

ClustrixDB AWS Installation Guide

This document provides step-by-step instructions on how to install and configure ClustrixDB in AWS using the ClustrixDB AMI. To proceed with this installation, you will also need a ClustrixDB license. If you do not yet have a ClustrixDB license, please contact [Clustrix Sales](#). If you encounter any problems or issues while using these instructions, please contact [Clustrix Support](#).

These instructions are a customized version of the steps found in the following ClustrixDB Online Documentation:

- [Best Practices for ClustrixDB Platform Configuration](#)
- [ClustrixDB Installation Guide Bare OS Instructions](#)

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Recommended Server Specifications

ClustrixDB AMI comes preinstalled with CentOS 7, ClustrixDB, and a few additional linux tools such as ntpd, htop, etc. For recommended server specifications for your particular deployment, please refer to [ClustrixDB Reference Server Configurations](#).

Overview of Setup Steps

The installation of ClustrixDB follows these high-level phases:

1. Creating Placement and Security Groups
2. Launching of EC2 instances using the correct parameters
3. Formation of the ClustrixDB Cluster
4. Initialization of the ClustrixGUI
5. Creating the Elastic Load Balancer

Creating Placement and Security Groups

Log into the AWS Console, and select the EC2 service.

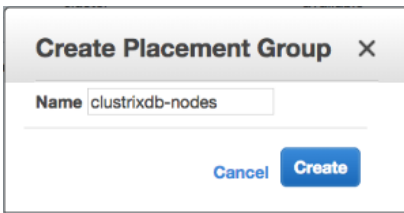
Creating a Placement Group

A Placement Group is used to ensure low latency and high throughput between nodes. It is a logical grouping of instances within an Availability Zone (see [Regions and Availability Zones](#)) which affects how close together the instances are created, from a networking standpoint. By placing all ClustrixDB instances in the same Placement Group you ensure the network latency is as low as possible between the instances. If you are using ClustrixDB Zones you will want to create one Placement Group for each Zone. See the [Zones](#) documentation for more information.

To create a Placement Group, select the "Placement Groups" link under Network & Security on the left-side menu.



Then click the "Create Placement Group" button and enter a name for the Placement Group. The name must be a name that has not been previously used by another Placement Group.



Create Placement Group ✕

Name

Click the "Create" button.

Creating a Security Group

A security group, like a firewall, is used to control incoming and outgoing network traffic to and from your AWS machine instance. Select the "Security Groups" link under Network & Security on the left-side menu.

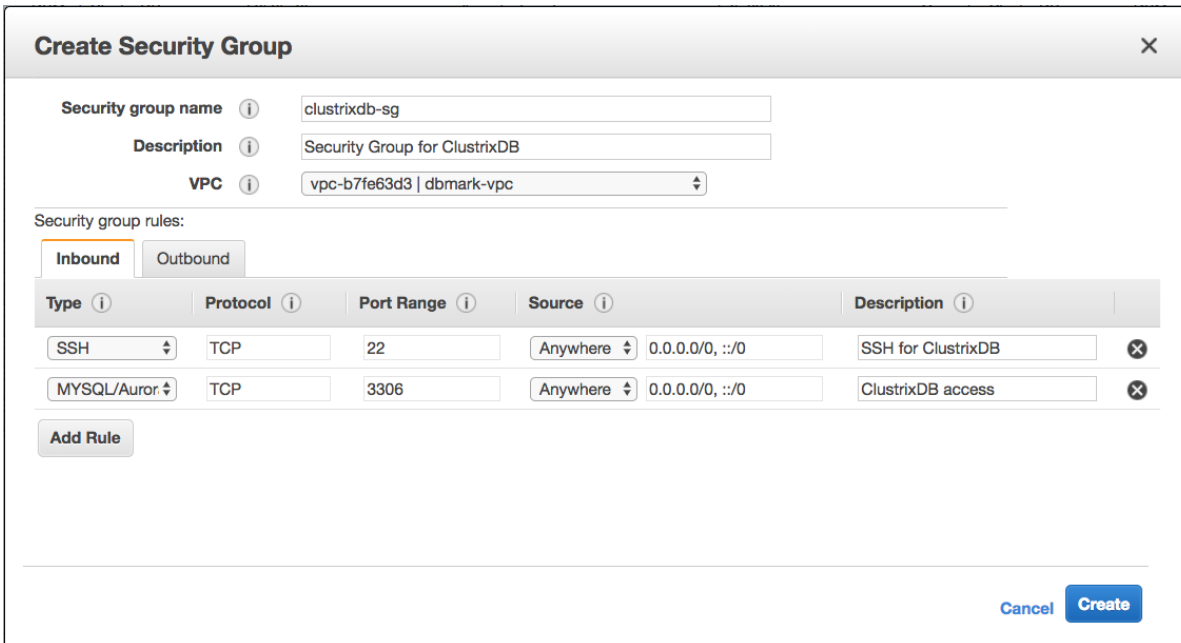
- ☐ NETWORK & SECURITY
 - Security Groups
 - Elastic IPs
 - Placement Groups
 - Key Pairs
 - Network Interfaces

Then click the "Create Security Group" button.

Enter a name and description for the Security Group, and select the VPC ([Best Practices For AWS Security Groups](#)) in which the ClustrixDB instances will run. Then add the following 2 rules:

- Type: **SSH** (this will be used to install/configure/administer the instances)
- Type: **MYSQL/Aurora** (this is the port on which ClustrixDB listens for DB connections)

You may customize the Source of each rule. Ensure that the rule allows proper access from SSH and MySQL clients. We recommend starting with the Source set to "Anywhere" as the rules can be configured to be more restrictive after the installation is complete.



Create Security Group ✕

Security group name ⓘ

Description ⓘ

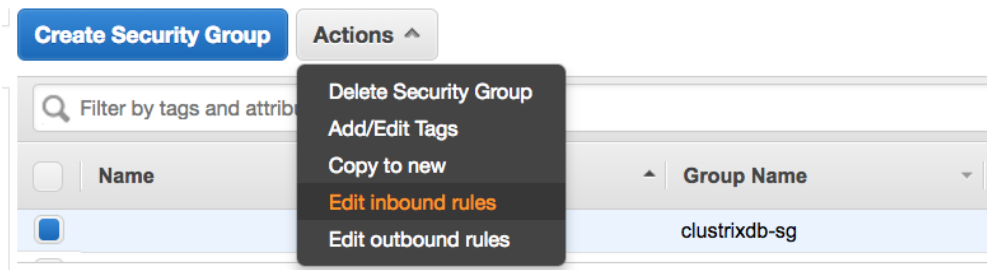
VPC ⓘ

Security group rules:

Type ⓘ	Protocol ⓘ	Port Range ⓘ	Source ⓘ	Description ⓘ
SSH	TCP	22	Anywhere	SSH for ClustrixDB ✕
MYSQL/Aurora	TCP	3306	Anywhere	ClustrixDB access ✕

Click the "Create" button.

Now we must add three more rules that were not easy to add on the previous screen. Select the Security Group created from the list of groups, and choose Actions Edit inbound rules.



Add the following rules:

- "All TCP" and an "All UDP" rule. For both of these rules, the Source should be "Custom" and the name should be that of the current Security Group. These rules will allow all TCP and UDP traffic ONLY within this Security Group.
- "Custom TCP Rule" to set the HTTP rule for port 8080. Set the Port Range to 8080 and the Source to Anywhere. This will be used to access the ClustrixGUI.

After selecting "Custom" for the Source, in the field to the right start typing this Security Group's name (e.g. in our example: "clustrixdb-sg"). As you type, a selection menu will appear and you can click the Security Group's name to cause the Security Group's ID to be populated (shown below).

Example:

Edit inbound rules ✕

Type <small>i</small>	Protocol <small>i</small>	Port Range <small>i</small>	Source <small>i</small>	Description <small>i</small>	
SSH	TCP	22	Custom 0.0.0.0/0	SSH for ClustrixDB	✕
SSH	TCP	22	Custom ::/0	SSH for ClustrixDB	✕
MYSQL/Aurora	TCP	3306	Custom 0.0.0.0/0	ClustrixDB access	✕
MYSQL/Aurora	TCP	3306	Custom ::/0	ClustrixDB access	✕
All TCP	TCP	0 - 65535	Custom sg-2c97b15e	TCP Traffic	✕
All UDP	UDP	0 - 65535	Custom sg-2c97b15e	UDP Traffic	✕
Custom TCP	TCP	8080	Anywhere 0.0.0.0/0, ::/0	HTTP for ClustrixGUI	✕

[Add Rule](#)

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

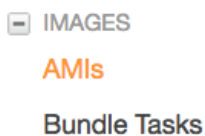
[Cancel](#) [Save](#)

Please double-check your Security Group settings. Errors in the Security Group are the most common misconfiguration we see with ClustrixDB in AWS.

Click the "Save" button.

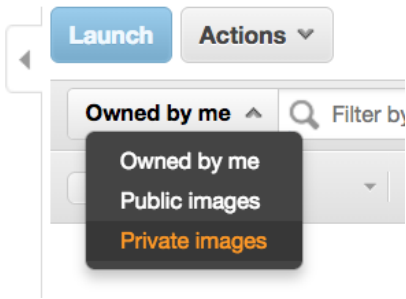
Launching the EC2 instances

Still, within the AWS Console, select the EC2 service and then select AMIs from the left-hand menu under the IMAGES category.



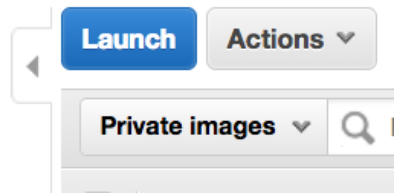
Step 1: Choose an Amazon Machine Image (AMI)

Then in the top-left corner of the list of AMIs, change the search drop-down box to "Private images".



Identify and select the private AMI using the AMI ID provided by your Clustrix representative. If your list of private AMIs is long, you may need to enter the intended AMI ID in the search box and press enter.

After selecting the correct AMI from the list of private AMIs, click the Launch button to move on to Step 2.



Step 2: Choose an Instance Type

Select one of the following instance types:

- C3: 2xlarge, 4xlarge, or 8xlarge
- I2: 2xlarge, 4xlarge, or 8xlarge
- I3: 2xlarge, 4xlarge, or 8xlarge

<input checked="" type="checkbox"/>	Compute optimized	c3.2xlarge	8	15	2 x 80 (SSD)	Yes	High	Yes
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Click the "Next: Configure Instance Details" button to move to Step 3.

Step 3: Configure Instance Details

Make the following selections:

- **Number of Instances:** Total # of ClustrixDB instances to launch
 - Note: It is best to launch all instances at the same time, instead of one by one. This will ensure that they all launch in the same Placement Group
 - If you are configuring ClustrixDB without zones (default), the minimum is 3 instances
 - If you are configuring ClustrixDB using zones, you must have at least 3 instances across 3 zones (one per zone). For additional information, see [Zones](#)
- **Network:** Choose a VPC network
 - Do not launch ClustrixDB into EC2 Classic since Enhanced Networking is not available in EC2 Classic
 - All the nodes should all be in the same VPC, including when ClustrixDB is configured using [Zones](#).
- **Subnet:** Select the desired subnet in the VPC
 - If you are unsure which subnet to use, please consult with your AWS admin, or you can ask for guidance from Clustrix
 - If you are configuring ClustrixDB using [Zones](#), the nodes in one zone should all be in the same subnet.
- **Auto-Assign Public IP:** Normally production databases are not assigned public IPs. But if you prefer this for testing, the default is Enable
- **Placement Group:** Select the Placement Group you created in the previous steps.
 - If you are configuring ClustrixDB using [Zones](#) nodes placed in the same zone should be in the same Placement Group.
- **IAM Role:** Leave at the default, unless your company requires a different setting
- **Shutdown behavior:** Leave at the default, Stop (choices are: Terminate or Stop)
- **Enable termination protection:** Select this option
- **Monitoring:** Leave at default, or select if your company wants to use CloudWatch with ClustrixDB servers
- **EBS-Optimized Instance:** Leave at the default (unchecked)
- **Tenancy:** Leave at the default (Shared)
- **Network Interfaces:** Leave at the default

Example:

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances ⓘ [Launch into Auto Scaling Group](#) ⓘ

You may want to consider launching these instances into an Auto Scaling Group to help you maintain application availability and for easy scaling in the future. [Learn how Auto Scaling can help your application stay healthy and cost effective.](#)

Purchasing option ⓘ Request Spot instances

Network ⓘ [Create new VPC](#)

Subnet ⓘ [Create new subnet](#)
251 IP Addresses available

Auto-assign Public IP ⓘ

Placement group ⓘ

IAM role ⓘ [Create new IAM role](#)

Shutdown behavior ⓘ

Enable termination protection ⓘ Protect against accidental termination

Monitoring ⓘ Enable CloudWatch detailed monitoring
[Additional charges apply.](#)

EBS-optimized instance ⓘ Launch as EBS-optimized instance
[Additional charges apply.](#)

Tenancy ⓘ
[Additional charges will apply for dedicated tenancy.](#)

▼ Network interfaces ⓘ

Device	Network Interface	Subnet	Primary IP	Secondary IP addresses	IPv6 IPs
eth0	<input type="text" value="New network interface"/>	<input type="text" value="subnet-77d31d01"/>	<input type="text" value="Auto-assign"/>	Add IP	

[Add Device](#)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Add Storage](#)

Click the "Next: Add Storage" button

Step 4: Add Storage

The AMI is pre-configured to leverage the ephemeral SSD disks, therefore there is no action required to configure the /data/clustrix/ partition.

We recommend configuring an EBS volume for logging. More detail on that can be found here: [How to use an EBS volume for ClustrixDB logs](#)

Click the "Next: Add Tags" button

Step 5: Add Tags

ClustrixDB does not require any additional instance tags.

Click the "Next: Configure Security Group" button

Step 6: Configure Security Group

Choose the option “Select an existing security group” and select the Security Group you created in the previous steps.

Example:

Assign a security group: Create a new security group
 Select an existing security group

Filter

Security Group ID	Name	Description	Actions
<input checked="" type="checkbox"/> sg-2c97b15e	clustrixdb-sg	Security Group for ClustrixDB	Copy to new

Click the “Review and Launch” button.

Step 7: Review Instance Launch

You may review the selections, then click the “Launch” button.

You are prompted to select an existing key pair or create a new key pair. Make the appropriate selection and click the “Launch Instances” button.

Once the EC2 instance is running, the ClustrixDB software is already running on the instance. However, the instance is not yet part of a cluster.

Gather Private IP Addresses

From the AWS Console, gather the private IP address of each EC2 instance that will run the ClustrixDB software. You will need these IP addresses during the installation.

Form the ClustrixDB Cluster

To join the ClustrixDB servers into a single unified cluster, connect to one ClustrixDB server and run a few SQL commands.

```
# set permissions for the pem file
shell> chmod 600 path_to_ec2_private_key.pem
# SSH into one of the ClustrixDB servers
shell> ssh -i path_to_ec2_private_key.pem
clustrix@ip_of_one_clustrixdb_server
# Launch the mysql client
shell> mysql -u root
```

The ClustrixDB AMI uses the `clxd` OS user to run the database process. An additional management (`clustrix`) is also configured. See [Overview of OS Users and Managing Users and Privileges](#) for more information.

Run the commands below where `ip` is the internal/private ip address of each node (10.0.x.y).

```
-- Set the cluster license
sql> SET GLOBAL license = 'license_key';
-- Create a cluster with the other nodes
sql> ALTER CLUSTER ADD 'ip', 'ip';
```

The `ALTER CLUSTER` command will initiate a short group change , after which the cluster is formed.

Run the `clx` command-line utility to view the status of the ClustrixDB nodes. This command can be run on any of the ClustrixDB servers as the `clustrix` user.

```

shell> /opt/clustrix/bin/clx stat
Cluster Name:   clae30606ca58824f
Cluster Version: 5.0.45-clustrix-9.0.4
Cluster Status: OK
Cluster Size:   3 nodes - 16 CPUs per Node
Current Node:   ip-10-76-3-58 - nid 1

```

nid	Hostname	Status	IP Address	TPS	Used	Total
1	ip-10-76-3-58	OK	10.76.3.58	0	10.6M (0.01%)	119.0G
2	ip-10-76-3-105	OK	10.76.3.105	0	5.9M (0.00%)	119.0G
3	ip-10-76-3-232	OK	10.76.3.232	0	5.9M (0.00%)	119.0G
				0	22.4M (0.01%)	357.0G

Post Installation Setup

Configure passwordless SSH Authentication for the clustrix user (clustrix user has the role of clxm user) for all nodes: [Configure SSH Authentication](#).

Create a user to be used during the import. This should be done while logged into ClustrixDB as the root DB user.

```

-- Create a user for importing
sql> grant all on *.* to 'importuser'@'%' identified by 'importuserpasswd';

```

For more information see: [clustrix_import](#)

ClustrixGUI

The ClustrixGUI must be started with the following commands before the first time you access it.

```

shell> /opt/clustrix/bin/clx nanny stop_job
clxdbi
shell> /opt/clustrix/bin/clx nanny
start_job clxdbi

```

Access the ClustrixGUI by typing the ip or hostname of one of your nodes into a web browser, include port :8080. Chrome is the recommended web browser.

The screenshot shows the Clustrix login page. On the left is the Clustrix logo. On the right is a login form with the following elements:

- An input field for "Email".
- An input field for "Password".
- A dropdown menu for "Target" currently showing "localhost".
- A checkbox labeled "Remember me".
- A blue "Log in" button.
- A "Forgot Password" button.

Provide the following credentials:

- Email: noreply@clustrix.com
- Password: clustrix
- Target: localhost

Setting up a Load Balancer

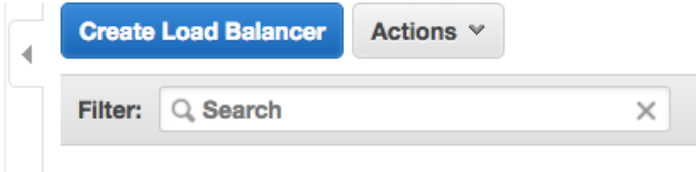
Select the "Load Balancers" link on the left-side menu.

LOAD BALANCING

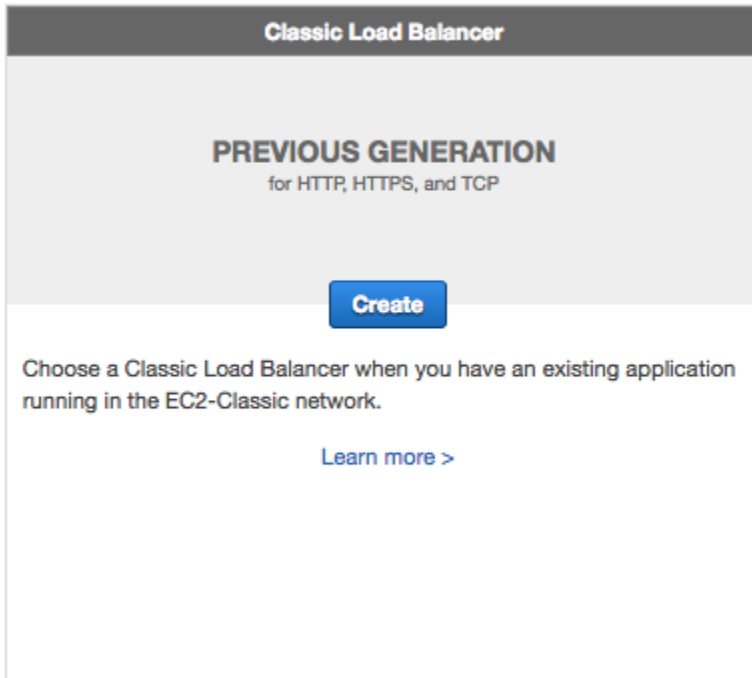
Load Balancers

Target Groups

Then click the "Create Load Balancer" button.



Choose the Classic Load Balancer, and click the Continue button.



Step 1: Define Load Balancer

Enter the Basic Configuration as follows.

- Enter a name for the load balancer (any un-used name).
- For "Create LB Inside", select the same VPC that you used above.
- Check the box labeled "Create an internal load balancer" so the ELB is fully contained inside of your VPC.

Then add the following Load Balancer Protocols:

- HTTP port 80
 - Load Balancer Protocol: HTTP
 - Load Balancer Port: 80
 - Instance Protocol: HTTP
 - Instance Port: 80
- MySQL Port 3306
 - Load Balancer Protocol: TCP
 - Load Balancer Port: 3306
 - Instance Protocol: TCP
 - Instance Port: 3306

Then select the same subnet that you used above in “Step 3: Configure Instance Details” when launching the EC2 instances.

Example:

Load Balancer name:

Create LB Inside:

Create an internal load balancer: (what's this?)

Listener Configuration:

Load Balancer Protocol	Load Balancer Port	Instance Protocol	Instance Port	
HTTP	80	HTTP	80	✕
TCP	3306	TCP	3306	✕

Select Subnets

Select the subnet your Cluster is in (see Configure Instance Details, above). If you are using ClustrixDB Zones, you will also need to select the subnet for each zone where you wish traffic to be routed by your load balancer:

Available subnets

Actions	Availability Zone	Subnet ID	Subnet CIDR	Name
+	us-east-1a	subnet-8f7bfbeb	10.0.3.0/24	dbmark-driver-1a
+	us-east-1b	subnet-54c4217b	10.0.2.0/24	dbmark-east-1b
+	us-east-1d	subnet-5949a801	10.0.1.0/24	dbmark-east-1d
+	us-east-1e	subnet-992783a6	10.0.4.0/24	dbmark-east-1e

Selected subnets

Actions	Availability Zone	Subnet ID	Subnet CIDR	Name
-	us-east-1c	subnet-77d31d01	10.0.0.0/24	dbmark-east-1c

Click the “Next: Assign Security Groups” button.

Step 2: Assign Security Groups

Select the same Security Group that you created previously for the ClustrixDB instances. Choose the option “Select an existing security group”, and then check the proper security group.

Example:

Assign a security group: Create a new security group
 Select an existing security group

Filter

Security Group ID	Name	Description	Actions
<input checked="" type="checkbox"/> sg-2c97b15e	clustrixdb-sg	Security Group for ClustrixDB	Copy to new

Click the “Next: Configure Security Settings” button.

Step 3: Configure Security Settings

Click the “Next: Configure Health Check” button

Step 4: Configure Health Check

Configure the health check using the following values:

- Ping Protocol: HTTP
- Ping Port: 3581
- Ping Path: /index.html
- Advanced Details:
 - Response Timeout: 5 seconds
 - Interval: 10 seconds
 - Unhealthy threshold: 2
 - Healthy threshold: 10

Example:

Ping Protocol	<input type="text" value="HTTP"/>
Ping Port	<input type="text" value="3581"/>
Ping Path	<input type="text" value="/index.html"/>

Advanced Details

Response Timeout ⓘ	<input type="text" value="5"/>	seconds
Interval ⓘ	<input type="text" value="10"/>	seconds
Unhealthy threshold ⓘ	<input type="text" value="2"/>	
Healthy threshold ⓘ	<input type="text" value="10"/>	

Click the "Next: Add EC2 Instances" button

Step 5: Add EC2 Instances

Select from the list the ClustrixDB EC2 instances you launched previously.

Additionally, check the following options:

- Enable Cross-Zone Load Balancing
 - Unselected - if not using ClustrixDB Zones
 - Selected - if using ClustrixDB Zones
- Enable Connection Draining - Unselected

Example:

<input type="checkbox"/>	Instance	State	Security groups	Zone	Subnet ID	Subnet CIDR
<input type="checkbox"/>	i-0699da4a89cacddf1	running	clustrixdb-sg	us-east-1c	subnet-77d31d01	10.0.0.0/24
<input type="checkbox"/>	i-086c26d4ff012cba3	running	clustrixdb-sg	us-east-1c	subnet-77d31d01	10.0.0.0/24
<input type="checkbox"/>	i-0cf81f24b3c8b6d26	running	clustrixdb-sg	us-east-1c	subnet-77d31d01	10.0.0.0/24

Availability Zone Distribution

3 instances in us-east-1c

- Enable Cross-Zone Load Balancing ⓘ
- Enable Connection Draining ⓘ seconds

Click the "Next: Add Tags" button.

Step 6: Add Tags

ClustrixDB does not require any additional tags.

Click the "Review and Create" button.

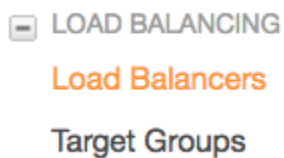
Step 7: Review

Review the settings, then click the "Create" button.

Increase Idle Timeout

We want the database to handle terminating idle connections instead of the ELB. The default ELB Idle Timeout value is 60 seconds, which is too short for long-running queries. Therefore, we recommend setting the ELB Idle Timeout to its maximum value of 3600 seconds.

Return to the main Load Balancers page by selecting the "Load Balancers" link on the left-side menu.



Then in the list of load balancers, select the load balancer you just created. In the Description tab of the details pane below the list of load balancers, find the Attributes section near the bottom:

Attributes

Idle timeout: 60 seconds

Edit idle timeout

Click the "Edit idle timeout" button, then enter 3600, and click the Save button.

Configure Connection Settings

Idle Timeout is the number of seconds a connection can be idle before the load balancer closes the connection. See [documentation](#) for more information.

Idle timeout ⓘ seconds

Cancel Save