Oracle Flash Storage System

Glossary

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Documentation Accessibility

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Preface

Oracle Resources

Important: For the latest version of this document, visit the *SAN Storage – Oracle Flash Storage Systems* section at the Oracle Help Center (http://www.oracle.com/goto/fssystems/docs).

Table 1: Oracle resources

For help with...	Contact...
Support	*http://www.oracle.com/support* (www.oracle.com/support)
Training	*https://education.oracle.com* (https://education.oracle.com)
Documentation	• *SAN Storage – Oracle Flash Storage Systems*: (http://www.oracle.com/goto/fssystems/docs) • From Oracle FS System Manager (GUI): Help > Documentation • From Oracle FS System HTTP access: (http://system-name-ip/documentation.php where system-name-ip is the name or the public IP address of your system)
Documentation feedback	*http://www.oracle.com/goto/docfeedback* (http://www.oracle.com/goto/docfeedback)
Contact Oracle	*http://www.oracle.com/us/corporate/contact/index.html* (http://www.oracle.com/us/corporate/contact/index.html)

Typographical Conventions

Table 2: Typography to mark certain content

Convention	Meaning
italics	Within normal text, words in italics indicate one of the following items: • Hypertext, as in a URL • A reference to a book title • New terms and emphasized words • Command variables
`monospace`	Indicates one of the following, depending on the context: • The name of a file or the path to the file • *Output* displayed by the system on the command line
`monospace` (bold)	*Input* provided by an administrator on the command line.
>	Indicates a menu item or a navigation path in Oracle FS System Manager (GUI). For example, “Click SAN > Storage > LUNS > Action > Clone” means to click the Clone link on the SAN page in the GUI.
...	Indicates that one or more steps have been omitted from the path or menu structure. The ellipsis is used within an expression of a navigation path or within a cascading menu structure. For example, in the SAN > Storage > LUNS > ... > Clone menu structure, the ... implies that one or more menu items have been omitted.

Glossary

A

access bias

A QoS attribute that translates to an optimization bias:

Mixed, Random	The system reads and writes relatively small chunks and caches data for a longer period.
Sequential	The system reads and writes relatively large chunks and caches data for a shorter period.

Compare I/O bias.

See also Quality of Service (QoS).

access control list (ACL)

A set of access control entries (ACEs) that is associated with a file or directory that defines the access rights that each user or each group has for that object. An Oracle FS System uses ACL permissions as the basis of the security for an object and derives the UNIX permission modes from the collection of ACEs. A *discretionary* access control list (DACL) is one of two types of ACL.

Active Directory

A Microsoft technology that enables applications to find, use, and manage directory resources (such as user names, network printers, and permissions). The Oracle FS System CIFS server authenticates Kerberos clients against an Active Directory™ server in both mixed and native mode.

When the Oracle FS System provides a CIFS server, the CIFS client gets the ticket from Kerberos and presents it to the system. When the Oracle FS System is a CIFS client, the system gets the ticket from Kerberos and presents it to a customer-supplied domain controller.

See also Kerberos.

adaptive forwarding filesystem (AFFS)

An Oracle FS System feature that allows access to filesystems that are homed on a remote NAS Controller.

If a filesystem request is received on a virtual interface (VIF) that physically resides on a Controller other than the one containing the port for that VIF, the system forwards the request to the remote home Controller for processing. When the processing is complete, the system returns the results of the request to the original Controller. The original VIF then returns the results to the client.

See also home Controller.

See also partner Controller.

See also virtual interface (VIF).

addressable (logical capacity)

A QoS attribute that defines the amount of storage that is provisioned for a logical volume. For original volumes, the system might provision and display a value that is greater than what was requested, guaranteeing that the amount of storage requested is available. For clones and copies, the addressable logical capacity is the same as the source volume, unless a greater amount is requested.

For thinly provisioned volumes, the addressable capacity is unlimited. For all other volumes, the addressable capacity is the same as or slightly less than the allocated capacity.

Compare allocated (logical capacity).

See also capacity.

See also logical volume.

See also Quality of Service (QoS).

Administrator 1

The administrator role for a login account that provides the authority to perform all administrative tasks and all configuration tasks except for certain tasks that are reserved for the support roles.

Compare Administrator 2.

Compare Monitor.

Compare Oracle Support.

Compare Primary Administrator.

Compare Support.

Administrator 2

The administrator role for a login account that provides the authority to perform most administrative and configuration tasks. A login account assigned to this role cannot, however, perform the following tasks:

- Manage the administrator accounts and other global system settings such as those settings for networking, the Controller ports, system security, and the system time.
- Perform software upgrades or use Guided Maintenance to replace hardware components.
- Shut down the Oracle FS System system.

Compare Administrator 1.

Compare Monitor.

Compare Oracle Support.

Compare Primary Administrator.

Compare Support.

alert	*See system alert*.
allocated (logical capacity)	A QoS attribute that defines the amount of storage that is reserved for a logical volume. An allocated capacity can increase up to, and possibly exceed by a small amount, the addressable logical capacity. *Compare addressable (logical capacity)*. *See also capacity*. *See also logical volume*. *See also Quality of Service (QoS)*.
assigned Controller	The Controller that the system has configured as the preferred home Controller for a logical volume. Depending on the data path over which incoming access requests arrive for the volume, the system might re-home the volume to the partner Controller to optimize the access to the volume. *Compare home Controller*. *Compare partner Controller*. *See also adaptive forwarding filesystem (AFFS)*. *See also Controller*.
Auto Service Request (ASR)	A secure, scalable software solution that automatically generates a support case when specific system faults occur. ASR solutions combine the Call-Home feature of an Oracle FS System with My Oracle Support (MOS). A customer uses MOS to enable ASR so that Call-Home can generate the service requests. *See also Call-Home*.
auto-tiering	*See QoS Plus*.
availability	A feature of an Oracle FS System that makes the system fault tolerant. The following availability features make customer data highly accessible, even during hardware replacements and non-disruptive software updates: • Redundant components • Controller warmstarts • Failover and failback processing • RAID array rebuilds using dynamic spares for hard disk drives • RAID array rebuilds using dedicated spare drives for solid state drives *See also dynamic spare*. *See also failback*. *See also failover*.

See also fault tolerance.

See also reliability.

See also Reliability, Availability, Serviceability (RAS).

See also serviceability.

See also spare drive.

B

Backend SAS Interconnect

A multi-lane SAS network in an Oracle FS System that forms an intricate pattern of cross connections among the Controller nodes and the Drive Enclosures. Sometimes referred to as the *private interconnect (PI)*.

Compare private management interface (PMI).

background media scan (BGMS)

A drive operation that attempts to find problematic sectors and to rectify those sectors automatically. This operation is performed continuously so that regular I/O can occur without encountering problematic drive sectors. All drives in a Drive Enclosure, including the drives that have not been assigned to a drive group, are scrubbed. Sometimes referred to as *drive scrubbing*.

See also Drive Enclosure.

beacon

A feature of the Pilots, the Controllers, and the Drive Enclosures that identifies the chassis or a particular replaceable unit. During Guided Maintenance, when the administrator or the service technician beacons a hardware component, the system blinks the associated LED or set of LEDs on the component. A *reverse beacon* blinks everything except the LEDs on the component of interest.

See also Controller.

See also customer replaceable unit (CRU).

See also Drive Enclosure.

See also field replaceable unit (FRU).

See also Guided Maintenance.

See also Pilot.

block-level snapshot

See Filesystem Copy and *LUN Copy*.

C

cache

A sequential record of committed transactions (a set of modified blocks) that are guaranteed to be written to the underlying drive group storage. The Oracle FS System maintains one cache for each LUN. In the background, the

system asynchronously flushes each cache to permanent storage.

The system maintains two copies of the cache in flash-backed memory. The primary copy exists on the same Controller node on which the LUN resides. The secondary copy (a mirror) exists in the flash-backed memory in the partner node to allow recovery in the event of a failure of the home Controller.

Compare journal.

See also drive group.

See also flash-backed memory (FBM).

See also home Controller.

See also pinned data.

See also SAN Controller.

Call-Home A feature of an Oracle FS System that, when enabled, allows the system to send the system status information, the appropriate logs, and the system configuration information to Oracle Customer Support. If the Auto Service Request (ASR) feature is enabled, Call-Home also notifies Oracle Customer Support about critical issues that exist in the Oracle FS System.

See also Auto Service Request (ASR).

See also Call-Home matrix.

See also failover.

See also system configuration database.

Call-Home matrix An XML file that defines the default settings for the Call-Home feature and how the Oracle FS System handles events. Oracle Customer Support can provide a custom file to help in the diagnosis of a particular system issue. Custom files can be uploaded to the system by means of an Oracle FS CLI subcommand.

Software updates reset the Call-Home matrix to factory settings.

See also Call-Home.

capacity The amount of data that a logical volume can store. Capacity is expressed as *addressable logical capacity* or as *allocated logical capacity*.

See also addressable (logical capacity).

See also allocated (logical capacity).

See also logical volume.

Clone FS	A point-in-time, read-write, partial-block snapshot of a filesystem that you intend to split from the original filesystem for immediate access. A Clone FS retains the same QoS parameters as the source filesystem. A Clone FS consumes storage capacity from the capacity that was allocated for the source filesystem. Clone FSs provide a convenient method to branch from the source data without the need to do a full-block copy operation. *Compare Clone LUN.* *Compare Oracle MaxRep for NAS.* *Compare Snap FS.* *Compare Volume Copy.* *See also filesystem.*
Clone LUN	A point-in-time, read-write, partial-block snapshot of a LUN that can be accessed immediately. A Clone LUN retains the same QoS parameters as the source LUN. A Clone LUN consumes storage capacity from the clone repository that was allocated separately for the source LUN. Formerly called a *Snap LUN*. *Compare Clone FS.* *Compare Oracle MaxRep for SAN.* *Compare Volume Copy.* *See also LUN.*
command line interface (CLI)	*See Oracle FS CLI.*
Common Internet File System (CIFS)	A protocol that allows network users in a Windows environment to share and access files that are stored on an Oracle FS System. The Oracle FS System implementation of CIFS adheres to the Server Message Block (SMB) version 1.0 protocol. *Compare Network File System (NFS).*
community string	A text string, which can contain up to 255 printable characters (ASCII 33-126), that acts like a password to control access to Management Information Base (MIB) fields within a Simple Network Management Protocol (SNMP) device. *See also Management Information Base (MIB).* *See also Simple Network Management Protocol (SNMP).*
Controller	A 4U, clustered storage subsystem that is the front end to an Oracle FS System. A Controller is one of the nodes in an active-active pair of nodes, each of which provides access to user data and mirrors the cached data and the state of the partner node. A Controller can support the NAS protocol

	and the SAN protocol at the same time. A Controller accesses the storage pool through the Backend SAS Interface. *Compare Drive Enclosure.* *Compare Pilot.* *See also Backend SAS Interconnect.* *See also home Controller.* *See also NAS Controller.* *See also partner Controller.* *See also SAN Controller.* *See also service type.*
copyaway	See *Oracle Pre-Emptive Copy*.
customer replaceable unit (CRU)	A component in an Oracle FS System that can be replaced by the customer. Oracle FS System Manager (GUI) facilitates the hardware maintenance and the hardware upgrades and provides step-by-step instructions for the replacement of the components. *Compare field replaceable unit (FRU).* *See also Guided Maintenance.*

D

data migration	The movement of data blocks from a Storage Class to a different Storage Class based on the QoS Plus settings of the logical volume. The Oracle FS System uses the historical usage statistics for each QoS Plus volume in determining which data blocks to move. The system uses the priority level of the volume to determine the Storage Class on which to move the data. Sometimes referred to as *data progression*. *Compare immobile data.* *See also priority level.* *See also QoS Plus.* *See also statistics.* *See also Storage Class.*
data path	The network route from a client application to the Oracle FS System storage arrays. The customer data network connects to the public ports on the Controllers. From there, the data path progresses through the Backend SAS Interconnect to the appropriate drive groups that contain the data. *See also Backend SAS Interconnect.* *See also Controller.*

See also drive group.

data tier

A NAS storage tier for storing user data. A data tier is dedicated to a specific filesystem and takes advantage of specific performance and storage utilization properties of the media. An administrator defines the data tiers separately for each filesystem. The administrator can create up to three different data tiers for a filesystem.

Compare QoS Plus.

See also metadata tier.

See also storage tier.

disruptive software update

An installation of the Oracle FS System operating systems, applications, and Drive Enclosure firmware in a way that requires the Oracle FS System to be placed in an inactive state temporarily and all user data paths taken offline. Oracle FS Systems implement disruptive software updates by restarting the entire system to bring up the new software. User applications lose access to the Oracle FS System storage arrays during a disruptive software update.

Compare non-disruptive software update.

See also update.

domain

1. On the Internet, a set of network addresses that are organized in levels of specificity, as in oracle.com. For example, the top level of an address identifies the most general part of the address, such as .com (commercial) or .de (Germany).
2. For Windows, a set of network resources for a group of users. CIFS servers that have been configured for an Oracle FS System require a domain name to authenticate CIFS users.
3. For NIS (Network Information System), a collection of computers each of which has knowledge of the entire system of computers.

See also Common Internet File System (CIFS).

See also Kerberos.

See also Network Information Service (NIS).

See also Storage Domain.

Domain Controller (DC)

A networked computer that manages authentication and access to network resources. CIFS users on Windows clients authenticate through a DC. Used also in expressions such as *Primary Domain Controller (PDC)* and *Backup Domain Controller (BDC).*

Compare Network Information Service (NIS).

See also Common Internet File System (CIFS).

	See also domain, definition 2.
Domain Name System (DNS)	A service used on the Internet to translate host or domain names into IP addresses. In an Oracle FS System, an administrator identifies the IP addresses of one or more DNS servers that a File Server can use. Also, Pilots use DNS for sending Call-Home logs. *See also Call-Home*, definition 1. *See also domain*, definition 1. *See also File Server*.
Drive Enclosure	A 2U chassis or a 4U chassis in an Oracle FS System that contains SAS drives of one Storage Class. For hard disk drives (HDDs), a Drive Enclosure contains 24 drives in groups of 12. For performance solid state drives (SSDs), a Drive Enclosure contains 7 or 13 drives (one or two groups of six, plus one extra). For capacity SSDs, a Drive Enclosure contains 7, 13, or 19 drives (one, two, or three groups of six drives, plus one extra). Drive Enclosures are a part of the Backend SAS Interconnect. All of the drives in a Drive Enclosure support end-to-end CRC by means of the SCSI protection information field, which provides the data integrity metadata. *Compare Controller*. *Compare Pilot*. *See also Backend SAS Interconnect*. *See also drive group*. *See also reference tag*. *See also Storage Class*.
drive group	A logical object that manages a collection of drives of the same Storage Class, all of which are from the same Drive Enclosure. The number of drives in the drive group depends on the drive type. A drive group containing hard disk drives (HDDs) consists of 12 drives. A drive group containing solid state drives (SSDs) consists of six drives. A drive group resides in a single Storage Domain. *See also Drive Enclosure*. *See also dynamic spare*. *See also Persistence*. *See also primary drive group*. *See also spare drive*. *See also Storage Domain*.

dynamic spare — Unallocated strips on high-capacity hard disk drives (HDDs) in a given drive group. This spare capacity is striped across all of the HDDs in the drive group. Dynamic spares are used to support the RAID 5 protection level and the RAID 10 protection level. Dynamic spares cannot cross drive group boundaries.

Compare spare drive.

See also strip.

See also stripe, definition 2.

E

energy storage module (ESM) — An array of supercapacitors that are packaged into a 2.5-inch drive carrier. An ESM supplies power to the NV-DIMMs in a Controller so that, during a power failure, the NV-DIMMs can move the data from the dynamic memory in the Controller to the flash-backed portion of the NV-DIMMs.

See also Controller.

See also flash-backed memory (FBM).

Ethernet — An IEEE 802.3 standard for network transmission. Oracle FS Systems support public connections using Fast Ethernet, GbE, and 10 GbE technologies. These connections can be copper or optical.

event notification — Simple Mail Transfer Protocol (SMTP) email messages that notify recipients of specified system events. System events include informational events, warning events, and critical events such as the creation of a logical volume or the occurrence of a hardware problem or software problem. Event notifications are optional and, when enabled, supplement normal event logging and Call-Home notification.

See also Call-Home.

See also event severity.

event severity — The importance of events that have occurred within the system. The level of severity ranges from Informational (no action is required) to Critical (immediate action is required). The administrator can set up alerts (email notifications) that notify users when preselected events are triggered.

See also event notification.

export — A named NFS resource in a filesystem that remote clients can mount. In Oracle FS Systems, CIFS clients can access an NFS export if the path name definition for the CIFS share is the same as that for the export.

Compare share.

See also Common Internet File System (CIFS).

See also filesystem.

See also Network File System (NFS).

extent — An integer number of minimum allocation units (MAUs) that occupy a contiguous range of storage on a particular drive group. An extent uses a particular RAID level and is dedicated to a specific volume. A volume consists of an integer number of extents.

See also drive group.

See also minimum allocation unit (MAU).

See also strip.

See also stripe, definition 1.

F

failback — The restoration of a set of services and resources (which had been failed over earlier) to the original hardware component.

Compare failover.

failover — The transference of a set of services and resources from a failed hardware component to another hardware component. For example, when the active Pilot node can no longer function properly, failover occurs to the stand-by Pilot node, which then becomes the active node.

Compare failback.

See also port failover.

fault tolerance — The ability of an Oracle FS System to respond gracefully to an unexpected hardware or software failure.

See also availability.

field replaceable unit (FRU) — A replaceable hardware component in an Oracle FS System that requires an Oracle field support technician to replace the component.

Compare customer replaceable unit (CRU).

See also Guided Maintenance.

File Server — A NAS object that is assigned security, network, and protocol access attributes. These attributes apply to all of the filesystems that are associated with a specific File Server. A NAS Controller in an Oracle FS System requires at least one File Server. Sometimes referred to as a *CIFS server* or as an *NFS server*.

See also filesystem.

See also virtual interface (VIF).

filesystem

A logical volume that organizes and catalogs files and assigns resources to a given collection of directories and files in a NAS system. Administrators can assign different QoS attributes to each filesystem. A filesystem is associated with a File Server by means of exports and shares.

Compare LUN.

Compare virtual LUN (VLUN).

See also data tier.

See also export.

See also File Server.

See also logical volume.

See also Quality of Service (QoS).

See also share.

Filesystem Copy

A block-level, full-image copy of a filesystem or Clone FS. This copy can be read from and written to immediately. The QoS properties for a Filesystem Copy can differ from the original. Copies use the available storage in the system. Called *Copy Filesystem* in Oracle FS System Manager (GUI).

A duplicate copy requires greater system and storage resources than a Snap FS. To create an archival copy, use an inactive Clone FS.

Compare Snap FS.

See also Clone FS.

See also filesystem.

See also volume group.

flash-backed memory (FBM)

Memory modules in a Controller that provide nonvolatile memory. Because of the reserve of power that is provided by an energy storage module, the FBM retains the user data across system reset events and power loss events.

See also Controller.

See also energy storage module (ESM).

foreign drive

A drive that is new from the factory or is from a different Oracle FS System Drive Enclosure. To incorporate a foreign drive into the system, the administrator must accept the foreign drive when prompted by a system alert.

When a new factory drive is inserted into a Drive Enclosure, the RAID software automatically writes Oracle-specific metadata on the drive, which binds the drive to the Drive Enclosure. This binding process is called *branding*.

See also Drive Enclosure.

FSPM	*See Oracle FS Path Manager (FSPM).*

G

gateway	A router that enables traffic to flow from the network to which the Oracle FS System is connected to other networks. For Controllers, Oracle FS System administrators identify this gateway by its IP address as a File Server parameter. Pilots and Controllers use different gateways for their respective management and data paths. *See also File Server.* *See also route.*
geomap	A description of the physical layout on the Drive Enclosures for a given logical volume. A geomap is maintained internally within a Controller and is available for inspection through the Oracle FS CLI interface. *See also Controller.* *See also Drive Enclosure.* *See also virtual LUN (VLUN).*
graphical user interface (GUI)	*See Oracle FS System Manager (GUI).* *See Oracle MaxMan.* *See Oracle MaxRep for SAN.*
growth increment	The capacity by which a thinly provisioned (sparse) LUN or a thinly provisioned filesystem is expanded as usage increases. The value of this increment is between 1 GB and 2 GB. The minimum growth increment cannot be directly configured. *See also geomap.* *See also minimum allocation unit (MAU).* *See also stripe.* *See also thin provisioning.*
Guided Maintenance	A feature of Oracle FS System Manager that presents a series of dialogs that leads a person through the exact steps to replace a replaceable unit in an Oracle FS System. The dialogs include features that help you to identify the replaceable unit accurately. In addition to the guidance, this feature automatically integrates the new unit into the system and brings the unit into a Normal state. *See also beacon.* *See also customer replaceable unit (CRU).*

See also field replaceable unit (FRU).

See also serviceability.

H

halt point

A particular step that is associated with an Oracle FS System software module at which the system startup process is suspended. Specific halt points can be enabled and disabled only by a Support administrator.

Halt points are used for recovery purposes only. When the startup process is suspended, the Support administrator can gather information or clear conditions that cannot otherwise be accomplished. Halt points should never be set or cleared without the assistance from Oracle Customer Support.

See also initialization.

See also power on with data recovery (PODR).

See also restart.

See also Support.

hardware component

A Controller, a Drive Enclosure, or a Pilot.

Compare customer replaceable unit (CRU).

Compare field replaceable unit (FRU).

See also Controller.

See also Drive Enclosure.

See also Pilot.

high availability (HA)

See availability.

home Controller

The Controller on which the logical volume resides. The Oracle FS System automatically moves the ownership of a volume (*rehomes* the volume) to the Controller where the majority of the I/O operations occur. Rehoming a volume ensures efficient I/O operations for the volume.

Compare assigned Controller.

Compare partner Controller.

See also Controller.

For NAS, see also adaptive forwarding filesystem (AFFS).

For SAN, see also non-optimized access (NOA).

hot serviceable

A CRU or FRU that can be removed and replaced without the need for the administrator to issue any commands before the removal or after the replacement of the unit and without the need to power down the system or the unit

before the replacement. All data paths remain online and functioning during the servicing of the hardware.

See also customer replaceable unit (CRU).

See also field replaceable unit (FRU).

See also serviceability.

I

immobile data

The LUN data that QoS Plus cannot migrate to a low performance Storage Class because the Storage Class is excluded from the available LUN storage pool.

See also data migration.

See also QoS Plus.

See also Storage Class.

infill

The action of the Oracle FS System automatically allocating additional capacity to a thinly provisioned logical volume. This additional capacity might not be contiguous with the previous allocations.

See also thin provisioning.

initialization

1. The start-up process in an Oracle FS System. Sometimes called *boot-up*.

   See also restart.

2. The process of the Oracle FS System writing zeros to an area in storage (to make the capacity available for allocation).

Input/Output Operations per Second (IOPS)

A performance measurement for read (input) operations and write (output) operations. Adding drive groups can increase the IOPS capability of an Oracle FS System.

See also drive group.

Integrated Lights Out Manager (ILOM)

The service processor software that monitors the events, the errors, and the faults that occur in the Oracle FS System hardware. ILOM controls all LED activity and is present on all Controllers and on all Pilots. When documentation is available for an event, an error, or a fault that ILOM encounters, the ILOM messaging provides a URL to the appropriate knowledge base article on the My Oracle Support (MOS) website.

See also Controller.

See also Pilot.

See also Reliability, Availability, Serviceability (RAS).

See also service processor (SP).

I/O bias

A QoS attribute that identifies the typical read-write ratio for files, which translates to an optimization bias for the logical volume:

- Mixed, if the read-write ratio varies.
- Read, if the read activity exceeds the write activity.
- Write, if the write activity exceeds the read activity.

Compare access bias.

See also Quality of Service (QoS).

J

journal

A sequential record of committed transactions (set of modified blocks) that are guaranteed to be written to the underlying drive group storage. The Oracle FS System maintains one journal for each filesystem. In the background, the system asynchronously flushes these journals to permanent storage.

The system maintains two copies of a journal in Controller memory. The primary copy exists on the home Controller. The secondary copy (a mirror) exists in the non-volatile, flash-backed memory in the partner Controller, which allows data recovery in the event of a failure of the home Controller.

Compare cache.

See also drive group.

See also flash-backed memory (FBM).

See also home Controller.

See also NAS Controller.

See also partner Controller.

See also pinned data.

K

Kerberos

A secure method for authenticating a request for a service. Kerberos lets a user request an encrypted ticket from an authentication process that is a part of the Key Distribution Centre (KDC), which can then be used to request a particular service from a server. The user's password does not have to pass through the network.

Oracle FS System administrators can choose to authenticate users by requiring them to request a KDC ticket.

L

link aggregation

A process that groups two adjacent Ethernet ports into a single NAS channel, creating a higher-bandwidth logical link. Link aggregation provides load balancing and fault tolerance for multiple Ethernet links. When link aggregation is enabled for an Oracle FS System, the aggregated GbE ports on each Controller node become redundant. Conforms to the IEEE 803.2ad standard Link Aggregation Control Protocol (LACP) standard.

Compare port failover.

See also Ethernet.

See also NAS Controller.

local area network (LAN)

Computers and other devices that span a geographic area of up to a few thousand meters and interact through a common Ethernet link. An Oracle FS System provides interfaces to the following types of LANs:

- Private management network, which the system uses for internal communication
- Public management network, which administrators use to manage the system
- Public data network to service CIFS and NFS clients

See also data path.

See also Pilot.

See also private management interface (PMI).

log bundle

An archive of system information that can be used by Oracle Support for diagnostic purposes. A log bundle contains information of any combination of the following types:

- Controller events
- Pilot events
- Replication Engine events
- System configuration
- SAN host logs
- System statistics

See also Controller.

See also Oracle MaxRep Replication Engine.

See also Pilot.

See also statistics.

See also system configuration database.

logical volume	A named segment of storage in a Storage Domain that represents a NAS filesystem or a SAN LUN. Both volume types can act as source volumes for clone operations, snapshot operations, and copy operations. The products of those operations are logical volumes as well. *See also Clone FS*. *See also Clone LUN*. *See also filesystem*. *See also LUN*. *See also Snap FS*. *See also Storage Domain*. *See also thin provisioning*. *See also Volume Copy*. *See also volume group*.
loopback diagnostics	A diagnostic test for a SAN Controller that validates the connectivity between a target port on the Controller and a SAN switch port. During the test, the target port sends an Extended Link Service (ELS) Echo request to the switch, which then routes the request back to the sending port. *See also SAN Controller*.
lost data	A condition in which data might not be accessible or available. When this condition exists, the logical volume reports a *lost data* status, which means that the Oracle FS System cannot guarantee that some data has not been lost. This condition can arise when the following events occur: • During a power outage, the energy storage module (ESM) fails or exhausts its energy reserve before it can transfer all of the cached data from dynamic memory to the flash-backed memory in the NV-DIMM. • A Drive Enclosure fails. A lost data condition causes the system to take the logical volume offline and to generate a system event. *See also availability*. *See also Controller*. *See also Drive Enclosure*. *See also energy storage module (ESM)*. *See also flash-backed memory (FBM)*.
LUN	A logical volume that is defined over a collection of drive groups and is addressed using SCSI protocol in a SAN. An administrator defines the QoS attributes of the LUN.

Compare filesystem.

Compare virtual LUN (VLUN).

See also logical volume.

See also Quality of Service (QoS).

LUN Copy

A block-level, full-image copy of a LUN or a Clone LUN. This copy can be read from and written to immediately. QoS parameters for a LUN Copy can differ from the original. Copies use the available storage in the system. Called *Copy LUN* in Oracle FS System Manager (GUI).

A duplicate copy requires greater system and storage resources than the Clone LUN feature.

Compare Clone LUN.

See also LUN.

See also Volume Copy.

M

Management Information Base (MIB)

An information store that provides the current state of a collection of managed network objects and is accessed by means of the Simple Network Management Protocol (SNMP). Access to MIB state information is controlled through the use of a community string.

An Oracle FS System exposes an MIB that corresponds to the physical state of the system, including system status, statistics, and notification information.

See also community string.

See also Simple Network Management Protocol (SNMP).

management IP

The IP address that administrators use to access the Oracle FS System management interface on the Pilot. This address is often set to a customer-defined address when the Oracle FS System is first installed.

metadata tier

A NAS storage tier for storing filesystem metadata. A metadata tier is dedicated to a specific filesystem and can take advantage of specific performance and storage utilization properties of the storage media. An administrator defines one metadata tier for each filesystem.

Compare data tier.

Compare QoS Plus.

See also filesystem.

See also storage tier.

minimum allocation unit (MAU)	The smallest, fixed amount of contiguous storage that the system can allocate to a volume. A MAU is an integer number of strips and consumes approximately 256 MB of capacity. *See also strip.*
mirror	A RAID level in which the Oracle FS System maintains an exact duplicate of a logical volume at a different location. No parity data is used. Mirroring protects against the loss of at least one drive and possibly more drives with an improvement of the performance of random write operations. Mirrored RAID is implemented using RAID 10 technology. *Compare RAID 6.* *See also RAID 10.*
Monitor	An administrator role for login accounts that provides the authority for those accounts to perform read-only management tasks and to modify their own account properties. *Compare Administrator 1.* *Compare Administrator 2.* *Compare Oracle Support.* *Compare Primary Administrator.* *Compare Support.*

N

Name Service Switch (NSS)	A service that provides ordered access to databases to resolve users, groups, and hosts. An administrator can identify the search order that a File Server uses among these databases and files: • Network Information Service (NIS) database for host and password resolution. • Domain Name System (DNS) database for host resolution in non-NIS environments. • Files (`/etc/passwd`, `/etc/group`, and `/etc/netgroup`) for password resolution in non-NIS environments. *See also Domain Name System (DNS).* *See also File Server.* *See also Network Information Service (NIS).*
NAS Controller	A Controller that provides file-based storage services. It connects to host servers by means of a Gigabit Ethernet

	connection into a LAN. NAS Controllers service filesystems using CIFS and NFS protocols. *Compare SAN Controller.* *See also Common Internet File System (CIFS).* *See also Controller.* *See also Network File System (NFS).* *See also service type.*
NAS/SAN	The unification of NAS and SAN environments in an Oracle FS System, which uses a single storage pool and is controlled by flexible, QoS-driven policies. A Controller can service both protocols simultaneously. *Compare NAS Controller.* *Compare SAN Controller.* *See also service type.*
netgroup	A named list of computers that are given similar network access. A netgroup can be convenient when establishing a host entry that applies to a group of computers. *See also File Server.* *See also Network Information Service (NIS).*
netmask	A pattern that shows how an Internet address is to be divided into network, subnet, and host parts. As a File Server network parameter, it identifies the mask that is assigned to the virtual network interfaces of the File Server. *Compare virtual interface (VIF).* *See also File Server.*
Network Data Management Protocol (NDMP)	An industry-standard protocol that allows for the use of third-party backup applications to manage the backup and recovery of customer data. Refer to *http://www.ndmp.org/info/faq.shtml*.
Network File System (NFS)	A file-sharing protocol that allows users who have NFS client software installed on their workstations to access data that is stored on an Oracle FS System. Users can manipulate these files as though they were stored locally on their own drive. Oracle FS Systems supports NFS versions 2 and 3 commands over TCP and User Datagram Protocol (UDP). *Compare Common Internet File System (CIFS).*
Network Information Service (NIS)	A network naming and administration service. Administrators can choose to authenticate UNIX, Linux, and Windows NFS clients by means of an NIS database. *Compare Domain Controller (DC).*

	See also Network File System (NFS).
Network Time Protocol (NTP)	A standard that is used to synchronize computer clock times in a network of computers. The Pilot management controller synchronizes its time with an NTP server outside of the Oracle FS System. Controllers synchronize their clocks with the Pilot. You can also set the time manually. *See also Controller.* *See also Pilot.*
non-disruptive software update	An installation of operating systems, applications, and Drive Enclosure firmware on an Oracle FS System in a way that does not require the Controller data paths to be taken offline and the system restarted. Instead, user applications can continue accessing the Oracle FS System storage arrays without interruption while the Pilot warmstarts the Controller nodes. Sometimes called *NDU* (non-disruptive update). *Compare disruptive software update.* *See also Controller.* *See also Pilot.* *See also update.*
non-optimized access (NOA)	Less efficient access to a LUN through the ports on the partner Controller for the LUN, as opposed to the optimized access through the ports on the home Controller for the LUN. *Compare adaptive forwarding filesystem (AFFS).* *See also home Controller.* *See also partner Controller.*
notification	See *event notification*.

O

opportunistic lock (oplock)	In CIFS, a specialized form of file lock that allows the CIFS client to cache data, generally improving performance. Oplocks are an optional feature when an administrator creates a File Server. Without oplocks, CIFS clients access data files directly. *See also Common Internet File System (CIFS).* *See also File Server.*
Oracle FS CLI	A client-based application that enables administrative actions by means of commands from a shell. Through this interface, system administrators can configure and manage an Oracle FS System. This application follows conventions

	used by other command line interfaces and supports automation through scripting using standard shells such as Perl and Python. *Compare Oracle FS System Manager (GUI).*
Oracle FS Path Manager (FSPM)	Optional software installed on a SAN host to manage multiple paths to the Oracle FS System.
Oracle FS SecureWORMfs	A type of filesystem used to enforce data retention. Data is stored on an Oracle FS SecureWORMfs in a protected (non-rewritable) manner. *See also filesystem.*
Oracle FS Statistics Tools	An Oracle FS System utility that is used to download and to format the statistics that are automatically collected by the system. The formatted statistics can then be analyzed in, for example, a spreadsheet. This utility can be downloaded from any Oracle FS System. *See also statistics.*
Oracle FS System Manager (GUI)	The Java-based application that administrators use to configure and to manage an Oracle FS System. Oracle FS System Manager is the name of the application that is used to manage a particular Oracle FS System. *Compare Oracle FS CLI.* *Compare Oracle MaxMan.*
Oracle MaxMan	The Java-based application that administrators use to configure and to manage multiple Oracle FS Systems. *Compare Oracle FS System Manager (GUI).*
Oracle MaxRep for NAS	Optional software for NAS environments that allows administrators to replicate filesystems onto one or more Oracle FS Systems. This software can keep the content of the replicas synchronized with the content of the parent volumes.
Oracle MaxRep for SAN	Optional hardware (the Oracle MaxRep Replication Engine) and software that allows administrators to replicate SAN LUNs onto one or more Oracle FS Systems for the purpose of disaster recovery, application consistent recovery, and business continuity. Oracle MaxRep for SAN provides a GUI for configuration, control, and monitoring purposes. *See also Oracle MaxRep Replication Engine.*
Oracle MaxRep Replication Engine	A 2U server that manages and monitors the replication and recovery process for the Oracle FS System data in a SAN. A Replication Engine captures the write requests and replicates them immediately to a target LUN. The Replication Engine is the hardware component of Oracle

MaxRep for SAN. The software component of Oracle MaxRep for SAN runs on one or more Replication Engines.

If two Replication Engines are used in an Oracle FS System, the two nodes operate as a cooperative pair. One node operates in active mode while the other node operates in stand-by mode.

See also Oracle MaxRep for SAN.

Oracle Pre-Emptive Copy

A feature of the Oracle FS System firmware that copies the data on a drive that has been predicted to fail to a spare drive or to a dynamic spare. This operation occurs before the suspect drive fails and is subsequently taken offline for replacement. This feature avoids the performance degradation and the potential exposure to data loss when the drive does fail. This feature optimizes overall performance by avoiding the overhead of rebuild operations. Sometimes referred to as *copyaway*.

See also dynamic spare.

See also Reliability, Availability, Serviceability (RAS).

See also spare drive.

Oracle Support

The administrator role that is assigned to the `pillar` login account, which is installed at the factory and cannot be deleted. The `pillar` login account has special privileges strictly for the purposes of maintenance and cannot modify the system configurations, the data resources, the system alerts, or any of the administrator accounts.

The `pillar` login account is reserved for use by Oracle Customer Support and by authorized service providers. Additional login accounts using the Oracle Support role cannot be created.

Compare Administrator 1.

Compare Administrator 2.

Compare Monitor.

Compare Primary Administrator.

Compare Support.

P

partner Controller

One of two Controller nodes that are paired together in an active-active state. In terms of volume assignment, the partner Controller is the second of the pair of Controllers that are associated with a logical volume. The partner Controller is not currently assigned as the home Controller.

Compare assigned Controller.

Compare home Controller.

See also adaptive forwarding filesystem (AFFS).

See also Controller.

path

The physical route along which the protocol or the data for a logical connection travels. A path connecting a customer hardware device to an Oracle FS System is dedicated to transporting user data or management information.

See also Backend SAS Interconnect.

See also route.

Persistence

The internal name of the volume that contains the system configuration database. The Persistence volume resides on a virtual drive in the primary drive group. This virtual drive is called the *Persistence VLUN*.

See also primary drive group.

See also system configuration database.

See also system root configuration.

See also virtual LUN (VLUN).

personality

See service type.

Pilot

An Oracle FS System hardware component that provides system management services, system restart services, Call-Home services, administrative access, and maintenance access. Administrators can connect to the Pilot nodes over the Ethernet using Oracle FS System Manager (GUI) or Oracle FS CLI.

Compare Controller.

Compare Drive Enclosure.

See also Oracle FS CLI.

See also Oracle FS System Manager (GUI).

Pilot restart

The reinitiation of the Pilot nodes while the rest of the Oracle FS System continues to function. The management software restarts the Pilot nodes when the Oracle FS System experiences one of the following events:

- An internal issue has been detected.
- A non-disruptive software update (which means that the data resources remain online) is being performed.

The restarting of the Pilot nodes does not affect or impact the data path in any way.

Compare restart.

Compare warmstart.

See also non-disruptive software update.

pinned data

Any modified data that the system cannot flush from memory to physical storage due to a system failure or a power failure. The Oracle FS System protects this in-memory data until the system can flush the data to physical storage. To resolve any pinned data, administrators can perform the following actions:

- Fix the issue, which would then let the system flush the pinned data.
- Discard the pinned data.

See also cache.

See also flash-backed memory (FBM).

See also journal.

policy-based management

An Oracle FS System administrative mechanism that simplifies resource management. This mechanism allows the creation of policies to deal with situations that are likely to occur. System administrators define QoS policies for filesystems and LUNs that define the following characteristics of the volumes:

- Capacity limits
- Performance targets
- Data protection

Administrators can define other policies to handle system-level occurrences:

- Event notifications
- Data replication
- Hardware component failures

port failover

An Oracle FS System feature that permits link loss recovery by allowing a virtual interface (VIF) to migrate another port. In the case of a switch failure or a cable failure, the VIF can migrate to another port on the same Controller. In the case of a home Controller failure, the VIF can migrate to the partner Controller.

Compare link aggregation.

See also home Controller.

See also partner Controller.

See also virtual interface (VIF).

port group

A collection of serial-attached SCSI (SAS) ports within the Backend SAS Interconnect that is used to access the storage arrays.

	See also Backend SAS Interconnect.
power on with data recovery (PODR)	A power cycle that keeps the data intact within the flash-backed memory in the Controllers. PODR applies most often in the context of a Controller node that has been power cycled without a clean shutdown. PODR can apply to the entire Oracle FS System as well. *See also cache*. *See also Controller*. *See also flash-backed memory (FBM)*. *See also journal*. *See also shutdown*.
Primary Administrator	The administrator role that is assigned to the `administrator` login account, which is installed at the factory and cannot be deleted or disabled. The `administrator` login account has the authority to perform all administration and configuration tasks. Additional login accounts using the Primary Administrator role cannot be created. *Compare Administrator 1*. *Compare Administrator 2*. *Compare Monitor*. *Compare Oracle Support*. *Compare Support*.
primary drive group	The drive group in an Oracle FS System that contains the system-wide Persistence volume. *See also drive group*. *See also Persistence*.
priority level	A QoS attribute that determines the characteristics of the system response to the incoming I/O requests against a volume. Generally, higher priority volumes are striped across a greater number of drive groups when compared to lower priority volumes. QoS Plus causes a higher priority volume to be given a greater opportunity to occupy the higher performance Storage Classes when data migration is indicated for the volume. *See also data migration*. *See also drive group*. *See also QoS Plus*. *See also Quality of Service (QoS)*. *See also Storage Class*.

private interconnect (PI)	*See Backend SAS Interconnect.*
Private Interconnect Topology Manager (PITMAN)	A tool that runs on the Oracle FS System that collects high-level statistics and error information. The information collected is for the private interconnect, which is also known as the Backend SAS Interconnect. PITMAN can be run manually to disable selected components in the Backend SAS Interconnect and to identify malfunctioning hardware. *See also Backend SAS Interconnect.*
private management interface (PMI)	The internal Ethernet network that interconnects the Pilot nodes and the Controller nodes to support the management function and other functions of the Oracle FS System. *Compare Backend SAS Interconnect.*
processing queue	A software-based container that is maintained in the Controller memory to store incoming I/O requests. One container exists for each of the QoS priority settings. The SAN interface of a Controller places each incoming I/O request for a LUN into the processing queue that corresponds to the QoS priority of the LUN. If the SAN interface of a FixController becomes overcommitted, the Oracle FS System allocates the processing resources of the Controller to each queue according to the priority of the queue. *See also priority level.*

Q

QoS Plus	A software feature of the Oracle FS System that enhances the QoS properties of a LUN, which allows the system to automatically migrate chunks of LUN data to a more optimum storage tier for performance reasons. When QoS Plus is requested for a LUN, the system automatically creates a RAID 10 storage tier in the owning Storage Domain. If the Storage Domain contains performance hard disk drives (HDDs) or solid state drives (SSDs) of any type, the system also creates a RAID 5 storage tier. If the Storage Domain contains capacity HDDs, the systems also creates a RAID 6 storage tier. Sometimes referred to as *auto-tiering* or *sub-LUN auto-tiering*. *See also Quality of Service (QoS).* *See also RAID 5.* *See also RAID 6.* *See also RAID 10.*

See also Storage Class.

See also Storage Domain.

See also storage tier.

Quality of Service (QoS)

The set of attributes for a logical volume that affects how the volume utilizes storage and the priority that the Oracle FS System gives to the I/O requests that target the volume.

For LUNs that use QoS Plus, the system automatically places the user data on a storage tier that has QoS attributes that are appropriate for how the data is actually being used. For filesystems, administrators can create multiple data tiers, each having different QoS properties, on which to store files. An administrator or a user can move the file later to a different data tier, if desired.

See also access bias.

See also capacity.

See also data tier.

See also I/O bias.

See also priority level.

See also QoS Plus.

See also redundancy.

See also service level agreement (SLA).

See also Storage Profile.

See also storage tier.

queue

See processing queue.

quota

A capacity control for directories, users, or groups who store data in a filesystem.

See also capacity.

See also filesystem.

R

rack mounted

Assembled, cabled, and tested at the factory and then boxed for shipping to a customer site. *Rack mounted* is used to identify an Oracle FS System that can be unpacked, plugged in, and powered up without any assembly at the customer site.

Compare rack ready.

rack ready

Assembled, cabled, and tested at the factory and then disassembled before shipping to a customer site. *Rack ready* is used to identify an Oracle FS System for which the

	hardware components must be unpacked and installed in a rack at the customer site before the system can be plugged in and powered up. *Compare rack mounted.*
RAID 5	A storage technology that stripes the data and the parity bits across the drives in the RAID array. The Oracle FS System writes the data and the parity bits to the drives of a given Storage Class within a single Storage Domain. The system intersperses the parity bits with the user data by placing the bits into different locations for each stripe that supports a logical volume. *Compare RAID 6.* *See also redundancy.* *See also Storage Class.* *See also Storage Domain.* *See also stripe,* definition 1.
RAID 6	RAID 5 with double parity and no mirroring. On an Oracle FS System, RAID 6 is supported only on hard disk drives (HDDs). *Compare RAID 5.* *Compare RAID 10.*
RAID 10	A storage technology that writes two copies of the user data to different drives. RAID 10 does not compute parity bits for the user data. RAID 10 is typically selected for write intensive workloads to improve performance. *Compare RAID 6.* *See also mirror.*
redundancy	The number of copies of the parity bits that are created for a logical volume. *Standard redundancy* is a synonym for single parity (RAID 5) and protects the user data even after the failure of one drive. *Double redundancy* is a synonym for double parity (RAID 6) and protects the user data even after the simultaneous failure of two drives. Redundancy stripes the data over multiple drive groups. *See also drive group.* *See also mirror.* *See also RAID 5.* *See also RAID 6.* *See also stripe,* definition 1.

reference tag

A segment of the SCSI protection information field, which contains data integrity metadata (the block address of the data). The protection information field is a part of a data record only at the firmware level. This information is not available to client applications. The administrator can control whether the system checks the reference tag metadata for a particular LUN.

See also Drive Enclosure.

reliability

A feature of an Oracle FS System in which dependable hardware and system software consistently serve customer data. The reliability of the system reduces maintenance costs and minimizes service disruptions.

See also availability.

See also Reliability, Availability, Serviceability (RAS).

See also serviceability.

Reliability, Availability, Serviceability (RAS)

The ability to serve customer data, to respond to a failure, and to undergo maintenance without a complete system shutdown. Oracle FS Systems are designed with these features in mind to produce a highly reliable, highly available system that is easy to service.

See also availability.

See also reliability.

See also serviceability.

replica

A copy of a logical volume. Replicas are generally used for recovery from file corruption or catastrophic situations and sometimes for testing purposes. Replicas include all forms of copies, clones, and snapshots.

All replicas, *except* those that are created by the Oracle MaxRep utilities, have the following characteristics:

- Created by an explicit one-time operation.
- Performed on the same Oracle FS System.
- Require no prior configuration.
- Disassociated from and not synchronized with changes to the parent volumes.

Oracle MaxRep operations produce copies of the data that, once created, continue to be associated with the parent volume. This type of replica requires pre-configuration and can be placed on a different system. A synchronization operation mirrors in the replica all updates to the parent volume.

Compare Oracle MaxRep for NAS.

Compare Oracle MaxRep for SAN.

See also Clone FS.

See also Clone LUN.

See also Snap FS.

See also Volume Copy.

Replication Engine

See Oracle MaxRep Replication Engine.

replication pair

1 For Oracle MaxRep for NAS, a relationship established between two filesystems on the same or different Oracle FS System. Through the use of a command, the administrator requests that the replication process transfer to the target volume all changes made to the source volume since the previous replication process.

   See also filesystem.

   See also Oracle MaxRep for NAS.

2 For Oracle MaxRep for SAN, an association of a source LUN and a target LUN for recovery purposes.

   See also LUN.

   See also Oracle MaxRep for SAN.

restart

A process that ensures that the Oracle FS System software components shut down and start back up in an orderly way. The Pilot management software controls this process. During a Pilot restart, all data paths are available. During a full system restart, the data paths are not available.

During the startup of the Oracle FS System, the management software obtains heartbeats from the Controller nodes and verifies the configuration of the Oracle FS System. Disruptive software updates and explicit system administrator requests initiate system restarts.

Compare non-disruptive software update.

Compare warmstart.

See also Controller.

See also halt point.

See also Pilot restart.

See also shutdown.

restart point

A block of information that is periodically saved during Oracle MaxRep for NAS synchronization operations. If needed, this information can be used to continue the synchronization process after an interruption. The system records a restart point approximately every minute.

See also Oracle MaxRep for NAS.

See also replication pair, definition 1.

route

The progression through hosts, routers, gateways, and other devices that network traffic can take. Oracle FS System administrators identify at least one gateway for a File Server to use to route messages to other networks.

See also File Server.

See also gateway.

See also sendback routing.

S

SAN Controller

A Controller that provides block-based storage services to a SAN. A SAN Controller communicates with customer servers using Small Computer System Interface (SCSI) commands over the customer SAN. SAN Controllers support Fibre Channel technologies.

Compare NAS Controller.

See also Controller.

See also service type.

Self-Monitoring, Analysis, and Reporting Technology (SMART)

A mechanism by which drives can report health information and the likelihood of failure. In an Oracle FS System, the RAID software use SMART to predict whether a drive is in danger of failing, which allows administrators to prevent the failure in a proactive way.

sendback routing

The policy that the Oracle FS System uses to respond to an incoming network packet, which routes the outgoing packet by using the network port that is associated with the IP address of the source of the incoming packet. If the incoming request arrived at the correct network port, the outgoing response generally responds by using the same port.

Sendback routing is similar to *boomerang* or *reflect mode* routing for host implementations.

See also route.

serviceability

An attribute of an Oracle FS System that eases the cost and the time for system maintenance through such features as self-diagnostics, automatic failover and failback, hot-serviceable CRUs and FRUs, and Guided Maintenance.

See also customer replaceable unit (CRU).

See also failback.

See also failover.

See also field replaceable unit (FRU).

See also Guided Maintenance.

	See also reliability. *See also Reliability, Availability, Serviceability (RAS)*.
service level agreement (SLA)	Contractually defined performance metrics in which Oracle provides technical support, replacement parts, and on-site service to an entitled customer. *See also Quality of Service (QoS)*.
service processor (SP)	A component on a Controller motherboard and on a Pilot motherboard that monitors the physical state of the hardware component. Service processors also provide access to motherboard reset operations, AC power control, fan control, voltage monitoring, and temperature monitoring. This access can be through a local interface or through a remote interface on the partner hardware node. Oracle Support technicians and system administrators can access the SP through a special management port. Sometimes referred to as a *baseboard management controller (BMC)*. *See also Controller*. *See also Integrated Lights Out Manager (ILOM)*. *See also Pilot*. *See also restart*.
service type	The degree of bias of a pair of Controllers toward servicing the NAS protocol, the SAN protocol, or a combination of the two protocols. The bias can be 100% toward one protocol or split 70% toward one of the protocols and 30% toward the remaining protocol. The service type defines how much memory is optimized for I/O performance to support SAN or NAS. Sometimes referred to as *personality*. *See also NAS Controller*. *See also SAN Controller*.
session	The period of time during which a client is logged in to an Oracle FS System server with the credentials necessary to run commands against the Oracle FS System. A session begins when the server successfully authenticates the user. The session remains active until the user explicitly ends or quits the session or simply logs out. Often referred to as a *command session*, a *login session*, or a *shell session*. *See also Oracle FS CLI*.
share	A named CIFS resource in a filesystem that remote systems can access. In an Oracle FS System, NFS users can access a CIFS share if the path name definition for the NFS export point is the same as that for the share.

	Compare export. *See also Common Internet File System (CIFS)*. *See also filesystem*. *See also Network File System (NFS)*.
shutdown	A process that completes all running processes and quiets all parts of the Oracle FS System. The shutdown process allows the safe removal of the power and the replacement of the hardware components. The shutdown process disables all of the data interfaces on the Controllers and flushes all cached user data to permanent storage. Shutdown can also apply to the quieting of a Pilot node or a Controller node, such as when Guided Maintenance prepares the system for the replacement of a non-hot serviceable FRU or CRU. [Guided Maintenance shuts down the Pilot node or a Controller node, making the node safe to remove the power cords.] *Compare warmstart*. *See also restart*.
Simple Network Management Protocol (SNMP)	A standard network protocol that is used to monitor Controllers, Drive Enclosures, and the drives within the Drive Enclosures. SNMP hosts can monitor the system by querying the SNMP service by accessing the management information base (MIB) that is provided. *See also community string*. *See also Controller*. *See also Drive Enclosure*. *See also field replaceable unit (FRU)*. *See also Management Information Base (MIB)*. *See also trap host*.
Snap FS	A point-in-time, read-only snapshot of a filesystem, which can be used later to restore the filesystem. A Snap FS has no QoS parameters. It consumes storage capacity from the filesystem itself. A Snap FS can be scheduled to occur at any time. Creating filesystem snapshots is recommended. You can use them to recover accidentally deleted files and for quick filesystem recovery. *Compare Clone FS*.
Snap LUN	*See Clone LUN*.
spare drive	An unused solid state drive (SSD) that can support the rebuilding of a drive group by means of copy-away operations. Drive Enclosures and drive groups do not

	contain an SSD that is dedicated only to this purpose. If, however, an unused SSD exists in a Drive Enclosure and if an SSD in that Drive Enclosure fails, is predicted to fail, or is removed, the system uses that unused drive to rebuild the problematic drive. Furthermore, if no unused SSD exists, the system can use its parity data to continue functioning with a lost SSD. *Compare dynamic spare.* *See also Drive Enclosure.* *See also drive group.*
statistics	Collections of data about various aspects of an Oracle FS System. Statistics include, for example, the access rates and the access patterns of data blocks, the performance of the SAN protocol, and capacity usage. The collections of statistics can be viewed by using Oracle FS System Manager (GUI). Also, these statistics can be downloaded from the system and analyzed by the Oracle FS Statistics Tools utility. *See also Oracle FS Statistics Tools.* *See also Oracle FS System Manager (GUI).*
Storage Class	A categorization of SAS physical storage, each category having distinct characteristics with regard to capacity and to data access performance. The Oracle FS System supports high-capacity hard disk drives (HDDs), high-performance HDDs, high-capacity solid state drives (SSDs), and high-performance SSDs. *See also Drive Enclosure.* *See also drive group.* *See also priority level.* *See also Storage Domain.*
Storage Domain	A virtual storage pool that consists of an assortment of drive groups. Each drive group contains drives of a particular Storage Class and of a particular capacity. The drive groups that comprise a Storage Domain can be of different Storage Classes. A Storage Domain can contain from 0 to 1024 drive groups. *See also drive group.* *See also Storage Class.*
Storage Profile	A set of QoS attributes that can be used to configure a logical volume. Oracle provides a collection of Storage Profiles that are optimized for specific uses within an application context. Administrators can select one of the

available profiles, create a new profile, or modify an existing profile.

See also Quality of Service (QoS).

storage tier

A collection of blocks of contiguous storage, all of which have the same RAID level. This collection is spread across one or more drive groups within a given Storage Domain. Storage tiers are used by administrators and by the Oracle FS System to provision logical volumes. For filesystems, the administrator creates the storage tiers. For SAN LUNs using QoS Plus, the Oracle FS System automatically creates the storage tiers.

See also data tier.

See also drive group.

See also metadata tier.

See also minimum allocation unit (MAU).

See also QoS Plus.

See also Storage Domain.

strip

A contiguous block of storage on a single drive. A strip is the amount of data that can be written on a drive before the system rotates to the next drive in the drive group. Sometimes referred to as a *chunk*. The size of a strip (referred to as its depth) is 64 KB for all RAID levels and for all Storage Classes.

See also drive group.

See also minimum allocation unit (MAU).

See also Storage Class.

stripe

1. A set of extents belonging to a particular logical volume. These extents occupy a contiguous range of address space in the volume, which is spread across a number of drive groups. The preferred number of drive groups (sometimes called the *striping factor*) depends on the QoS priority level that is assigned to the logical volume.

   See also drive group.

   See also extent.

   See also priority level.

   See also strip.

   See also stripe width.

2. For solid state drives (SSDs), a set of six strips. For hard disk drives (HDDs), a set of 12 strips. These sets

of strips are used by the RAID 5 technology and by the RAID 6 technology.

See also RAID 5.

See also RAID 6.

See also strip.

stripe width — The number of drive groups that compose a stripe. The stripe width is independent of the level of redundancy. Sometimes called the *striping factor*.

See also drive group.

See also redundancy.

See also stripe.

Support — An administrator role that has special privileges strictly for the purposes of maintenance. A login account having this role is typically used only when instructed to do so by Oracle Customer Support. A login account having this role cannot modify data resources, system alerts, or administrator accounts.

Compare Administrator 1.

Compare Administrator 2.

Compare Monitor.

Compare Oracle Support.

Compare Primary Administrator.

system alert — A message generated by an Oracle FS System to notify an administrator of a situation or condition that the administrator needs to resolve. These messages are accessible through the Oracle FS System user interfaces. (Formerly called an *administrator action* or *AA*.)

system configuration database — The database that contains the system metadata and resides in the Persistence volume. For example, this database contains the records for administrator accounts, email addresses, snapshot schedules, and all storage and hardware resource names and mappings. This database is located on the primary drive group of the Oracle FS System.

See also Persistence.

See also primary drive group.

See also system root configuration.

system root configuration — The records in the system configuration database that describe the basic hardware resources and software resources that are necessary to restart an Oracle FS System.

See also Persistence.

See also system configuration database.

system status

One of the four possible states of the hardware in an Oracle FS System:

Normal	The system is in an expected state of operation; no user intervention is required.
Warning	An error condition cannot be corrected, but data is still accessible. User intervention is required.
Critical	Some system element has been compromised. Data access has been lost to some degree. User intervention is required.
Unknown	Component is unavailable or offline.

The status of a system does not directly reflect the status of the logical volumes that the system contains.

T

task

A unit of work within an Oracle FS System. For example, the system converts every configuration request into one or more tasks. The system queues the tasks so that dependencies are satisfied and then performs the tasks.

thin provisioning

An approach to storage allocation in which a logical volume appears to be much larger than the storage actually allocated to it. Additional storage is dynamically allocated when necessary. Administrators interact with thinly provisioned volumes when configuring their capacity and growth increments. These types of volumes are sometimes referred to as *sparse filesystems* and *sparse LUNs*.

See also capacity.

See also filesystem.

See also growth increment.

See also infill.

See also LUN.

trap host

A management device that receives Simple Network Management Protocol (SNMP) based network packets that contain device statistics or status.

See also Management Information Base (MIB).

See also Simple Network Management Protocol (SNMP).

U

uninterruptible power supply (UPS)	A device that contains a collection of batteries that engages instantaneously when the device senses a loss of power from the primary source. An Oracle FS System receives Simple Network Management Protocol (SNMP) traps from the UPS device and generates events. *See also Simple Network Management Protocol (SNMP).*
update	A coordinated change in the version of the software, the firmware, or both in an Oracle FS System. The system handles both disruptive and non-disruptive updates and verifies that the software and firmware versions across the system are compatible before allowing the change to proceed. The system also notifies the system administrator if an update will be disruptive to the data paths. *See also disruptive software update.* *See also non-disruptive software update.* *See also path.*

V

VIF	*See virtual interface (VIF).*
virtual interface (VIF)	A logical interface for regulating network I/O across different processes that access the same physical interface. A virtual interface (VIF) is a virtual network port that shares a physical network port or a pair of physical network ports (when link aggregation is in use) with other VIFs. *See also Controller.* *See also File Server.* *See also link aggregation.*
virtual LUN (VLUN)	A logical unit of storage where customer data is striped and optionally mirrored across two or more drive groups. VLUNs support filesystems, LUNs, clones, and snapshots and are internally managed, block-level structures. System administrators manage VLUNs only indirectly when they create or modify logical volumes. *See also drive group.* *See also filesystem.* *See also LUN.* *See also stripe.*
virtual server	Sometimes referred to as *VServer*. *See File Server.*
VLAN tag	Identifies the virtual local area network (VLAN) identifier (ID) that can be assigned to the virtual interface (VIF) of a File Server. VLAN IDs 1 through 4094 can optionally be

	used to connect a VLAN-capable switch to the Oracle FS System. *See also File Server*. *See also virtual interface (VIF)*.
volume	*See logical volume*.
Volume Copy	A block-level, full-image, read-write copy of a logical volume. A Volume Copy is created by a copy LUN operation or by a copy filesystem operation through the use of Oracle FS System Manager (GUI) or Oracle FS CLI. A Volume Copy is created by an explicit one-time operation, is performed on a single Oracle FS System, and requires no prior configuration. Volume Copy operations produce copies of the data that, once created, are no longer associated with the source volume. Updates to the source volume are not mirrored in the copy. *Compare Oracle MaxRep for NAS*. *Compare Oracle MaxRep for SAN*. *See also Filesystem Copy*. *See also LUN Copy*. *See also replica*.
volume group	An administrative system object that is used to organize logical volumes and, possibly, other volume groups. Volume groups can span Storage Domains. *See also filesystem*. *See also LUN*. *See also Storage Domain*.

W

warmstart	A soft reset (not a reload) of the operating system in a Controller. During a warmstart, the operating system data structures are reinitialized and all customer data is kept intact. TCP connections for NAS users are reset. A warmstart in a SAN appears as a target reset, which causes all outstanding commands to be retried by the host. *Compare restart*. *See also Controller*.
write coalescing	A RAID optimization technique that groups multiple, small write operations to a particular stripe into a single write operation. This single write operation affects all LUNs that have unwritten data on that stripe. Write coalescing can

increase the performance of random write operations that involve small amounts of data.

See also RAID 5.

See also RAID 6.

See also stripe, definition 2.