

Unit 2: Node Recovery

In this unit, we will explore how a MarkLogic cluster recovers from the loss of one of MarkLogic servers.

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The AWS Auto Scaling Group and Managed Cluster features ensure the health of the cluster. The EC2 Auto Scaling Group feature ensures the health of the MarkLogic cluster and terminates non-responsive MarkLogic instances. New instances replace the old ones. The replacement MarkLogic EC2 instances join the MarkLogic cluster and attach to the existing EBS volumes containing your data.

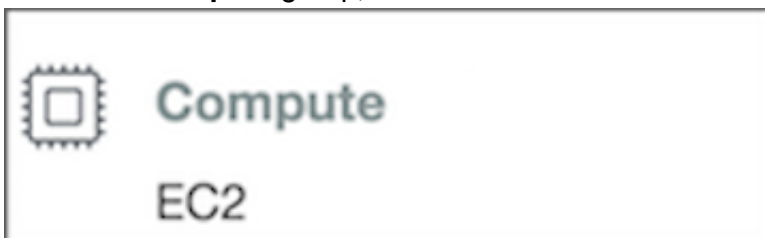
Amazon's Elastic Load Balancer sends periodic "heartbeat" messages to the MarkLogic server instances. The MarkLogic *HealthCheck* Application Server responds to these "heartbeats" so AWS knows when a MarkLogic server instance is non-responsive. When the instance stops responding, AWS' Managed Cluster feature terminates that instance. The AWS Auto Scaling Group starts another EC2 instance. The Managed Cluster feature ensures the new instance joins the MarkLogic cluster.

Data is not lost during this process. The new MarkLogic instance connects to the existing EBS volume when the new instance starts.

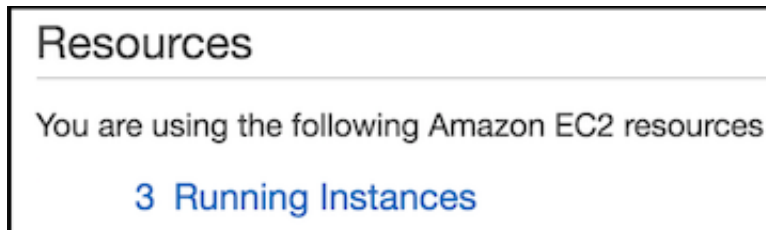
Let's take a look at the recovery process.

Terminate a MarkLogic Node Instance

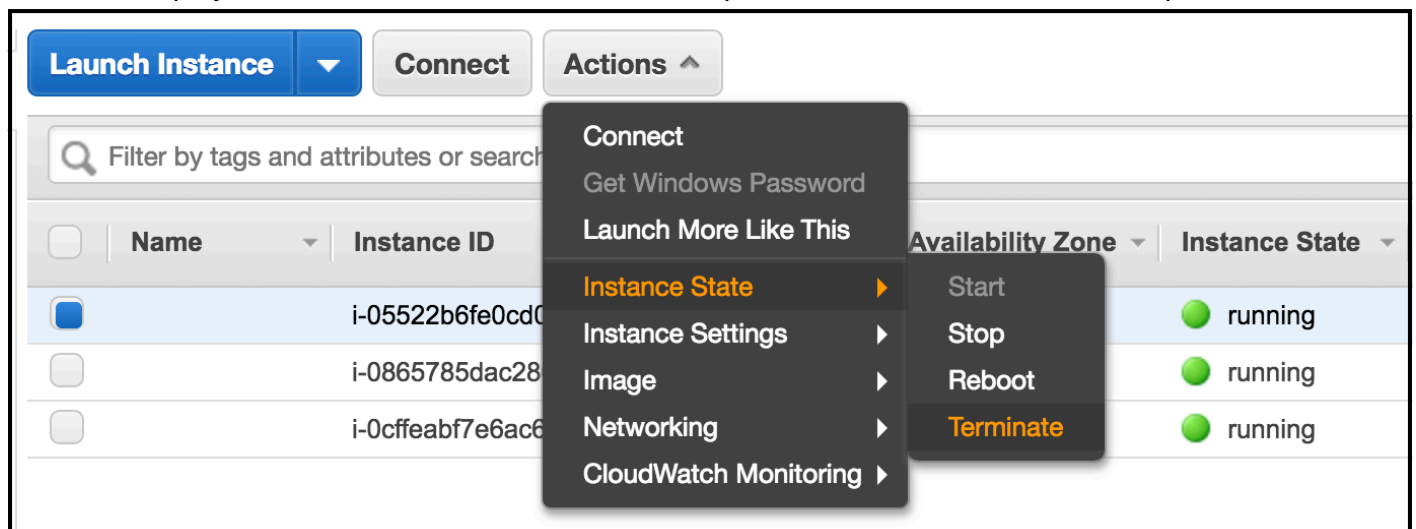
1. Access your AWS Console.
 - Go to <https://console.aws.amazon.com> and log in, if needed.
2. Under the **Compute** group, click the **EC2** link.



3. In the **EC2 Dashboard**, note there are *3 Running Instances*. Click the **Running Instances** link.




4. The table of instances is displayed.
- Each row has an empty checkbox in the first column.
 - You can select and unselect each instance by clicking the checkbox to toggle between selected and unselected.
5. Select the first instance in the table by clicking its checkbox.
6. Click the **Actions** dropdown button at the top of the instances table.
7. From the displayed menu, select the **Instance State** option then select the **Terminate** option.



8. A **Terminate Instance** verification window displays. Click the **Yes, Terminate** button to confirm.

Terminate Instances

Warning

On an EBS-backed instance, the default action is for the root EBS volume to be deleted when the instance is terminated. Storage on any local drives will be lost.

Are you sure you want to terminate these instances?
i-05522b6fe0cd03b56

Clean up associated resources

Associated resources may incur costs after these instances are terminated.

▶ Delete EBS volumes

Cancel

Yes, Terminate

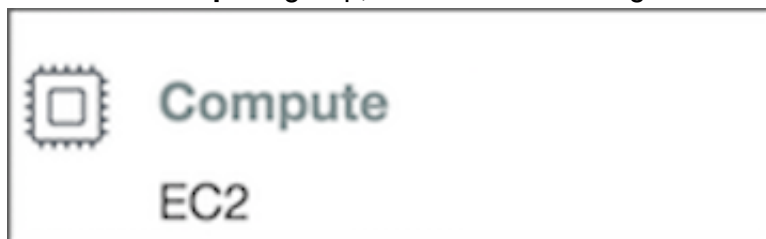
9. The instance will begin the termination process.

Verify Replacement Node

1. Click the **Refresh** icon at the top of the instances table, towards the right-hand side.
2. The table will refresh. Periodically refresh the table until the old instance's **Instance State** is `terminated`.

This may take a couple of minutes.

3. At the top of the web page, click the **Services** menu.
4. Under the **Compute** group, click the **EC2** link again.



5. In the **EC2 Dashboard**, note there are *2 Running Instances*.

Resources

You are using the following Amazon EC2 resources in the US West (Oregon) region:

2 Running Instances

0 Dedicated Hosts

5 Volumes

1 Key Pairs

0 Placement Groups

0 Elastic IPs

0 Snapshots

1 Load Balancers

5 Security Groups

6. Click the link for **Load Balancers** to view your Elastic Load Balancer.

7. On the Load Balancer page, select the Load Balancer from the table.

8. Scroll down and click the **Instances* tab to display the EC2 instances it is balancing.

Load balancer: MLW2018-3-ElasticL-O5QSARQNZUI6

Description **Instances** Health Check Listeners Monitoring Tags Migration

Connection Draining: Enabled, 60 seconds ([Edit](#))

9. Scroll the bottom instance table a bit to display the names of your EC2 instances.

Instance ID	Name	Availability Zone	Status	Actions
i-0cffeabf7e6ac61d0		us-west-2a	InService ⓘ	Remove from Load Balancer
i-0865785dac280b588		us-west-2c	InService ⓘ	Remove from Load Balancer

10. Refresh the table by clicking on the *Refresh* icon at the top of the **Load Balancer** page.



11. Refresh every few minutes. A new instance will start and appear in the table.

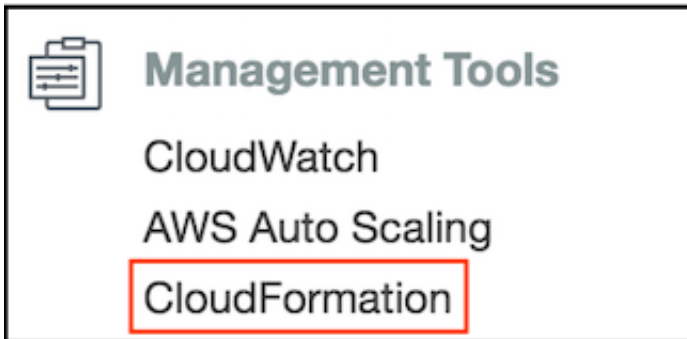
Instance ID	Name	Availability Zone	Status	Actions
i-0cffeabf7e6ac61d0		us-west-2a	InService ⓘ	Remove from Load Balancer
i-0865785dac280b588		us-west-2c	InService ⓘ	Remove from Load Balancer
i-07bf7dc8175bd582c		us-west-2b	OutOfService ⓘ	Remove from Load Balancer

12. Continue to refresh every few minutes until the new instance changes **Status** to **InService**.

Instance ID	Name	Availability Zone	Status	Actions
i-0cffeabf7e6ac61d0		us-west-2a	InService ⓘ	Remove from Load Balancer
i-0865785dac280b588		us-west-2c	InService ⓘ	Remove from Load Balancer
i-07bf7dc8175bd582c		us-west-2b	InService ⓘ	Remove from Load Balancer

Access MarkLogic Cluster

1. Click the **Services** icon at the top then select **CloudFormation** under the **Management Tools** group.



2. Select the CloudFormation Stack again then select the **Outputs** tab below the table of stack names. ⓘ
3. The MarkLogic cluster is recovered and can be accessed again by its Elastic Load Balancer URL.

Summary

When Amazon's Elastic Load Balancer doesn't get a response from MarkLogic's HealthCheck application server, the MarkLogic EC2 instance is terminated. The AWS Auto Scaling Group will start a new MarkLogic EC2 instance to ensure the number of nodes per zone value from the CloudFormation template is maintained. As part of the Managed Cluster feature, the new instance will re-attach to the EBS storage containing your configuration and content.

Quiz

1. AutoScaling Groups ensure that...
 1. Databases don't run out of storage space.
 2. Unhealthy MarkLogic instances are restarted.
 3. Data is automatically backed up to S3 Buckets.
2. One feature of Managed Clusters ensures that...
 1. New MarkLogic instances replace existing, unhealthy instances.
 2. Managers can cluster around the water fountain.
 3. MarkLogic Clusters on AWS can easily share data.

3. When an instance is created, it has an **Instance State** of...
 1. **running**
 2. **started**
 3. **initialized**
4. When an instance is terminated, it remains in the table of instances...
 1. Until you remove it from the list.
 2. Until the instance is completely deleted by AWS.
 3. For up to 2 minutes, then removed from the list.
5. When the new instance starts, it has a new hostname. How do the other MarkLogic servers know how to contact it?
 1. The other instances ping until they get a response.
 2. The Managed Cluster feature automatically detects hostname changes and propagates the changes throughout the cluster.
 3. The new instance's hostname has to be manually changed to the older hostname.

(Answers to Quiz)

- 1) 2.
- 2) 1.
- 3) 1.
- 4) 3.
- 5) 2.