apache under the root user
 - Disable directory listing
 - Set proper file permissions
- Securing the underlying operating system
- Enable the modules/features you really need
- Enable and force TLS/SSL
- Enable and keep watching your logs

Apache Basic Authentication

- Manage authentication for directory and file level access
- .htaccess file - Apache directory level configuration file

AuthType Basic

AuthName "Authentication Required"

AuthUserFile "/var/www/web.dhammikalalantha.com/.htpasswd"

require valid-user

- Creating users
 - `sudo htpasswd -c /var/www/web.dhammikalalantha.com/.htpasswd user`
 - Create the next user with option -c

Databases

- Database
 - A collection of related data stored in a manner that enables information to be retrieved as needed
- Database Management System (DBMS)
 - An application used to create, maintain and access databases
 - Sits between the user and the database
 - Enables data sharing among applications
 - Minimize data inconsistency
 - Efficient use of data
 - Increased end-user productivity
 - Improved data security

Why PHP ?

- Runs on many operating systems
- Compatible with almost all web servers
- Supports a wide range of databases
- Open source and free
- Easy to learn and plentiful documentation
- Strong community support
- Has been around for decades and well tested and reliable
- Cheaper web hosting services

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Thank You

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