



# **Managing SnapMirror transfers and schedule**

## **ONTAP 7-Mode Transition**

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# Managing SnapMirror transfers and schedule

In the data copy phase, the clustered Data ONTAP volumes are updated periodically with the data from the 7-Mode volumes based on a data copy schedule. You can create, edit, and delete the data copy schedule to be used for SnapMirror baseline copy, update, and resynchronization operations.

You can manage the copy operations for all the volumes selected for transition by specifying multiple data copy schedules comprising details such as, start time, duration, update frequency, the number of concurrent SnapMirror transfers to run during that schedule, and throttle limit.

You can provide multiple concurrent transfers count and throttle limit for different time periods, such as weekday, weekend, business hours, non-business hours, DR schedules, and non-DR schedules.

## Related information

[Creating a transition project](#)

## Creating a data copy schedule for SnapMirror transfers

You can create data copy schedules to effectively manage the transition data copy operations for the volumes in a project. You can also specify the number of concurrent SnapMirror transfers to run during that schedule to ensure that any replication operation does not fail due to the concurrent SnapMirror transfers reaching the maximum limit.

- The project must be in the preparation, data copy, or apply configuration (precutover) phase.
- The 7-Mode Transition Tool service must always be running for the schedules to be effective.



The data copy schedule is used for SnapMirror baseline copy, update, and resynchronization operations.

- You must create at least one data copy schedule for each project.
- You can create a maximum of 7 schedules per project; however, the schedules cannot overlap within a project.

For example, you can create customized schedules for business hours and non-business hours, DR hours and non-DR hours, and weekdays and weekends.



If the projects use the same 7-Mode controller or cluster, ensure that the data copy schedules do not overlap across different projects.

- The configured schedules are applied based on the 7-Mode controller's time zone.
- The number of concurrent SnapMirror transfers to use during the schedule is determined at run time based on the percentage of concurrent SnapMirror streams to use and the maximum limit configured.
- The number of concurrent SnapMirror transfers to use during the schedule should be provided in such a way that the existing 7-Mode DR schedules are not affected because of the tool using the SnapMirror transfers specified with the schedule.
- If the number of concurrent SnapMirror transfers that the tool is using is less than the configured number of

concurrent SnapMirror transfers to use during the schedule, tool schedules new transfers to make use of the remaining transfers.

- If the schedule is coming to an end or there is a reduction in number of concurrent SnapMirror transfers on the 7-Mode storage system, the tool aborts the extra transfers to ensure that it uses only the configured number of transfers at any point in time.



If a baseline is in progress and Snapshot checkpoint is not yet created, the tool does not abort the transfer but waits for the Snapshot checkpoint to be created before aborting the transfer.

## Steps

1. Create schedules from the Data Copy Schedule page of the Dashboard by clicking **Edit Project**, and then selecting **Configure Schedule**.
2. Enter a name for the new schedule.
3. In the Recurring Days pane, select the days when the data copy operation should run.

| If you want to run the data copy operations... | Then...   |
|--|---|
| Daily  | Select <b>Daily</b> . This is the default value.  |
| Only on certain days                           | <ol style="list-style-type: none"><li>a. Select <b>Select Days</b>.</li><li>b. Select the days of the week.</li></ol> |

4. In the Time Interval pane, specify the start time, duration, and frequency of the data copy schedule.
  - a. Enter the time the data copy operations should start by selecting the hours and minutes from the **Start Time** drop-down list.

Valid values are from 00:00 to 23:30.
  - b. Enter the time period for which you want the data copy operations to run, select the hours and minutes from the **Duration** drop-down list.



The duration of a schedule should not exceed a week (167 hours and 30 minutes).

For example, if 20:30 is specified, SnapMirror operations run for next 20 hours and 30 minutes from the start time.

- c. Select the frequency at which incremental transfers should be done (within the created schedule duration) after the baseline transfer has been completed by doing one of the following:
  - Select the hours and minutes from the **Update Frequency** drop-down list.
  - Select **Continuous Updates**.

The minimum delay between two consecutive updates will be 5 minutes.

By default, SnapMirror updates run every 30 minutes.

5. In the Parameters for Transition Data Copy Operations pane, enter the SnapMirror parameters.

- a. Specify the maximum number of concurrent SnapMirror transfers that should be used for data copy by doing one or all of the following:
- Specify the percentage of the available volume SnapMirror transfers that should be used for data copy (when schedule is active), by entering the percentage in the **Maximum Number of Concurrent VSM Transfers** field.

The available volume SnapMirror transfers is calculated at run time.



The maximum number of concurrent SnapMirror transfers supported on your platform is displayed in this pane.

- Specify the maximum number of concurrent volume SnapMirror transfers that can run during this schedule in the **Not Exceeding** field. If you enter both values, the lowest value is used as the number of concurrent transfers.

The number of concurrent transfers to be used for transition is calculated at run time based on the schedule and the number of configured concurrent transfers.

+ Your platform supports a maximum of 100 concurrent volume SnapMirror transfers, 60 are currently available, and you have specified the following values:

- Percentage of the available volume SnapMirror transfers option is 50%.

The maximum number of concurrent transfers based on the percentage option is 50% of 60 = 30.

- Maximum number of concurrent volume SnapMirror transfers option is 25. In this scenario, the tool sets the maximum number of concurrent volume SnapMirror transfers to 25, which is the lowest of the two values.

- a. Specify the maximum bandwidth in MB/s (throttle) by doing one of the following:

| If you want to...                   | Then...  |
|-------------------------------------|--|
| Utilize all the available bandwidth | Select <b>Maximum</b> . This is the default value.   |
| Specify the throttle value          | Enter the value in the <b>Not Exceeding</b> field.<br>Maximum allowed input value is 4194303.<br><br>+ |

The throttle value is equally distributed among all the active transfers in the project.



The throttle for each transfer is determined at run time based on the number of available concurrent volume SnapMirror transfers.

If the active schedule is configured with the throttle value of 200 MBps and only 10 concurrent transfers are available, each transfer uses 20 MBps bandwidth.

The schedules become effective only when the project is in data copy or apply configuration (precutover) phase.

## Example for planning a data copy schedule

Consider a 7-Mode controller that supports 100 concurrent SnapMirror transfers with 75 DR relationships. The business requirements need SnapMirror operations to run during the following timings:

| Days               | Time  | Currently used SnapMirror transfers |
|--------------------|---|-------------------------------------|
| Monday to Friday   | 9:00 a.m. to 5:00 p.m.                                | 50% of available transfers          |
| Monday to Friday   | 11:30 p.m. to 2:30 a.m.                               | 75 transfers used for DR            |
| Monday to Friday   | 2:30 a.m. to 9:00 a.m. and<br>5:00 p.m. to 11:30 p.m. | 25% of available transfers          |
| Saturday to Monday | 2:30 a.m. (Saturday) to 9:00 a.m. (Monday)            | 10% of available transfers          |

You can create the following data copy schedules to manage your transition data copy operations:

| Schedule   | Option   | Value            |
|------------|--|------------------|
| peak_hours | Days Range   | Monday to Friday |
|            | Start Time   | 09:30            |
|            | Duration   | 8:00             |
|            | Percentage of maximum number of concurrent transfers | 50               |
|            | Maximum number of concurrent transfers               |                  |
|            | Throttle (MBps)                                      | 100              |
|            | Update Frequency                                     | 0:00             |

| Schedule         | Option   | Value            |
|------------------|--|------------------|
| dr_active        | Days Range   | Monday to Friday |
|                  | Start Time   | 23:30            |
|                  | Duration   | 3:00             |
|                  | Percentage of maximum number of concurrent transfers |                  |
|                  | Maximum number of concurrent transfers               | 25               |
|                  | Throttle (MBps)                                      | 200              |
|                  | Update Frequency                                     | 0:30             |
| non_peak_non_dr1 | Days Range   | Monday to Friday |
|                  | Start Time   | 17:00            |
|                  | Duration   | 6:30             |
|                  | Percentage of maximum number of concurrent transfers | 75               |
|                  | Maximum number of concurrent transfers               |                  |
|                  | Throttle (MBps)                                      | 300              |
|                  | Update Frequency                                     | 1:00             |

| Schedule         | Option   | Value            |
|------------------|--|------------------|
| non_peak_non_dr2 | Days Range   | Monday to Friday |
|                  | Start Time   | 02:30            |
|                  | Duration   | 6:30             |
|                  | Percentage of maximum number of concurrent transfers | 75               |
|                  | Maximum number of concurrent transfers               |                  |
|                  | Throttle (MBps)                                      | 300              |
|                  | Update Frequency                                     | 1:00             |
| week_ends        | Days Range   | Saturday         |
|                  | Start Time   | 02:30            |
|                  | Duration   | 53:30            |
|                  | Percentage of maximum number of concurrent transfers | 90               |
|                  | Maximum number of concurrent transfers               |                  |
|                  | Throttle (MBps)                                      | 500              |
|                  | Update Frequency                                     | 2:00             |

## Considerations for creating a data copy schedule

The 7-Mode Transition Tool runs a scheduler that checks for the active schedule every 5 minutes. You must be aware of the requirements to make a data copy schedule active. You can manage the SnapMirror transfers effectively by following some best practices when configuring the different parameters of a data copy schedule.

### Requirements to make a data copy schedule active

- The 7-Mode Transition Tool service must be running.

If the 7-Mode Transition Tool service is restarted, the SnapMirror operations are not performed until the



credentials are added.

- There should be at least one data copy schedule available for SnapMirror data copy operations to run.

If there is no schedule available for a particular time range, the SnapMirror data copy operations are not performed during that time.

- If the SnapMirror relationships are in the quiesced state, the data copy operations are not performed.
- The system time of the 7-Mode and the cluster must be synchronized for the incremental transfers to happen according to the data copy schedule.

If the 7-Mode system time is lagging behind the cluster time, the updates are scheduled more frequently than the specified update frequency. If the 7-Mode system time is ahead of the cluster time, the updates are delayed than the specified update frequency.

## Best practices during data copy

To improve SnapMirror replication performance, the source and destination systems should have optimum CPU utilization and memory available. Additionally, network traffic that is unrelated to the migration activity should be minimized so that the throughput is maximized and latency is minimized between the source and destination systems.

## Priority for data transfers

When scheduling the data copy operations, baseline or resynchronization operations take priority over the incremental transfers.

When aborting the data copy operations for releasing the SnapMirror transfers, incremental transfers are aborted first, and then baseline or resynchronization operations are aborted.

For incremental transfers, priority is given to the volumes that are lagging more behind the source volume based on the time elapsed from the previous update.

## Editing or deleting a data copy schedule for SnapMirror transfers

You can edit or delete data copy schedules that are used for SnapMirror baseline copy, update, and resynchronization operations, if you have other DR schedules configured or modified that require the transition data copy schedule to be modified.

The project must be in the preparation, data copy, or apply configuration (precutover) phase.

- After a schedule is edited, it takes up to 5 minutes for it to become effective.
- If the throttle limit is changed in the schedule when there are active transfers, the new throttle limit is not applicable for the currently running SnapMirror transfers.

After the current transfer is completed for a particular SnapMirror relationship, a new throttle limit is considered for the subsequent operations for that SnapMirror relationship.

- If you want the throttle limit to be effective immediately for the current SnapMirror transfers, you must pause and resume the project.





## Steps

1. From the Dashboard, select a project, and then click Configure Schedule.

All the existing schedules for the project are displayed.

You can also edit or delete schedules from the Configure Schedule option.

2. Edit or delete a schedule:

| If you want to...         | Then...  |
|---------------------------|--|
| Edit an existing schedule | <div>a. Click .</div> <div>The Modify Schedule dialog box is displayed.</div> <div><div></div><div>You can edit the schedule and SnapMirror parameters for the data copy operations.</div></div> <div>b. Make the required changes, and then click <b>Save</b>.</div> |
| Delete a schedule         | <div>a. Click .</div> <div>The schedule is deleted from the pane.</div> <div><div></div><div>At least one schedule is required for data transfers. Therefore, you should not delete all of the schedules.</div></div>   |

## Example

The following example illustrates how the throttle limit is applied when there are active SnapMirror transfers in the project.

| Schedule         | Number of volumes and data copy state | Maximum number of concurrent SnapMirror transfers | Throttle limit | Throttle used by each transfer |
|------------------|---------------------------------------|---|----------------|--------------------------------|
| Before modifying | Five volumes waiting for baseline     | Five  | 500 MBps       | 100 MBps                       |

| Schedule        | Number of volumes and data copy state  | Maximum number of concurrent SnapMirror transfers | Throttle limit | Throttle used by each transfer  |
|-----------------|--|---|----------------|---|
| After modifying | <ul style="list-style-type: none"> <li>• For two volumes, baseline is in progress using 100 MBps throttle</li> <li>• For three volumes, baseline is completed and are waiting for updates</li> </ul> | Five  | 250 MBps       | <ul style="list-style-type: none"> <li>• Two volumes that are in baseline continue to use the 100 MBps throttle</li> <li>• Three volumes for which the baseline is completed use the modified 50 MBps throttle for the updates</li> </ul> |

When the baseline copy for the two volumes is completed, the new throttle limit of 50 MBps is used for these volume SnapMirror relationships while scheduling the next data copy operations.

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