

StorageTek Tape Analytics

Requirements Guide

Version 2.3.0

E87800-03

December 2017

This document lists the requirements for Oracle's StorageTek Tape Analytics (STA) Version 2.3.x as of this document's publication. Review the following sections before installing and configuring STA.

- [Library Requirements](#)
- [Tape Drive Requirements](#)
- [Server Requirements](#)
- [User Interface Requirements](#)
- [Media Validation Requirements](#)
- [StorageTek SDP Interface Requirements](#)
- [IBM RACF Mainframe Requirements](#)
- [What's New for STA 2.3.0](#)
- [Related Documents](#)
- [Documentation Accessibility](#)

Library Requirements

- [Library Firmware Requirements](#)
- [Library Hardware Requirements](#)

Library Firmware Requirements

For the best functionality and user experience, upgrade to the recommended or latest available library firmware. Firmware versions are subject to change. See the *STA Installation and Configuration Guide* for instructions on checking your library firmware version.

To upgrade your firmware, open a Service Request (SR) with your Oracle support representative.

Table 1 Library Firmware Requirements for Full STA Features

Firmware	SL150	SL500	SL3000	SL8500
Recommended for full STA features in this release. Newer firmware may be available.	3.00	FRS 1501	FRS 4.40	FRS 8.51
Minimum for the full STA 2.1.x and higher feature set, including richer component health and media validation	2.25	FRS 1501	FRS 4.31	FRS 8.36

Table 2 Library Firmware Requirements for Select IBM LTO Drives

Firmware	SL150	SL500	SL3000	SL8500
Minimum for IBM LTO-8 drives, with or without encryption	3.20	NA	FRS_4.50	FRS_8.60
Minimum for IBM LTO-7 drives, with or without encryption	2.60	NA	FRS 4.40	FRS 8.51
Minimum for IBM LTO-6 drives, with or without encryption	2.25	NA	FRS 4.31	FRS 8.36
Minimum for IBM LTO-5 drives, with or without encryption	NA	FRS 1493	FRS 4.31	FRS 8.36
Minimum for IBM LTO-4 drives with encryption	NA	FRS 1493	FRS 4.31	FRS 8.36

Table 3 Library Firmware Requirements for Select HP LTO Drives

Firmware	SL150	SL500	SL3000	SL8500
Minimum for HP LTO-6 drives	1.82	FRS 1485	FRS 3.61	FRS 8.01
Minimum for HP LTO-5 drives	1.82	FRS 1485	FRS 3.61	FRS 8.01

Table 4 Library Firmware Requirements for Other Drives

Firmware	SL150	SL500	SL3000	SL8500
Minimum for all other drives.	NA	FRS 1485	FRS 3.61	FRS 8.01

Library Hardware Requirements

Table 5 Library Hardware Requirements

Library	Component	Requirement
SL3000 SL8500	HBT card	<p>High-memory drive controller (HBT) card: Required for media validation support and reporting of richer drive data. For libraries with LTO drives, a high-memory HBT card is required to enable ADI mode.</p> <p>See the <i>STA Installation and Configuration Guide</i> to determine the memory level of your HBT card.</p> <p>Note: All SL3000 libraries ship with the high-memory card. Since 2006, all SL8500 libraries ship with the high-memory card.</p>
SL8500	Complex	All SL8500 libraries in a single complex must be monitored by a single instance of the STA application.
All	Ethernet connection	<p>Separate connection from STA to each library: each library must have an assigned IP address and be reachable by the STA server.</p> <p>Note: Each library in an SL8500 complex has its own SNMP agent. Therefore, STA must be able to connect to each library separately.</p>

Tape Drive Requirements

- [StorageTek Drive Firmware Requirements](#)
- [ADI Requirements for LTO Drives](#)
- [HP LTO Drive Firmware Requirements](#)
- [IBM LTO Drive Requirements](#)

StorageTek Drive Firmware Requirements

The quality of data provided to STA depends on the TTI level shown in [Table 6](#). As the TTI level increases, so does the quality of the data. Oracle recommends using the highest TTI level and corresponding firmware supported by your drive model. Firmware versions are subject to change.

To upgrade your firmware, open a Service Request (SR) with your Oracle support representative.

Note: The media validation Complete Verify Plus test is not supported in FICON environments (applies to TTI 5.40 and TTI 5.5.0 only).

Table 6 StorageTek Tape Drive Firmware — Minimum Versions for STA

Drive Model	TTI 5.10	TTI 5.20	TTI 5.30	TTI 5.40	Media Validation Support TTI 5.40	Media Validation Support TTI 5.50
T10000A	1.44.108	1.46.109	1.52.103	NA	NA	NA
T10000B	1.44.208	1.46.209	1.52.203	NA	NA	NA
T10000C	NA	1.51.320	1.53.316	1.57.308	1.59.302	3.62.111

Table 6 (Cont.) StorageTek Tape Drive Firmware — Minimum Versions for STA

Drive Model	TTI 5.10	TTI 5.20	TTI 5.30	TTI 5.40	Media Validation Support TTI 5.40	Media Validation Support TTI 5.50
T10000D	NA	NA	NA	4.07.104 (FC/FCoE) 4.07.106 (FICON)	4.09.107 (FC/FCoE) 4.09.107 (FICON)	Not available at time of publication; contact your Oracle support representative
9840C	1.44.510	1.47.502	NA	NA	NA	NA
9840D	1.44.710	1.47.702	NA	NA	NA	NA

ADI Requirements for LTO Drives

LTO drives that support the Automation/Drive Interface (ADI) can provide rich data (for example drive performance and utilization) to the library, depending on drive configuration and firmware level.

For a library to send rich LTO drive data to STA, ADI must be enabled on both the library and the LTO drives. If ADI is not enabled on both, the library will only send basic data about the LTO drives.

For SL3000 and SL8500 libraries, you can enable ADI only if the library has a high-memory drive controller (HBT) card. See "[Library Hardware Requirements](#)" on page 1-3 for details. Because enabling ADI requires a reboot of the library, you should enable it in advance if you are planning to install LTO drives.

See the following sections for related information:

- For instructions on enabling ADI on the library, see the *STA Installation and Configuration Guide*.
- For details about how ADI is enabled on LTO drives, see the *STA Installation and Configuration Guide*.

HP LTO Drive Firmware Requirements

Firmware versions are subject to change. To upgrade your drive firmware, open a Service Request (SR) with your Oracle support representative.

Note: A "Yes" or "No" entry indicates whether the drive model is supported by the library.

Table 7 HP LTO Tape Drive Firmware — Supported Versions for STA

HP LTO Drive	Minimum	Recommended	SL8500	SL3000	SL500	SL150
LTO-3 LVD SCSI	G69S	G69S	No	No	Yes	No
LTO-3 FC 2Gb	L6HS	L6HS	Yes	Yes	Yes	No
LTO-3 FC 4Gb	M6BS	M6BS	Yes	Yes	Yes	No
LTO-4 LVD SCSI	B57S	B63S	No	No	Yes	No

Table 7 (Cont.) HP LTO Tape Drive Firmware — Supported Versions for STA

HP LTO Drive	Minimum	Recomm ended	SL8500	SL3000	SL500	SL150
LTO-4 FC 4Gb	H58S	H67S	Yes	Yes	Yes	No
LTO-5 Full-height FC 8Gb	I3CS	I6PS	Yes	Yes	Yes	No
LTO-5 Full-height SAS 6Gb (requires an SL500 bridged Base Unit)	X3AS	X6JS	No	No	Yes	No
LTO-5 Half-height FC 8Gb	Y5BS	Y6KS	No	No	No	Yes
LTO-5 Half-height SAS 6Gb	Z55S	Z6HS	No	No	No	Yes
LTO-6 Full-height FC 8Gb	J2DS	J5ES	Yes	Yes	Yes	No
LTO-6 Half-height FC 8Gb	22GS	25FS	No	No	No	Yes
LTO-6 Half-height SAS 6Gb	32DS	35FS	No	No	No	Yes

IBM LTO Drive Requirements

Firmware versions are subject to change. To upgrade your drive firmware and to enable ADI on IBM LTO drives, open a Service Request (SR) with your Oracle support representative.

See [Table 1](#) for minimum required library firmware versions for each drive model.

Non-encryption Drives

For non-encryption drives, use the drive firmware shown in [Table 8](#).

Note: A "Yes" or "No" entry indicates whether the drive model is supported by the library.

Table 8 IBM LTO Non-encryption Drive Firmware — Supported Versions for STA

IBM LTO Drive	Minimum	Recomm ended	SL8500	SL3000	SL500	SL150
LTO-3 FC 2Gb	93G0	93G0	Yes	Yes	Yes	No
LTO-4 FC 2/4Gb	C7QH	C7QH	Yes	Yes	Yes	No
LTO-5 Full-height FC	E4J0	G360	Yes	Yes	Yes	No
LTO-6 Full-height FC	E4J0	G9P2	Yes	Yes	No	No
LTO-6 Half-height FC & SAS	G9P3	G9P3	No	No	No	Yes
LTO-7 Full-height FC	FA14	G9Q2	Yes	Yes	No	No
LTO-7 Half-height FC & SAS	G341	G341	No	No	No	Yes
LTO-8 Full-height FC	H9E2	H9E2	Yes	Yes	No	No
LTO-8 Half-height FC & SAS	H9E3	H9E3	No	No	No	Yes

Encryption drives

For full ADI support of encryption drives, use the drive firmware versions shown in [Table 9](#) and the encryption card firmware versions shown in [Table 10](#).

Note: A "Yes" or "No" entry indicates whether the drive model is supported by the library.

Table 9 IBM LTO Encryption Drive Firmware — Supported Versions for STA

IBM LTO Drive	Minimum	Recomm ended	SL8500	SL3000	SL500	SL150
LTO-4 FC 2/4Gb with encryption	C7QH	C7QH	Yes	Yes	Yes	No
LTO-5 Full-height FC 8Gb with encryption	E4J0	G360	Yes	Yes	Yes	No
LTO-6 Full-height FC 8Gb with encryption	E4J0	G9P2	Yes	Yes	No	No
LTO-7 Full-height FC 8Gb with encryption	FA14	FA14	Yes	Yes	No	No

The minimum encryption card version is based on Oracle Key Manager (OKM) version.

Table 10 Encryption Card Firmware Required for ADI Support

OKM 3 Version	Minimum Encryption Card Firmware
OKM 3.1.x and above	5.32.20.40
OKM 3.0.x and below	4.20.20.40

Server Requirements

- [STA Server Sizing](#)
- [Server Hardware Requirements](#)
- [Operating System Requirements](#)
- [Operationally Approved](#)
- [Network Requirements and Recommendations](#)

Note: To ensure optimal performance and functionality of the STA application, STA must be installed on a dedicated server (called the *STA server*). Also, there should be no other applications running on this server. Oracle Service can provide support only if these conditions are met.

STA Server Sizing

Note: Before you install or upgrade to the latest version of STA, Oracle highly recommends you contact your Oracle sales representative for assistance with sizing your STA server. Your sales representative can use the STA Server Sizing Tool to provide you with best recommendations to ensure your server is sized appropriately to meet your site's current needs and expected growth.

Server sizing depends on a number of factors, including the following:

- Number of monitored libraries
- Number of media slots
- Number of drives
- Number of media
- Exchanges per hour

Memory swap size must be 50 to 100 percent of RAM size. See the *STA Installation and Configuration Guide* for details.

Sizing considerations for larger installations

If you have significant exchanges per hour rates (that is, greater than 300 EPH) with multiple libraries attached to a single STA server and a long history with STA, you should carefully consider the size and configuration of the following key areas:

- Operating system and main application area — Oracle recommends this to be on its own appropriately sized HDD. The Oracle storage home location (for example, `/Oracle`) needs to be at least 100 GB, but you should allocate 200 GB if `/tmp` is in the root partition. Allocate another 200 GB if `/var/log/tbi` is also in the root partition.
- STA database data (for example, `/dbdata`) — Oracle recommends this to be on its own appropriately sized HDD. Guidance is from 250 GB up to 500 GB.
- STA database backups (for example, `/dbbackup`) — Oracle recommends this to be on its own appropriately sized HDD. Guidance is from 500 GB up to 2 TB.

You may also want to consider using SSDs.

Server Hardware Requirements

[Table 11](#) lists the minimum and recommended server hardware requirements. Oracle highly recommends that the server configuration be expandable in number of disk bays, CPU cores, and RAM slots to accommodate future database growth, additional library requirements, and STA upgrades.

Note: Oracle highly recommends you contact your Oracle sales representative for assistance with sizing your STA server.

Table 11 STA Server Hardware Requirements

Hardware	Configuration
Processor	Intel Xeon Series or equal AMD CPU
CPU cores	Minimum: 6 Recommended: 12 to 32, or capability to expand to this configuration
Memory	Minimum: 16 GB RAM Recommended: 32 GB to 128 GB RAM
Operating system disk	Dual HDD drives: <ul style="list-style-type: none"> ▪ 600 GB each (single library, typical) ▪ 1 TB each (multiple libraries, typical) Note: As the number of data exchanges increases, so does the size of the database.
Database data and local backup disks	Minimum: 100 GB each Recommended: 250 GB to 2 TB each
Connection	Gigabit Ethernet
Platform	All disk storage residing on a single platform See the <i>STA Installation and Configuration Guide</i> for the recommended file system layout and allocations.

Operating System Requirements

Oracle tests, documents, and recommends Oracle Enterprise Linux.

Note: STA 2.3.x does not support Linux 7.0 or above.

Table 12 Operating System Versions and Requirements for STA

Operating System	Supported Versions
Oracle Enterprise Linux (OEL), 64-bit (Oracle kernel)	Minimum: 6.6 Recommended: 6.8
Red Hat Enterprise Linux (RHEL), 64-bit (Red Hat kernel); see " Operationally Approved " on page 1-8 for details.	Minimum: 6.6 Recommended: 6.8
STA does not support SELinux. SELinux must be disabled before STA can be installed.	Not applicable

Operationally Approved

The product has been successfully installed to execute in the below-ascribed operating environments. It has been demonstrated to provide its basic functionality without detriment to either the product or the associated execution environment.

- VMware vSphere Hypervisor
- Red Hat Enterprise Linux

Network Requirements and Recommendations

- The STA server must have a static IP address.
- Oracle recommends that you place the STA server on the same subnet as the library to improve SNMP UDP reliability.
- If you configure STA to support dual TCP/IP using two distinct subnets, configure the network to allow the delivery of SNMP packets on either subnet between the library and STA. Consult your network administrator and your Oracle support representative for more information.

User Interface Requirements

Table 13 STA User Interface — Minimum Requirements

Item	Minimum Requirements
Screen Resolution	1024 x 800 minimum, 1280 x 1024 (or better) recommended
Browsers	Officially supported versions (other versions are known to work with STA): <ul style="list-style-type: none">■ Internet Explorer 9 Note: STA does not support Internet Explorer 11.■ Firefox 13+■ Safari 5■ Google Chrome 20+
Browser Settings, Plugins, and Add-ons	Enable JavaScript Flash 11.2 (latest version is recommended) Run all browsers in Native Mode Disable or remove third-party add-ons
RTL Language Support	Support for right-to-left (RTL) languages is available only with Internet Explorer 8.0 or 9.0
Screen Reader Assistive Technology	JAWS 11+ is recommended See the <i>STA Screen Basics Guide</i> for accessibility information.

Media Validation Requirements

The minimum requirements for using STA for media validation are listed in the following sections.

- [STA Requirements for Media Validation](#)
- [Library Requirements for Media Validation](#)
- [Drive Requirements for Media Validation](#)
- [Media Requirements for Media Validation](#)

To configure media validation after configuring STA, see the *STA User's Guide*.

Note: Use only one instance of STA to perform media validation activities. The use of multiple instances on the same library is not supported.

STA Requirements for Media Validation

- STA 2.3.0 (minimum)
- Connections to libraries using SNMP v3 protocol

Note: For media validation requirements for earlier versions of STA, see that version of the *STA Requirements Guide*.

Library Requirements for Media Validation

- SL8500 or SL3000 library with compatible firmware (see "[Library Firmware Requirements](#)" on page 1-1)
- High-memory drive controller (HBT) card
- SL Console 6.25 (minimum for SL8500), 6.50 (minimum for SL3000)
- Dedicated pool of media validation drives defined with SL Console

Drive Requirements for Media Validation

- StorageTek T10000C or T10000D drives using compatible firmware (see "[StorageTek Drive Firmware Requirements](#)" on page 1-3). STA does not initiate media validations on drives that do not have the minimum firmware levels.
- Drives used to validate encrypted media must be enabled for encryption and connected to an Oracle Key Manager (OKM) 2.5 (minimum).

Media Requirements for Media Validation

- T10000T1 or T10000T2 media
- Media validation is not supported for media formatted with StorageTek Automatically Linked Partitioning (ALP) done with Oracle's StorageTek Virtual Storage Manager (VSM).

StorageTek SDP Interface Requirements

STA 2.3.x supports the creation of automatic log bundles and forwarding to StorageTek Service Delivery Platform (SDP). Depending on how SDP and Oracle Auto Service Request (ASR) are configured for your site, SDP may automatically create Service Requests and forward the STA log bundles to My Oracle Support (MOS). These products and services are separate from STA. See the *StorageTek Service Delivery Platform User's Guide* for details.

Note: STA 2.3.x supports automatic bundle forwarding to only one SDP host. You can connect any number of STA servers to the SDP host.

The minimum requirements for the interface between STA and the SDP host are listed in the following sections.

- [STA Requirements](#)
- [SDP Requirements](#)

STA Requirements

See the *STA User's Guide* for configuration instructions.

- STA 2.3.0 (minimum)
- Internet connection to the SDP host
- IP address and host name of the SDP host must be defined on the network.
- Ports must be assigned on the STA server for communications between STA and the SDP host.

SDP Requirements

See the *StorageTek Service Delivery Platform User's Guide* for complete SDP requirements and configuration instructions.

- See your Oracle service representative for minimum SDP version.
- SDP host must be registered with and connect to My Oracle Support (MOS).

IBM RACF Mainframe Requirements

If you plan to configure STA for RACF authentication, the following requirements apply. See the *STA Installation and Configuration Guide* for instructions on configuring STA for RACF.

You must install two separate packages to configure RACF for STA:

- RACF service for STA, which is part of the SMC component of ELS 7.0 and 7.1. You must install the PTF to support this RACF service on the mainframe.
- WebLogic RACF Security Service Provider (or RACF SSP) that must be installed into WebLogic.

Table 14 IBM RACF Software Required

Software/Firmware	Version
ELS PTF versions for STA/RACF	ELS 7.0 - L1H16DH (MVS)
Note: STA/RACF is <i>not</i> supported in HSC 6.2.	ELS 7.1 - L1H16DI (MVS) ELS 7.2 - in the base code (MVS)
IBM PTF versions (for APAR PK69048) for AT-TLS encryption to NCS/ELS HTTP server connection	Best performance: z/OS 1.10 - Release 1A0: UK39417 available 08/10/07 Minimum for the Communication Server: z/OS 1.9 - Release 190: UK39419 available 08/10/07

What's New for STA 2.3.0

Oracle recommends upgrading to STA 2.3.0 or higher to take advantage of the new features described below.

- LTO-8 support
- Updated recommended library and drive requirements to support STA 2.3.0 and higher. See the *STA Requirements Guide*.
- STA support for SL8500 bulk CAPs. See the *STA Requirements Guide*.
- STA 2.3.x requires minimum Linux 6.6. See the *STA Requirements Guide*.

Note: STA 2.3.x does not support Linux 7.0 or above.

- New STA automatic upgrade installer allows you to upgrade to STA 2.3.x from STA 2.1.x or STA 2.2.x without deinstalling the old version. To perform an automatic upgrade, the STA server must be running Linux 6.6.

The STA automatic upgrade automatically handles all phases of the upgrade, including taking a snapshot of your current data, installing STA 2.3.x and MySQL and WebLogic infrastructure, and upgrading your old data to the new version. You can run the automatic upgrade in graphical mode or silent mode. See the *STA Installation and Configuration Guide*.

- For improved system security, the STA application and supplied utilities now run as the Oracle user, not system root. See the *STA Installation and Configuration Guide*.

Note: To support this change, you may need to update custom scripts and other site-specific automation tools deployed on your STA server.

- Internal port forwarding for SNMP traps has been added to support the STA application running as the Oracle user. You must define the internal redirection port number during STA 2.3.x installation or upgrade. See the *STA Installation and Configuration Guide*.
- The STA installer and STA application now require the system iptables service to be running to verify port assignments and support internal port forwarding for SNMP traps. See the *STA Installation and Configuration Guide*.
- For added security, STA has new password character restrictions. See the *STA Installation and Configuration Guide*.
- New STA Password Change Utility allows you to change the passwords for STA administration and database accounts. See the *STA Administration Guide*.
- New STA Port Change Utility allows you to change the STA configurable external and internal port numbers. See the *STA Administration Guide*.
- You can manually create a full dump of the STA database from the STA user interface instead of using MySQL commands from the system command line. See the *STA User's Guide*.
- You can manually create select service log bundles for the following monitored components: libraries, drives, media, robots, CAPs, elevators, and PTPs. See the *STA User's Guide*.
- New automatic log bundle creation feature allows you to enable STA to automatically create Remote Diagnostic Agent (RDA) log bundles and service log bundles for the following monitored components: libraries, drives, robots, CAPs, elevators, and PTPs. See the *STA User's Guide*.
- Through the new "Send to SDP" feature, you can optionally enable STA to forward automatic log bundles to a StorageTek Service Delivery Platform (SDP) host at your site. To enable this option, you must identify the SDP host and assign communication ports on the STA server. See the *STA User's Guide*.
- If "Send to SDP" is enabled, depending on SDP and Oracle's Auto Service Request (ASR) configuration, SDP may automatically create Service Requests and forward

the STA log bundles to My Oracle Support (MOS). These support products and services are external to STA. See the *StorageTek Service Delivery Platform User's Guide*.

Related Documents

The STA documentation set consists of the following documents.

For users of the STA application

- *STA Quick Start Guide*—Use this guide to introduce yourself to the STA application and some features of the user interface.
- *STA User's Guide*—Use this guide for instructions on using all STA application features, including the Dashboard, templates, filters, alerts, Executive Reports, logical groups, and STA media validation. This guide also provides instructions for administering and managing STA usernames, email addresses, service logs, and SNMP connections with the monitored libraries.
- *STA Screen Basics Guide*—Use this guide for full details about the STA user interface. It describes the screen navigation and layout, and the use of graphs and tables.
- *STA Data Reference Guide*—Use this guide to look up definitions for all STA tape library system screens and data attributes.

For installers and administrators of the STA server and application

- *STA Release Notes*—Read this document before installing and using STA. It contains important release information, including known issues. This document is included in the STA media pack download.
- *STA Requirements Guide*—Use this guide to learn about minimum and recommended requirements for using STA. This guide includes the following requirements: library, drive, server, user interface, STA media validation, and IBM RACF access control.
- *STA Installation and Configuration Guide*—Use this guide to plan for installation of STA, install the Linux operating system, install the STA application, and then configure STA to begin monitoring the libraries. This guide also provides instructions for upgrading to a new version of STA.
- *STA Administration Guide*—Use this guide for information about STA server administration tasks, such as STA services configuration, database backup and restore, and password administration for database accounts.
- *STA Security Guide*—Read this document for important STA security information, including requirements, recommendations, and general security principles.
- *STA Licensing Information User Manual*—Read this document for information about use of third-party technology distributed with the STA product.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at

<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

StorageTek Tape Analytics Requirements Guide, Version 2.3.0
E87800-03

Copyright © 2013, 2017, Oracle and/or its affiliates. All rights reserved.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.