

provided as a component of an operating system, but may be provided as an independent software component.

Oracle ASM uses disk groups to store data files; an Oracle ASM disk group is a collection of disks that Oracle ASM manages as a unit. Within a disk group, Oracle ASM exposes a file system interface for Oracle Database files. The content of files that are stored in a disk group is evenly distributed to eliminate hot spots and to provide uniform performance across the disks. The performance is comparable to the performance of raw devices.

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You can add or remove disks from a disk group while a database continues to access files from the disk group. When you add or remove disks from a disk group, Oracle ASM automatically redistributes the file contents and eliminates the need for downtime when redistributing the content.

The Oracle ASM volume manager functionality provides flexible server-based mirroring options. The Oracle ASM normal and high redundancy disk groups enable two-way and three-way mirroring respectively. You can use external redundancy to enable a Redundant Array of Independent Disks (RAID) storage subsystem to perform the mirroring protection function.

Oracle ASM also uses the Oracle Managed Files (OMF) feature to simplify database file management. OMF automatically creates files in designated locations. OMF also names files and removes them while relinquishing space when tablespaces or files are deleted. When using OMF to create new files, new names are created for the new files so overwriting files is avoided.

Oracle ASM reduces the administrative overhead for managing database storage by consolidating data storage into a small number of disk groups. The smaller number of disk groups consolidates the storage for multiple databases and provides for improved I/O performance.

Oracle ASM files can coexist with other storage management options such as raw disks and third-party file systems. This capability simplifies the integration of Oracle ASM into pre-existing environments.

Oracle ASM has easy to use management interfaces such as SQL*Plus, the Oracle ASM Command Line Utility (ASMCMD) command-line interface, and Oracle ASM Configuration Assistant (ASMCA).



See Also:

- [Administering Oracle ASM Disk Groups](#) for information about administering disk groups
- [Managing Oracle ASM With ASMCA](#) for information about Oracle ASM Configuration Assistant
- [Managing Oracle ASM with ASMCMD](#) for information about the ASMCMD command-line interface
- *Oracle Database Administrator's Guide* for information about Oracle Database structure and storage

About Discovering Disks

The disk discovery process locates the operating system names for disks that Oracle ASM can access.

Disk discovery finds all of the disks that comprise a disk group to be mounted. The set of discovered disks also includes disks that could be added to a disk group.

An Oracle ASM instance requires an `ASM_DISKSTRING` initialization parameter value to specify its discovery strings. Only path names that the Oracle ASM instance has permission to open are discovered. The exact syntax of a discovery string depends various factors, such as the platform and whether Oracle Exadata disks are used. The path names that an operating system accepts are always usable as discovery strings.

See Also:

- [ASM_DISKSTRING](#) for information about the `ASM_DISKSTRING` initialization parameter
- [Oracle ASM Disk Discovery](#) for information about disk discovery
- [Administering Oracle ASM Filter Driver](#) for information about Oracle ASM Filter Driver

About Mounting and Dismounting Disk Groups

A disk group must be mounted by a local Oracle ASM instance before database instances can access the files in the disk group.

Mounting the disk group requires discovering all of the disks and locating the files in the disk group that is being mounted.

You can explicitly dismount a disk group. Oracle reports an error if you attempt to dismount a disk group without the force option when any of the disk group files are open. It is possible to have disks fail in excess of the Oracle ASM redundancy setting. If this happens, then the disk group is forcibly dismounted. If the disk group is forcibly dismounted, a database cannot access files in the disk group.

See Also:

[Mounting and Dismounting Disk Groups](#) for more information about disk groups

About Adding and Dropping Disks

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You can add a disk to an existing disk group to add space and to improve throughput.

The specified discovery string identifies the disk or disks that you could add. The disks that you add must be discovered by every Oracle ASM instance using its `ASM_DISKSTRING` initialization parameter. After you add a disk, Oracle ASM rebalancing operations move data

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onto the new disk. To minimize the rebalancing I/O, it is more efficient to add multiple disks at the same time.

You can drop a disk from a disk group if it fails or to re-purpose capacity. Use the Oracle ASM disk name to drop a disk, not the discovery string device name. If an error occurs while writing to a disk, then Oracle ASM drops the disk automatically.



See Also:

[Altering Disk Groups](#) for more information about altering disk group membership

About Online Storage Reconfigurations and Dynamic Rebalancing

Rebalancing a disk group moves data between disks to ensure that every file is evenly spread across all of the disks in a disk group.

When all of the files are evenly dispersed, all of the disks are evenly filled to the same percentage; this ensures load balancing. Rebalancing does not relocate data based on I/O statistics nor is rebalancing started based on I/O statistics. Oracle ASM rebalancing operations are controlled by the size of the disks in a disk group.

Oracle ASM automatically initiates a rebalance after storage configuration changes, such as when you add, drop, or resize disks. The power setting parameter determines the speed with which rebalancing operations occur.

You can manually start a rebalance to change the power setting of a running rebalance. A rebalance is automatically restarted if the instance on which the rebalancing is running stops. Databases can remain operational during rebalancing operations.

You can minimize the impact on database performance with the setting of the `ASM_POWER_LIMIT` initialization parameter.



See Also:

- [ASM_POWER_LIMIT](#) for more information about the power limit setting
- [Manually Rebalancing Disk Groups](#) for more information about disk rebalancing

Administering Oracle ASM with Oracle Enterprise Manager

Oracle Enterprise Manager Cloud Control provides tools for administering Oracle ASM.

This chapter describes how to administer Oracle Automatic Storage Management (Oracle ASM) with Oracle Enterprise Manager Cloud Control.

This chapter contains the following topics:

- [Accessing the Oracle Automatic Storage Management Home Page](#)
- [Configuring Oracle ASM Initialization Parameters with Oracle Enterprise Manager](#)
- [Managing Oracle ASM Users with Oracle Enterprise Manager](#)
- [Managing Disk Groups with Oracle Enterprise Manager](#)
- [Managing Oracle ASM File Access Control with Oracle Enterprise Manager](#)
- [Managing Directories, Files, and Aliases with Oracle Enterprise Manager](#)
- [Managing Disk Group Templates with Oracle Enterprise Manager](#)
- [Managing Oracle ASM Filter Driver With Oracle Enterprise Manager](#)
- [Monitoring Oracle ASM Performance With Oracle Enterprise Manager](#)
- [Backing Up Oracle ASM Files with Oracle Enterprise Manager](#)
- [Performing Bad Block Recovery with Oracle Enterprise Manager](#)
- [Migrating to Oracle ASM with Oracle Enterprise Manager](#)
- [Monitoring Alerts and Incidents With Oracle ASM Support Workbench](#)
- [Monitoring Oracle Flex ASM](#)



See Also:

Oracle Enterprise Manager Cloud Control Administrator's Guide

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Accessing the Oracle Automatic Storage Management Home Page

All Oracle ASM administration tasks begin with the Oracle Automatic Storage Management home page in Oracle Enterprise Manager Cloud Control. The Oracle Automatic Storage Management home page displays:

- The status of the Oracle ASM instance.

- A chart that shows the used and free space of each disk group and disk group internal usage.
- A list of databases that are serviced by the Oracle ASM instance.
- A list of Oracle Automatic Storage Management Cluster File System (Oracle ACFS) file systems that are serviced by the Oracle ASM instance.
- A list of other non-Oracle ACFS volumes.
- A list of alerts for the Oracle ASM instance and the host computer.
- [Links to the Oracle ASM Performance, Disk Groups, Configuration, Users, and Oracle ACFS pages.](#)

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To access the Oracle Automatic Storage Management home page on a single-instance system:

1. Log in to Oracle Enterprise Manager Cloud Control.
2. Under the **Targets** drop down menu at the top of the page, select **All Targets**.
3. In the lists of targets on the **All Targets** page, click the target for the Oracle ASM instance.
4. If prompted for Oracle ASM login credentials, then enter the user `SYS`, provide the `SYS` password that was set for the Oracle ASM instance during installation, and connect as `SYSASM`. The Oracle Automatic Storage Management home page displays.

For more information about authentication, refer to [Authentication for Accessing Oracle ASM Instances](#).

Configuring Oracle ASM Initialization Parameters with Oracle Enterprise Manager

You can configure Oracle ASM with the Oracle Enterprise Manager Configuration Parameters page.

To configure the Oracle ASM instance:

1. Access the Oracle Automatic Storage Management home page.
2. Click the **Configuration** link at the top of the page to view the Configuration Parameters page.
3. Update the configuration options on the page as follows:
 - Disk Discovery Path (`ASM_DISKSTRING` initialization parameter)
Enter a string value.
 - Auto Mount Disk Groups (`ASM_DISKGROUPS` initialization parameter)
Enter a string value.
 - Rebalance Power (`ASM_POWER_LIMIT` initialization parameter)
Enter an integer value.
 - Preferred Read Failure Groups (Only in Oracle RAC environments)
(`ASM_PREFERRED_READ_FAILURE_GROUPS` initialization parameter)