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Photography Learning and Collaboration Hub

IP: 35.171.72.78

DNS entry: https://photo-hub.online

Contents

1	Launching an EC2 Instance	3
2	Setting Up the Web Server	4
3	Installing and Configuring WordPress	4
4	Script to install WordPress from scratch	10
5	Linking the Server with a DNS Entry	15
6	Obtaining a digital certificate from Lets Encrypt	17
7	8	18
	7.1 Installing the Theme and Plugins	18
	7.2 Customising the Theme	18
	7.3 Customizing the Site Structure	18
	7.4 Adding Content	19
R	References	

1 Launching an EC2 Instance

- 1. Log in to AWS Management Console: Navigate to AWS Management Console.
- 2. Launch an EC2 Instance[5]:
 - Go to the EC2 dashboard.
 - Click Launch Instance.
 - Select Ubuntu Server 24.04 LTS as the AMI.
 - Choose an instance type (e.g., t2.micro for free tier eligibility).
 - Create or select a key pair for SSH access.
 - Configure security group: Allow SSH (port 22), HTTP (port 80) and HTTPS (port 443).
 - Configure instance details, add storage, and add tags as necessary.
 - Review and launch the instance.
- 3. Select your virtual machine and click "connect" to your instance To connect through SSH client:
 - Open an SSH client.
 - Locate your private key file.
 - Run this command, if necessary, to ensure your key is not publicly viewable.

• Connect to your instance using its Public DNS

Example:

ssh -i "your-key.pem" ubuntu@<your-ec2-public-ip>

2 Setting Up the Web Server

Update and Install Apache sh

```
sudo apt update
sudo apt install apache2
```

Apache is now installed and running on your EC2 instance. You can verify by navigating to http \hookrightarrow ://<your-ec2-public-ip> in your web browser.

3 Installing and Configuring WordPress

1. Install PHP and MySQL

```
sudo apt install php libapache2-mod-php php-mysql php-gd -y
sudo apt install mysql-server -y
```

2. Secure MySQL Installation

```
sudo mysql_secure_installation
```

Prompts:

- Set up the VALIDATE PASSWORD plugin? (Press Y to enable or N to skip)
- New password: yourpassword
- Re-enter new password: yourpassword
- Remove anonymous users? (Press Y)
- Disallow root login remotely? (Press Y)
- Remove test database and access to it? (Press Y)
- Reload privilege tables now? (Press Y)
- 3. Create WordPress Database and User.

Log into MySQL, create a database for WordPress, and a dedicated user with privileges.

```
sudo mysql -u root -p
```

Inside MySQL write:

```
CREATE DATABASE wordpress;
CREATE USER 'wpuser'@'localhost' IDENTIFIED BY 'yourpassword';
GRANT ALL PRIVILEGES ON wordpress.* TO 'wpuser'@'localhost';
FLUSH PRIVILEGES;
EXIT;
```

4. Configure Apache for WordPress[6]

Set up a virtual host for your WordPress site. Create a new configuration file for your Word-Press site.

```
sudo nano /etc/apache2/sites-available/wordpress.conf
```

Add the following configuration, save, and close the file.

```
<VirtualHost *:80>
ServerAdmin webmaster@localhost
DocumentRoot /var/www/wordpress

<Directory /var/www/wordpress/>
        AllowOverride All
        Require all granted
        </Directory>

ErrorLog ${APACHE_LOG_DIR}/error.log
        CustomLog ${APACHE_LOG_DIR}/access.log combined
        </VirtualHost>
```

Enable the new site and Apache rewrite module, then restart Apache.

```
sudo a2enmod rewrite
sudo a2ensite wordpress.conf
sudo a2dissite 000-default.conf
sudo apache2ctl configtest
sudo systemctl restart apache2
```

5. Download and Configure WordPress
Download the latest WordPress and configure.

```
cd /tmp
curl -0 https://wordpress.org/latest.tar.gz
tar xzvf latest.tar.gz
touch /tmp/wordpress/.htaccess
cp /tmp/wordpress/wp-config-sample.php /tmp/wordpress/wp-config.php
```

Adjust permissions and move WordPress files to the web root.

```
sudo cp -a /tmp/wordpress/. /var/www/wordpress
sudo chown -R www-data:www-data /var/www/wordpress
sudo find /var/www/wordpress/ -type d -exec chmod 755 {} \;
sudo find /var/www/wordpress/ -type f -exec chmod 644 {} \;
```

6. Configure the WordPress wp-config.php File Fetch unique security keys.

```
curl -s https://api.wordpress.org/secret-key/1.1/salt/
```

Edit the wp-config.php file with your database information and the keys.

```
sudo nano /var/www/wordpress/wp-config.php
```

Replace the database details placeholders with your actual database details and paste the unique security keys.

```
// ** Database settings - You can get this info from your web host **
/** The name of the database for WordPress */
define( 'DB_NAME', 'wordpress');
/** Database username */
define( 'DB_USER', 'wordpressuser');
/** Database password */
define( 'DB_PASSWORD', 'TestPass@123#');
/** Database hostname */
define( 'DB_HOST', 'localhost' );
/** Database charset to use in creating database tables. */
define( 'DB_CHARSET', 'utf8');
/** The database collate type. Don't change this if in doubt. */
define( 'DB_COLLATE', '' );
define('FS_METHOD', 'direct');
define('AUTH_KEY', 'your_unique-key');
define('SECURE_AUTH_KEY', 'your_unique-key');
define('LOGGED_IN_KEY', 'your_unique-key');
define('NONCE_KEY', 'your_unique-key');
define('AUTH_SALT', 'your_unique-key');
define('SECURE_AUTH_SALT', 'your_unique-key');
define('LOGGED_IN_SALT', 'your_unique-key');
define('NONCE_SALT', 'your_unique-key');
```

In case of changing IP, creating elastic IP or using domain name, add the following lines in wp-config.php file[2]:

```
define( 'WP_HOME', 'https://example.com');
define( 'WP_SITEURL', 'https://example.com');
```

You won't be able to edit them on the General settings page anymore when using this method.

7. Completing the Installation Through the Web Interface

Now that the server configuration is complete, you can complete the installation through the web interface.

In your web browser, navigate to your server's public IP address. You will be prompted to select the language you would like to use:



Next, you will come to the main setup page.

Select a name for your WordPress site and choose a username. A strong password is generated automatically. Save this password or select an alternative strong password.

Enter your email address and select whether you want to discourage search engines from indexing your site:

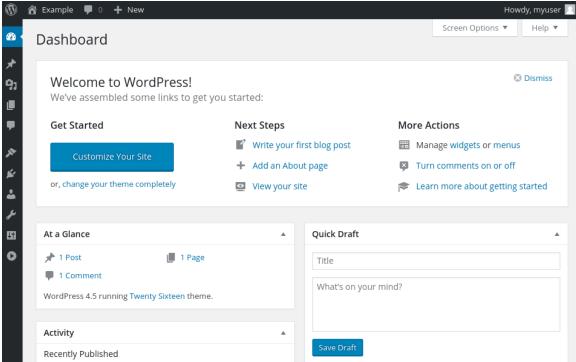


Welcome Welcome to the famous five-minute WordPress installation process! Just fill in the information below and you'll be on your way to using the most extendable and powerful personal publishing platform in the world. Information needed Please provide the following information. Don't worry, you can always change these settings later. Site Title Example **±** Username ...| myuser Usernames can have only alphanumeric characters, spaces, underscores, hyphens, periods, and the @ symbol. Password Z0pkm0lG9vHZ7Gfl&F Hide Strong Important: You will need this password to log in. Please store it in a secure location. Your Email admin@example.com Double-check your email address before continuing. Search Engine Discourage search engines from indexing this site Visibility It is up to search engines to honor this request. Install WordPress

When you click ahead, you will be taken to a page that prompts you to log in:

Success! WordPress has been installed. Thank you, and enjoy! Username myuser Password Your chosen password. Log In

Once you log in, you will be taken to the WordPress administration dashboard:



Now you are ready to customize your website! But before this, we'll obtain a domain name and HTTPS protocol.

4 Script to install WordPress from scratch

```
#!/bin/bash
# WordPress Installation Script
# This script installs WordPress from scratch on a server, including Apache, MySQL
    \hookrightarrow , and PHP.
# It sets up the necessary database and configures WordPress.
# Usage: Run this script as root.
print_green() {
 echo -e "\ensuremath{\text{e}}[32m$1\ensuremath{\text{e}}[0m"]
print_red() {
 echo -e "\e[31m$1\e[0m"
if [[ $EUID -ne 0 ]]; then
 print_red "This script must be run as root."
 exit 1
fi
print_green "Updating package index and upgrading installed packages..."
apt-get update && apt-get upgrade -y
print_green "Installing Apache web server..."
apt-get install -y apache2
a2enmod rewrite
systemctl restart apache2
print_green "Installing prerequisites..."
apt-get install -y curl software-properties-common
print_green "Adding PHP repository..."
add-apt-repository -y ppa:ondrej/php
apt-get update
print_green "Installing PHP and required extensions..."
apt-get install -y php7.4 php7.4-mysql php7.4-curl php7.4-gd php7.4-mbstring php7

→ .4-xml php7.4-zip php7.4-xmlrpc

print_green "Installing MySQL server..."
apt-get install -y mysql-server
mysql_secure_installation
print_green "Setting up MySQL database and user for WordPress..."
read -p "Enter MySQL root password: " root_pass
read -p "Enter WordPress database name: " dbname
```

```
read -p "Enter WordPress database user: " dbuser
read -sp "Enter WordPress database user password: " dbpass
echo
mysql -uroot -p"$root_pass" -e "CREATE DATABASE $dbname;"
mysql -uroot -p"$root_pass" -e "CREATE USER '$dbuser'@'localhost' IDENTIFIED BY '

    $dbpass';"

mysql -uroot -p"$root_pass" -e "GRANT ALL PRIVILEGES ON $dbname.* TO '$dbuser'@'
   → localhost';"
mysql -uroot -p"$root_pass" -e "FLUSH PRIVILEGES;"
print_green "Downloading and extracting WordPress..."
cd /tmp || { print_red "Error: not directory /tmp"; exit 1; }
curl -0 https://wordpress.org/latest.tar.gz
tar xzvf latest.tar.gz
cp -a /tmp/wordpress/. /var/www/wordpress
chown -R www-data:www-data /var/www/wordpress
chmod -R 755 /var/www/wordpress
print_green "Configuring WordPress..."
cd /var/www/wordpress || { print_red "Error: not directory /var/www/wordpress";
   \hookrightarrow exit 1; }
cp wp-config-sample.php wp-config.php
chown -R www-data:www-data wp-config.php
perl -pi -e "s/database_name_here/$dbname/g" wp-config.php
perl -pi -e "s/username_here/$dbuser/g" wp-config.php
perl -pi -e "s/password_here/$dbpass/g" wp-config.php
# Set WP salts
perl -i -pe'
 BEGIN {
   @chars = ("a" .. "z", "A" .. "Z", 0 .. 9);
   push @chars, split //, "!@#$%^&*()-_ []{}<>~\'+=,.;:/?|";
   sub salt { join "", map $chars[ rand @chars ], 1 .. 64 }
 s/put your unique phrase here/salt()/ge
'wp-config.php
mkdir wp-content/uploads
chmod 775 wp-content/uploads
print_green "Creating Apache virtual host for WordPress..."
cat <<EOF > /etc/apache2/sites-available/wordpress.conf
<VirtualHost *:80>
   ServerAdmin webmaster@localhost
   DocumentRoot /var/www/wordpress
   ErrorLog \${APACHE_LOG_DIR}/error.log
```

```
CustomLog \${APACHE_LOG_DIR}/access.log combined
   <Directory /var/www/wordpress>
       Options Indexes FollowSymLinks
      AllowOverride All
      Require all granted
   </Directory>
</VirtualHost>
EOF
a2ensite wordpress.conf
a2enmod rewrite
a2dissite 000-default.conf
systemctl restart apache2
print_green "WordPress installation is complete."
rm /tmp/latest.tar.gz
print_green "IMPORTANT: Make sure to note down the MySQL root password for future
   → reference."
exit
```

[7]

To execute program, do the following commands:

Screenshots with script output:

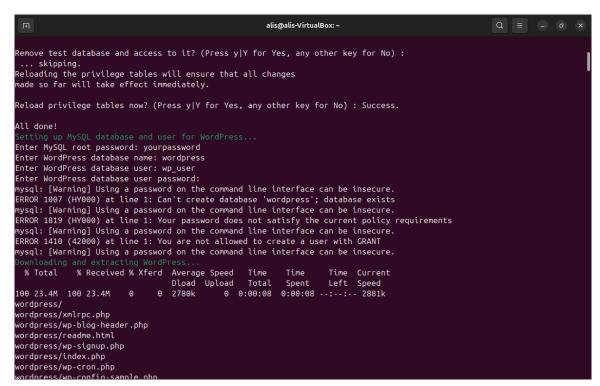
```
alis@alis-VirtualBox: ~
alis@alis-VirtualBox:~$ sudo ./wp_install.sh | tee wp_install.log
Get:1 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Hit:2 https://ppa.launchpadcontent.net/ondrej/php/ubuntu noble InRelease
Hit:3 http://ae.archive.ubuntu.com/ubuntu noble InRelease
Get:4 http://ae.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:5 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [233 kB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [57.2 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [180 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [35.0 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [240 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [105 kB]
Hit:11 http://ae.archive.ubuntu.com/ubuntu noble-backports InRelease

Get:12 http://ae.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [270 kB]

Get:13 http://ae.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [71.7 kB]

Get:14 http://ae.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [180 kB]

Get:15 http://ae.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [35.0 kB]
Get:16 http://ae.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [302 kB]
Get:17 http://ae.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [127 kB]
Fetched 2,087 kB in 4s (527 kB/s)
Reading package lists...
W: https://ppa.launchpadcontent.net/ondrej/php/ubuntu/dists/noble/InRelease: Signature by key 14AA40EC0831756756D7F66C4F
4EA0AAE5267A6C uses weak algorithm (rsa1024)
Reading package lists...
Building dependency tree...
Reading state information...
Calculating upgrade...
The following upgrades have been deferred due to phasing:
   gnome-shell gnome-shell-common
   upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
Reading package lists...
```



```
wordpress/wp-admin/js/set-post-thumbnail.min.js
wordpress/wp-admin/js/postbox.min.js
wordpress/wp-admin/js/postbox.min.js
wordpress/wp-admin/js/color-picker.js
wordpress/wp-admin/js/postbox.min.js
wordpress/wp-admin/js/postbox.min.js
wordpress/wp-admin/js/password-strength-meter.js
wordpress/wp-admin/js/customize-nav-menus.js
wordpress/wp-admin/js/customize-nav-menus.js
wordpress/wp-admin/js/cetitor-expand.js
wordpress/wp-admin/js/set-post-thumbnail.js
wordp
```

The full script output is here.

5 Linking the Server with a DNS Entry

Before going to a domain registrar site, let's acquire a permanent IP address.

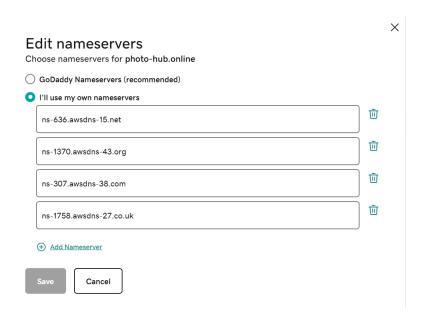
- 1. Open Elastic IPs on EC2 AWS Console
- 2. Click "Allocate new address" and then "Allocate".
- 3. Click the select box next to the IP address you just created.
- 4. Click "Actions" button to associate the address with your instance.

Now you have a permanent IP that won't be changed when you stop your instance. You should point your Domain name to this IP.

Let's acquire Domain name[3]:

- 1. Register a domain with a domain registrar (e.g. GoDaddy).
- 2. Go to Route 53 AWS Service
- 3. Create a "Hosted Zone" found within DNS Management.
- 4. Click on the domain name that matches the domain name you just purchased.
- 5. Click on "Create Record".
- 6. Obtain the public IP address of your EC2 instance from the EC2 dashboard. (It is automatically changed to your new Elastic IP)
- 7. Configure an A record in your domain's DNS settings pointing to the public IP address of your EC2 instance.
- 8. Go back to Domain provider and open Nameservers list
- 9. Choose custom Nameservers, delete old ones and paste Nameservers from Route 53. You will see four of them under NS type of your Records, which is created automatically by Route53 Service[1].





Congratulations, the setup is now complete! The only thing left to do is wait for the DNS propagation to be completed.

6 Obtaining a digital certificate from Lets Encrypt

1. Install snapd[4]

```
sudo snap install core
sudo snap refresh core
```

2. Remove certbot-auto and any Certbot OS packages

```
sudo apt remove certbot
```

3. Install Certbot

```
sudo snap install --classic certbot
```

4. Execute the following instruction on the command line on the machine to ensure that the certbot command can be run.

```
sudo ln -s /snap/bin/certbot /usr/bin/certbot
sudo certbot --apache
```

5. You should not need to run Certbot again, unless you change your configuration. You can test automatic renewal for your certificates by running this command:

```
sudo certbot renew --dry-run
```

6. Visit your website in your browser and look for the lock icon, to ensure that that everything is configured correctly.

7 Customizing WordPress site

7.1 Installing the Theme and Plugins

First of all, you need to choose new theme for your site. Go to Appearance > Themes > Add New

Theme and search for OceanWP. Follow setup instructions and choose *Photos* website template.

To customize our website, we need additional plugins. You can install them directly from your WordPress dashboard. Go to Plugins > Add New Plugin and search for:

- Elementor and Ocean Extra (installed automatically with OceanWP theme)
- bbPress for creating forums
- BuddyPress for interactions between users, e.g. collaboration projects
- Photo Gallery to display photos on gallery page
- All-in-One WP Migration for creating back-up files

Click "Install" and then "Activate" button on each plugin to use them on the site.

7.2 Customising the Theme

Using the WordPress Customizer Access the Customizer: Go to Appearance > Customize. Customize Site Identity:

- Set the site title and tagline.
- Upload a site logo and favicon.

Customize Colors and Fonts:

- Navigate to the *Colors* section to set primary and secondary colors.
- Navigate to the *Typography* section to set fonts for headings and body text.

Customize Layout:

• Navigate to the Layout section to adjust the layout of pages, header, and footer.

7.3 Customizing the Site Structure

Create Pages:

- Navigate to Pages > Add New.
- Create essential pages (e.g., Home, Educational Resources, Gallery, Community Forum, Collaboration Projects and Blog).

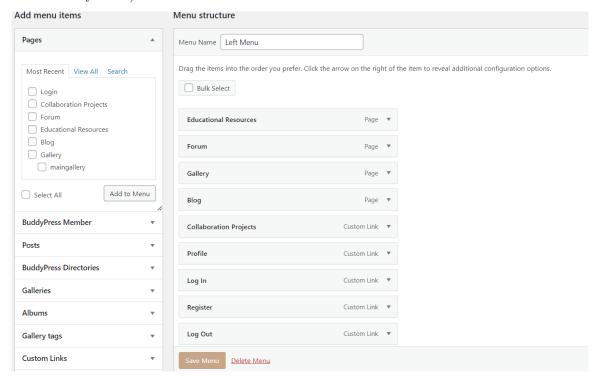
Set the Homepage:

- Go to Settings > Reading.
- Set the homepage to a static page and select the newly created Home page.

Create Menus:

• Navigate to Appearance > Menus.

• Create a new menu and add the created pages to the menu. Set the menu location (e.g., Primary Menu).

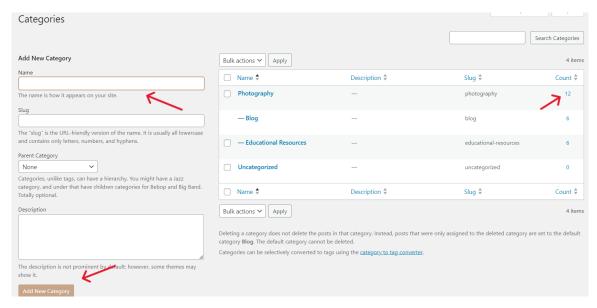


7.4 Adding Content

Add Posts:

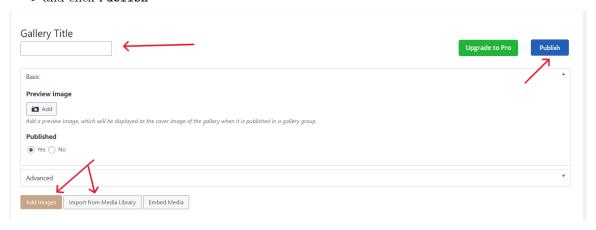
- Navigate to Posts > Add New Post to create blog posts and post as Educational Resources.
- \bullet Navigate to Media > Add New Media File to upload images or videos.

Use categories and tags to organise blog and educational posts. After creation categories, add them while creating your posts.

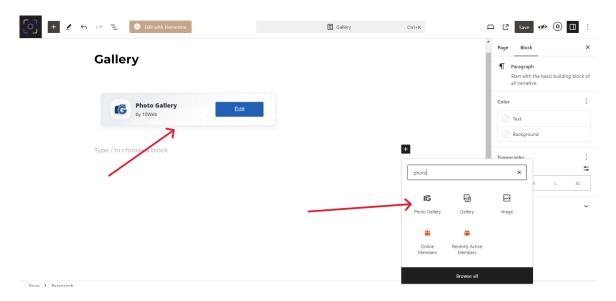


Create Gallery:

- Go to Photo Gallery (plugin), click Add New Gallery
- Add title for gallery
- Add new images or import from media gallery
- and click Publish

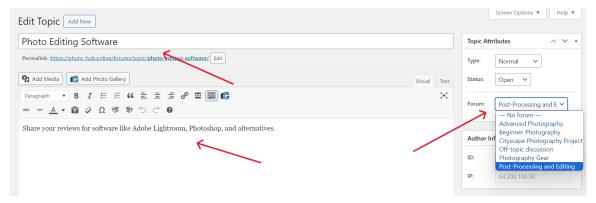


This gallery you can upload on the website through a page as a widget.



Create Forums and Topics:

- Go to Forums > Add New
- Add title, description and click Publish
- Then go to Topics > Add New
- Add title, description and choose Forum, where you want to place this topic
- Click Publish



Create Groups: To implement Collaboration Projects feature, you need to use Groups from BuddyPress plugin

- Go to Groups > Add New
- $\bullet\,$ Add title, description and click Publish

References

- [1] O. Ehoneah, How to connect a domain name to a website hosted on aws ec2, Feb. 2024. [Online]. Available: https://www.freecodecamp.org/news/how-to-connect-a-domain-to-a-website-hosted-on-aws-ec2/.
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- [6] S. Sharan, How to install wordpress on aws with ubuntu 22.04 with a lamp stack, Jul. 2024. [Online]. Available: https://medium.com/@sutrapusharan/how-to-install-wordpress-on-aws-with-ubuntu-22-04-with-a-lamp-stack-220f7335089c.
- [7] The quickest way to setup wordpress: A bash script to install php, wordpress, and mysql on ubuntu... Aug. 2023. [Online]. Available: https://engr-syedusmanahmad.medium.com/the-quickest-way-to-setup-wordpress-a-bash-script-to-install-php-wordpress-and-mysql-on-ubuntu-10cd5291e4a9.