

SUSE Linux Enterprise Server 12, 15

WordPress on LAMP on SUSE Linux Enterprise Server

Getting Started

SUSE Linux Enterprise Server 15
SUSE Linux Enterprise Server 12

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This guide helps users install and configure WordPress using the LAMP stack on SUSE Linux Enterprise Server.

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Contents

- 1 Scope 4
- 2 Preinstallation / prerequisites 6
- 3 Installing and configuring the components 7
- 4 Two-tier architecture 17
- 5 Appendix 19
- 6 Legal notice 22
- 7 GNU Free Documentation License 23

1 Scope

The [LAMP \(https://en.wikipedia.org/wiki/LAMP_\(software_bundle\)\)](https://en.wikipedia.org/wiki/LAMP_(software_bundle)) stack, while simple, is **ubiquitous**. Its popularity in demos and tutorials all over the Internet to introduce a new concept or explain a complex one is like no other. This guide details how to install and configure [MariaDB \(https://mariadb.org/\)](https://mariadb.org/), [Apache \(https://httpd.apache.org/\)](https://httpd.apache.org/), [PHP \(https://www.php.net/\)](https://www.php.net/) on [SUSE Linux Enterprise Server \(https://www.suse.com/products/server/\)](https://www.suse.com/products/server/) to compose the [LAMP \(https://en.wikipedia.org/wiki/LAMP_\(software_bundle\)\)](https://en.wikipedia.org/wiki/LAMP_(software_bundle)) stack. To demonstrate the LAMP stack is functional, [WordPress \(https://wordpress.com\)](https://wordpress.com/) will be installed and configured to use the stack. The audience is expected to have a basic familiarity of Linux and be comfortable using the command line interface. The result is not intended for production scenarios but rather for **workshops** or **demos**.

1.1 The LAMP stack

The term LAMP stands for the components:

- **Linux** - SUSE Linux Enterprise Server Operating System
- **Apache** - HTTP Server
- **MySQL / MariaDB** - Relational Database
- **PHP / Python / Perl** - Programming Language

The below graphic roughly visualizes what the stack looks like when completed.

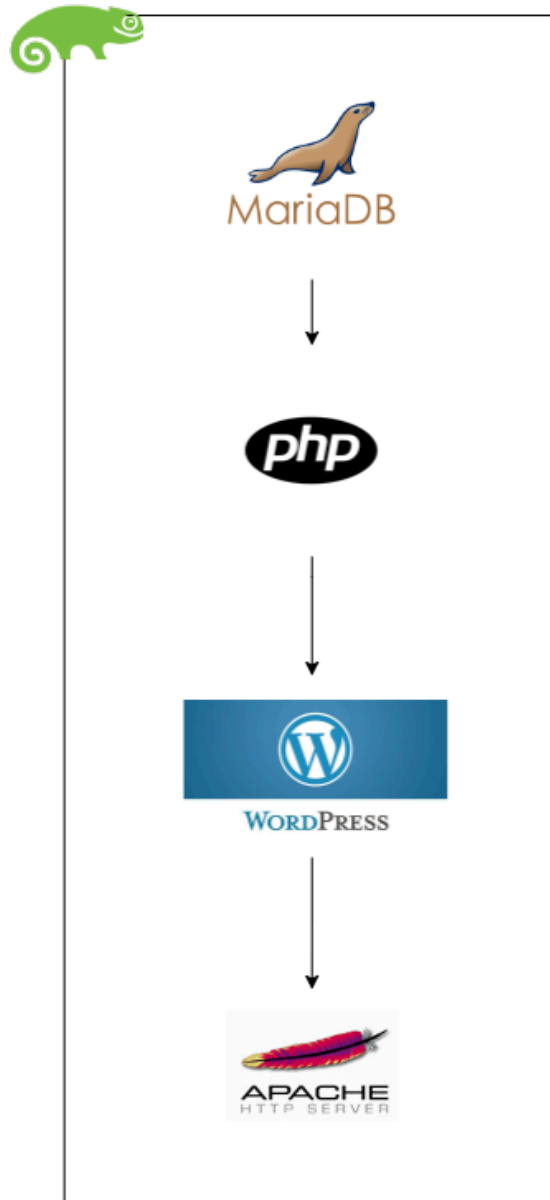


FIGURE 1: WORDPRESS LAMP STACK ARCHITECTURE

1.2 MariaDB and MySQL

Starting with SUSE Linux Enterprise Server 12, MySQL has been [replaced \(https://www.suse.com/releasenotes/x86_64/SUSE-SLES/12/#fate-316482\)](https://www.suse.com/releasenotes/x86_64/SUSE-SLES/12/#fate-316482) with MariaDB. MariaDB's client protocol is "wire" compatible with MySQL's protocol and in most scenarios even the data files are binary

compatible. For our purposes, MariaDB will work fine (and still spells LAMP!). For more information, visit [MariaDB versus MySQL: Compatibility \(https://mariadb.com/kb/en/mariadb-vs-mysql-compatibility/\)](https://mariadb.com/kb/en/mariadb-vs-mysql-compatibility/) ↗.

2 Preinstallation / prerequisites

2.1 System requirements

- CPU with 1 core
- AMD64/Intel 64 architecture
- 2 GB disk space
- 2 GB RAM
- an [installation](https://documentation.suse.com/sles/15-SP3/single-html/SLES-installation/#article-installation) (https://documentation.suse.com/sles/15-SP3/single-html/SLES-installation/#article-installation) ↗ of SUSE Linux Enterprise Server



Note

These requirements cover a minimal installation. Adapt as needed to cover your use case.

2.2 Registering the server

Before starting, ensure your SUSE Linux Enterprise Server instance is registered by following this [knowledge base article \(https://www.suse.com/support/kb/doc/?id=000018564\)](https://www.suse.com/support/kb/doc/?id=000018564) ↗ to enable access to repositories. If you are using one of SUSE's "pay-as-you-go" respective "on-demand" images on one of the public cloud providers, you may omit this step.

2.3 Refreshing repositories

1. Prior to starting the installation, refresh your repositories to ensure you have the latest packages to install.

```
sudo zypper update --no-confirm
```

```
Refreshing service 'Basesystem_Module_15_SP3_x86_64'.
Refreshing service 'SUSE_Linux_Enterprise_Server_15_SP3_x86_64'.
Refreshing service 'Server_Applications_Module_15_SP3_x86_64'.
Loading repository data...
Reading installed packages...
Resolving package dependencies...
...
```

3 Installing and configuring the components

3.1 Setting up MariaDB

Start with the MariaDB installation. This includes verifying a successful installation, starting up MariaDB, and creating a database along with an associated user for WordPress to use. MariaDB will store all the data in your WordPress application.

1. Install the MariaDB package. The `--no-confirm` option bypasses the user confirmation to install.

```
sudo zypper install --no-confirm mariadb
```

```
Refreshing service 'Basesystem_Module_15_SP3_x86_64'.
Refreshing service 'SUSE_Linux_Enterprise_Server_15_SP3_x86_64'.
Refreshing service 'Server_Applications_Module_15_SP3_x86_64'.
Loading repository data...
Reading installed packages...
Resolving package dependencies...
```

The following 9 NEW packages are going to be installed:

```
libJudy1 libmariadb3 libpq5 mariadb mariadb-client mariadb-errormessages psqlODBC
python3-mysqldb unixODBC
```

The following 2 recommended packages were automatically selected:

```
mariadb psqlODBC
```

9 new packages to install.

Overall download size: 23.7 MiB. Already cached: 0 B. After the operation,
additional 171.2 MiB will be used.

Continue? [y/n/v/...? shows all options] (y): y

Retrieving package libmariadb3-3.1.13-3.30.1.x86_64

(1/9), 132.3 KiB (354.9

KiB unpacked)

...

2. Enable MariaDB to start automatically on boot (optional).

```
sudo systemctl enable mariadb
```

```
Created symlink /etc/systemd/system/mysql.service → /usr/lib/systemd/system/mariadb.service.  
Created symlink /etc/systemd/system/multi-user.target.wants/mariadb.service → /usr/lib/systemd/system/mariadb.service.
```

3. Start MariaDB.

```
sudo systemctl start mariadb
```

4. Check to see that MariaDB actually started. The Active output field should read active(running).

```
sudo systemctl status mariadb
```

```
● mariadb.service - MariaDB database server  
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; disabled; vendor preset: disabled)  
   Active: active (running) since Fri 2021-07-02 01:55:22 UTC; 7s ago  
     Docs: man:mysql(8)  
           https://mariadb.com/kb/en/library/systemd/  
  Process: 26513 ExecStartPre=/usr/lib/mysql/mysql-systemd-helper upgrade (code=exited, status=0/SUCCESS)  
  Process: 26447 ExecStartPre=/usr/lib/mysql/mysql-systemd-helper install (code=exited, status=0/SUCCESS)  
 Main PID: 26519 (mysqld)  
   Status: "Taking your SQL requests now..."  
    Tasks: 30  
   CGroup: /system.slice/mariadb.service  
           └─26519 /usr/sbin/mysqld --defaults-file=/etc/my.cnf --user=mysql
```

5. Verify you can connect to MariaDB with the mariadb client. The -u flag selects the user to log in as. Use the root user since no other users exist yet (except the default user discussed below (*[default-user]*)). The MariaDB [(none)]> prompt indicates you are now in the MariaDB shell (<https://mariadb.com/docs/server/clients-and-utilites/mariadb-client/mysql-command-line-client>) with no default database, hence "none".

```
mariadb -u root
```

```
Welcome to the MariaDB monitor.  Commands end with ; or \g.
```



```
Your MariaDB connection id is 3
Server version: 10.5.11-MariaDB MariaDB package

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

6. The MariaDB installation comes with a pesky default user that can mask login attempts from other users from localhost. While still in the MariaDB shell, remove this user.

```
DROP USER ''@localhost;
```

For example:

```
MariaDB [(none)]> DROP USER ''@localhost;
Query OK, 0 rows affected (0.003 sec)
```

7. Now create a database for WordPress and a corresponding user. Replace password with your own password. Exit the MariaDB shell when completed.

```
CREATE DATABASE IF NOT EXISTS wordpress;
GRANT ALL PRIVILEGES ON wordpress.* TO 'wordpress' IDENTIFIED BY 'password';
exit;
```

For example:

```
MariaDB [(none)]> CREATE DATABASE IF NOT EXISTS wordpress;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON wordpress.* TO 'wordpress' IDENTIFIED BY
'password';
Query OK, 0 rows affected (0.003 sec)

MariaDB [(none)]> exit
Bye
```

8. Verify you can connect as the WordPress user. Replace password with your own password.

```
mariadb -u wordpress -p wordpress
```

```
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 4
Server version: 10.5.11-MariaDB MariaDB package
```

```
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [wordpress]>
```

9. You have completed the MariaDB section. Exit the MariaDB shell.

```
exit
```

For example:

```
MariaDB [wordpress]> exit
Bye
```

3.2 Setting up Apache HTTP server

Next, set up the Apache server. Apache server is used to host and serve the WordPress content. In this section, you will install Apache server and configure it to start on boot.

1. Install the `apache2` package.

```
zypper install --no-confirm apache2
```

```
Refreshing service 'Basesystem_Module_15_SP3_x86_64'.
Refreshing service 'SUSE_Linux_Enterprise_Server_15_SP3_x86_64'.
Refreshing service 'Server_Applications_Module_15_SP3_x86_64'.
Refreshing service 'Web_and_Scripting_Module_15_SP3_x86_64'.
Loading repository data...
Reading installed packages...
Resolving package dependencies...

The following 2 NEW packages are going to be installed:
  apache2 apache2-prefork

2 new packages to install.
Overall download size: 1.6 MiB. Already cached: 0 B. After the operation, additional
 4.9 MiB will be used.
Continue? [y/n/v/...? shows all options] (y): y
Retrieving package apache2-2.4.43-3.22.1.
...
```

2. Enable the `apache2` service to start on boot (optional).

```
systemctl enable apache2
```

```
Created symlink /etc/systemd/system/httpd.service → /usr/lib/systemd/system/apache2.service.  
Created symlink /etc/systemd/system/apache.service → /usr/lib/systemd/system/apache2.service.  
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /usr/lib/systemd/system/apache2.service.
```

3.3 Setting up PHP

With Apache installed, continue with PHP. WordPress is written in PHP as the main scripting language which in conjunction with the Apache PHP module enables rendering HTML pages for browsers to display. This section details how to enable the *Web and Scripting Module* (<https://documentation.suse.com/sles/15-SP2/html/SLES-all/art-modules.html#sec-modules-what-modules>), install PHP, install the Apache PHP module, and finally configure Apache to handle PHP files.

1. First, you need the *Web and Scripting Module* which is included with your SUSE Linux Enterprise Server subscription. The *Web and Scripting Module* contains common tools such as php, python, node.js for hosting Web applications. *SUSEConnect* allows you to enable this module. The `--product` option configures the module. Substitute it with your specific SUSE Linux Enterprise Server version, `{sles_version}` and system architecture, `{architecture}`.

```
> sudo SUSEConnect --product sle-module-web-scripting/{sles_version}/{architecture}
```

For example:

```
sudo SUSEConnect --product sle-module-web-scripting/15.3/x86_64
```

```
Registering system to SUSE Customer Center
```

```
Updating system details on https://scc.suse.com ...
```

```
Activating sle-module-web-scripting 15.3 x86_64 ...
```

```
-> Adding service to system ...
```

```
-> Installing release package ...
```

Successfully registered system

2. Now install PHP and the Apache PHP module which will be needed later on.

```
sudo zypper install -y php php-mysql php-zlib apache2-mod_php7
```

```
Refreshing service 'Basesystem_Module_15_SP3_x86_64'.
Refreshing service 'SUSE_Linux_Enterprise_Server_15_SP3_x86_64'.
Refreshing service 'Server_Applications_Module_15_SP3_x86_64'.
Refreshing service 'Web_and_Scripting_Module_15_SP3_x86_64'.
Loading repository data...
Reading installed packages...
Resolving package dependencies...

The following 13 NEW packages are going to be installed:
  apache2-mod_php7 php7 php7-ctype php7-dom php7-iconv php7-json php7-mysql php7-pdo
  php7-sqlite php7-tokenizer php7-xmlreader php7-xmlwriter php7-zlib

The following 8 recommended packages were automatically selected:
  php7-ctype php7-dom php7-iconv php7-json php7-sqlite php7-tokenizer php7-xmlreader
  php7-xmlwriter

The following 3 packages are suggested, but will not be installed:
  php7-gd php7-gettext php7-mbstring

13 new packages to install.
Overall download size: 3.7 MiB. Already cached: 0 B. After the operation, additional
 20.5 MiB will be used.
Continue? [y/n/v/...? shows all options] (y): y
...
```

3. Test your PHP installation.

```
php --version
```

```
PHP 7.4.6 (cli) ( NTS )
Copyright (c) The PHP Group
Zend Engine v3.4.0, Copyright (c) Zend Technologies
```

4. Enable the Apache PHP module with a2enmod.

```
a2enmod php7
```

5. Associate PHP files with the application/x-httpd-php content type so that PHP files are rendered on the client.

```
echo -e "AddType application/x-httpd-php .php\n" >> /etc/apache2/mod_mime-  
defaults.conf
```

3.4 Setting up WordPress

The final component in your stack is WordPress. This section explains where to download and how to install and configure WordPress to connect to MariaDB.

1. First, download WordPress.

```
curl -L https://wordpress.org/latest.zip -o /opt/wordpress_latest.zip
```

% Total	% Received	% Xferd	Average Speed	Time	Time	Time	Current
			Dload Upload	Total	Spent	Left	Speed
100 15.7M	100 15.7M	0 0	3209k	0	0:00:05	0:00:05	--:--:-- 3510k

2. Extract the zip file.

```
unzip /opt/wordpress_latest.zip -d /opt
```

```
Archive: /opt/wordpress_latest.zip  
  creating: /opt/wordpress/wordpress/  
  inflating: /opt/wordpress/wordpress/xmlrpc.php  
  inflating: /opt/wordpress/wordpress/wp-blog-header.php  
  inflating: /opt/wordpress/wordpress/readme.html  
...
```

3. By default Apache serves documents from /srv/www/htdocs, so move the WordPress contents there.

```
mv wordpress/* /srv/www/htdocs/
```

4. Create a copy of the wp-config PHP configuration file. Apply your installation-specific settings.

```
cp /srv/www/htdocs/wp-config-sample.php /srv/www/htdocs/wp-config.php
```

5. Now update the configuration with the database settings. Replace password with your password.

```
sed -i 's/database_name_here/wordpress/' /srv/www/htdocs/wp-config.php  
sed -i 's/username_here/wordpress/' /srv/www/htdocs/wp-config.php
```

```
sed -i 's/password_here/password/' /srv/www/htdocs/wp-config.php
```

3.5 Configuring firewalld

You may need to open port 80 on the firewall to allow clients to connect to Apache. If you are not using a firewall, or if it is disabled, skip this section.

1. To check if **firewalld** (<https://firewalld.org/>)  (firewall service) is running, use `systemctl`.

```
systemctl status firewalld
```

If no firewall service is found, proceed to the next section.

```
Unit firewalld.service could not be found.
```

Otherwise, if it is running as shown below, continue to the next step to open port 80.

```
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; vendor
   preset: disabled)
   Active: active (running) since Fri 2021-10-29 19:10:33 PDT; 28min ago
     Docs: man:firewalld(1)
  Main PID: 858 (firewalld)
    Tasks: 2
   CGroup: /system.slice/firewalld.service
           └─858 /usr/bin/python3 /usr/sbin/firewalld --nofork --nopid

Oct 29 19:10:31 localhost systemd[1]: Starting firewalld - dynamic firewall
daemon...
Oct 29 19:10:33 localhost systemd[1]: Started firewalld - dynamic firewall daemon.
```

2. Add the HTTP service to the firewall permanently.

```
firewall-cmd --permanent --add-service http
```

```
You're performing an operation over default zone ('external'),
but your connections/interfaces are in zone 'docker' (see --get-active-zones)
You most likely need to use --zone=docker option.

success
```

3. Reload the firewall to apply the changes.

```
firewall-cmd --reload
```

```
success
```

3.6 Starting the system

1. Everything should be configured now. Start the Apache server.

```
systemctl start apache2
```

2. Open a browser with your server IP or host name at <http://hostname>. If the installation was successful, you should be presented with the WordPress installation page.



Welcome

Welcome to the famous five-minute WordPress installation process! Just fill in the information below and you'll be on your way to using the most extendable and powerful personal publishing platform in the world.

Information needed

Please provide the following information. Don't worry, you can always change these settings later.

Site Title

Username

Username can have only alphanumeric characters, spaces, underscores, hyphens, periods, and the @ symbol.

Password

e587AoQeIXHAcVnXdt

 Hide

Strong

Important: You will need this password to log in. Please store it in a secure location.

Your Email

Double-check your email address before continuing.

Search engine
visibility

☐ Discourage search engines from indexing this site

It is up to search engines to honor this request.

[Install WordPress](#)

FIGURE 2: WORDPRESS INSTALLATION PAGE

4 Two-tier architecture

You can create a two-tier architecture and separate the database server from the application server as shown in the graphic below:

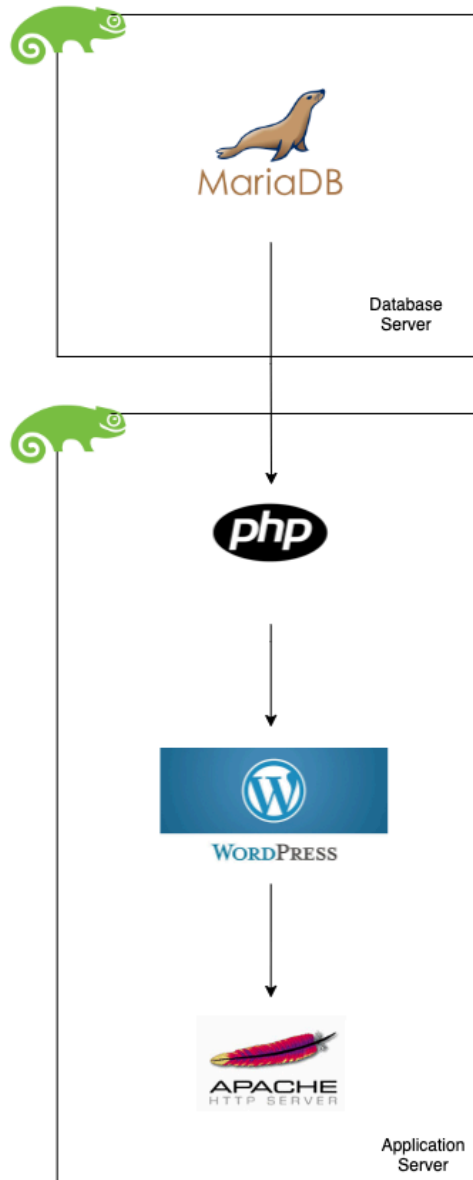


FIGURE 3: TWO-TIER WORDPRESS LAMP STACK

Only a few additional steps are needed to do so. As before, ensure both servers are registered ([Section 2.2, “Registering the server”](#)) before starting.

4.1 Database server

On the database server, make the following changes:

1. Repeat the previous steps for [Section 3.1, “Setting up MariaDB”](#).
2. MariaDB binds only to the loopback interface by default. Change it to bind to all addresses.

```
sed -i 's/= 127.0.0.1/= 0.0.0.0/' /etc/my.cnf
```

3. Restart MariaDB so it picks up the changes.

```
systemctl restart mariadb
```

4. Open port 3306 (default for MariaDB) to enable the clients to connect. Skip this step if you are not using a firewall.

```
firewall-cmd --add-port 3306/tcp --permanent
```

```
success
```

4.2 Application server

On the application server, perform the following steps:

1. Verify the application server has connectivity to MariaDB on the database server.

```
nc -vz ${ip of database server} 3306
```

For example:

```
> nc -vz 10.0.0.40 3306
Connection to 10.0.0.40 3306 port [tcp/mysql] succeeded!
```

2. Then repeat the previous steps as explained in [Section 3.2, “Setting up Apache HTTP server”](#), [Section 3.3, “Setting up PHP”](#), [Section 3.4, “Setting up WordPress”](#) and in [Section 3.5, “Configuring firewalld”](#).

3. One additional step is required to point WordPress at the database server. Replace `application_server_ip` with the IP address of your MariaDB server.

```
sed -i "s/'DB_HOST', 'localhost'/'DB_HOST', '${application_server_ip}'/" /srv/www/htdocs/wp-config.php
```

For example:

```
> sed -i "s/'DB_HOST', 'localhost'/'DB_HOST', '10.0.0.40'/" /srv/www/htdocs/wp-config.php
```

4. Visit `http://application_server_ip` with a browser to check if your setup was successful.

5 Appendix

5.1 Debugging WordPress

1. If you need to diagnose why a WordPress page will not load, it can be insightful to enable WordPress debugging. To enable WordPress debugging, set `WP_DEBUG` to `true` in `wp-config.php`:

```
sed -i "s/'WP_DEBUG', false/'WP_DEBUG', true/" /srv/www/htdocs/wp-config.php
```

Then reload the page. This will enable printing the output of PHP errors and warnings on the page. In the example below, an incorrect password was used which caused MariaDB to return an error to the PHP client. With debugging enabled, the error message can be viewed without accessing the server directly.

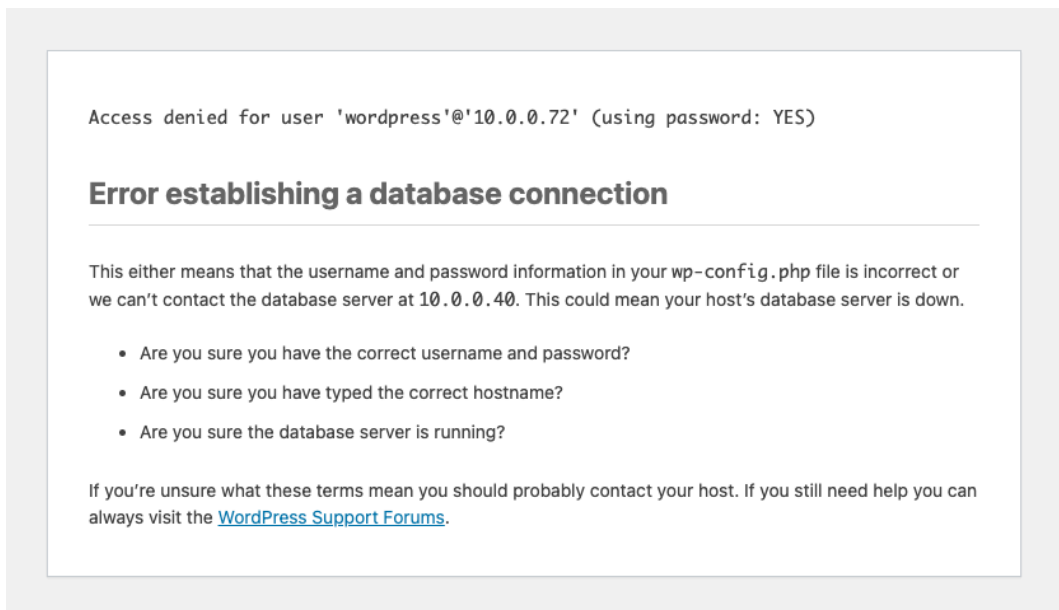


FIGURE 4: WORDPRESS ON LAMP DEBUGGING

For more details on further WordPress debugging, see [WordPress debugging \(https://wordpress.org/support/article/debugging-in-wordpress/\)](https://wordpress.org/support/article/debugging-in-wordpress/) ↗.

2. To revert WordPress debugging, simply set `WP_DEBUG` back to `false`.

```
sed -i "s/'WP_DEBUG', true/'WP_DEBUG', false/" /srv/www/htdocs/wp-config.php
```

5.2 References

For more information, visit the links below:


- LAMP (software bundle) (https://en.wikipedia.org/wiki/LAMP_%28software_bundle%29) ↗
- LAMP Stack explained (<https://www.ibm.com/cloud/learn/lamp-stack-explained>) ↗
- webopedia LAMP (<https://www.webopedia.com/definitions/lamp/>) ↗
- How to install WordPress (<https://wordpress.org/documentation/category/installation/>) ↗
- WordPress debugging (<https://wordpress.org/support/article/debugging-in-wordpress/>) ↗
- MariaDB shell (<https://mariadb.com/docs/server/clients-and-utilites/mariadb-client/mysql-command-line-client>) ↗
- Compiling and Installing Apache (<http://httpd.apache.org/docs/current/install.html>) ↗

- Installing MariaDB with zypper (<https://mariadb.com/kb/en/installing-mariadb-with-zypper/>) ↗
- SLES 12 Release Notes (https://www.suse.com/releasenotes/x86_64/SUSE-SLES/12/#fate-316482) ↗
- MariaDB vs MySQL Compatibility (<https://mariadb.com/kb/en/mariadb-vs-mysql-compatibility/>) ↗
- SLES 15 - Masquerading and Firewalls (<https://documentation.suse.com/sles/15-SP1/html/SLES-all/cha-security-firewall.html>) ↗
- Modules for the SUSE Linux Enterprise Product Family (<https://documentation.suse.com/sles/15-SP2/html/SLES-all/art-modules.html#sec-modules-what-modules>) ↗
- firewalld (<https://firewalld.org/>) ↗

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