

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

11

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.

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:

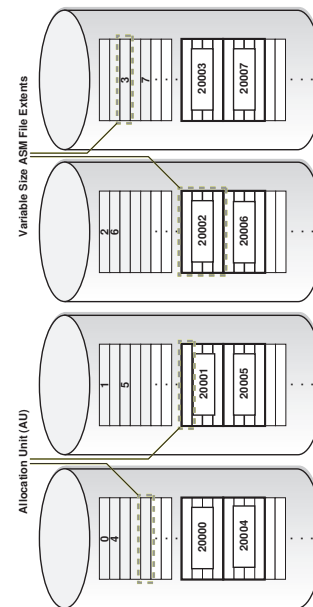
- [Administering Oracle ASM Disk Groups](#) for information about administering disk groups
- [Managing Oracle ASM With ASMCA](#) for information about Oracle ASM Configuration Assistant
- [Managing Oracle ASM with ASMCMD](#) for information about the ASMCMD command-line interface
- *Oracle Database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

For disk groups with AU size greater than or equal to 4 MB and the disk group RDBMS compatibility greater than or equal to 11.2.0.4, the counts for extents of sizes (the disk group AU size, 4\*AU size, or 16\*AU size) are calculated using the application block size to support maximum file size.

The extent sizing feature is automatic for newly created and resized data files when specific disk group compatibility attributes are set to 11.1 or higher. For information about compatibility attributes, see [Disk Group Compatibility](#).

Figure 1-4 shows the Oracle ASM file extent relationship with allocation units. The first eight extents (0 to 7) are distributed on four Oracle ASM disks and are equal to the AU size. After the first 20000 extent sets, the extent size becomes 4\*AU for the next 20000 extent sets (20000 - 39999). This is shown as bold rectangles labeled with the extent set numbers 20000 to 20007, and so on. The next increment for an Oracle ASM extent is 16\*AU (not shown in Figure 1-4).

Figure 1-4 Oracle ASM File Allocation in a Disk Group



## Understanding Oracle ASM Striping 11

Oracle ASM striping has two primary purposes: balance loads across all of the disks in a disk group and reduce I/O latency.

Coarse-grained striping provides load balancing for disk groups while fine-grained striping reduces latency for certain file types by spreading the load more widely.

To stripe data, Oracle ASM separates files into stripes and spreads data evenly across all of the disks in a disk group. The fine-grained stripe size always equals 128 KB in any configuration; this provides lower I/O latency for small I/O operations. The coarse-grained stripe size is always equal to the AU size (not the data extent size).

Figure 1-5 and Figure 1-6 are illustrations of Oracle ASM file striping. In both illustrations, the allocation unit size has been set to 1 M (AU\_SIZE = 1M) for the disk group which consists of 8 disks. The instance is Oracle ASM 11g Release 2 (11.2) and the disk group compatibility attributes for ASM and RDBMS have been set to 11.2, so