

AWS-Based Multi-Server Architecture Implementation

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Batch – TR3

Instances

- 1. Instance 1 (44.203.254.53) - NFS Server & MariaDB Slave
- 2. Instance 2 (3.89.232.189) - Web Server & MariaDB Slave

Instances (2) Info

Last updated less than a minute ago

Connect

Instance state

Actions

Launch instances

Find Instance by attribute or tag (case-sensitive)

All states

Instance state (client) != terminated

Clear filters

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
<input type="checkbox"/>	NFS with Maria Slave	i-07738fc230000dda9	Running	t2.micro	Initializing	View alarms +	us-east-1b	ec2-44-203-254-53.co...	44.203.254.53	-
<input type="checkbox"/>	Apache with Maria	i-080fc5768ddeba57	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1b	ec2-3-89-232-189.com...	3.89.232.189	-

AWS Infrastructure

1. Security Group

- Allow SSH (22).
- Allow HTTP (80) & HTTPS (443)
- Allow MySQL (3306)
- Allow NFS (2049)

sg-01731a40b7eec7dc - launch-wizard-3

Actions

Details

Security group name
launch-wizard-3

Security group ID
sg-01731a40b7eec7dc

Description
launch-wizard-3 created 2025-02-15T09:05:52.634Z

VPC ID
vpc-0704499cad18a91b3

Owner
058264291193

Inbound rules count
5 Permission entries

Outbound rules count
2 Permission entries

Inbound rules

Outbound rules

Sharing - new

VPC associations - new

Tags

Inbound rules (5)



Manage tags

Edit inbound rules

Search

<input type="checkbox"/>	Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
<input type="checkbox"/>	-	sg-07eaa5f26ecb7b10	IPv4	MYSQL/Aurora	TCP	3306	0.0.0.0/0	-
<input type="checkbox"/>	-	sg-044a3c9c1cba11fd9	IPv4	HTTPS	TCP	443	0.0.0.0/0	-
<input type="checkbox"/>	-	sg-0119c434a5e110c04	IPv4	SSH	TCP	22	0.0.0.0/0	-
<input type="checkbox"/>	-	sg-016967534a275fc1a	IPv4	NFS	TCP	2049	0.0.0.0/0	-
<input type="checkbox"/>	-	sg-0efb31ec008737f65	IPv4	HTTP	TCP	80	0.0.0.0/0	-

Implementation Steps

Configure Instance 1 (NFS + MariaDB Slave)

1. Setup NFS Server

```
sudo apt update && sudo apt install -y nfs-kernel-server
sudo mkdir -p /nfs/wp-data /nfs/db-data
sudo chown -R nobody:nogroup /nfs/wp-data /nfs/db-data
```

Configure exports:

```
echo "/nfs/wp-data 3.89.232.189(rw,sync,no_root_squash)" | sudo tee -a /etc/exports
echo "/nfs/db-data 3.89.232.189(rw,sync,no_root_squash)" | sudo tee -a /etc/exports
```

```
ubuntu@ip-172-31-89-204:~$ echo "/nfs/wp-data 3.89.232.189(rw,sync,no_root_squash)" | sudo tee -a /etc/exports
echo "/nfs/db-data 3.89.232.189(rw,sync,no_root_squash)" | sudo tee -a /etc/exports
/nfs/wp-data 3.89.232.189(rw,sync,no_root_squash)
/nfs/db-data 3.89.232.189(rw,sync,no_root_squash)
ubuntu@ip-172-31-89-204:~$ |
```

```
sudo exportfs -a
sudo systemctl restart nfs-kernel-server
```

```
ubuntu@ip-172-31-89-204:~$ sudo exportfs -a
sudo systemctl restart nfs-kernel-server
exportfs: /etc/exports [1]: Neither 'subtree_check' or 'no_subtree_check' specified for export "3.89.232.189:/nfs/wp-data".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
exportfs: /etc/exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "3.89.232.189:/nfs/db-data".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
ubuntu@ip-172-31-89-204:~$ |
```

2. Setup MariaDB Slave

```
sudo apt install -y mariadb-server
sudo nano /etc/mysql/mariadb.conf.d/50-server.cnf
```

Modify configuration:

```
[mysqld]
server-id = 2
relay-log = /var/log/mysql/mysql-relay-bin.log
```

```
# this is only for the mysqld standalone daemon
[mysqld]

#
# * Basic Settings
#

server-id = 2
relay-log = /var/log/mysql/mysql-relay-bin.log
```

Restart MariaDB:

```
sudo systemctl restart mariadb
```

```

ubuntu@ip-172-31-89-204:~$ sudo systemctl restart mariadb
ubuntu@ip-172-31-89-204:~$ sudo systemctl enable mariadb
Synchronizing state of mariadb.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable mariadb
ubuntu@ip-172-31-89-204:~$ sudo systemctl start mariadb
ubuntu@ip-172-31-89-204:~$ sudo systemctl status mariadb
● mariadb.service - MariaDB 10.11.8 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: enabled)
   Active: active (running) since Mon 2025-02-24 08:49:13 UTC; 30s ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 11516 (mariadb)
   Status: "Taking your SQL requests now..."
     Tasks: 12 (limit: 7463)
    Memory: 78.7M (peak: 81.6M)
       CPU: 364ms
   CGroup: /system.slice/mariadb.service
           └─11516 /usr/sbin/mariadb

Feb 24 08:49:13 ip-172-31-89-204 mariadb[11516]: 2025-02-24 8:49:13 0 [Note] InnoDB: log sequence number 46980; transaction id 14
Feb 24 08:49:13 ip-172-31-89-204 mariadb[11516]: 2025-02-24 8:49:13 0 [Note] InnoDB: Loading buffer pool(s) from /var/lib/mysql/ib_buffer_pool
Feb 24 08:49:13 ip-172-31-89-204 mariadb[11516]: 2025-02-24 8:49:13 0 [Note] Plugin 'FEEDBACK' is disabled.
Feb 24 08:49:13 ip-172-31-89-204 mariadb[11516]: 2025-02-24 8:49:13 0 [Warning] You need to use --log-bin to make --expire-logs-days or --binlog-expire-logs-seconds work.
Feb 24 08:49:13 ip-172-31-89-204 mariadb[11516]: 2025-02-24 8:49:13 0 [Note] Server socket created on IP: '127.0.0.1'.
Feb 24 08:49:13 ip-172-31-89-204 mariadb[11516]: 2025-02-24 8:49:13 0 [Note] /usr/sbin/mariadb: ready for connections.
Feb 24 08:49:13 ip-172-31-89-204 mariadb[11516]: Version: '10.11.8-MariaDB-0ubuntu0.24.04.1' socket: '/run/mysqld/mysqld.sock' port: 3306 Ubuntu 24.04
Feb 24 08:49:13 ip-172-31-89-204 mariadb[11516]: 2025-02-24 8:49:13 0 [Note] InnoDB: Buffer pool(s) load completed at 250224 8:49:13
Feb 24 08:49:13 ip-172-31-89-204 systemd[1]: Started mariadb.service - MariaDB 10.11.8 database server.
Feb 24 08:49:13 ip-172-31-89-204 /etc/mysql/debian-start[11544]: Checking for insecure root accounts.

```

Connect to MariaDB and start replication:

```

CHANGE MASTER TO MASTER_HOST='3.89.232.189',
MASTER_USER='replica',
MASTER_PASSWORD='replica_password',
MASTER_LOG_FILE='mysql-bin.000001', -- Use actual File value
MASTER_LOG_POS=154; -- Use actual Position value
START SLAVE;
SHOW SLAVE STATUS\G;

```

```

ubuntu@ip-172-31-89-204:~$ sudo mariadb -u root
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 36
Server version: 10.11.8-MariaDB-0ubuntu0.24.04.1 Ubuntu 24.04

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)]> SHOW SLAVE STATUS\G;
***** 1. row *****
Slave_IO_State: Waiting for master to send event
Master_Host: 3.89.232.189
Master_User: replica
Master_Port: 3306
Connect_Retry: 60
Master_Log_File: mysql-bin.000001
Read_Master_Log_Pos: 493628
Relay_Log_File: mysql-relay-bin.000002
Relay_Log_Pos: 555
Relay_Master_Log_File: mysql-bin.000001
Slave_IO_Running: Yes
Slave_SQL_Running: Yes

```

Step 3: Configure Instance 2 (Apache + MariaDB Master)

1. Setup Web Server

```

sudo apt update && sudo apt install -y apache2 php php-mysql nfs-common
sudo mount 44.203.254.53:/nfs/wp-data /var/www/html

```

```
echo "44.203.254.53:/nfs/wp-data /var/www/html nfs defaults 0 0" | sudo tee -a /etc/fstab
```

```
ubuntu@ip-172-31-87-44:~$ echo "44.203.254.53:/nfs/wp-data /var/www/html nfs defaults 0 0" | sudo tee -a /etc/fstab
44.203.254.53:/nfs/wp-data /var/www/html nfs defaults 0 0
ubuntu@ip-172-31-87-44:~$
```

```
sudo mount 44.203.254.53:/nfs/db-data /var/log/mysql
```

```
echo "44.203.254.53:/nfs/db-data /var/log/mysql nfs defaults 0 0" | sudo tee -a /etc/fstab
```

```
ubuntu@ip-172-31-87-44:/var/log/mysql$ sudo mount 44.203.254.53:/nfs/db-data /var/log/mysql
ubuntu@ip-172-31-87-44:/var/log/mysql$ echo "44.203.254.53:/nfs/db-data /var/log/mysql nfs defaults 0 0" | sudo tee -a /etc/fstab
44.203.254.53:/nfs/db-data /var/log/mysql nfs defaults 0 0
ubuntu@ip-172-31-87-44:/var/log/mysql$
```

2. Setup MariaDB Master

```
sudo apt install -y mariadb-server
```

```
sudo nano /etc/mysql/mariadb.conf.d/50-server.cnf
```

Modify configuration:

```
[mysqld]
bind-address = 0.0.0.0
server-id = 1
log_bin = /var/log/mysql/mysql-bin.log
binlog_do_db = wordpress
```

```
[mysqld]
#
# * Basic Settings
#
|
bind-address = 0.0.0.0
server-id = 1
log_bin = /var/log/mysql/mysql-bin.log
binlog_do_db = wordpress
```

Restart MariaDB:

```
sudo systemctl restart mariadb
```

Create database and user:

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

Enable replication:

```
CREATE USER 'replica'@'44.203.254.53' IDENTIFIED BY 'replica_password';
GRANT REPLICATION SLAVE ON *.* TO 'replica'@'44.203.254.53';
FLUSH PRIVILEGES;
SHOW MASTER STATUS;
```



```

ubuntu@ip-172-31-87-44:~$ sudo mariadb -u root
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 34
Server version: 10.11.8-MariaDB-0ubuntu0.24.04.1-log Ubuntu 24.04

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)]> CREATE DATABASE wordpress;
ERROR 1007 (HY000): Can't create database 'wordpress'; database exists
MariaDB [(none)]> CREATE USER 'wpuser'@'%' IDENTIFIED BY 'wordpress';
Query OK, 0 rows affected (0.005 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON wordpress.* TO 'wpuser'@'%';
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.000 sec)

MariaDB [(none)]> CREATE USER 'replica'@'44.203.254.53' IDENTIFIED BY 'replica_password';
Query OK, 0 rows affected (0.002 sec)

MariaDB [(none)]> GRANT REPLICATION SLAVE ON *.* TO 'replica'@'44.203.254.53';
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.000 sec)

MariaDB [(none)]> SHOW MASTER STATUS;
+-----+-----+-----+-----+
| File           | Position | Binlog_Do_DB | Binlog_Ignore_DB |
+-----+-----+-----+-----+
| mysql-bin.000001 |      467 | wordpress    |                   |
+-----+-----+-----+-----+
1 row in set (0.000 sec)

MariaDB [(none)]> |

```

Step 4: Configure WordPress

```

cd /var/www/html
sudo wget https://wordpress.org/latest.tar.gz
sudo tar -xzf latest.tar.gz
sudo mv wordpress/* .
sudo rm -rf wordpress latest.tar.gz
sudo chown -R www-data:www-data /var/www/html
sudo chmod -R 755 /var/www/html

```

Edit wp-config.php:

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

Modify:

```

define('DB_NAME', 'wordpress');
define('DB_USER', 'wpuser');
define('DB_PASSWORD', 'wordpress');
define('DB_HOST', '3.89.232.189');

```

Restart Apache:

sudo systemctl restart apache2

```
ubuntu@ip-172-31-87-44:/var/www/html$ cat wp-config.php
<?php
/**
 * The base configuration for WordPress
 *
 * The wp-config.php creation script uses this file during the installation.
 * You don't have to use the website, you can copy this file to "wp-config.php"
 * and fill in the values.
 *
 * This file contains the following configurations:
 *
 * * Database settings
 * * Secret keys
 * * Database table prefix
 * * ABSPATH
 *
 * @link https://developer.wordpress.org/advanced-administration/wordpress/wp-config/
 *
 * @package WordPress
 */

// ** 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', 'wpuser' );

/** Database password */
define( 'DB_PASSWORD', 'wordpress' );

/** Database hostname */
define( 'DB_HOST', '3.89.232.189' );

/** Database charset to use in creating database tables. */
define( 'DB_CHARSET', 'utf8mb4' );

/** The database collate type. Don't change this if in doubt. */
define( 'DB_COLLATE', '' );
```

Step 5: Testing

1. Check NFS

df -h

```
ubuntu@ip-172-31-87-44:~$ df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/root	6.8G	2.3G	4.5G	34%	/
tmpfs	479M	0	479M	0%	/dev/shm
tmpfs	192M	948K	191M	1%	/run
tmpfs	5.0M	0	5.0M	0%	/run/lock
/dev/xvda16	881M	76M	744M	10%	/boot/efi
/dev/xvda15	105M	6.1M	99M	6%	/boot/efi
tmpfs	96M	12K	96M	1%	/run/user/1000
44.203.254.53:/nfs/wp-data	6.8G	2.4G	4.4G	35%	/var/www/html
44.203.254.53:/nfs/db-data	6.8G	2.4G	4.4G	35%	/var/log/mysql

2. Verify Web Server

Open <http://3.89.232.189> in a browser.

