Database move, copy

Last updated by | Radhika Shah | Nov 16, 2022 at 8:31 AM PST

Contents

Self-help content presented in Azure Portal

(This content was shown to the customer during case submission. It's also visible on 'Diagnose and solve problems' blade.)

The feature for an online database move/copy uses Always On technology to perform a database copy and move operation across managed instances, with you being in full control of the process. Once you start the copy or move operation, the seeding (copying) of your database starts online from the source-managed instance to the target instance. Once the seeding has been completed, the system enters the catch-up phase. In this phase, all new commits to the source (primary)-managed instance are copied near real-time to the destination (secondary)-managed instance, that is, two databases are kept continuously in sync. The system will keep databases in sync while waiting for your instruction to perform the cutover. Once you instruct the system to perform the cutover, the operation is completed with minimum downtime. Upon operation completion, you can re-point your application(s) to use the moved or copied database instantaneously without having interruption to your workload.

Common error messages

Review the causes for the most common error message that occur during a database move/copy.

Error message	Cause
Replication to the partner-managed instance could not be established. Verify that connectivity between the virtual networks (VNet) of the primary and secondary managed servers has been established correctly.	If the source-managed and target-managed instances are on different VNets, network connectivity needs to be enabled. In addition, network security groups (NSG) rules on the subnet hosting instance must have port 5022 (TCP) and the port range 11000–11999 (TCP) open inbound and outbound for connections from and to the subnet hosting the other managed instance. This applies to both subnets hosting source and target instances.
The operation can't be performed since the database is in a replication relationship.	Moving a database that's a member of the failover group (geo-disaster recovery) configuration on the source, or to destination instances with failover groups, is not supported at this time.
The selected managed instance is in a different region than the source-managed instance.	A database move between managed instances in different regions is not supported.
One or more selected databases already exists on the instance.	The database name needs to be unique for the target instance. Rename the existing database on the target instance and retry the move/copy operation.
A managed instance has ongoing operations.	Simultaneous operations of instance scaling and a database move/copy is not supported.
The database is not accessible.	External connections to the destination database are disabled. The move/copy operation is ready for completion, but the failover for the operation has not been completed.

Database move/copy requirements

Prior to starting the online database move, ensure the following:

- Both source and destination managed instance reside in the same Azure region and the same subscription.
- You have the minimum Azure role-based access control (RBAC) permissions: database R/W permissions on the source, and database R/W permissions on the destination managed instance.
- Your source or destination managed instance is not configured with a failover group (geo-disaster recovery) setup.
- You're moving/copying user database(s) only. Moving/Copying system databases are not permitted.

- Destination managed instance has enough free storage space for the database that's being moved or copied.
- If the source-managed and target-managed instances are on different VNets, network connectivity needs to be enabled.
- Network security group (NSG) rules on the subnet hosting instance must have port 5022 (TCP) and the port range 11000–11999 (TCP) open inbound and outbound for connections from and to the subnet hosting the other managed instance. This applies to both subnets, hosting source, and target instance.
- Simultaneous operation of instance scaling and a database move/copy is not supported. Scaling operation on a managed instance will block a database move or copy, and vice versa. When a database move/copy is ongoing, scaling of a managed instance is blocked, unless the move/copy is cancelled.
- If you're moving several databases simultaneously, you'll need to initiate a separate move operation for each database via API. The system can seed up to eight databases in parallel per single managed instance. If more than eight databases are requested to be moved to the same instance, such move operations will be queued.
- If you're using other replication technologies, such as transactional replication, CDC, log shipping, etc., on the source database, once that database is moved/copied to the destination managed instance, such other replication setups will not automatically continue. You'll need to reconfigure the setup.
- If you're using distributed transactions with the source database, once that database is moved/copied to the destination managed instance, distributed transactions will not automatically continue. You'll need to reconfigure the setup.

Steps for a database copy/move operation

The following describes in detail what's happening during each step of a database copy/move operation.

1. Initiate the database move/copy operation.
    - In this step, the database is being seeded (copied) from the source to the destination-managed instance.
    - During the initial database seeding (copying), the source database can be accessed, while the destination database is not accessible (until failover has been initiated).
    - The initial database seeding (copying) is a *size-of-data* operation. Meaning, the larger the database, the longer the initial wait time is for the seeding to complete. Heavy write workload on the source database can also impact the operation duration. For your reference, the average database seeding time is about 220 GB/hour (same as for the *update SLO* operation on the managed instance).
    - At this stage, the status of the operation will show *in progress*.
2. Once the database is seeded, the system moves to async catch-up mode and is ready for failover.
    - The system will keep catching up for the maximum for the next 24 hours.
    - At this stage, the status of the operation will show *ready for completion*.
    - When the start-move operation has succeeded, the system will be waiting for you to initiate the final failover command. This is to allow you to manually orchestrate application string re-pointing after initiating the failover, to minimize the database downtime.
3. Initiate the failover operation.
    - Before initiating the failover, we recommend stopping or minimizing transaction commits (writes) on the source database.
    - If there are active transactions during the failover, the system might experience a prolonged wait time for the transaction(s) to complete. After the database copy/move, in-doubt distributed transactions

may need to be resolved manually on the target database.

4. Failover is completed and move/copy operation has finished.
    - At this stage, the status will show the operation as *completed*.
    - Upon completion, the destination database is made active, and in the case of a move operation, the source database is deleted.
    - Once the failover is completed, external connections to the source database will be disabled, and the destination database will start accepting external connections.
    - At this point, you can re-point the database connection string for its application(s).

> **Important**: There is a 24-hour window for customers to initiate the failover (this is the maximum time the system will be in the database replication catch-up mode). If you don't initiate operation completion within 24 hours, the system will roll back the operation. If the operation has been rolled back, you'll need to restart the move/copy operation from scratch.

Check the status of the database copy/move operation

You can check the status of underlying operations using dynamic management views (DMV):

Seeding status can be monitored by querying this DMV on a managed instance:

```
SELECT * FROM sys.dm_hadr_physical_seeding_stats
```

If there's a row present in this view, it means the initial seeding (start move/copy) is in progress. Once the start move/copy is completed, this view will be empty.

Once the initial seeding of a database has been completed, you can monitor the catch-up operation (transferring commits from the source to the destination database after the initial seeding) using the following DMV on the managed instance:

```
SELECT * FROM sys.dm_hadr_database_replica_states
```

This view will be available only once the catch-up phase starts. This view also provides log sequence numbers (LSN) applied on the source and destination databases to understand the difference and the lag between them.

Initiate the completion of a move/copy operation

To complete the move/copy operation, select **Copy ready for completion** or **Move ready for completion**, or through the API client of your choice.

If workload on the source has been stopped and all transactions have been completed, the expected failover time should be less than one minute. However, if there are long-running transactions on the source, the failover period could be longer, depending on the time the long-running transaction takes to complete.

Keep in mind, when the move/copy operation completion (failover) has been requested, the following occurs:

- Connections to the source database are disabled (apps can no longer sign-in to the source database).
- The system is applying all remaining log records from the source database.
- Connections to the destination database are enabled (apps can now sign in to the destination database).

Troubleshoot issues with connecting to the target database

When attempting to connect to the target-managed instance database, you might see the following error:

```
The database is not accessible.
```

This is expected because external connections to the destination database are disabled, and the failover for the operation has not been completed. Once the failover is completed, the destination database will start accepting external connections, and you'll need to re-point the database connection string to the destination managed instance.

Troubleshoot issues with a database move/copy taking longer than expected

Once the status of the move operation has moved to *Succeeded*, the operation is ready for failover. Prior to initiating the failover, it's important that the workload, if possible, on the source database is slowed down, or preferably, completely stopped. An option to consider is cutting off connections to the source database (this is not automated by the system). This will allow the shortest possible failover time.

If there are long-running transactions while initiating the failover, the total failover time might be influenced by completing the long-running transaction.

Resources

- Test connectivity between source-managed and target-managed instance

How good have you found this content?