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TEAL Local Classroom Setup Guide

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Improving Access to Science and Technology Higher Education in Resource-Poor Institutions
through an Open Platform for Technology Enabled Active Learning Environment

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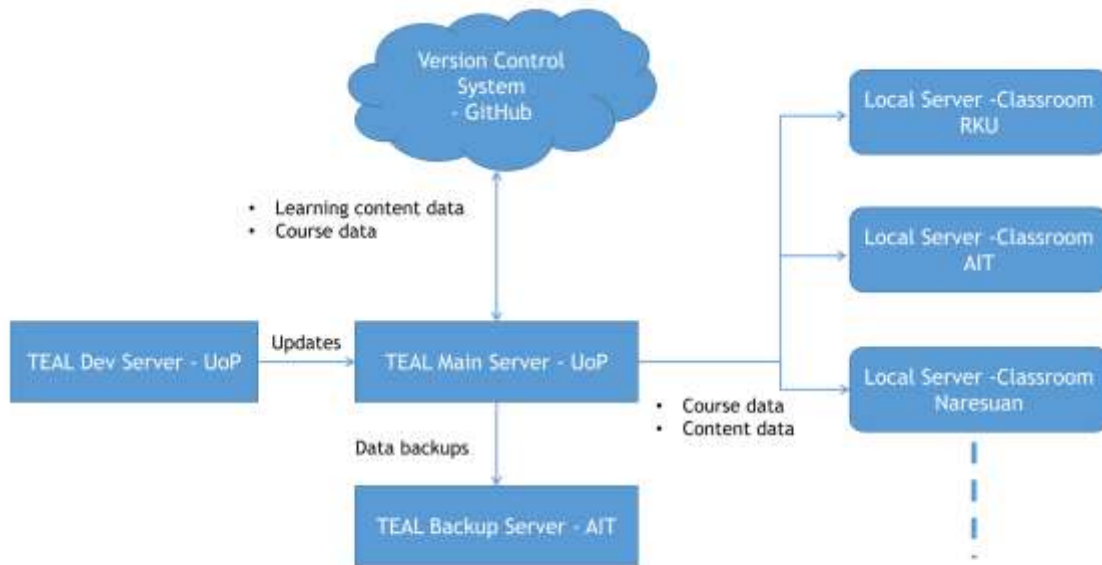


Figure 1 - TEAL Server Architecture

Figure 1 illustrates the existing server architecture. The main TEAL application, along with course and content data, resides on the main server.

Every institute requires an individual local server to facilitate course delivery. After the course content is finalized, each institute is responsible for setting up a local server with a Moodle instance for student access and login.

To create classrooms and transfer specific content, there must be a connection between the global TEAL server and the local server. However, it's also feasible to accomplish these tasks independently, without any connectivity to the global server. In such cases, classroom creation will require manual intervention.

To set up a server for Moodle you'll need hardware and software specifications that meet the requirements of both the operating system and the Moodle application. Please note that these specifications are general guidelines, and the specific hardware and software requirements can vary based on the size and usage of your Moodle installation. Always refer to Moodle's official documentation and system requirements for the version you plan to install for the most accurate and up-to-date information.

2.1 Hardware Requirements:

1. Processor (CPU)

Moodle is not particularly CPU-intensive, but a modern multi-core processor will ensure smoother performance, especially for concurrent users. A quad-core processor or better is recommended.

2. Memory (RAM)

Moodle's memory requirements can vary depending on the number of users and the complexity of your courses. A minimum of 4GB of RAM is recommended for small installations, but 8GB or more is preferable for larger sites.

3. Storage (HDD/SSD)

Moodle itself doesn't consume much storage space, but the content you create and upload (e.g., videos, and documents) will impact your storage needs. A minimum of 40GB of storage space is a good starting point. SSDs are preferred over HDDs for improved performance.

4. Network

A stable internet connection with Gigabit Ethernet or higher bandwidth is required to accommodate the expected number of concurrent users.

2.2 Software Requirements:

1. Operating System

Ubuntu is a suitable choice for Moodle. Choose the latest LTS (Long Term Support) release for stability and support.

2. Web Server

Nginx is a high-performance web server and is well-suited for Moodle. Ensure to install and configure Nginx to work with PHP-FPM to process PHP scripts.

3. Database Server

You'll need a database server. Moodle supports several databases, with MySQL (or its fork, MariaDB) being a common choice. MariaDB is recommended. Ensure you install and configure the database server properly.

4. PHP

Moodle requires PHP for server-side scripting. Choose a version that is compatible with the Moodle version you plan to install (check Moodle's documentation for compatibility information).

5. PHP Extensions

Install the necessary PHP extensions required by Moodle, such as php-xml, php-curl, php-zip, php-intl, php-mbstring, and php-gd.

6. Other Software

Depending on your specific needs, you may also need additional software components like an email server (e.g., Postfix) and a caching system (e.g., Redis).

2.3 Security Considerations:

→ Firewall

Set up a firewall to restrict incoming traffic to only necessary ports (e.g., 80, 443 for web traffic).

→ HTTPS

Secure your Moodle site with SSL/TLS certificates to encrypt data in transit.

→ Regular Updates

Keep the operating system, web server, database server, and Moodle itself up to date with security patches.

→ Backup and Disaster Recovery

Implement regular backups of your Moodle data and server configuration to ensure you can recover from any unexpected issues.

→ User Authentication

Consider using secure authentication methods, such as LDAP or Single Sign-On (SSO), if needed.

2.4 Installation steps of Moodle

Following are the basic steps to install Moodle on a Linux server running Ubuntu with Nginx and MariaDB.

1. Prepare Your Server

→ Ensure your server meets the minimum requirements for Moodle, including PHP, MariaDB, and Nginx.

→ Make sure you have root or sudo access to the server.

2. Update System Packages

→ your server's package manager to ensure you have the latest software updates.

```
sudo apt update
```

```
sudo apt upgrade
```

3. Install Required Software

→ Install necessary software packages like Nginx, PHP, MariaDB, and other dependencies. For example,

```
sudo apt install nginx mariadb-server php-fpm php-mysql php-xml php-curl php-zip php-intl  
php-mbstring php-json
```

4. Configure Nginx

→ Create a new Nginx server block configuration for Moodle.

```
sudo nano /etc/nginx/sites-available/moodle
```

→ Configure the server block with the necessary settings, including the `server_name`, root directory, and PHP-FPM socket.

5. Enable the Nginx Configuration

→ Create a symbolic link to enable the configuration.

```
sudo ln -s /etc/nginx/sites-available/moodle /etc/nginx/sites-enabled/
```

6. Test Nginx Configuration:

→ Check if there are any syntax errors in your Nginx configuration.

```
sudo nginx -t
```

7. Create a Database

→ Log in to MariaDB and create a database and a user for Moodle.

```
mysql -u root -p
CREATE DATABASE moodle;
CREATE USER 'moodleuser'@'localhost' IDENTIFIED BY 'password';
GRANT ALL PRIVILEGES ON moodle.* TO 'moodleuser'@'localhost';
FLUSH PRIVILEGES;
```

8. Download Moodle

→ Download the latest Moodle package from the official website.

```
sudo wget
```

```
https://download.moodle.org/download.php/direct/stableXY/moodle-latest.tgz
```

9. Extract Moodle:

→ Extract the Moodle archive to your web server's root directory (e.g., "/var/www/html/").

```
sudo tar xvf moodle-latest.tgz -C /var/www/html/
```

10. Set Moodle Data Directory

→ Create a directory outside of the web root to store Moodle data files, e.g., "/var/moodledata/", and ensure it's writable by the web server user (usually "www-data").

11. Finish Moodle Installation

→ Open a web browser and visit your server's domain or IP address to complete the Moodle installation. Follow the web-based installation wizard, and provide the database details and other necessary information.

12. Configure SMTP for Email

→ Access Moodle's administration panel and navigate to the email settings section. Input the SMTP server details, including the server address, port, and authentication credentials. Ensure proper configuration to enable email functionality.

13. Secure Your Moodle Installation

→ After installation, ensure you secure your Moodle instance by following best practices, including regular backups, user management, and keeping Moodle and server software up to date.

14. Set Up Cron Jobs

→ Configure cron jobs to automate tasks like sending emails, checking for updates, and running scheduled tasks within Moodle.

These are the basic steps to install Moodle on an Ubuntu server with Nginx and MariaDB. Please refer to Moodle's official documentation for any specific configuration details and security considerations relevant to your version of Moodle.

2.5 Connectivity requirements for the main server

To enable TEAL application to access the local classroom Moodle, direct access to the local Moodle database is required. This database can either be made publicly accessible or made available through an SSH tunnel for enhanced security. The required information includes the database name, username, and password. The user must have the write permissions.

Additionally, the external web service functionality for the classroom Moodle must be activated, and a security token should be enabled to access the core functions via API.

This connectivity is required to create classrooms and move specific content via the TEAL app. However, it is also possible to create classrooms without any connectivity to the main server. In this case, users have to manually add all the course parameters, including the objectives and the ILOs and set the relevant course categories manually.