Oracle FS1-2 Flash Storage System Software Features

Oracle FS1-2 flash storage system, Oracle’s premier preferred SAN storage solution, delivers enterprise-grade storage capabilities that are optimized for flash media and coengineered with Oracle software. Using the Quality of Service Plus (QoS Plus) feature, the Oracle FS1-2 flash storage system places data across flash and disk storage to maximize performance, efficiency, and cost based on usage profiles and business priorities. The Oracle FS1-2 flash storage system takes application-engineered storage to a new level by providing out-of-the-box tuned storage provisioning profiles for Oracle Database and key applications, including Microsoft SharePoint and Exchange. With the Oracle FS1-2 flash storage system, you can consolidate storage while achieving predictable performance for multiple diverse workloads in enterprise computing or multitenant environments.

Flash-Optimized Performance

Leveraging a foundation of flash innovation leadership, the Oracle FS1-2 flash storage system is designed from the ground up to exploit the unique characteristics of flash storage to provide high IOPS and throughput without compromising expandability. It scales to 912 TB of flash, and up to 2.8 PB combined flash and disk, to meet the most demanding performance requirements. By supporting performance-optimized flash and capacity-optimized flash, you can create flash tiers to optimize read-intensive and mixed-use I/O.

QoS Plus

QoS Plus is a policy-based virtualization feature incorporating business priority I/O queue management fused with subLUN automatic tiering into one simple management framework. Built on Oracle’s patented storage quality-of-service technology, QoS Plus collects detailed information on your storage usage profile, evaluates data chunk for movement to different storage tiers, then automatically migrates data to the most cost-effective media (flash or disk) from a $/IOP and $/GB standpoint based on the usage profile and the importance of that data to the business. QoS Plus performs data collection, evaluation, and movement based on the most efficient data granularity in the storage industry—up to 1,600 times more granular than competitive systems, making it the most efficient auto-tiering system in the market.
Intelligent Heat Map Management

QoS Plus has intelligent heat maps that “learn” the optimal data migration required at the 640 K chunk level. For example, archive data is placed on lower-cost disk drives while hot data is placed on, or migrated to, flash media. The Oracle FS1-2’s heat maps capture not only access density (accesses over a specific period of time) but type of access (random/sequential and read or write) to allow QoS Plus to potentially change RAID types when data is migrated to a more optimal RAID topology based on observed data access types.

Application Profiles

The Oracle FS1-2 flash storage system comes with predefined application profiles that provide tuned and tested out-of-the-box storage optimization for Oracle Database and key enterprise applications, including non-Oracle applications such as Microsoft Exchange. With one-click provisioning you can optimize flash performance and manage Oracle Applications with a minimum of administration. The Oracle FS1-2 database storage profiles can disaggregate database components such as index files, database tables, archive logs, redo logs, control files, block change tracking files, and temp files so provisioning automatically optimizes Oracle Database performance without requiring detailed knowledge of the database components. New application profiles can be added to Oracle FS1-2, existing ones can be modified, and all profiles can be exported to other Oracle FS1-2 systems to standardize storage provisioning across global data centers.

Storage Domains

Storage domain software enables multiple, virtual storage systems within a single Oracle FS1-2 flash storage system. Each storage domain is a “data container” that isolates data from other storage domains, providing independence in multitenancy environments for private or public cloud deployments, regulatory compliance requirements, or chargeback models. With storage domains, you can custom-tailor QoS settings for multiple unique environments, with all storage domains still residing on a single physical Oracle FS1-2 flash storage system for reduced power, cooling, and management administration expense.

Oracle FS Data Protection Manager

Oracle FS Data Protection Manager allows IT administrators the ability to perform application-consistent backup via scheduled clones (writable snapshots) with convenient and rapid point-in-time restores. Your application data is always protected and the fast recovery time keeps business disruption to an absolute minimum. Oracle FS Data Protection Manager works in conjunction with Oracle FS Copy Services to deliver recovery times to meet tight recovery time objectives (RTOs). Broad OS support for Oracle Solaris and Linux and application-consistent support for Microsoft Exchange, SharePoint, or any Windows application that has Microsoft's Volume Shadow Copy Service, are supported.

Oracle FS Path Manager

Oracle FS Path Manager is designed to deliver seamless interoperability with diverse server operating systems. Oracle FS Path Manager runs on a host server system and
automatically transfers host I/O port information into Oracle FS Storage Services Manager with “friendly” SAN port names and updates configuration information if the host information changes. Oracle FS Path Manager also manages multiple paths to the Oracle FS1-2 storage system ensuring optimal paths are used based on the Oracle FS1-2’s asymmetric logical unit access (ALUA) design. Traffic is load balanced (assuming multiple ports/paths are available) and reduces unnecessary failovers and I/O ‘hot spots.’

Integrated with Oracle’s Red Stack Management for Improved IT Staff Productivity

The Oracle MaxMan feature of the Oracle FS1-2 flash storage system enables the management of multiple Oracle FS1-2 flash storage systems and/or Oracle’s Pillar Axiom storage systems from a single console. Oracle FS1-2 provides management plug-ins for Oracle Enterprise Manager and the Storage Connect feature of Oracle VM for single-pane-of-glass monitoring and management.

T10 Protection Information

The Oracle FS1-2 flash storage system uses T10 Protection Information (T10-PI) for end-to-end data integrity checking. T10-PI protects against silent data corruption from the application to the storage devices.

Oracle MaxRep for SAN

For the Oracle FS1-2 flash storage system, the optional Oracle MaxRep Replication Engine supports both high-performance synchronous and asynchronous replication to local and remote locations, including many-to-one, one-to-many, and multihop replication. Multiple recovery point objectives (RPOs) and recovery time objectives (RTOs) are supported. Application-consistent recovery options restore applications to a consistent point. Oracle MaxRep Replication Engine supports both the Oracle FS1-2 flash storage system as well as Oracle’s legacy Pillar Axiom 600 storage system concurrently.

Warranty

The Oracle FS1-2 flash storage system comes with a one-year warranty. Visit oracle.com/goto/sun/warranty for more information about Oracle’s hardware warranty.

Oracle Premier Support

With Oracle Premier Support, you receive complete, integrated support to maximize the return on your Oracle investment—from software updates and operational best practices to proactive support tools and rapid problem resolution. For more information, visit oracle.com/support.

Oracle Business Critical Service for Systems

For mission-critical support, Oracle Business Critical Service for Systems is a valuable choice. Oracle Business Critical Support for Systems provides 24/7 fault monitoring and event detection, rapid response and hardware replacement SLAs, and priority handling of IT service requests and quarterly reviews and patch installation. This annual service
ensures high availability for all critical servers and storage within your data center and reduces the risk and cost of downtime. For more information, visit oracle.com/acs

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>QoS Plus</td>
<td>Adaptive automated data tiering to the most cost-effective media combined with I/O queue management based on business value of the data</td>
<td>Cold, low-business-value data is placed on lower-cost HDD media while hot, business-critical data is placed on flash media to efficiently use all available storage media types</td>
</tr>
<tr>
<td>Oracle FS Path Management</td>
<td>Provides redundant path management for LUN access</td>
<td>Interoperability with all major server OSs. High-availability access to LUNs even when primary path is offline</td>
</tr>
<tr>
<td>Oracle MaxMan</td>
<td>Manage multiple units of Oracle FS1-2 and Oracle's legacy Pillar Axiom 600 storage systems from a single pane of glass</td>
<td>Single, consolidated console to manage all your Oracle FS1-2 systems and Pillar Axiom storage systems</td>
</tr>
<tr>
<td>Storage Domains</td>
<td>Isolates data to any combination of drive RAID groups</td>
<td>Perfect for cloud deployments, regulatory compliance, data and application segregation, and non-disruptive technology refresh</td>
</tr>
<tr>
<td>T10 Protection Information</td>
<td>End-to-end error detection and correction of data</td>
<td>Protects against silent data corruption</td>
</tr>
<tr>
<td>Application Profiles</td>
<td>Preconfigured QoS Plus settings for popular applications</td>
<td>Factory-optimized storage provisioning for specific applications such as Oracle Database and Microsoft Exchange that are portable and standardize storage provisioning across data centers</td>
</tr>
<tr>
<td>Oracle FS Mobile</td>
<td>Oracle FS1-2 management application for iOS and Android devices</td>
<td>Anytime, anywhere monitoring of Oracle FS1-2 and legacy Pillar Axiom storage systems from mobile interface</td>
</tr>
<tr>
<td>Oracle FS Copy Services</td>
<td>CloneLUN: Space efficient, read/write virtual copy of a SAN LUN</td>
<td>Application testing, data corruption recovery, instantaneous backup, offline file manipulation; see Oracle FS Data Protection Manager below</td>
</tr>
<tr>
<td></td>
<td>VolumeCopy (SAN): Full block-by-block copy</td>
<td>Data mining, test/dev, backup staging</td>
</tr>
<tr>
<td>Oracle FS Data Protection Manager</td>
<td>Takes application-consistent clones on a scheduled basis for Oracle Database and all Microsoft applications that support Volume Shadow Copy Services, such as Exchange, SharePoint, etc.</td>
<td>Automatic application-consistent protection with customizable RTO and RPO; fast, consistent recovery from data corruption, consistent backup copies, and test/dev uses; leverages Oracle FS Copy Services</td>
</tr>
<tr>
<td>NDMP</td>
<td>Interface to third-party backup software</td>
<td>Supports Symantec Netbackup, BakBone NetVault, CommVault Simpana, Atempo TimeNavigator, Oracle Secure Backup</td>
</tr>
<tr>
<td>Automated Serviceability</td>
<td>“Phone home” capability with automatic case creation using Oracle Auto Service Request (ASR), configurable alerts</td>
<td>Seamless Oracle system health monitoring</td>
</tr>
<tr>
<td>RAID</td>
<td>RAID 10, RAID 5, RAID 6</td>
<td>Multiple data protection choices for capacity and performance; can be changed on the fly or by QoS Plus</td>
</tr>
<tr>
<td>Remote Management</td>
<td>HTTPS, SSH, SNMP v1/v2c, IPMI</td>
<td>24/7 management access</td>
</tr>
<tr>
<td>Thin Provisioning</td>
<td>Automatic expansion of storage capacity in background when required</td>
<td>Higher utilization rates—allocate physical storage only when actually needed</td>
</tr>
<tr>
<td>Oracle Enterprise Manager Plug-In for Oracle Flash Storage Systems</td>
<td>Manage the Oracle FS1-2 flash storage system from Oracle Enterprise Manager</td>
<td>Seamless management of storage and other data center resources through a common Oracle Database interface</td>
</tr>
</tbody>
</table>
## ORACLE FS1-2 FLASH STORAGE SYSTEM: MAXIMUM VALUES, SETTINGS, AND POLICIES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Maximum Values/Settings/Policies</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failover time</td>
<td>Less than 1 second</td>
<td></td>
</tr>
<tr>
<td>SAN initiators per port</td>
<td>512 (active)</td>
<td></td>
</tr>
<tr>
<td>LUNs</td>
<td>8,192</td>
<td></td>
</tr>
<tr>
<td>Power fail nonvolatile cache hold up time</td>
<td>Infinite</td>
<td></td>
</tr>
<tr>
<td>Snapshots</td>
<td>255 (per LUN and/or file system)</td>
<td></td>
</tr>
<tr>
<td>Storage domains</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>VIFS</td>
<td>1,024</td>
<td></td>
</tr>
<tr>
<td>16 FC ports</td>
<td>4 to 12 ports (2 to 6 HBAs); any HBA pair combination—customer-selected</td>
<td>Examples: four 16 G FC ports</td>
</tr>
<tr>
<td>QoS Plus: auto-tiering block size</td>
<td>640 K</td>
<td></td>
</tr>
<tr>
<td>QoS Plus: auto-tiering learning period</td>
<td>Adjustable from 1 to 9,999 minutes</td>
<td></td>
</tr>
<tr>
<td>QoS Plus: priority settings</td>
<td>Premium, High, Medium, Low, Archive</td>
<td>Each storage domain has unique QoS Plus settings</td>
</tr>
<tr>
<td>QoS Plus policies</td>
<td>Run, Pin, Learn and Hold, Adjust Rate, and Throttle</td>
<td>User can assign different policy for each storage domain</td>
</tr>
</tbody>
</table>

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**CONTACT US**

For more information about Oracle FS1-2 flash storage system, visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.