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Failing over a Multi-AZ DB cluster for Amazon RDS

⬇ **PDF (/pdfs/AmazonRDS/latest/UserGuide/rds-ug.pdf#multi-az-db-clusters-concepts-failover)**

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Manually failing over a Multi-AZ DB cluster(#multi-az-db-clusters-concepts-failover-manual)

Determining whether a Multi-AZ DB cluster has failed over (#multi-az-db-clusters-concepts-failover-determining)

Setting the JVM TTL for DNS name lookups(#multi-az-db-clusters-concepts-failover-java-dns)

Related resources

Amazon RDS API Reference (https://docs.aws.amazon.com/AmazonRDS/latest/APIReference/index.htm

AWS CLI commands for Amazon RDS (https://docs.aws.amazon.com/cli/latest/reference/rds/)

SDKs & Tools ↗ (https://aws.amazon.com/tools/)

▼ **Recommended tasks**

How to

Reboot an RDS DB instance to apply configuration changes (https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_RebootInstance.html)

Automate cross-Region failover and failback (https://docs.aws.amazon.com/prescriptive-guidance/latest/patterns/automate-cross-region-failover-ar failback-by-using-dr-orchestrator-framework.html)

rds-
connect.html)

Migrate to a Multi-AZ DB cluster using a read replica
(https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/multi-az-db-clusters-migrating-to-with-
read-replica.html)

Learn about

Understand limitations of Multi-AZ DB clusters
(https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/multi-az-db-clusters-
concepts.Limitations.html)

Understand DR Orchestrator Framework for database failover
(https://docs.aws.amazon.com/prescriptive-guidance/latest/automate-dr-solution-relational-database/
orchestrator-framework-overview.html)

Understand how to retrieve access findings statistics
(https://docs.aws.amazon.com/access-analyzer/latest/APIReference/API_GetFindingsStatistics.html)

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If there is a planned or unplanned outage of your writer DB instance in a Multi-AZ DI
cluster, Amazon RDS automatically fails over to a reader DB instance in different
Availability Zone. This ensures high availability with minimal disruption. Failovers ca
occur during hardware failures, network issues, or manual requests. The topic outlin
the automatic detection of failures, the sequence of events during failover, and its in
on read and write operations. It also provides best practices for monitoring and
minimizing failover times.

The time it takes for the failover to complete depends on the database activity and
conditions when the writer DB instance became unavailable. Failover times are typic
under 35 seconds. Failover completes when both reader DB instances have applied
outstanding transactions from the failed writer. When the failover is complete, it car
additional time for the RDS console to reflect the new Availability Zone.

Topics

Automatic failovers

Amazon RDS handles failovers automatically so you can resume database operations quickly as possible without administrative intervention. To fail over, the writer DB instance switches automatically to a reader DB instance.

Manually failing over a Multi-AZ DB cluster

If you manually fail over a Multi-AZ DB cluster, RDS first terminates the primary DB instance. Then, the internal monitoring system detects that the primary DB instance unhealthy and promotes a readable replica DB instance. Failover times are typically 35 seconds.

You can fail over a Multi-AZ DB cluster manually using the AWS Management Console the AWS CLI, or the RDS API.

▼ **Console**

To fail over a Multi-AZ DB cluster manually

1. Sign in to the AWS Management Console and open the Amazon RDS console at https://console.aws.amazon.com/rds/ ↗ (https://console.aws.amazon.com/rds/) .

2. In the navigation pane, choose **Databases**.

3. Choose the Multi-AZ DB cluster that you want to fail over.

4. For **Actions**, choose **Failover**.

   The **Failover DB cluster** page appears.

5. Choose **Failover** to confirm the manual failover.

▶ **AWS CLI**

To fail over a Multi-AZ DB cluster manually, use the AWS CLI command failover-db-cluster (https://docs.aws.amazon.com/cli/latest/reference/rds/failover-db-cluster.html) .

```
aws rds failover-db-cluster --db-cluster-identifier
mymultiazdbcluster
```

▶ **RDS API**

To fail over a Multi-AZ DB cluster manually, call the Amazon RDS API FailoverDBCluster (https://docs.aws.amazon.com/AmazonRDS/latest/APIReference/API_FailoverDBCluster.html) and specify the `DBClusterIdentifier` .

Determining whether a Multi-AZ DB cluster has failed over

To determine if your Multi-AZ DB cluster has failed over, you can do the following:

- Set up DB event subscriptions to notify you by email or SMS that a failover has been initiated. For more information about events, see Working with Amazon RDS event notification (./USER_Events.html) .
- View your DB events by using the Amazon RDS console or API operations.
- View the current state of your Multi-AZ DB cluster by using the Amazon RDS console, the AWS CLI, and the RDS API.

For information on how you can respond to failovers, reduce recovery time, and other best practices for Amazon RDS, see Best practices for Amazon RDS (./CHAP_BestPractices.html) .

Setting the JVM TTL for DNS name lookups

The failover mechanism automatically changes the Domain Name System (DNS) record of the DB instance to point to the reader DB instance. As a result, you need to re-establish any existing connections to your DB instance. In a Java virtual machine (JVM)

environment, due to how the Java DNS caching mechanism works, you might need t
reconfigure JVM settings.

The JVM caches DNS name lookups. When the JVM resolves a host name to an IP
address, it caches the IP address for a specified period of time, known as the *time-to*
(TTL).

Because AWS resources use DNS name entries that occasionally change, we recomm
that you configure your JVM with a TTL value of no more than 60 seconds. Doing thi
makes sure that when a resource's IP address changes, your application can receive a
use the resource's new IP address by requerying the DNS.

On some Java configurations, the JVM default TTL is set so that it never refreshes DI
entries until the JVM is restarted. Thus, if the IP address for an AWS resource change
while your application is still running, it can't use that resource until you manually re
the JVM and the cached IP information is refreshed. In this case, it's crucial to set the
JVM's TTL so that it periodically refreshes its cached IP information.

> ⓘ **Note**
>
> The default TTL can vary according to the version of your JVM and whether a
> security manager is installed. Many JVMs provide a default TTL less than 60
> seconds. If you're using such a JVM and not using a security manager, you can
> ignore the rest of this topic. For more information on security managers in
> Oracle, see The security manager ↗
> (https://docs.oracle.com/javase/tutorial/essential/environment/security.html) in the
> Oracle documentation.

To modify the JVM's TTL, set the networkaddress.cache.ttl ↗
(https://docs.oracle.com/javase/7/docs/technotes/guides/net/properties.html) property val
Use one of the following methods, depending on your needs:

- To set the property value globally for all applications that use the JVM, set
  networkaddress.cache.ttl in the
  $JAVA_HOME/jre/lib/security/java.security file.

  ```
  networkaddress.cache.ttl=60
  ```

- To set the property locally for your application only, set
  networkaddress.cache.ttl in your application's initialization code before a
  network connections are established.

  ```
  java.security.Security.setProperty("networkaddress.cache.
  ttl" , "60");
  ```

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Best practices (https://docs.aws.amazon.com/prescrip…

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Multi-AZ DB instance failover automatically switches to standby replic… on infrastructure defect. Failover time depends on database activity. Reasons include maintenance, network reachabil… modifications, unresponsiveness. Monitc… performance, reboot with failover. Set J… TTL for DNS name lookups.

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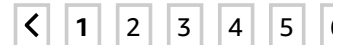
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Regions, Availability Zones, and Local Zones…

Amazon RDS enables placing resources like DB instances closer to users via Local Zones extending VPCs. Availability Zones are isolated locations within Regions. Describe Availability Zones, choose one when creating DB instances, create subnets in Local Zones.

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DB instance classes (https://docs.aws.amazon.com/Amazor…

DB instance class determines compute a… memory capacity. Supported DB engine… AWS Regions vary. Modify instance clas… change CPU, memory.

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AWS Solutions Library (https://aws.amazon.com/solutions/)

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Service Guides

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AWS service guides (https://docs.aws.amazon.com/#prod/docs)

AWS CLI Tutorials on GitHub (https://github.com/aws-samples/sample-developer-tutorials)

Developer Tools

AWS Code Example Library (https://docs.aws.amazon.com/code-library/latest/ug/what-is-code-library.html)

AWS CLI (https://docs.aws.amazon.com/cli/)

AWS Builder Center (https://builder.aws.com/)

AWS Developer Tools Blog (https://aws.amazon.com/blogs/developer/)

Helpful Links

Download the AWS Docs MCP (https://github.com/awslabs/mcp/tree/main/src/aws-documentation-mcp-server)

Sign into the AWS Console (https://console.aws.amazon.com/)

AWS re:Post (https://repost.aws/)

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