

## Experiment No. 12

Aim: To provision a LAMP/MEAN Stack using puppet manifest.

LO No. & Statement: (LO6): Synthesis software configuration and provisioning using Ansible.

Theory:

LAMP is an open-source Web development platform that uses Linux as the operating system, Apache as the Web server, MySQL as the relational database management system and PHP/Perl/Python as the object-oriented scripting language.

Sometimes LAMP is referred to as a LAMP stack because the platform has four layers. Stacks can be built on different operating systems.

LAMP is an example of a web service stack, named as an acronym. The LAMP components are largely interchangeable and not limited to the original selection. LAMP is suitable for building dynamic websites and web applications.

Since its creation, the LAMP model has been adapted to another component, though typically consisting of free and open-source software.

Developers that use these tools with a Windows operating system instead of Linux are said to be using WAMP, with a Macintosh system MAMP, and with a Solaris system SAMP

Linux, Apache, MySQL and PHP, all of them add something unique to the development of high-performance web applications. Originally popularized from the phrase Linux, Apache, MySQL, and PHP, the acronym LAMP now refers to a generic software stack model.

Linux-based web servers consist of four software components. These components are arranged in layers Supporting one another and making up the software stack Websites and Web Applications run on top of this underlying stack. The common software components are as follows:

Components of LAMP Stack:

1. **Linux:** Linux started in 1991. It sets the foundation for the stack model. All other layers are run on top of this layer. It is an open-source and free operating system. It is endured partly because it's flexible, and other operating systems are harder to configure.
2. **Apache:** The second layer consists of web server software, typically Apache Web Server. This layer resides on top of the Linux layer. Apache HTTP Server is a free web server software package made available under an open-source license. It used to be known as Apache Web Server when it was created in 1995. It offers a secure and extendable Web server that's in sync with current HTTP standards. Web servers are responsible for translating from web browsers to their correct website.
3. **MySQL:** MySQL is a relational database management system used to store application data. It is open source and keeps all the data in a format that can easily be queried with the SQL language. SQL works great with well-structured business domains, and a great workhorse that can handle even the most extensive and most complicated websites with ease. MySQL stores details that can be queried by scripting to construct a website. MySQL usually sits on top of the Linux layer alongside Apache. In high-end configurations, MySQL can be offloaded to a separate host server.

4. PHP: The scripting layer consists of PHP and other similar web programming languages. The PHP open-source scripting language works with Apache to create dynamic web pages. We cannot use HTML to perform dynamic processes such as pulling data out of a database. To provide this type of functionality, we drop PHP code into the parts of a page that you want to be dynamic. Websites and Web Applications run within this layer. PHP is designed for efficiency. It makes programming easier and allowing to write new code, hit refresh, and immediately see the resulting changes without the need for compiling.

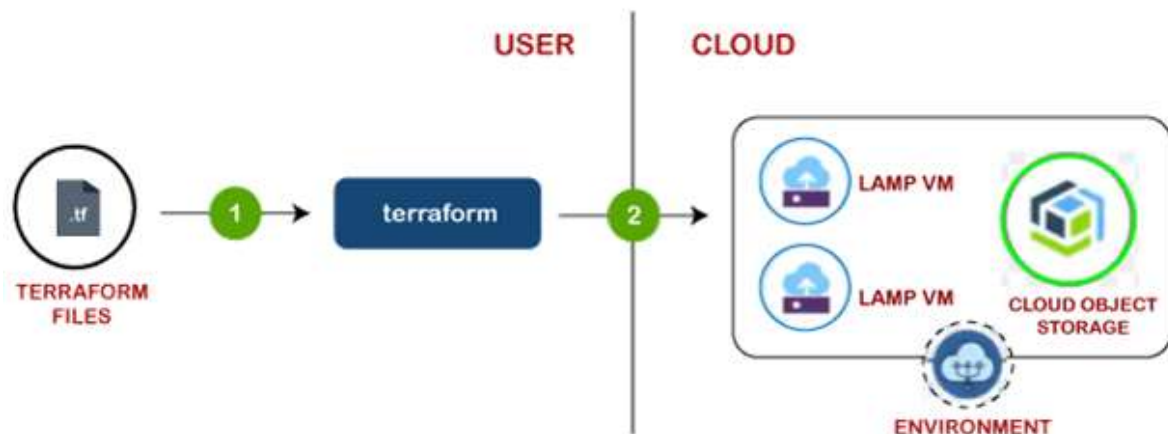


Figure 1: LAMP Architecture

The LAMP stack order of execution shows how the elements interoperate. The process starts when the Apache webserver receives requests for web pages from a user's browser. If the request is for a PHP file, Apache passes the request to PHP, which loads the file and executes the code contained in the file. PHP also communicates with MySQL to fetch any data referenced in the code.

PHP then uses the code in the file and the data from the database to create the HTML that browsers require to display web pages. The LAMP stack is efficient at handling not only static web pages but also dynamic pages where the content may change each time it is loaded depending on the date, time, user identity and other factors.

After running the file code, PHP then passes the resulting data back to the Apache webserver to send to the browser. It can also store this new data in MySQL. And of course, all of these operations are enabled by the Linux operating system running at the base of the stack.

Advantages of LAMP:

- The LAMP stack consists of four components, all of which are examples of Free and Open-Source Software (FOSS). As they are free and available for download, it attracts the attention of many users who wish to avoid paying large sums of money when developing their website.
- Because it is FOSS, the source code of the software is shared and available for people to make changes and improvements, enhancing its overall performance.
- The LAMP stack has proven to be a secure and stable platform thanks to its vast community that contributes when any problems arise.

- We can easily customize the stack and interchange the components with other open-source software to suit the needs.

Puppet is a powerful open-source configuration management tool that can be used to deploy, configure, manage, and maintain a server while accessing it remotely. Puppet is written in Ruby and helps you to deploy and manage a single server-all the way up to thousands of physical and virtual servers - all from a central location.

Puppet modules are collections of manifest files and data that allow Puppet to load and find classes, facts, functions, defined types, and tasks. With Puppet modules, you can install and update packages, create files and directories, and/or make any configuration changes quickly and easily. It aims to perform and automate almost any task, such as launching a LAMP environment, setting up virtual hosts, etc.

Conclusion:

In this experiment, we studied LAMP Stack and its four components, architecture, and advantages of LAMP. We also how we can provision a puppet with the LAMP stack with puppet master and puppet agent.

We have achieved LO6 from this experiment.

We have also achieved Program Outcomes PO1, PO2, PO3, PO4, PO5, PO12.