Deployment Documentation

TEAM MA12 ECO-CULT
CARBCON WEB APP

Table of Contents

1. Introduction

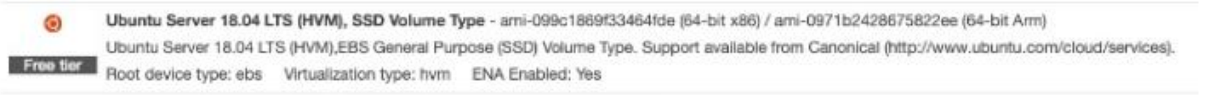
This documentation focuses on CarbCon web app system deployment . In detail, the report contains EC2 instance deployment along with MySQL, Wordpress and Apache setup on ubuntu. It also covers the domain and DNS setup for the website and digital ocean droplet deployment for instance migration in the final iteration.

2. System Setup and Technical Requirements

System	Description
Operating System	Ubuntu 18.04.01
EC2 Instance	Type: t2.micro Security Group: Custom – Defined AMI ID: 099720109477/ubuntu/images/hvm-ssd/ubuntu-bionic-18.04-amd64-server-20200810 (ami-0f87b0a4eff45d9ce)
AWS EC2	Server Hosting
PuttyGen	Generate private key for SSH connection
Apache 2.4 Web	Web server software
Wordpress Version 5.5.1	Web management system
HTML	Web development tool
MySQL 5.7	Database management system
AWS Route 53	DNS management system
Cloudfare	DNS Security system
Get.tech	Tech domain registration

3. EC2 Instance and SSH setup

- Create AWS account as root user
- Create EC2 instance by selecting Ubuntu Server

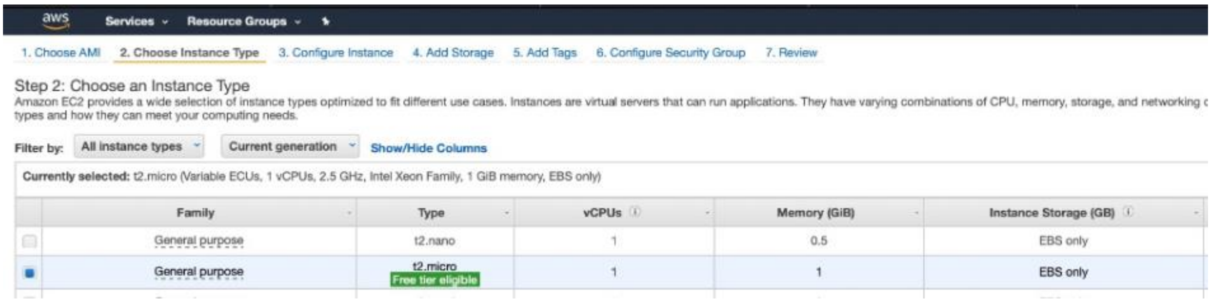


Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-099c1869f33464fde (64-bit x86) / ami-0971b2428675822ee (64-bit Arm)

Ubuntu Server 18.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

- Choose the instance type t2.micro



Step 2: Choose an Instance Type

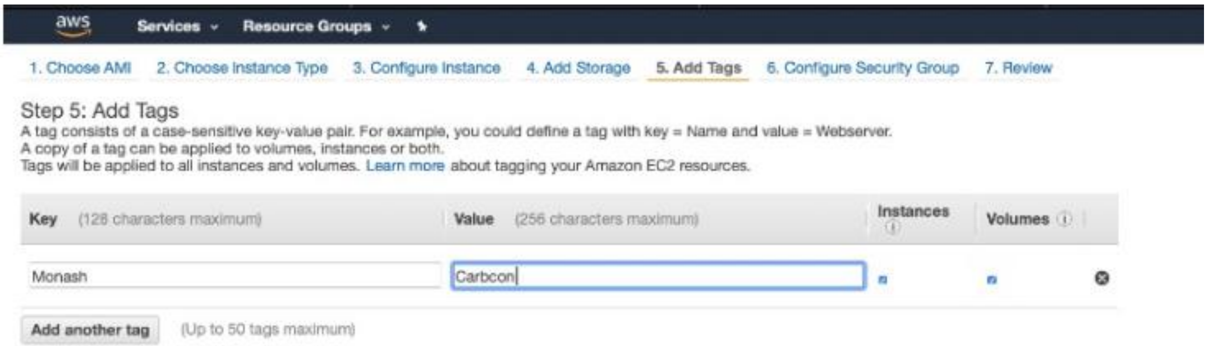
Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking c types and how they can meet your computing needs.

Filter by: All instance types Current generation

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)
□	General purpose	t2.nano	1	0.5	EBS only
■	General purpose	t2.micro Free tier eligible	1	1	EBS only

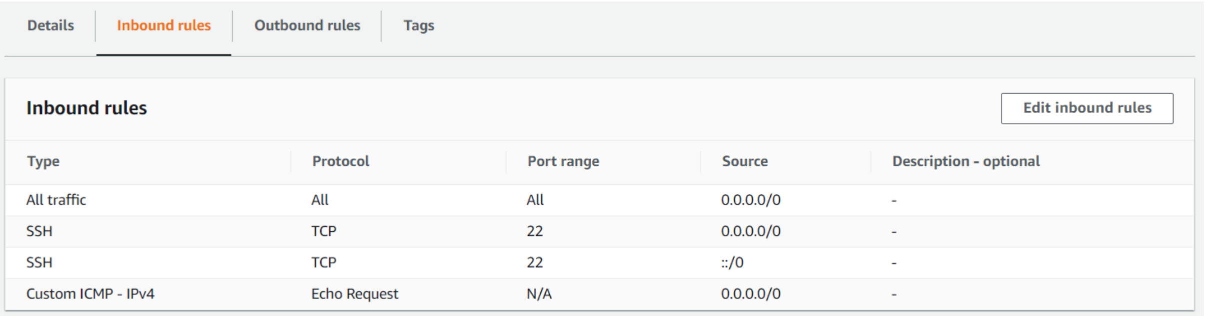
- Configure the EC2 instance as follows



Step 5: Add Tags
A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver.
A copy of a tag can be applied to volumes, instances or both.
Tags will be applied to all instances and volumes. Learn more about tagging your Amazon EC2 resources.

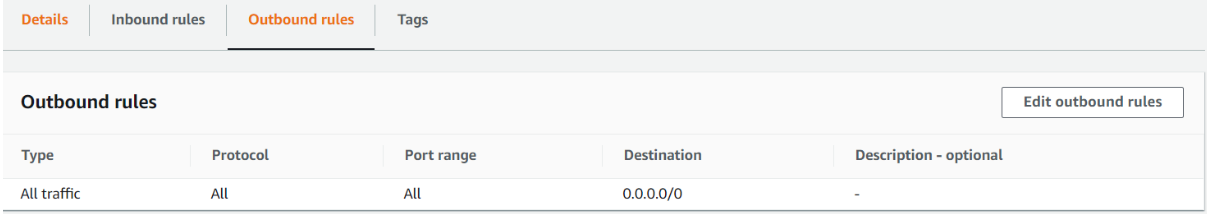
Key (128 characters maximum)	Value (256 characters maximum)	Instances	Volumes
Monash	Carbcon	☑	☑

- Setup EC2 instance inbound and outbound rules as follows



Inbound rules

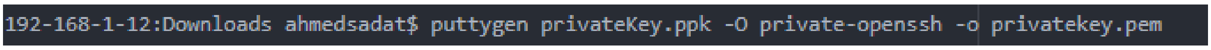
Type	Protocol	Port range	Source	Description - optional
All traffic	All	All	0.0.0.0/0	-
SSH	TCP	22	0.0.0.0/0	-
SSH	TCP	22	::/0	-
Custom ICMP - IPv4	Echo Request	N/A	0.0.0.0/0	-



Outbound rules

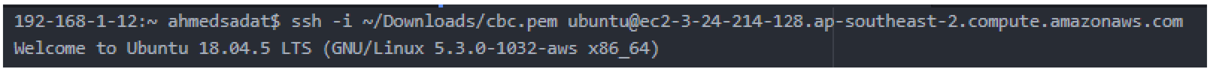
Type	Protocol	Port range	Destination	Description - optional
All traffic	All	All	0.0.0.0/0	-

- Download the privatekey ppk file and generate pem with putty gen



```
192-168-1-12:Downloads ahmedsadat$ puttygen privateKey.ppk -O private-openssh -o privatekey.pem
```

- To access the EC2 instance SSH using local terminal with pem file and instance address as follows



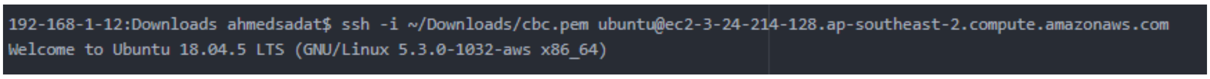
```
192-168-1-12:~ ahmedsadat$ ssh -i ~/Downloads/cbc.pem ubuntu@ec2-3-24-214-128.ap-southeast-2.compute.amazonaws.com
Welcome to Ubuntu 18.04.5 LTS (GNU/Linux 5.3.0-1032-aws x86_64)
```

4. Setup Database.

- Update Package and Install MySQL

  sudo apt update
  sudo apt install mysql-server

- Configure MySQL



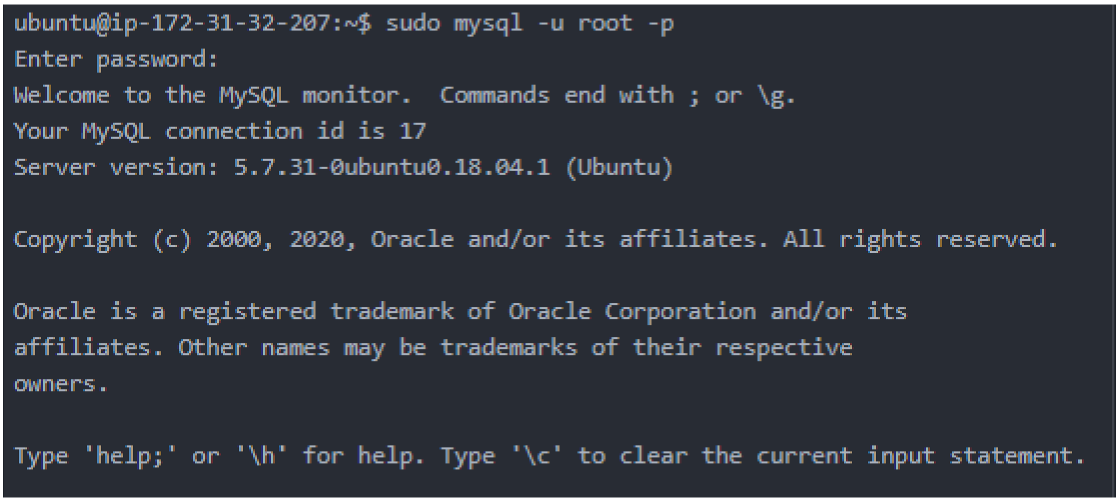
```
192-168-1-12:Downloads ahmedsadat$ ssh -i ~/Downloads/cbc.pem ubuntu@ec2-3-24-214-128.ap-southeast-2.compute.amazonaws.com
Welcome to Ubuntu 18.04.5 LTS (GNU/Linux 5.3.0-1032-aws x86_64)
```

sudo mysql_secure_installation

- Set MySQL user authentication

sudo mysql
ALTER USER 'root'@'localhost' IDENTIFIED WITH mysql_native_password BY 'password';
FLUSH PRIVILEGES;

- Login to the MySQL



```
ubuntu@ip-172-31-32-207:~$ sudo mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 17
Server version: 5.7.31-0ubuntu0.18.04.1 (Ubuntu)

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owners.

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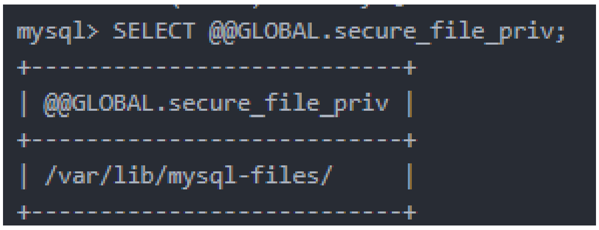
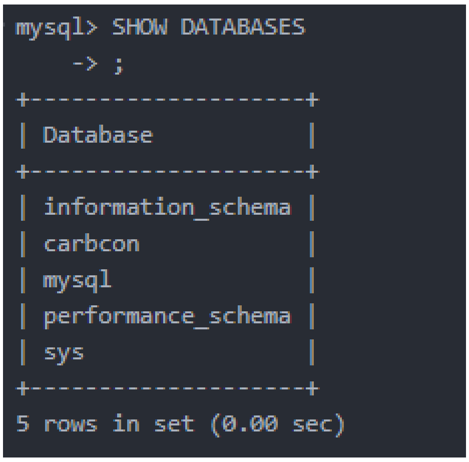

- Query the global secure file folder and upload csv data to the directory from local computer

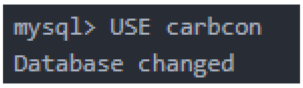


```
mysql> SELECT @@GLOBAL.secure_file_priv;
+---------------------------+
| @@GLOBAL.secure_file_priv |
+---------------------------+
| /var/lib/mysql-files/     |
+---------------------------+
```

- Display the database list and change the database to carbcon

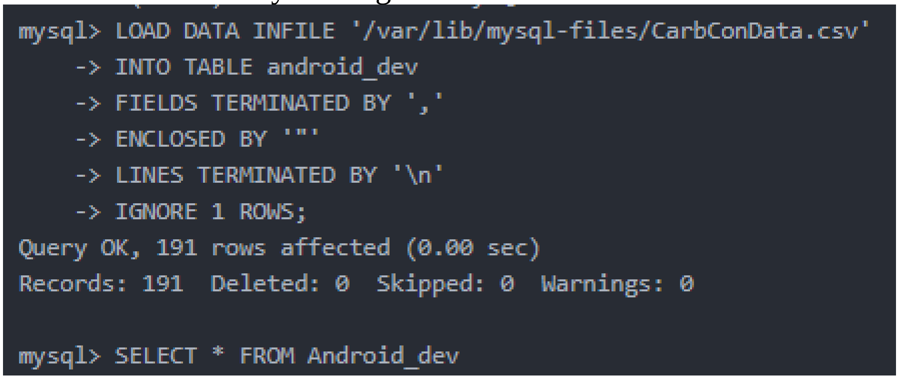


```
mysql> SHOW DATABASES
    -> ;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| carbcon            |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.00 sec)
```



```
mysql> USE carbcon
Database changed
```

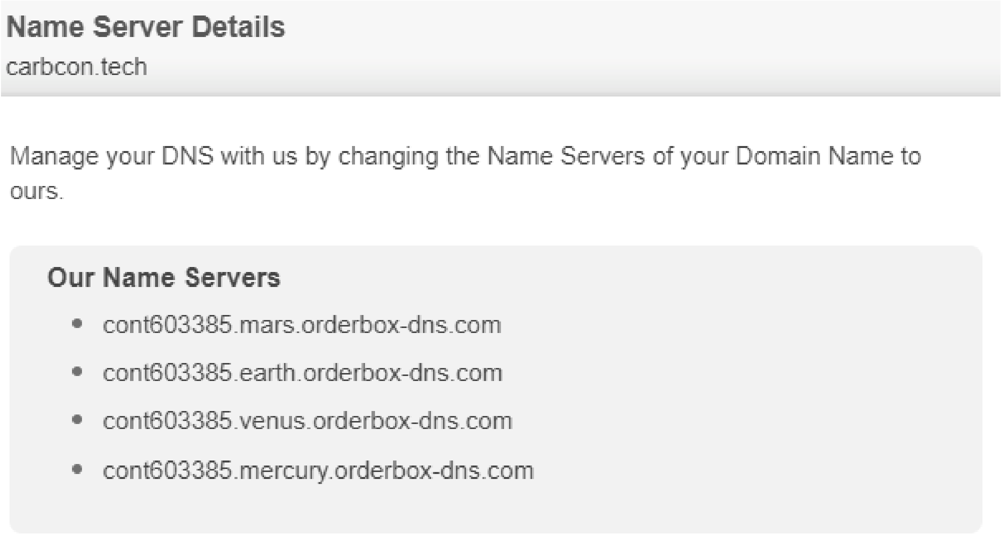
- Create the database by loading the carbcon.csv data



```
mysql> LOAD DATA INFILE '/var/lib/mysql-files/CarbConData.csv'
    -> INTO TABLE android_dev
    -> FIELDS TERMINATED BY ','
    -> ENCLOSED BY '"'
    -> LINES TERMINATED BY '\n'
    -> IGNORE 1 ROWS;
Query OK, 191 rows affected (0.00 sec)
Records: 191  Deleted: 0  Skipped: 0  Warnings: 0

mysql> SELECT * FROM Android_dev
```

5. Setup Domain and DNS

- Obtain the domain name through get.tech and get the nameserver information



Name Server Details

carbcon.tech

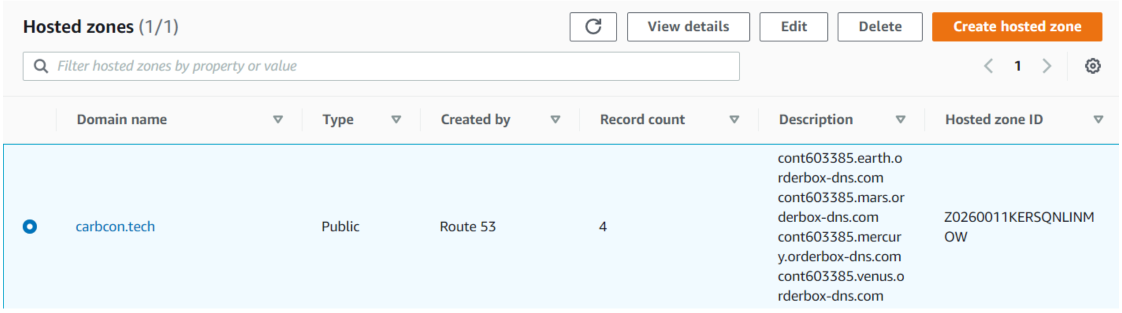
Manage your DNS with us by changing the Name Servers of your Domain Name to ours.

Our Name Servers

- cont603385.mars.orderbox-dns.com
- cont603385.earth.orderbox-dns.com
- cont603385.venus.orderbox-dns.com
- cont603385.mercury.orderbox-dns.com

- Create hosted zone using AWS route 53 and set the nameserver as follows

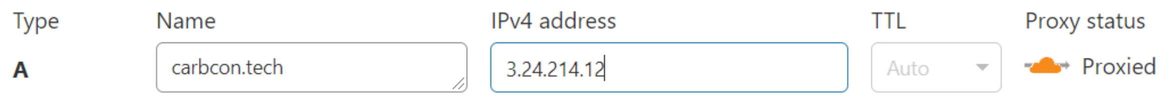
-



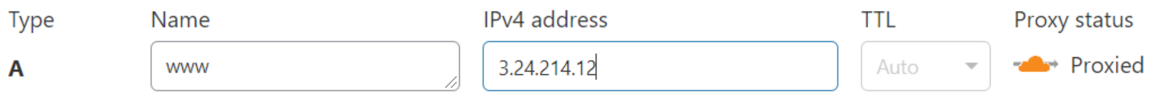
Hosted zones (1/1)

	Domain name	Type	Created by	Record count	Description	Hosted zone ID
●	carbcon.tech	Public	Route 53	4	cont603385.earth.orderbox-dns.com cont603385.mars.orderbox-dns.com cont603385.mercury.orderbox-dns.com cont603385.venus.orderbox-dns.com	Z0260011KERSQNLINMOW

- Create cloudflare account and setup the DNS management using the nameserver and EC2 instance IP address

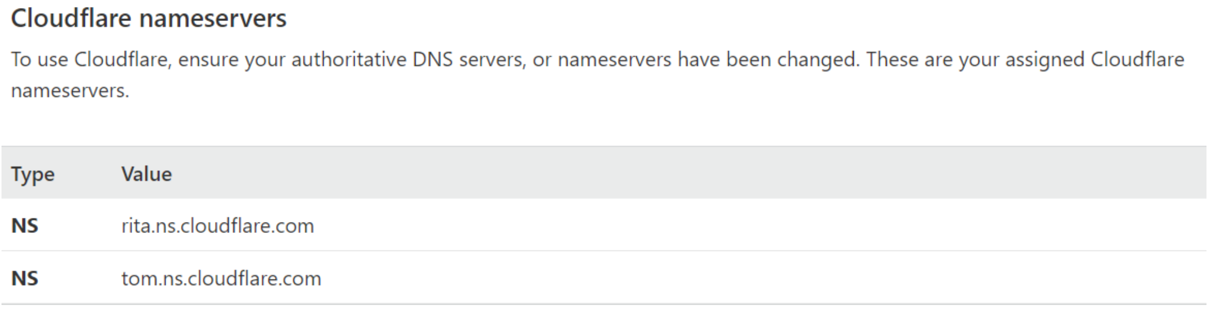


Type	Name	IPv4 address	TTL	Proxy status
A	carbcon.tech	3.24.214.12	Auto	Proxied



Type	Name	IPv4 address	TTL	Proxy status
A	www	3.24.214.12	Auto	Proxied

- Generate cloudflare nameservers as follows

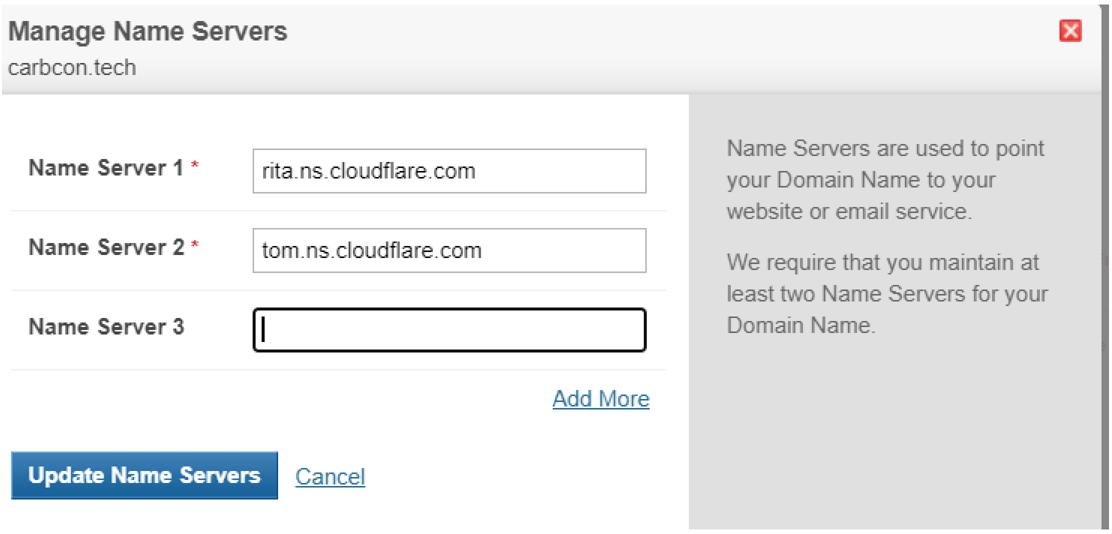


Cloudflare nameservers

To use Cloudflare, ensure your authoritative DNS servers, or nameservers have been changed. These are your assigned Cloudflare nameservers.

Type	Value
NS	rita.ns.cloudflare.com
NS	tom.ns.cloudflare.com

- Replace nameserver in get.tech with cloudlfare nameservers as follows



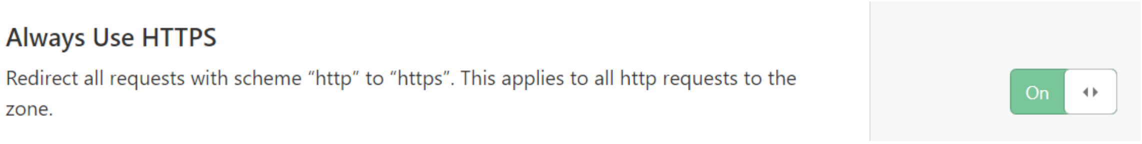
Manage Name Servers
carbcon.tech

Name Server 1 *	rita.ns.cloudflare.com
Name Server 2 *	tom.ns.cloudflare.com
Name Server 3	

Name Servers are used to point your Domain Name to your website or email service.

We require that you maintain at least two Name Servers for your Domain Name.

- Enable the HTTPS in the cloudflare DNS setting



Always Use HTTPS

Redirect all requests with scheme "http" to "https". This applies to all http requests to the zone.

6. Install WordPress on Amazon EC2 Ubuntu

- Install WordPress on Amazon EC2 Ubuntu

```
ssh -i cbc.pem ubuntu@ec2-3-24-214-128.ap-southeast-2.compute.amazonaws.com
```

- Install Apache 2.4 Web in the EC2 instance

```
sudo add-apt-repository ppa:ondrej/apache2
```

- Update system repository to install available upgrade packages

```
sudo apt update
```

- Install Apache package

```
sudo apt-get install apache2 -y
```

- Install PHP 7.2 for WordPress

```
sudo add-apt-repository ppa:ondrej/php
sudo apt update
sudo apt install -y php7.2
```

- Install PHP (one line)

```
sudo apt install -y libapache2-mod-php7.2 php7.2-common php7.2-mbstring
php7.2-xmlrpc php7.2-gd php7.2-xml php7.2-mysql php7.2-cli php7.2-zip
php7.2-curl php-imagick
```

- Modify php.ini configuration file

```
sudo vim /etc/php/7.2/apache2/php.ini
```

- Modify the following parameters and save the file

```
file_uploads = On
allow_url_fopen = On
memory_limit = 256M
upload_max_filesize = 64M
post_max_size = 64M
max_execution_time = 360
```

- Install MySQL server

```
sudo apt update
sudo apt-get install mysql-server -y
```

- Download and extract Wordpress

```
cd /tmp && wget https://wordpress.org/latest.tar.gz
tar -zxvf latest.tar.gz
```

- Move the file to root document directory and change to the directory

```
sudo mv wordpress /var/www/wordpress
cd /var/www/wordpress/
```

- Create .htaccess file

```
sudo vim .htaccess
```

- Add following lines into the .htacess file

```
<IfModule mod_rewrite.c>
RewriteEngine On
RewriteBase /
RewriteRule ^index\.php$ - [L]
RewriteCond %{REQUEST_FILENAME} !-f
RewriteCond %{REQUEST_FILENAME} !-d
RewriteRule . /index.php [L]
</IfModule>
```

- Rename the wp-config-sample.php

```
sudo mv wp-config-sample.php wp-config.php
```

- Change WordPress ownership

```
sudo chown -R www-data:ubuntu /var/www/wordpress
```

- Change the right permission for files and directories

```
sudo find /var/www/wordpress/ -type d -exec chmod 755 {} \;
sudo find /var/www/wordpress/ -type f -exec chmod 644 {} \;
sudo chmod 600 /var/www/wordpress/wp-config.php
sudo chmod 600 /var/www/wordpress/.htaccess
```

- Setup MySQL database

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

- Change the following part of the files

```
** The name of the database for WordPress */
define( 'DB_NAME', 'carbcon' );

/** MySQL database username */
define( 'DB_USER', 'root');

/** MySQL database password */
define( 'DB_PASSWORD', '********' );
```

```
/** MySQL hostname */
define( 'DB_HOST', 'localhost' );

/** Database Charset to use in creating database tables. */
define( 'DB_CHARSET', 'utf8' );
```

- Generate WordPress Security Key

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

- Open the WordPress configuration file and setup security key

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

define('AUTH_KEY',
'fdp_.GkB<6pQyvr%9nPrr.hBTl{:!j+/`H)DA,VRVok/4AGrGU|ytsXk=9Yl7q^5'
);
define('SECURE_AUTH_KEY',  'qc<VBYm~lAlB${=6V?Sh-
BCMA`>`UBK|,(YM-j92]>rk6-`h&-frBGOQ`!X>0DPF');
define('LOGGED_IN_KEY',    'F}zYI>+@T0gBQ-Suk[wx]gNkH6PYebu VbjC-
EZ3l,@N;G|`X%+59)n6K14T_-@c');
define('NONCE_KEY',
'!kgF;XQ2}s~FMVp5|@QN!G~aw</*|,0h7`gq?7LG5Q8l.N>/`&YFH2,HqH^U|y:
d');
define('AUTH_SALT',        'Ps-
x :&x(k#/TiF;KU9zWBe|`DXo%T3(4;ycl+TMi$EKY{0i:4R%KmMlcIgaVtZE');
define('SECURE_AUTH_SALT', '5e](bi||pL8Pb-
D$iF0wxm*:B)`Nf0}SEfGe.H%{ZeI?!#NJ(-JXso1-|Y5NINcK');
define('LOGGED_IN_SALT',
'|V,Q~yyo&4*y}+z`>WlY7{z>6i+rP?JE|`kZ&,R*pK;p*+XScMk-
|mQ7U/PCrMgh');
define('NONCE_SALT',
'V_FLgZcmF.gX~#[;4?%,%Lo%?V%P;?o1M5&@llg}?7Is2<3dJYYK!U|v`tXpJ
k<-');
```

- Create Apache virtual host

```
cd /etc/apache2/sites-available
sudo a2dissite 000-default.conf
sudo systemctl reload apache2
sudo vim wordpress.conf
```

- Copy host configuration file and change the domain name and root path location

```
<VirtualHost *:80>
    ServerAdmin carbcon-tech@gmail.com
    DocumentRoot /var/www/wordpress
    ServerName carbcon-tech
    ServerAlias carbcon-tech
    <Directory /var/www/wordpress/>
      Options +FollowSymlinks
      AllowOverride All
      Require all granted
    </Directory>

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

- Enable virtual host configuration and restart the service

```
sudo a2ensite wordpress.conf
sudo a2enmod rewrite
sudo apache2ctl configtest
sudo service apache2 restart
```

- Check Wordpress IP

```
curl http://checkip.amazonaws.com
```

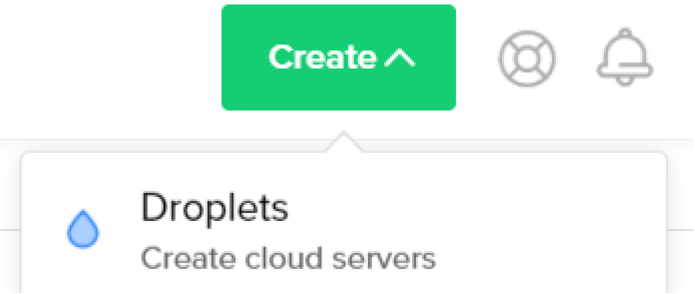
- Copy and paste IP address to the web browser

http://3.24.214.12

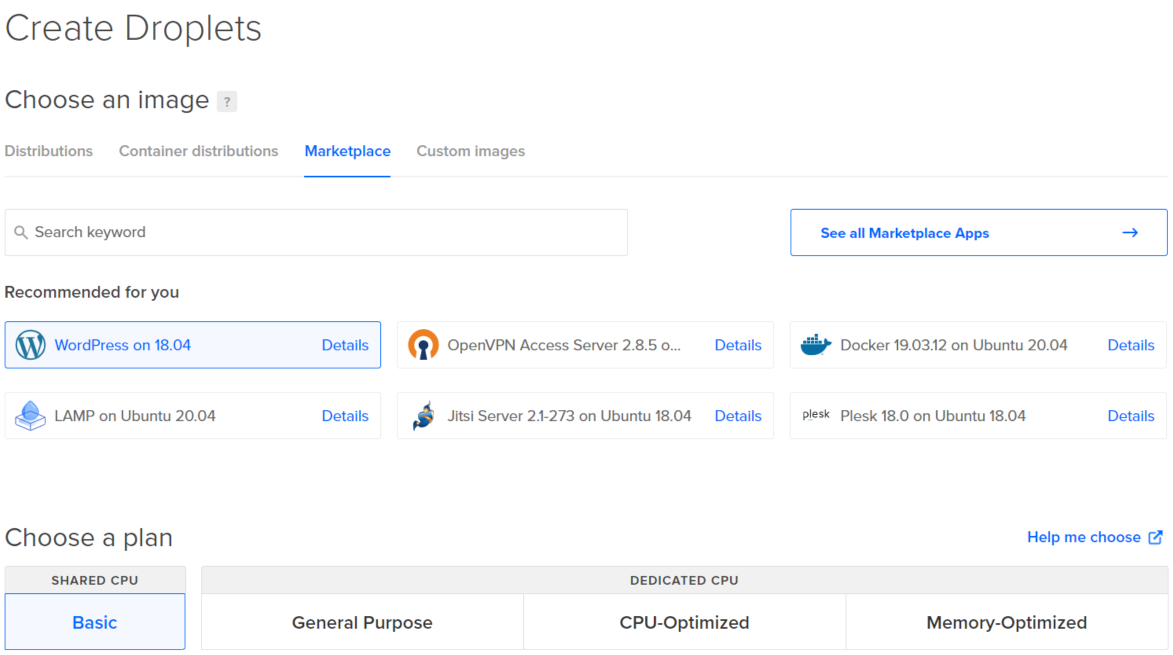
- Choose website language (english) and provide Title, Email, Username and Password
- Test the Wordpress by login to the console

7. Digital Ocean Droplet Deployment

- Create digitalocean account and create new droplet from menu



- Select the marketplace, select wordpress droplet image and cpu type



Create Droplets

Choose an image ?

Distributions | Container distributions | Marketplace | Custom images

Search keyword

See all Marketplace Apps →

Recommended for you

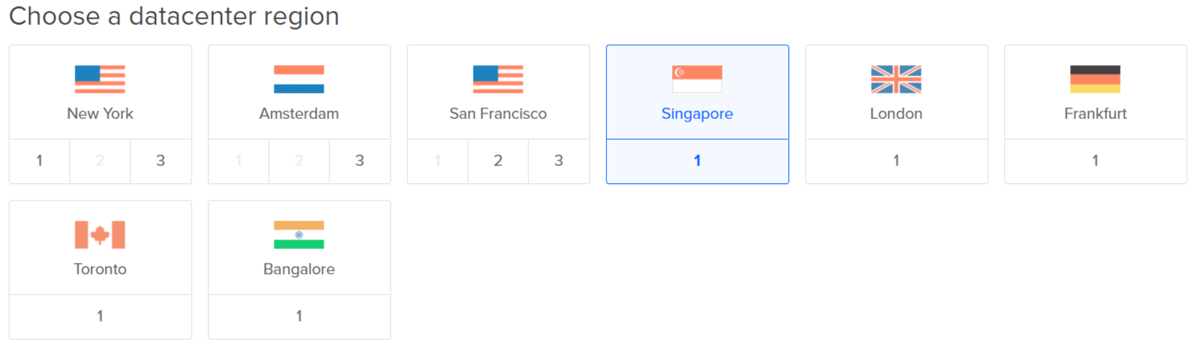
WordPress on 18.04	Details
OpenVPN Access Server 2.8.5 o...	Details
Docker 19.03.12 on Ubuntu 20.04	Details
LAMP on Ubuntu 20.04	Details
Jitsi Server 2.1-273 on Ubuntu 18.04	Details
Plesk 18.0 on Ubuntu 18.04	Details

Choose a plan

Help me choose

SHARED CPU	DEDICATED CPU		
Basic	General Purpose	CPU-Optimized	Memory-Optimized

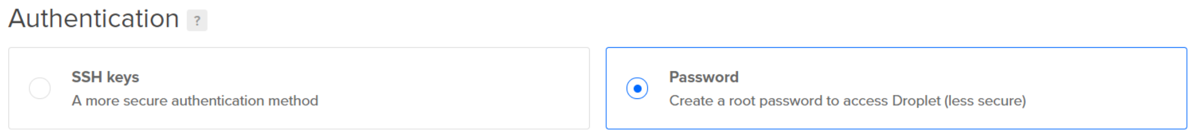
- Choose a datacenter region



Choose a datacenter region

Region	Datacenters
New York	1, 2, 3
Amsterdam	1, 2, 3
San Francisco	1, 2, 3
Singapore	1
London	1
Frankfurt	1
Toronto	1
Bangalore	1

- Select ssh or password authentication type

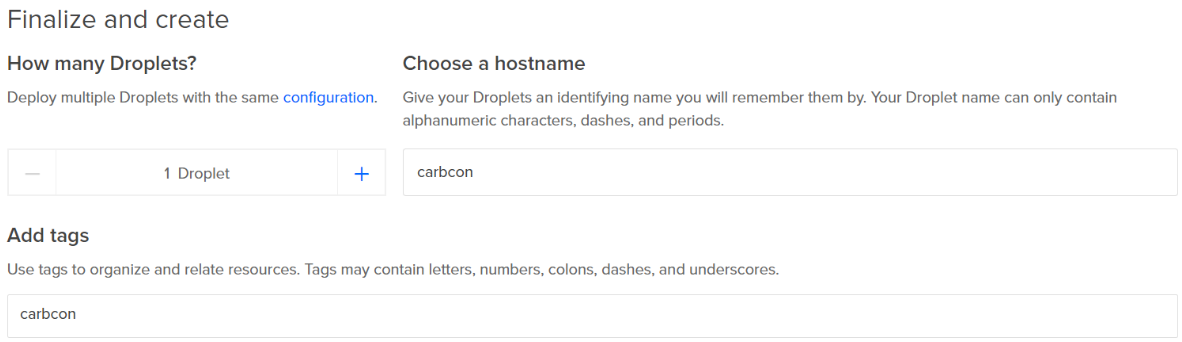


Authentication ?

○ SSH keys
A more secure authentication method

● Password
Create a root password to access Droplet (less secure)

- Finalise droplet information and tag
-



Finalize and create

How many Droplets?

Deploy multiple Droplets with the same configuration.

— 1 Droplet +

Choose a hostname

Give your Droplets an identifying name you will remember them by. Your Droplet name can only contain alphanumeric characters, dashes, and periods.

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Add tags

Use tags to organize and relate resources. Tags may contain letters, numbers, colons, dashes, and underscores.

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- After the droplet creation finished install the wordpress by redirecting into droplet IP address