



VERITAS NetBackup™ 6.0

Release Notes

for UNIX, Windows, and Linux

30-001056-011

September 2005

Disclaimer

The information contained in this publication is subject to change without notice. VERITAS Software Corporation makes no warranty of any kind with regard to this manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. VERITAS Software Corporation shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this manual.

VERITAS Legal Notice

Copyright © 1998 - 2005 VERITAS Software Corporation. All rights reserved. VERITAS, the VERITAS Logo, and VERITAS NetBackup are trademarks or registered trademarks of VERITAS Software Corporation or its affiliates in the U.S. and other countries. Other names may be trademarks of their respective owners.

Portions of this software are derived from the RSA Data Security, Inc. MD5 Message-Digest Algorithm. Copyright 1991-92, RSA Data Security, Inc. Created 1991. All rights reserved.

VERITAS Software Corporation
350 Ellis Street
Mountain View, CA 94043
USA
Phone 650-527-8000
Fax 650-527-2908
www.veritas.com

Third-Party Copyrights

For a list of third-party copyrights, see Appendix B in this document.

Contents

Preface	xi
Getting Help	xi
Finding NetBackup Documentation	xii
Accessing the VERITAS Technical Support Web Site	xii
Contacting VERITAS Licensing	xiv
Accessibility Features	xiv
Related Resources	xiv
On the Support Web Site	xiv
Glossary	xv
 Chapter 1. New Features in NetBackup 6.0	1
New Publications or Changes	3
NetBackup 6.0 Enhancements	3
NetBackup Advanced Client Enhancements	4
Advanced Client Support for NDMP SnapVault Extension	4
Advanced Client Support for NAS Disk-based Data	4
Instant Recovery Enhancements	4
NetBackup Bare Metal Restore Enhancements	5
BMR Integrated into the NetBackup Administration Console	5
BMR Integrated into Backup Policies	5
BMR Servers Supported on Windows Systems	5
BMR Windows Boot Servers	5
BMR Linux Client Support	6
BMR Volume Manager and File System Support	6

NetBackup Database Agent Enhancements	6
SAP Backup Integration with Oracle RMAN	6
NetBackup for Exchange with Advanced Client	7
Lotus Notes Agent	7
Microsoft SQL Server 2005 Support	8
NetBackup SharePoint 2003 Support	8
Network Appliance NearStore Disk Storage Unit Enhancements	9
Network Appliance (NetApp) SnapVault	9
NetBackup Disk Backup Capabilities	10
Disk Backup Performance	10
Disk Storage Unit Enhancements	10
NetBackup Media Manager	11
Enterprise Media Manager (EMM)	11
Multi-path Shared Storage Option (SSO) for NDMP	11
Improved TapeAlert Support	11
ACS and TLM Device Discovery and Auto Configuration	12
Enhanced Device Qualification Tool Suite	12
Automatic Drive Swapping	12
Improvements to the Device Configuration Wizard	12
NetBackup Supports Microsoft's Plug-N-Play Support for Windows	13
WORM Tape Support	13
NetBackup Enhancements to the Core Functionality	13
Intelligent Resource Manager	13
NetBackup Catalog Enhancements	13
NetBackup Service Monitor	14
NetBackup Supports Sybase ASA Component	14
Port Reduction	14
Robust File Logging	14
Enhanced PBX Infrastructure Integration	15
Unified Logging Standardization	15

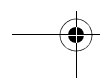
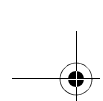
NetBackup Client Enhancements	15
VERITAS File System Enhancement - File Change Log for VxFS 4.0	15
NDMP	16
New Integrated Snapshot Features	16
NDMP Agent	16
NetBackup Operations Manager (NOM)	16
NetBackup Proliferations	17
NetBackup-Java Interface	17
New Back-level Administration Capabilities via the NetBackup-Java Console	17
NetBackup-Java Interface Logs Enhanced	17
NetBackup-Java Windows Display Console Logging Automated	17
NetBackup Patch Version Displayed for Hosts	18
NetBackup Cluster Support	18
NetBackup Duplication Enhancements	18
NetBackup Internationalization Enhancements	19
NetBackup Vault	19
Concurrent Vault Jobs and Queued Vault Jobs	19
Vault Reports Distribution Improvements	19
E-mail Notification on Eject	19
GUI Support for Multiple Retention Mappings	20
True Consolidation of Vault Reports	20
Catalog Backup Improvements for Vault	20
New NetBackup Vault Manager Service	21
Vault VSM Media	21
Eject Tapes by Expiration Date or Alphabetically	21
Assign Priority to Vault Duplication Jobs	21
Limit Search Range for Media Going Off-site Reports	21
Specify Image Duplication Order	22
 Chapter 2. Supported Platforms and Peripherals	 23

Server and Client Platform Support	24
Platform Life Cycle Issues	24
Adding a Platform	25
Removing a Platform	25
NetBackup 6.0 Supported Platforms and Operating Systems	25
Operating Systems Not Supported as of NetBackup 6.0	30
Operating Systems Not Supported as of Next Major Release	31
NetBackup Environment Requirements	34
Binary Sizes	34
Other NetBackup Compatibility Lists	37
NetBackup Access Control Compatibility List	37
NetBackup Advanced Client	40
NetBackup Bare Metal Restore Compatibility Lists	41
NetBackup Versions for BMR	42
BMR Supported Hardware Components and Architectures	42
BMR Supported Operating Systems	42
BMR Supported Shared Resource Tree (SRT) Versions	43
BMR Supported Files Systems and Volume Managers	44
BMR VxVM and VxFS Dependencies on Solaris	46
BMR SAN Support Matrix	46
BMR Supported Cluster Solutions	47
BMR Disk Space Requirements	48
NetBackup Database Agent Platform Support	49
NetBackup Operations Manager	50
Platforms Supported for the NOM Server	50
NetBackup Managed Master Server Platforms Supported by NOM	50
Component Levels Supported for NOM	51
Email Clients Supported by NOM	51
Web Browsers Supported by NOM	51
NetBackup Encryption	52

NetBackup Shared Storage Option (SSO)	53
Supported Robot Types	53
NetBackup Supported Peripherals Compatibility Lists	53
NetBackup Vault	55
NetBackup Support for Files Greater than Two Gigabytes	55
Platforms Supporting the NetBackup Administration Consoles for UNIX	56
Additional NetBackup-Java Administration Console - Supported Platform Information	57
Chapter 3. NetBackup Product Dependencies	59
Operating System Patches and Updates	59
Other Patch Information	65
Product Dependencies	66
Supported versions of VxFS and VxVM	68
Chapter 4. Operational Notes	71
NetBackup Installation Notes	71
NetBackup CD-ROM Changes	71
General Installation Items	72
NetBackup Cluster	77
CLIENT_NAME changes	77
NetBackup Documentation Changes	77
NetBackup Encryption	78
Internationalization and Localization Notes	78
NetBackup Bare Metal Restore	79
General NetBackup Operational Notes	80
NetBackup Access Control	81
NetBackup Cluster Support	82
Catalog Recovery	83
NetBackup Database Agents	84
DB2 Agent	84

Lotus Notes Agent	85
NetBackup Interfaces	87
NetBackup Administration Console for Windows	87
NetBackup Java Interfaces	87
General Notes	87
Activity Monitor	91
File System Analyzer & Storage Migrator	92
Host Properties	92
Backup, Archive, and Restore	92
NetBackup Media Manager	92
Media and Device Selection (MDS)	92
Media Management Interfaces	94
NDMP Configuration Interfaces	96
Device Support	96
Multi-path Tape Device Support	97
Shared Storage Option	97
Enterprise Media Manager Database	98
Device Configuration Interfaces	99
Test Utilities	101
Activity Monitor Interface	101
Device Monitor Interface	102
NetBackup Configuration File	102
Media Manager Configuration File	103
NetBackup "Touch" Files	103
NetBackup Commands	103
Storage Unit Configuration	104
NetBackup Storage Units	104
Disk Storage Units	104
NetBackup Vault	105
NetBackup Operations Manager	106

Chapter 5. NetBackup Features End of Life	109
Features, Enhancements, and Commands No Longer Supported	109
General NetBackup Features	109
NetBackup Commands no Longer Supported	110
End of Life Notifications	111
Notification of NetBackup Commands for Next Major Release	111
General NetBackup Notifications	112
Terminology End of Life	112
Support Changes for Robot Types	113
End of Life Notification for Catalog	114
End of Life Notification for Devices	114
Database Agent Notifications	115
Notification of AFS	116
 Appendix A. Related Documents	 117
Release Notes	117
Installation Guides	117
System Administrator's Guides - Basic Product	118
System Administrator's Guides - Agents and Options	119
User's Guides	122
Device Configuration Guide - Media Manager	122
Troubleshooting Guide	123
NetBackup Commands	123
 Appendix B. Third-Party Copyright Appendix	 125



Preface

The VERITAS NetBackup mission is to provide heterogeneous data protection solutions ranging from the workgroup or departmental level to the enterprise level.

The NetBackup Enterprise Server product provides powerful functionality, flexibility, mainframe-caliber robustness, and high performance in large enterprise environments. The NetBackup Server product is a high-performance solution offering ease of use and functionality that is appropriate to smaller work environments.

The document contains valuable information about each new release for the NetBackup customer. Customers will find information that highlights new features that comprise the latest NetBackup release and reference information in regards to the platforms that NetBackup supports, including various product dependency information. In addition, this document contains operational information associated with this release.

The following is a list of the chapters that comprise this document along with a small summary of the type of information that each chapter contains.

- ◆ Chapter 1 explains the important new features and enhancements that are included with this release of NetBackup.
- ◆ Chapter 2 lists the platforms and peripherals supported in this release of NetBackup.
- ◆ Chapter 3 lists the product patches, dependencies, and updates required for this release.
- ◆ Chapter 4 contains product operational notes as they pertain to the new features listed in Chapter 1.
- ◆ Chapter 5 provides end-of-life information on NetBackup features that will no longer be supported in the next major release following NetBackup 6.0.
- ◆ Appendix A lists all NetBackup documents for this release.
- ◆ Appendix B provides all third-party copyright information relative to NetBackup 6.0.

Getting Help

You can find answers to questions and get help from the NetBackup documentation and from the VERITAS technical support web site.

Getting Help

Finding NetBackup Documentation

A list of the entire NetBackup documentation set appears as an appendix in the *NetBackup Release Notes*. All NetBackup documents are included in PDF format on the NetBackup Documentation CD.

For definitions of NetBackup terms, consult the online glossary.

▼ To access the NetBackup online glossary

1. In the NetBackup Administration Console, click **Help** > **Help Topics**.
2. Click the **Contents** tab.
3. Click **Glossary of NetBackup Terms**.

Use the scroll function to navigate through the glossary.

Accessing the VERITAS Technical Support Web Site

The address for the VERITAS Technical Support Web site is <http://support.veritas.com>.

The VERITAS Support Web site lets you do any of the following:

- ◆ Obtain updated information about NetBackup, including system requirements, supported platforms, and supported peripherals
- ◆ Contact the VERITAS Technical Support staff and post questions to them
- ◆ Get the latest patches, upgrades, and utilities
- ◆ View the NetBackup Frequently Asked Questions (FAQ) page
- ◆ Search the knowledge base for answers to technical support questions
- ◆ Receive automatic notice of product updates
- ◆ Find out about NetBackup training
- ◆ Read current white papers related to NetBackup

From <http://support.veritas.com>, you can complete various tasks to obtain specific types of support for NetBackup:

1. Subscribe to the VERITAS Email notification service to be informed of software alerts, newly published documentation, Beta programs, and other services.
 - a. From the main <http://support.veritas.com> page, select a product family and a product.
 - b. Under Support Resources, click **Email Notifications**.

Your customer profile ensures you receive the latest VERITAS technical information pertaining to your specific interests.
2. Locate the telephone support directory at <http://support.veritas.com> by clicking the **Phone Support** icon. A page appears that contains VERITAS support numbers from around the world.

Note Telephone support for NetBackup is only available with a valid support contract. To contact VERITAS for technical support, dial the appropriate phone number listed on the Technical Support Guide included in the product box and have your product license information ready for quick navigation to the proper support group.

3. Contact technical support using e-mail.
 - a. From the main <http://support.veritas.com> page, click the **E-mail Support** icon.

A wizard guides you to do the following:

 - ◆ Select a language of your preference
 - ◆ Select a product and a platform
 - ◆ Provide additional contact and product information, and your message
 - ◆ Associate your message with an existing technical support case
 - b. After providing the required information, click **Send Message**.

Accessibility Features

Contacting VERITAS Licensing

For license information, you can contact us as follows:

- ◆ Call 1-800-634-4747 and select option 3
- ◆ Fax questions to 1-650-527-0952
- ◆ In the Americas, send e-mail to amercustomercore@veritas.com.
In the Asia and Pacific areas, send email to apaccustomercore@veritas.com.
In all other areas, send email to internationallicense@veritas.com.

Accessibility Features

NetBackup contains features that make the user interface easier to use by people who are visually impaired and by people who have limited dexterity. Accessibility features include:

- ◆ Support for assistive technologies such as screen readers and voice input (Windows servers only)
- ◆ Support for keyboard (mouseless) navigation using accelerator keys and mnemonic keys

For more information, see the *NetBackup Installation Guide*.

Related Resources

Refer to Appendix A of this document for a complete list of related manuals associated with the content of this document.

On the Support Web Site

Copies of NetBackup documentation are also available on the VERITAS support web site:

1. Log on to the VERITAS support web page by typing the following:
`http://support.veritas.com/`
The Support web page appears.
2. Select **NetBackup Products** in the Select Product Family window.

3. Choose a NetBackup product in the Select Product window, for example, **NetBackup Enterprise Server**.
4. To locate copies of the NetBackup Product documentation, do the following:
 - a. Enter a keyword of the document or documents that you want to find.
 - b. Select a product version, (**6.0**)
 - c. Select a product platform, (**All**)
 - d. Check the PDF checkbox to only search PDF files.

Note To quickly locate the latest compatibility information about a particular version of NetBackup, skip steps 2 - 4 and instead, click the **Compatibility & Reference** link on the Support page.

Glossary

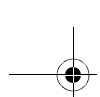
If you encounter unfamiliar terminology, consult the NetBackup online glossary. The glossary contains terms and definitions for NetBackup and all additional NetBackup options and agents.

The NetBackup online glossary is included in the NetBackup help file.

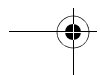
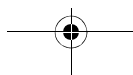
▼ To access the NetBackup online glossary

1. In the NetBackup Administration Console, click **Help > Help Topics**.
2. Click the **Contents** tab.
3. Click **Glossary of NetBackup Terms**.

Use the scroll function to navigate through the glossary.



Glossary



New Features in NetBackup 6.0

VERITAS NetBackup™ 6.0 contains many new features and enhancements designed to increase scalability and functionality of NetBackup for its large enterprise customers. Some of the more prominent objectives are to:

- ◆ Further enhance NetBackup's disk backup capabilities
- ◆ Respond to the increased market requirement for backing up data to disk
- ◆ Collaborate with Network Appliance to differentiate NetBackup by providing support to back up data directly to NearStore appliances
- ◆ Meet the VERITAS integration guidelines and enhance NetBackup integration with other VERITAS products
- ◆ Enable NetBackup to be more easily localized to other languages.

In addition, a new management and reporting interface for NetBackup is introduced in this release. NetBackup Operations Manager (NOM) is a new product feature developed to address NetBackup management needs of enterprise customers.

As VERITAS continues to improve NetBackup in the areas of scalability, improved disk backup capabilities, and product integration, many changes are underway. The following list is an abbreviated list of some of the new features and enhancements that are making it possible for NetBackup to continue to be a leader in this market:

- ◆ NetBackup Advanced Client enhancements
- ◆ NetBackup Bare Metal Restore (BMR) enhancements
 - ◆ Packaged and installed with NetBackup
 - ◆ Integrated into the NetBackup Administration Console and the Backup Policies
 - ◆ BMR master server supported on Windows systems
 - ◆ BMR Windows boot servers
 - ◆ Added Linux client support and improved the support for VERITAS Volume Manager and File System
- ◆ NetBackup Database Agent Enhancements
 - ◆ SAP Backup integration with Oracle RMAN

- ◆ NetBackup supports Microsoft SQL Server 2005 and NetBackup SharePoint 2003
- ◆ NetBackup Disk Backup capabilities include
 - ◆ Network Appliance NearStore Disk Storage Unit
 - ◆ Disk Backup performance
 - ◆ Leverage disk storage unit (DSU) groups
- ◆ NetBackup Media Manager enhancements
 - ◆ Enterprise Media Manager (EMM)
 - ◆ Enhanced device discovery for ACS and TLM robotics
 - ◆ Improvements to the device configuration wizard
 - ◆ Drive swapping
 - ◆ Multi-path Shared Storage Option (SSO) including NDMP support
 - ◆ NDMP WORM tape support
- ◆ NetBackup enhancements to the core functionality include
 - ◆ Intelligent Resource Manager (IRM)
 - ◆ NetBackup catalog enhancements
 - ◆ NetBackup service monitor
 - ◆ NetBackup supports Sybase ASA components
 - ◆ Port reduction
 - ◆ Robust file logging
 - ◆ Enhanced PBX infrastructure integration
 - ◆ Unified Logging standardization
- ◆ NDMP Enhancements
 - ◆ Integrated Snapshot feature
 - ◆ NDMP agent enhancements
 - ◆ Support has been added for SSO (See the Multi-path Shared Storage Option)
 - ◆ Enhanced Tape Alert support
- ◆ NetBackup Operations Manager (NOM) provides NetBackup management and reporting capabilities
- ◆ NetBackup proliferations
- ◆ New back-level administration capabilities

The following subsections within this chapter summarize each feature outlined in the proceeding list. Each of these features and enhancements are documented in the NetBackup documentation included in your NetBackup media kit.

New Publications or Changes

The following publications and help files have changed for the NetBackup 6.0 release:

- ◆ Included in the NetBackup 6.0 release is a documentation CD-ROM that contains all of the documents that pertain to the NetBackup products. This disk is labeled, *NetBackup 6.0 Documentation Set*. Offering the NetBackup documents to our customers on disk provides a few more freedoms such as portability. Customers can copy these documents to shared file locations or carry the documents on disk to various work locations where access may be restricted.
- ◆ With the introduction of NetBackup Operations Manager (NOM), a new document was added to the NetBackup documentation set. This is the *NetBackup Operations Manager Getting Started Guide for Windows and Solaris*. In addition to this guide, NOM includes a complete online help set for understanding and using the new NOM console interface.
- ◆ The *VERITAS NetBackup Bare Metal Restore System Administrator's Guide* introduces the NetBackup Bare Metal Restore product. This document describes how to install, configure, and use Bare Metal Restore to protect and restore client systems.
- ◆ As in previous releases, a Known Issues document is created that contains additional product information about known issues with the release. You can refer to Tech Note number 278130 on the VERITAS support web site or enter the following link in your web browser to view this information.

<http://support.veritas.com/docs/278130>.

NetBackup 6.0 Enhancements

NetBackup 6.0 contains many new features and enhancements to existing product features. The following subsections describe features in the base NetBackup product.

NetBackup Advanced Client Enhancements

Advanced Client Support for NDMP SnapVault Extension

NetBackup 6.0 contains a new feature that enhances the existing NetBackup Advanced Client technologies to include the open NDMP standard SnapVault extension. SnapVault is a disk-based backup feature that enables data stored on NAS filers to be backed up and restored on larger capacity filers. SnapVault is an open standard extension to the NDMP V4 protocol.

Advanced Client Support for NAS Disk-based Data

This feature extends the Advanced Client offering of NAS disk-based data protection methods to Oracle. The methods are currently highly desirable by our customers. The feature offers an integrated NetBackup solution for NAS filer disk-based storage protection of Oracle data.

Instant Recovery Enhancements

This feature gives additional functionality to Instant Recovery, which is an important part of Advanced Client functionality. It enables fast data backup and retrieval from snapshots on disks. In addition, Instant Recovery is able to rotate snapshot mirrors, so that a specified number of snapshots can be retained. During a restore, Instant Recovery is capable of performing file restore and file system/volume Point in Time Rollback, which are fast ways to put a file system or volume back in time with minimal I/O.

With this feature, VERITAS has added the FlashSnap snapshot method to this list.

There are a number of advantages to adding Instant Recovery capability to the FlashSnap snapshot method. FlashSnap snapshot method is an excellent way of doing off-host backup; it is a two host split mirror type of off-host backup. By utilizing VERITAS Volume Manager (VxVM) FlashSnap disk group split and join capability, a snapshot will be taken, and the disk group that contains only the snapshot is deported from the application host where the application is running and imported to the backup host. All backup processing is off-loaded to the backup host from the application host. This minimizes the impact of the backup to the application server. With the added Instant Recovery capability, customers are able to retain a number of snapshots and perform faster recoveries.

NetBackup Bare Metal Restore Enhancements

Bare Metal Restore (BMR) is now integrated into NetBackup 6.0. As a NetBackup licensed option, BMR is packaged and delivered with NetBackup and installed from the NetBackup media. Its functionality is activated by a NetBackup license key that includes BMR.

The BMR client software is installed automatically when the NetBackup client software is installed on a system. In addition, BMR is a node in the NetBackup Administration Console when NetBackup is licensed for BMR.

BMR Integrated into the NetBackup Administration Console

Bare Metal Restore Management is now a node in the tree view of the NetBackup Administration Console when NetBackup is licensed for BMR. This replaces the separate BMR graphical user interface in previous releases.

Some of the consequences of this change are:

- ◆ The BMR master server must reside on the same system as the NetBackup master server.
- ◆ Simpler administration of BMR.
- ◆ Improved editing of client configurations for special restore operations.
- ◆ Improved dissimilar disk restore mapping screens and wizards.

BMR Integrated into Backup Policies

BMR client configuration information is saved when a NetBackup policy configured for BMR protection backs up a client and when NetBackup is licensed for BMR (you no longer have to modify the `bpstart_notify` script on each client protected by BMR). Information about the agent that saves the client's configuration appears in the detailed status of the back job.

BMR Servers Supported on Windows Systems

Support has been added for BMR servers running on Microsoft Windows 2000 and Windows Server 2003 systems.

BMR Windows Boot Servers

Shared resource trees for Microsoft Windows clients are now hosted on Windows 2000 and Windows Server 2003 boot servers rather than on a UNIX system.

NetBackup 6.0 Enhancements

BMR Linux Client Support

Red Hat Linux and SuSE Linux are now supported as BMR clients.

For specific version support, see “NetBackup Bare Metal Restore Compatibility Lists” on page 41.

BMR Volume Manager and File System Support

BMR provides the following new volume manager and file system support:

- ◆ VERITAS Volume Manager (VxVM) on AIX and HP-UX systems.
- ◆ VERITAS File System (VxFS) on AIX and HP-UX systems.
- ◆ VERITAS Storage Foundation for Windows (VxSFW) on Windows.
- ◆ Using Solaris Volume Manager (SVM) to encapsulate Solaris root disks. Solaris Volume Manager metadatabases and metadevices are now recreated in restores, including dissimilar disk restore scenarios.

For specific version support, see “NetBackup Bare Metal Restore Compatibility Lists” on page 41.

NetBackup Database Agent Enhancements

The following sections describe the many enhancements made in the area of NetBackup database agents.

SAP Backup Integration with Oracle RMAN

The following list describes the integrations enhancements made to the SAP agent.

- ◆ With NetBackup 6.0, the SAP Agent supports the integration of SAP BR Tools with Oracle Recovery Manager (RMAN). This integration means that customers can perform incremental backups, significantly reducing the amount of data to be backed up. Additional benefits of this feature are described in *NetBackup for SAP System Administrator's Guide for Windows* or the *NetBackup System Administrator's Guide for UNIX*.
- ◆ The NetBackup for SAP 6.0 release implements an additional SAP backup interface, Backint for MaxDB. This enhancement allows you to protect SAP environments based on the MaxDB database. Previous releases supported SAP environments based on Oracle databases. For more information, see the *NetBackup for SAP System Administrator's Guide for Windows* or the *NetBackup System Administrator's Guide for UNIX*.

NetBackup for Exchange with Advanced Client

NetBackup for Exchange now supports off-host alternate client backup using Microsoft Volume ShadowCopy Services (VSS). This capability leverages Microsoft VSS to create a snapshot (ShadowCopy) of the Exchange volumes on a *VSS provider*. Then, the snapshot is exported to an alternate client, where the backup is performed on behalf of the Exchange server. This greatly reduces the backup load experienced by the Exchange server. Furthermore, the Exchange data can be restored directly to the Exchange server. At the time of this printing, supported VSS providers for off-host alternate client backups are:

- ◆ VERITAS VxVM 4.3 or later VSS Provider
- ◆ EMC CLARiiON VSS Provider
- ◆ Hitachi 9700/Tagma VSS Provider
- ◆ Other VSS Providers will be announced as they are supported. These new VSS providers are also supported with local, on-host VSS backups.

Lotus Notes Agent

The following list describes the enhancements made to the Lotus Notes agent.

- ◆ The Lotus Notes agent can now back up Windows network shared folders or UNIX NFS directories. A Windows UNC or UNIX NFS pathname can be added in the Backup Selections list of the Lotus Notes policy. This capability is useful when Lotus Notes databases reside on network storage, for example, NAS filers. Consult the *NetBackup System Administrator's Guide, Volume I*, for detailed instructions on backing up network drives and the Follow NFS policy attribute.

Consult your IBM Lotus Notes representative to determine if this capability is appropriate and supported within your Lotus Notes environment. Availability of this capability within NetBackup does not imply support by IBM. IBM has published a document, Statement of Support for Domino on SAN and NAS equipment regarding Lotus Notes in SAN/NAS environments:

<http://www-1.ibm.com/support/docview.wss?uid=swg27002613>

- ◆ The NetBackup for Lotus agent allows you to optionally use DB2 as the back end for Lotus databases. For details, refer to TechPDF #274536 at the VERITAS Support website:

<http://library.veritas.com/docs/274536>

NetBackup 6.0 Enhancements

Microsoft SQL Server 2005 Support

At the time of this printing, MS SQL Server 2005 was available in pre-release form. NetBackup 6.0 offers limited evaluation support for MS SQL Server 2005 at the June 2005 Community Technical Preview version and higher. Support announcements will be communicated in the NetBackup Database Agent Compatibility document found at <http://support.veritas.com>.

NetBackup for SQL Server has been extended to use new capabilities in SQL Server 2005, including:

- ◆ On-line Recovery
 - ◆ Partial recovery
 - ◆ Optimization for read-only file groups
 - ◆ On-line recovery during transaction log undo phase
- ◆ Data Verification
 - ◆ Verify-only restore
 - ◆ Page verification during backup and restore
- ◆ Page-level restore
- ◆ Instant file initialization during restore
- ◆ Transaction log backup when full backup is in progress
- ◆ Extended object information in the SQL Server catalog
- ◆ Progress statistics during backup and restore
- ◆ Backup and restore of full text catalogs
- ◆ Copy-only backup

NetBackup SharePoint 2003 Support

NetBackup 6.0 now supports SharePoint Portal Server 2003, and can backup and restore:

- ◆ A server farm configuration and single-sign-on databases
- ◆ Portal Content, Profile, Search, and Index databases
- ◆ Backward-compatible document libraries (migrated from SharePoint 2001)

Network Appliance NearStore Disk Storage Unit Enhancements

This feature is a collaborative effort between VERITAS and Network Appliance to implement a new NetBackup disk storage unit designed to take advantage of the storage capabilities of the NetApp NearStore Storage System. This feature is comprised of a new disk media architecture model to develop a disk-based storage unit for the NetBackup media server, so it can serve as a backup storage device for all the NetBackup client agents. Because this feature is a new licensed option, users will be required to enter a new license to create a NearStore storage unit. The new license is called the, Disk Optimization Option license.

Network Appliance (NetApp) SnapVault

This release of NetBackup includes the integration of the Network Appliance SnapVault functionality. This feature leverages the existing NetBackup Advanced Client product to include support for the open NDMP V4 SnapVault extension. SnapVault provides efficient disk space data protection of NetApp primary filers to more cost effective NetApp NearStore secondary systems. This feature enables administrators to schedule, configure, and manage NetApp SnapVault operations, and perform user-directed file restores within the integrated NetBackup graphical user interfaces.

Only NetApp Nearstore secondary devices are supported running Data ONTAP 7.1 or later, and have the SnapVault secondary license installed. NetApp filers require the SnapVault primary license. This functionality requires the NetBackup for NDMP, and NetBackup Advanced Client licenses (Optional: Oracle Database Agent). Some additional advantages to using this feature are:

- ◆ Oracle application interface now allows seamless SnapVault integration for Oracle databases residing on NetApp filers.
- ◆ Users can now consolidate primary and secondary snapshots.
- ◆ Enhancements have been made to make this feature more easy to use by replacing cumbersome administrative CLI commands that had to be run on both the primary and secondary systems.
- ◆ Provides a “single pane of glass” for NAS filer administration, backups, and restores.
- ◆ The scheduling of snapshot and SnapVault transfers has been improved, offering finer time granularity with predictability.
- ◆ This feature now provides a user-restore browse capability that enables efficient user-directed restores.
- ◆ The snapshot naming conventions has been enhanced and combined with NetBackup cataloging to identify images.

NetBackup 6.0 Enhancements

NetBackup Disk Backup Capabilities

The following features highlight some of the enhancements in the NetBackup disk backup area.

Disk Backup Performance

VERITAS has taken a close look at the default tuning parameters to optimize the performance of a disk backup operation, making it easier for a customer to achieve high backup/restore performance. The default maximum fragment size has been changed from 2 gigabytes to .5 terabytes, thereby minimizing fragments on disk images and avoiding the unnecessary overhead in trying to maintain multiple fragments.

For performance purposes, customers upgrading from a previous release should consider increasing the fragment size of all disk storage units (DSUs) configured under the older release to .5 terabytes.

Note You should not increase the fragment size to be larger than the maximum file size configured for your system.

Another disk enhancement in this release is to increase the default sleep mode from five minutes to 300 minutes. In previous releases, the default condition was to sleep for five minutes when a disk storage unit became full. With this release of NetBackup, the customer has the opportunity to change this value to 300 minutes.

Disk Storage Unit Enhancements

The following list identifies many areas in which VERITAS has enhanced disk storage capabilities:

- ◆ Disk staging is now an attribute of a disk storage unit (DSU) rather than a separate type of storage unit. Making staging an optionally-enabled attribute of a disk storage unit simplifies the configuration and planning of storage units.
- ◆ VERITAS has improved staging performance by enabling the simultaneous use of multiple drives, and allowing more than one duplicate at a time for a disk storage unit with the staging attribute set.
- ◆ Provide high and low thresholds (watermarks) that allow more predictable behavior and better performance. The thresholds enable the NetBackup administrator to specify at what point a disk storage unit is to be considered full (high watermark) or at what point expiration of images on disk should begin (high watermark) and at what point expiration should stop (low watermark).

- ◆ NetBackup leverages new load sharing capabilities by disallowing a job to be scheduled for backup to a full disk storage unit if another one in the storage unit group has ample space.

NetBackup Media Manager

The following sections describe some of the critical additions, enhancements, and changes that have been made in NetBackup Media Manager.

Enterprise Media Manager (EMM)

Enterprise Media Manager is part of a redeployment of the NetBackup media manager. In its first phase with this release, a new service is being introduced to centrally manage Media Manager data. This new service stores media and device information for a master and all of its media servers in a single relational database. This service improves the performance, scalability, and manageability of NetBackup's media and device databases, and it offers faster implementation of new media manager related features. In addition, this feature consolidates media and device configuration and run-time status information that is currently spread across multiple servers and integrates this with storage unit configuration, NDMP credentials, and includes a new managed server list.

Multi-path Shared Storage Option (SSO) for NDMP

This release of NetBackup offers a new dimension in drive configuration flexibility. Previous releases of NetBackup considered a drive to be shared only if the same drive was configured on more than one media server. This feature enables NetBackup to recognize multiple paths on a single media server to a single drive, making it possible for the same drive to be configured multiple times on one NetBackup media server. For the customer this means one media server can share all drives on all NAS/NDMP hosts and they need only have enough drives to sufficiently backup all filers.

Improved TapeAlert Support

Tape devices are capable of reporting many error, warning, and informational states by using the TapeAlert log page. The SCSI standard defines 48 conditions out of a maximum of 64. With this feature, NetBackup will provide logging of all TapeAlert conditions into the bptm debug log, the NetBackup error log, the job details log, and the system log/event viewer. A set of conditions have been defined that cause the media in use to be frozen. In addition, a set of conditions have been defined to cause the drive to be downed. TapeAlert will still be used to manage the cleaning of drives.

NetBackup 6.0 Enhancements

ACS and TLM Device Discovery and Auto Configuration

This version of NetBackup enhances device discovery by upgrading the Device Configuration Wizard so it now configures robots and drives in StorageTek's Automated Cartridge System Library Software (ACSL) on UNIX and Linux and ADIC's Scalar Distributed Library Controller (SDLC) libraries. This enhancement makes it possible for all robots to now be discovered.

Enhanced Device Qualification Tool Suite

The Enhanced Device Qualification Tool Suite (DQTS) feature improves NetBackup's existing tape drive qualification logic and extends the existing qualification functionality to robotic tape libraries. DQTS now runs as a job, fully integrated into the NetBackup scheduler.)

Automatic Drive Swapping

With this feature, users will benefit from NetBackup's ability to recognize and compensate for swapped tape drives and/or updated firmware revisions. In previous versions of NetBackup, the only way that NetBackup could recognize a tape drive swap (serial number change) or a firmware change was to run the Device Configuration Wizard or delete and re-add drives manually. This feature handles this functionality upon `ltid` restart (Media Manager device domain on UNIX system or the NetBackup Device Manager service on Windows systems). Recognizing the swap is critical to maintaining database integrity.

Improvements to the Device Configuration Wizard

Customers now have more control over the drive names that are selected when using the Device Configuration Wizard. In previous versions of NetBackup, customers had no control over this because the drive name was generated by a fixed algorithm that included the vendor ID, product ID, and a trailing index for uniqueness. With this release, customers who want different names will perform a few manual configuration steps creating drive name rules. Many customers use a naming scheme that identifies the robot number and position within a robot where the tape drive resides. For example, if a Quantum DLT 7000 drive were the fourth drive in TLD robot 2, the user can now change the name to be something like, DLT7000-TLD2-4. The Device Configuration wizard has also been rewritten for improved reliability, with the underlying device information now being stored in one location (the EMM database) instead of being distributed across several media server device databases and the certified global device database.

NetBackup Supports Microsoft's Plug-N-Play Support for Windows

NetBackup 6.0 can be used with Windows Plug-N-Play tape and medium changer class drivers and the Storport driver.

Without this feature, if non Plug-N-Play class drivers are being used, an unsafe device removal event will make the tape drive or medium changer unusable until a reboot. This feature, first introduced in NetBackup 5.0 MP2 and 5.1 MP1, enables NetBackup to use Plug-N-Play class drivers, which enables NetBackup to recover (using error recovery) from an unsafe device removal event and continue with reading or writing the tape, or controlling the robotic library.

WORM Tape Support

First introduced in a NetBackup 5.1 MP release, NetBackup 6.0 carries forward the ability to support writing to WORM tape including when using NDMP devices. For more information on what hardware the WORM Tape feature supports, refer to the hardware compatibility list (HCL) on the VERITAS support web site.

NetBackup Enhancements to the Core Functionality

Intelligent Resource Manager

Intelligent Resource Manager for NetBackup is the redeployment of the current scheduler (bpsched) and job manager providing additional functionality. The Intelligent Resource Manager also provides, in cooperation with the Enterprise Media Manager (EMM), the resource selection/allocation functionality currently embedded in the tape manager (bptm), disk manager (bpdm), and robotics (tlld, etc.). Finally, users will notice new job types appearing in the Activity Monitor, for example, tape drive clean, optical platter format, tape request, and DQTS. In addition, the capability has been added to pause or deactivate media servers to temporarily suspend starting jobs on a media server.

NetBackup Catalog Enhancements

The redeployment of the catalog infrastructure introduces a number of benefits to the user while preserving the present format of the catalog. The new infrastructure provides users with the following new functionality:

- ◆ Perform catalog backups while other jobs may be running. (Hot catalog backup)
- ◆ Provide hot catalog backup capability to support 24x7 backup environments
- ◆ Provide the ability to back up the EMM relational database
- ◆ Use a pool of tapes dedicated for catalog backups. (Spanning tapes)

NetBackup 6.0 Enhancements

- ◆ Choose full, or incremental catalog backup.
- ◆ Enable the catalog backup to take advantage of all of the features of the standard NetBackup policy type
- ◆ Improved catalog recovery procedures.

NetBackup Service Monitor

The NetBackup service monitor, called `nbsvcmon`, is a new service which has the primary responsibility of monitoring NetBackup services that run on the local machine. If a NetBackup service abnormally terminates, the monitor service attempts to restart the service. The number of attempts that the service monitor makes is configurable. Initially the service only restarts “new core” services that are being introduced in NetBackup 6.0. The service monitor is automatically turned off when NetBackup is configured as an Highly Available application in a cluster environment.

NetBackup Supports Sybase ASA Component

This feature ensures the proper installation and operation of the Sybase ASA component. NetBackup and Bare Metal Restore (BMR) share the component, and this feature ensures common installation and operation for all of these products. NetBackup Operations Manager (NOM) also uses an implementation of Sybase ASA. This database is not shared with other applications.

Port Reduction

This feature has been enhanced in this release of NetBackup to make it possible to access more services through a “Single Port” option to the customer. This feature was further enhanced by creating a *unidirectional* `bpcd` feature that enables the server to initiate all `bpcd` socket connections. Originally, the first socket was established by the server connecting to the `bpcd` port on the client and additional sockets were established by the client, connecting back to either the `vnetd` port or a random port. Designing it so that all connections are made by the server can make it easier for a systems administrator to maintain security if all connections are initiated by the master server from behind a firewall. Finally, changes were made to have `vnetd` “on” by default.

Robust File Logging

NetBackup 6.0 contains a Robust Logging feature that enables you to prune log files more frequently than once a day and it applies to the debug logs for the following processes: `bprd`, `bpbdbm`, `bpcd`, `bpbkar`, `bpbmr`, `bptm` and `bpdm`.

This feature is a vital addition to some VERITAS customers who run into the issue of having NetBackup log files grow so large, that within a single day the log files consume all available space. A situation like this may produce some undesirable consequences such as a system crash. This feature enables you to set a maximum size of each of the debug log files and also set the maximum number of log files in each NetBackup debug log directory. This way, if the maximum size is exceeded, a new debug log file is created. And if the maximum number of debug log files is exceeded, the oldest log file is deleted. And finally, it should improve your ability to estimate the amount of disk space that you will need to contain the NetBackup debug logs, based on the settings of the new options, prior to performing a product installation.

Enhanced PBX Infrastructure Integration

A new Infrastructure Core Services (ICS) product called Private Branch Exchange (PBX) has been added to this release of NetBackup. PBX provides similar functionality as `vnetd` used to in NetBackup. PBX helps limit the number of TCP/IP ports that other services use.

Unified Logging Standardization

The primary scope of this feature is to provide an infrastructure within NetBackup that will enable NetBackup components, such as Enterprise Media Manager (EMM), Intelligent Resource Manager (IRM) and Disk Media Server (DMS) to use VERITAS Unified logging (VxUL). VxUL improves the customer's experience with VERITAS products as well as reduces support costs by improving and standardizing common error messages and log files across all VERITAS products and operating systems. In addition, VxUL provides better support for the localization of the log messages.

NetBackup Client Enhancements

VERITAS File System Enhancement - File Change Log for VxFS 4.0

NetBackup can now take advantage of a new file change log feature in the VERITAS File System (VxFS 4.0). NetBackup has always scanned the file system looking for files to back up during incremental backups. This can be a slow process on file systems with millions of files, and can also be an unnecessary process if most of the files do not change often. VxFS 4.0 adds a file change log to track modifications to files. NetBackup can use this log to determine which files to select for incremental backups and potentially save very large amounts of unnecessary file-system processing.

NetBackup 6.0 Enhancements

NDMP

One of the new enhancements to NDMP is the ability for users to have remote NDMP support for AIX, HP-UX, and Linux platforms. NDMP support has also been added to the Shared Storage Option (see Multi-path Shared Storage Option). In addition, the following enhancements have been added to NDMP in this release of NetBackup.

New Integrated Snapshot Features

VERITAS currently has integrated snapshot backups, including disk-based backups, between NetBackup and Storage Foundation.

NDMP Agent

This feature simplifies the configuration of Remote NDMP by eliminating the need to configure drives attached to a media server as NDMP drives. Instead, NDMP filers can be backed up to NetBackup media server drives by simply selecting a media server storage unit for an NDMP policy. In previous releases, remote NDMP was only available on Solaris and Windows platforms. Starting with this release of NetBackup, this feature is available on the following platforms: Solaris, Windows (2000/2003IA64), Linux, HP-UX, and AIX.

NetBackup Operations Manager (NOM)

NetBackup Operations Manager (NOM) is a new product developed to address NetBackup management needs of enterprise customers. It combines active real-time monitoring, historical reporting, administration, alert management, and troubleshooting assistance in a centralized web-based user interface. NOM delivers many of the management and reporting capabilities previously available in NetBackup Global Data Manager and Advanced Reporter, but also adds new enhanced functionality beyond what these products offered.

NOM offers you the ability to quickly gain an understanding of the health of your entire NetBackup server environment. Selected subsets of servers can be monitored using server groupings and advanced data filtering options.

Using NOM, you can diagnose problems, identify potential issues, or just review the operational status of multiple NetBackup master and media servers at many locations, all from a centralized location.

NetBackup Proliferations

NetBackup 6.0 includes additional platform support for selected 32- and 64-bit servers and clients. A complete list of supported platforms can be found in Chapter 2, “Supported Platforms and Peripherals” on page 23.

In addition, NetBackup 6.0 adds 32- and 64-bit platforms support for additional database agents. Refer to Chapter 2, “Other NetBackup Compatibility Lists” on page 37 for more information on how to view these lists.

NetBackup-Java Interface

In the area of the NetBackup-Java interface and the Windows Display Console, enhancements have been made to the logs and where they are written. The following sections describe these enhancements in more detail.

New Back-level Administration Capabilities via the NetBackup-Java Console

NetBackup 6.0 provides additional ways to perform back-level administration of the supported back-level versions. These include:

- ◆ Packaging and installation of the NetBackup 5.0 MP4 and 5.1 MP2 versions of the NetBackup-Java console on supported UNIX and Linux platforms. In addition, the `jnbSA` and `jbpSA` commands have two new options to facilitate starting the desired version of the console. These are documented in *NetBackup System Administration Guide for UNIX and Linux*.
- ◆ Documentation in the *NetBackup Installation Guide for Windows* on how to install multiple versions of the NetBackup-Java console on the supported Windows platforms.

NetBackup-Java Interface Logs Enhanced

In this release of NetBackup, the debug log files for the NetBackup-Java Interfaces on NetBackup-Java capable UNIX server and client platforms are now written to `/usr/opensv/netbackup/logs/user_ops/nbjlogs`. These files are removed based on the value of the `bp.conf` option, `KEEP_LOGS_DAYS`.

NetBackup-Java Windows Display Console Logging Automated

When the NetBackup-Java Windows Display Console (WDC) is installed on a host that has NetBackup client or server software installed, the console will write its debug log to `nb_installed_folder\netbackup\logs\user_ops\nbjlogs`. The log files will be

NetBackup 6.0 Enhancements

removed based on setting the Windows Backup, Archive, and Restore GUI's Client Property titled, **Keep status of user-directed backups, archives, and restores for:**. If the WDC is installed on a host that does not have NetBackup client or server software installed, no log files will be written. For more information on how to retrieve a log file, refer to the *NetBackup Troubleshooting Guide for UNIX, Windows, and Linux*.

NetBackup Patch Version Displayed for Hosts

The NetBackup Java Administration Console title bar now displays the patch version of the NetBackup software on the host being administered. The NetBackup patch version also is displayed for the hosts listed in **NetBackup Management > Host Properties** views (**Master Servers**, **Media Servers**, and **Clients**).

NetBackup Cluster Support

NetBackup now offers a VCS Windows installation that is similar to the MSCS installation. In addition, NetBackup supports 64-bit MSCS and VCS cluster environments, and HP ServiceGuard.

NetBackup Duplication Enhancements

NetBackup 6.0 enhances the duplication operations of NetBackup for those users who rely on regularly-scheduled duplication. The following areas have been enhanced to better the duplication process:

- ◆ Utilize shared memory. NetBackup 6.0 utilizes shared memory to pass data from the read-side bptm to the write-side bptm when the source and destination is on the same media server. This improvement may significantly impact performance when duplicating large backup images.
- ◆ Reduce unnecessary tape unmount/mount activity. In previous versions of NetBackup, when duplicating a list of images, the destination tape was unmounted between the processing of images in the duplication list if the scheduler issues its `bptm -U` command. This process caused serious performance issues.

To avoid this, a user-configurable `MEDIA_UNMOUNT_DELAY` timeout is used on the destination tape after the duplication of each image in the list is complete. This ensures that the tape will stay mounted until the duplication of the next image has begun.

- ◆ Implement a one write-side bptm process. When copying a list of images in previous versions of NetBackup, `bpduplicate` would invoke a separate bptm for each copied image. NetBackup 6.0 reduces the overhead that occurs when duplicating many images by initiating only one bptm by `bpduplicate`. This results in all images being copied to be sent, in succession, to the same bptm session.

NetBackup Internationalization Enhancements

NetBackup now provides its customers with the ability to handle homogeneous encoding across heterogeneous UNIX platforms. While a majority of a user's inputs are limited to being English only, the file and directory names for backup and restore selections can be in multi-byte characters.

NetBackup Vault

NetBackup Vault has had many new enhancements added to its functionality in this release. The following subsections describe these changes.

Concurrent Vault Jobs and Queued Vault Jobs

Multiple Vault sessions can run at the same time, and multiple sessions from the same vault can run at the same time. You do not have to wait for one job to finish before starting another job. Resources are allocated to jobs, and jobs are queued so they do not fail if resources are not available. A job is queued if it needs to perform duplication and there already is an active Vault job (from the same Vault) performing duplication or it needs to perform an eject and there already is an active Vault job (from the same robot) performing the eject step. This queuing prevents commingling of tapes from two or more Vault jobs that belong to the same robot.

Vault Reports Distribution Improvements

You now can specify a distribution for each Vault report in a profile rather than using the same distribution for all reports in a profile as in previous releases. For each report, you can specify a printer or print command, e-mail addresses to send the report to, and a filename to save the report as.

In addition, you can specify report distributions for all vaults so that all profiles use the same report distributions, and then you can override the global settings and specify distributions for a profile.

E-mail Notification on Eject

You can now configure notification about Vault ejects in the NetBackup Administration Console. (In previous releases, you had to use the `vlt_starteject_notify` script to notify users when the eject process begins.) Eject notification is configured for each profile on the Eject tab, for each robot on the Vault Robot dialog, and globally for Vault on the Vault Management Properties dialog General tab; Vault sends the notification to the first e-mail addresses found in that order. E-mail is sent to notify when the eject begins and when the eject finishes.

NetBackup 6.0 Enhancements

GUI Support for Multiple Retention Mappings

Retention mappings are now specified by using the NetBackup Administration Console rather than the `retention_mappings` file used in previous releases. You configure retention mappings in two places:

- ◆ The Vault Management Properties dialog Retention Mappings tab (global)
- ◆ The Vault dialog Retention Mappings tab (vault specific)

True Consolidation of Vault Reports

Vault consolidated reports now combine the information about the media in one report body, with one report header and one report summary. (Previously, consolidated reports concatenated the reports from the participating session into one report with multiple headers, bodies, and summaries.) You have the option to continue to use the old style of consolidated reporting, but you must use the `vlteject` command for that functionality.

Catalog Backup Improvements for Vault

Catalog backup in NetBackup has changed; because Vault uses NetBackup functionality, Vault catalog backup also has changed. Vault uses the new *hot catalog backup* feature in NetBackup. Hot catalog backup:

- ◆ Supports 24x7 backup environments.
- ◆ Enables the catalog backup to take advantage of all of the features of the standard NetBackup policy type

For Vault, most of the catalog backup configuration is now performed in the NetBackup policy used for catalog backup. In a Vault profile, you then specify the catalog backup policy and schedule to use for the Vault catalog backup.

This new method means the following:

- ◆ You must specify the catalog volume pool in the profile's Eject tab (if using removable media).
- ◆ You do not specify the location of the catalogs.
- ◆ You cannot specify additional files to back up. The new critical policies feature in catalog backup replaces this functionality.
- ◆ You can make multiple copies of the catalog.
- ◆ You can specify a priority for the catalog backup. The catalog backup job is scheduled and competes for resources with other backup jobs.
- ◆ You can send the catalog backup to any storage unit, including disk and removable media storage units.

- ◆ The Recovery Report includes the information from the new disaster recovery file generated by the catalog backup policy.
- ◆ Vault reports have changed to accommodate the new catalog backup media type while still reporting the previous catalog backup media type.

New NetBackup Vault Manager Service

The new NetBackup Vault Manager (`nbvault`) manages Vault activity and arbitrates access to the Vault robot, vault, and profile configuration information. Therefore, you can use more than one instance of the NetBackup Administration Console or the Vault Administration interface on UNIX (`vltadm`) to manage Vault. The NetBackup Vault Manager must be running at all times so Vault will function correctly.

Vault VSM Media

Support for vaulting VERITAS Storage Migrator (VSM) media has been added to Vault Management in the NetBackup Administration Console. Therefore, you no longer have to use a `vlt_ejectlist_notify` script to vault VSM media.

Eject Tapes by Expiration Date or Alphabetically

You can choose whether to eject media alphabetically or by expiration date. By default, Vault ejects media alphabetically.

Assign Priority to Vault Duplication Jobs

Vault duplication jobs now compete with other processes in NetBackup (such as regularly scheduled backups) for resources, including tape drives. (Previously, Vault duplication jobs ran with the highest priority.) If you want your Vault duplication jobs to obtain resources before other processes, you can assign a higher priority to the Vault jobs than is assigned to other NetBackup processes. Priority is assigned to Vault duplication jobs on a profile's Duplication tab.

Limit Search Range for Media Going Off-site Reports

You now can enter the number of days before the day a profile runs to search for images to include in media going off-site reports. This can reduce the amount of time to generate reports because Vault will search fewer image database records to determine which images are on the ejected media. By default, Vault searches the entire image database. This option is configured on the Vault Management Properties dialog General tab.

NetBackup 6.0 Enhancements

Specifying a value does not affect whether media are ejected and vaulted; however, if a volume is ejected that has an image on it older than the period you specify, that image will not be listed on the media going offsite reports.

Specify Image Duplication Order

You now can select the order in which you want images duplicated, from smallest to largest or from largest to smallest. By default, Vault duplicates images from largest to smallest, which improves tape drive utilization during duplication and duplicates more data sooner. If you know that your most important data is in smaller backup images, you can configure duplication so that the smaller images are duplicated before the larger images. Duplication order is configured on a profile's Duplication tab.

This choice does not affect the total time required to duplicate the images.

Supported Platforms and Peripherals

This chapter provides information on the platforms and peripherals that this release of NetBackup supports. The following table identifies the primary functionality of this release and the platforms that support these functions.

Platforms for the NetBackup 6.0 Release

Functionality	Platform Support
Core Product / Servers	AIX, HP-UX, Linux ¹ , Solaris, Tru64, and Windows
Bare Metal Restore	AIX, HP-UX, Linux, Solaris, Windows
Vault	AIX, HP-UX, Linux ¹ , Solaris, Tru64, and Windows
NetBackup Operations Manager (NOM)	Solaris ² and Windows ³

1. Core product and server support is on the Linux Red Hat and SuSE SLES platforms.
2. NOM is a 32-bit application that runs on the 64-bit-capable Solaris Sparc as a 32-bit application.
3. NOM does not support Windows 64-bit platforms in this release.

Server and Client Platform Support

The supported platform information that this release of NetBackup supports is also located on the VERITAS Support web site. The supported platform tables in this chapter provide the following types of information:

- ◆ The operating system (OS) level and version required to support a NetBackup master or media server.
- ◆ The OS level and version required to support a NetBackup client. Predecessors and successors to the supported operating system levels may function without difficulty, as long as the release provides binary compatibility with the supported level.

NetBackup support for a platform or OS version requires platform vendor support for that product. The following platform support lists are subject to change as vendors add and drop support for platforms or OS versions.

Note You will also find the most up-to-date information on peripherals, drives, and libraries on the VERITAS Support Web site.

▼ To locate supported platform information on the VERITAS Support Web site

1. Go to <http://support.veritas.com>.
2. Select **NetBackup Products** in the Select Product Family window.
3. Select **NetBackup Enterprise Server** in the Select Product window.
4. On the web page that appears, click on **Compatibility & Reference**.

A list of compatibility documents appear on the page. The titles of these documents are linked to the actual document. Click on a title to open it. The compatibility list document is in PDF format. You must have Adobe Acrobat Reader to view the document.

Platform Life Cycle Issues

NetBackup software supports an ever-changing set of platforms and must be flexible enough to handle platform life cycle issues; issues such as adding and removing a platform from NetBackup's support list.

Adding a Platform

Adding support of a platform to NetBackup introduces a situation where the platform has a future, but no history. In this situation, backward compatibility cannot be guaranteed without exhaustive testing. As a general rule, when a platform is added for a NetBackup release, the platform is supported in that version and subsequent versions (but not previous versions).

Removing a Platform

Removing support of a platform from NetBackup introduces a situation where the platform has a history, but no future. The following rules apply when removing a server platform or a database agent platform.

Removing a Server Platform

When NetBackup announces the removal of a server platform, the platform is still supported for one major release and backward compatible for one more release beyond that.

Removing an Agent Platform

The customer commitment for client platform version support is one version back with every effort made to support all versions. An exception is that the client version cannot be newer than the Master/Media Server version.

You can mix individual agents that are at different versions within a NetBackup domain, however it is possible that during an alternate restore, the restore is sent to an older version. Alternate restores should go to the same or newer versions.

Database agents are to be at the same version level as the client upon which they reside. As with the client agent, support is one version back with every effort made to support all versions. An exception is that the agent version cannot be newer than the Master/Media Server version.

NetBackup 6.0 Supported Platforms and Operating Systems

The following table contains a list of platforms and the associated operating systems (including the version levels of the operating systems) that NetBackup Enterprise Server and NetBackup Server supports at the time of this product release. In addition, the Client Selection column defines the client type that you should select when installing NetBackup as a client on the corresponding operating system listed in the table.

Server and Client Platform Support

It is possible for this information to change after the product is released. VERITAS documents these changes and posts them on the VERITAS support web site, <http://support.veritas.com>.

Platform Support Matrix for NetBackup Enterprise Server and NetBackup Server

Vendor/Platform	Operating System and Version	Server	Client	Client Selection	Notes
HP9000 - PA-RISC	HP-UX 11.0	X	X	HP9000-700, HP-UX11.00 or HP9000-800, HP-UX11.00	
HP9000 - PA-RISC	HP-UX 11.i v1 (11.11)	X	X	HP9000-700, HP-UX11.11 or HP9000-800, HP-UX11.11	
HP9000 - PA-RISC	HP-UX 11.i v2 (11.23)	X	X	HP9000-700, HP-UX11.23 or HP9000-800, HP-UX11.23	
HP - Integrity	HP-UX 11.i v2 (11.23) IA-64	X	X	HP-UX-IA64, HP-UX11.23	
HP Alpha	OpenVMS Alpha 6.1 — 8.2		X	OpenVMS, OpenVMS_Alpha	1, 5, 6
HP VAX	OpenVMS VAX 5.5 — 8.2		X	OpenVMS, OpenVMS_VAX	1, 5, 6
HP Tru64/Alpha	Tru64 5.1b, 5.1b2	X	X	ALPHA, OSFI_V5	
IBM	AIX 5.1 RS/6000, SP, pSeries (32/64 bit)	X	X	RS6000, AIX5	
IBM	AIX 5.2 (32/64 bit)	X	X	RS6000, AIX5	7
IBM	AIX 5.3 (32/64 bit)	X	X	RS6000, AIX5	
Intel 32-bit/Novell	Novell 5.1 SP5		X	Novell, NetWare	5
Intel 32-bit/Novell	Novell 6.0 SP2 and SP3	X	X	Novell, NetWare	5, 8
Intel 32-bit/Novell	Novell 6.5 and 6.5 SP2	X	X	Novell, NetWare	5, 8
Intel 32-bit/Novell	Novell Open Enterprise Server (OES)		X	NSS file systems: Novell, NetWare Linux file systems: Linux, Red Hat2.4	5, 8, 17
Intel 32-bit/Windows	Windows 2000, SP4	X	X	PC, Windows 2000	
Intel 32-bit/Windows	Windows 2000 SAK	X	X	PC, Windows 2000	2, 4
Intel 32-bit/Windows	Windows 2000 SAK Business Server	X	X	PC, Windows 2000	2, 4

Server and Client Platform Support

Platform Support Matrix for NetBackup Enterprise Server and NetBackup Server (continued)

Vendor/Platform	Operating System and Version	Server	Client	Client Selection	Notes
Intel 32-bit/Windows	Windows 2000 Client - Citrix MetaFrame XPs, XPa, XPe		X	Use Appropriate Windows NetBackup Client	3
Intel 32-bit/Windows	Windows XP, SP2		X	PC, Windows XP	12
Intel 32-bit/Windows	Windows 2003, SP1, Standard, Enterprise, DataCenter, and Web editions	X	X	PC, Windows Server 2003	
Intel 32-bit/Windows	Windows 2000 Client - Citrix MetaFrame 1.8		X	Use Appropriate Windows NetBackup Client	
Intel 32-bit/Windows	Windows 2003 Client - Citrix Access Suite 3		X	Use Appropriate Windows NetBackup Client	
Intel 32-bit/Windows	Windows Storage Server 2003	X	X	PC, Windows Server 2003	2
Intel 32-bit/Windows	Virtual Server 2005 - Hosts and virtual Operating Systems that are supported NetBackup clients		X	PC, Windows Server 2003	
Intel 64-bit/UNIX	Open VMS v8.2 on HP-IA64		X	OpenVMS, OpenVMS_I64	1,5,6
Intel 64-bit/Windows	Windows XP SP2		X	PC-IA64, Windows XP	
Intel 64-bit/Windows	Windows 2003, SP1, Standard, Enterprise, DataCenter, and Web editions	X	X	PC-IA64, Windows Server 2003	9
EM64T or AMD64/Windows	32-bit Windows XP, SP2		X	PC, Windows Server 2003	
EM64T or AMD64/Windows	32-bit Windows 2003, SP1, Standard, Enterprise, DataCenter, and Web editions	X	X	PC, Windows Server 2003	10
VMware	VMware		X	Host: Use Appropriate NetBackup Windows Client, Client: Use Appropriate NetBackup Windows Client	11
VMware	VMware ESX version 2 Client		X	VMware Host: Linux, Red Hat 2.4 Client: Use appropriate NetBackup Client	11
Intel 32-bit/FreeBSD	FreeBSD 5.3		X	INTEL, FreeBSD5.3	
Intel 32-bit/Linux	Red Flag Linux Data Center 4.1	X	X	Linux, Red Hat2.4	15
Intel 32-bit/Linux	Linux Red Hat AS/ES 2.1, 3.0, 4.0	X	X	Linux, Red Hat2.4	
Intel 32-bit/Linux	Linux Red Hat WS 2.1, 3.0		X	Linux, Red Hat2.4	

Server and Client Platform Support

Platform Support Matrix for NetBackup Enterprise Server and NetBackup Server (continued)

Vendor/Platform	Operating System and Version	Server	Client	Client Selection	Notes
Intel 32-bit/Linux	SuSE 9.0, 9.2 Desktop		X	Linux, Red Hat2.4	
Intel 32-bit/Linux	Linux SuSE SLES 8.0 and 9.0	X	X	Linux, Red Hat2.4	
IBM z800/900 (31-bit mode)	Linux Red Hat 3.0		X	Linux, IBMzSeriesLinux2.4.21	
IBM z800/900 (31-bit mode)	Linux SuSE 9.0		X	Linux, IBMzSeriesLinux2.4.21	
IA64/Linux	Linux Red Hat AS/ES 3.0		X	Linux-IA64, SuSE2.4	
IA64/Linux	Linux Red Hat AS/ES 4.0	X	X	Linux-IA64, SuSE2.4	
IA64/Linux	Linux SuSE SLES 8.0		X	Linux-IA64, SuSE2.4	
IA64/Linux	Linux SuSE SLES 9.0	X	X	Linux-IA64, SuSE2.4	14
EM64T or AMD64/Linux64	64-bit Linux Red Hat AS/ES 3.0		X	Linux, Red Hat2.4	10
EM64T or AMD64/Linux64	32-bit Linux Red Hat AS/ES 3.0	X	X	Linux, Red Hat2.4	
EM64T or AMD64/Linux64	64-bit Linux Red Hat AS/ES 4.0		X	Linux, Red Hat2.4	10
EM64T or AMD64/Linux64	32-bit Linux Red Hat AS/ES 4.0	X	X	Linux, Red Hat2.4	
EM64T or AMD64/Linux64	Linux SuSE SLES 8.0		X	Linux, Red Hat2.4	10
EM64T or AMD64/Linux64	32- or 64-bit Linux SuSE SLES 9.0	X	X	Linux, Red Hat2.4	10
Intel 32-bit/UNIX	Solaris 8 (X86)		X	Solaris, Solaris_x86_8	
Intel 32-bit/UNIX	Solaris 9 (X86)		X	Solaris, Solaris_x86_9	
Intel 32-bit/UNIX	Solaris 10 (X86)		X	Solaris, Solaris_x86_10	13
AMD64/UNIX	Solaris 9		X	Solaris, Solaris_x86_9	
AMD64/UNIX	Solaris 10		X	Solaris, Solaris_x86_10	13
Macintosh	MacOS X 10.3, 10.4		X	MACINTOSH, MacOSX10.3	16
SGI	IRIX 6.5.23, 24 and 6.5.26		X	SGI, IRIX65	

Server and Client Platform Support

Platform Support Matrix for NetBackup Enterprise Server and NetBackup Server (continued)

Vendor/Platform	Operating System and Version	Server	Client	Client Selection	Notes
Sun	Solaris 8 (SPARC & Fujitsu PRIMEPOWER)	X	X	Solaris, Solaris 8	
Sun	Solaris 9 (SPARC & Fujitsu PRIMEPOWER)	X	X	Solaris, Solaris 9	
Sun	Solaris 10 (SPARC & Fujitsu PRIMEPOWER)	X	X	Solaris, Solaris 10	13

1. Not packaged with NetBackup media. Requires order of separate media.
2. Supports media server and not master server.
3. See TechNote 247732.
4. See TechNote 248317.
5. Does not support encryption.
6. The NetBackup OpenVMS client is available as a downloadable patch at site:
ftp://ftp.emea.support.veritas.com/pub/support/Products/NetBackup_OpenVMS
7. See Technote 256755 for AIX 5.2 support of fibre connected drives.
8. The NetWare Media Server Option does not support drive sharing. Master Server not supported.
9. Intelligent Disaster Recovery (IDR) is not supported at this time.
10. Supported with 32-bit NetBackup binaries.
11. NetBackup Operating System clients are supported when operated in a VMware virtual machine guest operating system environment with the following limitations:
 - If a customer issue is determined to not be related to NetBackup, VERITAS will refer the customer to the appropriate support vendor for the operating system or application.
 - VMware support is limited to supported NetBackup operating system clients-only; NetBackup servers are not supported.
12. See TechNote 267977 for Windows XP SP2 firewall considerations.
13. See TechNote 275107 for Solaris 10 considerations.
14. SGI offers a Propack update to Linux for their IA64 SGI ALTIX hardware. NetBackup server has not been tested and is not supported with the Propack installed on SGI ALTIX hardware. NetBackup client is supported with the SGI Propack update.
15. Supported within 60 days after the release of NetBackup 6.0.
16. No ACL support for Linux and Mac OS 10.4 at the time of this release. Targeted support for Linux ACLs is at the next major release of NetBackup.
17. See TechNote 271459 for Novell Open Enterprise Server (OES) support information.

Server and Client Platform Support

Operating Systems Not Supported as of NetBackup 6.0

Backward compatibility with NetBackup 6.0 client software is retained for at least one release level. The following operating systems are no longer supported at the release of NetBackup 6.0 and beyond.

Platforms Not Supported as of NetBackup 6.0 and Beyond

Hardware Type	Operating System and Version	Server	Client	Notes
HP Tru64/Alpha	Tru64 5.1, 5.1a	X	X	1
HP - Integrity	HP-UX 11.23 IA-64 ARIES Translator		X	
IBM	AIX 4.3.3.10	X	X	
IBM z800/900	Red Hat 7.2		X	
IBM z800/900	Red Hat AS 2.1		X	
IBM z800/900	SuSE SLES 7, SLES 8		X	
IBM z800/900 (31-bit mode)	Linux SuSE zSeries 8		X	
Intel X86/Novell	Novell 5.0		X	
Intel X86/Novell	Novell 6.0	X	X	2
Intel X86,Windows	Windows NT 4.0 SP6	X	X	
Intel X86,Windows	Windows XP SP1		X	4
Intel X86/FreeBSD	FreeBSD 4.7, 4.8, and 4.9		X	
Intel X86/Linux	Linux Debian GNU/Linux 3.0		X	
Intel X86/Linux	Linux Red Hat 8.0 and 9.0		X	3
Intel X86/Linux	SuSE 8.1 and SuSE 8.2 Desktop		X	
Intel X86/Novell	SCO UnixWare 7.1.2 and 7.1.3		X	
Intel X86/UNIX	Solaris 7 (X86)		X	
Macintosh (680x0 or PPC)	MacOS X10.2.2 and 10.2.6		X	

Server and Client Platform Support

Platforms Not Supported as of NetBackup 6.0 and Beyond (continued)

Hardware Type	Operating System and Version	Server	Client	Notes
SGI	IRIX 6.5.15 — 6.5.22		X	
SGI	IRIX - All versions for Media server	X		
Sun (Sparc)	Solaris 7	X	X	

Note All operating system versions for these platforms are not supported with NetBackup 6.0.

1. Replaced with Tru64 5.1b and 5.1b2.
2. Only provided support for the Media server; thus, support for the Media server has been dropped. The client for Novell 6.0 is supported with Service Pack 2 or Service Pack 3.
3. Linux Red Hat 9.0 was replaced with Linux Red Hat 2.1 WS.
4. Service Pack 1 (SP1) was replaced by (SP2), which is standard practice when a new service pack is available.

Operating Systems Not Supported as of Next Major Release

The next major release of NetBackup no longer contains software to upgrade some operating system levels to include new product features and capabilities. Backward compatibility with NetBackup 6.0 client software is retained for at least one release level.

Platforms Not Supported as of the Next Major Release

Hardware Type	Operating System and Version	Server	Client
HP9000 - PARISC	HP-UX 11.00	X	X
HP Tru64/Alpha	Tru64 5.1b, 5.1b2 (all versions)	X	
HP Tru64/Alpha	Tru64 5.1b		X
IBM	AIX 5.1 RS/6000, SP, pSeries - (32 bit and 64 bit)	X	X
Intel 32-bit/Novell	Novell 5.1, SP5		X
Intel 32-bit/Novell	Novell 6.0, SP2		X
Intel 32-bit/Windows	Windows 2000 (includes SAK and Citrix)	X	

Server and Client Platform Support

Platforms Not Supported as of the Next Major Release (continued)

Hardware Type	Operating System and Version	Server	Client
Intel 32-bit/FreeBSD	FreeBSD 5.3		X
Intel 32-bit/Linux	Red Flag Linux Data Center 4.1	X	X
Intel 32-bit/Linux	Linux Red Hat AS/ES 2.1	X	X
Intel 32-bit/Linux	Linux Red Hat WS 2.1		X
Intel 32-bit/Linux	Linux Red Hat AS/ES 3.0	X	X
Intel 32-bit/Linux	Linux Red Hat WS 3.0		X
IA64/Linux	Linux Red Hat AS/ES 3.0	X	X
IA64/Linux	Linux SuSE SLES 8.0	X	X
EM64T/AMD64	Linux Red Hat AS/ES 3.0	X	X
EM64T/AMD64	Linux SuSE SLES 8.0	X	X
Intel 32-bit/Linux	SuSE 9.0, 9.2 Desktop		X
Intel 32-bit/Linux	Linux SuSE SLES 8.0	X	X
Intel 32-bit/UNIX	Solaris 8 (X86)		X
IBM z800/900 (31-bit mode)	Linux Red Hat 3.0		X
IBM z800/900 (31-bit mode)	Linux SuSE 9.0		X
Macintosh	MacOSX Server 10.3C		X
SGI	IRIX 6.5.23-26		X
Sun	Solaris 8 (SPARC & Fujitsu PRIMEPOWER)	X	X

NetBackup Backward Compatibility

NetBackup has supported mixed patch-level versions for many releases. Mixed patch-level support enables NetBackup servers to run a mixture of NetBackup major releases and patches in the same environment. For example, with this release of NetBackup a customer can have the following in their environment and have all managed by one master server:

- ◆ A master server running NetBackup 6.0. (The EMM server must also run NetBackup 6.0.)
- ◆ All remaining master servers must also run NetBackup 6.0.
- ◆ A media server running NetBackup 6.0.
- ◆ Any other media server running either NetBackup 5.1 GA, 5.1 MPx, or 5.0 MP1 or greater.
- ◆ Any number of clients running NetBackup 5.x or 6.0.

For more information about upgrading NetBackup from 5.x to 6.0, refer to the *NetBackup Installation Guide* for your operating system. The upgrade sections contain various mixed-version scenarios and how they must be upgraded to this version of NetBackup. However, the general rules for a mixed-server environment are as follows:

- ◆ In a mixed environment such as this, the master server must be running the highest version of NetBackup in use in that configuration.
- ◆ A master server can inter-operate with a media server that is running a level of NetBackup that is one major release lower.
- ◆ Backlevel servers (those servers that are running NetBackup 5.x) cannot be used as a Volume Database Host, global device database host, or vmd/DA host. These capabilities are all on the EMM database host as part of the EMM server. Always upgrade NetBackup 5.x servers performing these roles first. Only then can media servers be upgraded and finally client machines. Again, refer to the *NetBackup Installation Guides* for detailed upgrade information.
- ◆ Media server backwards compatibility extends only one major release behind the master server. No media server may have a numerically higher version than the master server. (The media servers must be running equal or lower levels of NetBackup.)
- ◆ Client backwards compatibility extends only one major release behind the master server. This includes database clients.
- ◆ Applying a NetBackup maintenance pack (MP) does not alter the version of the release for NetBackup 5.1. For example, NetBackup 5.1 GA and NetBackup 5.1 Maintenance Pack 1 (MP1) are both treated as NetBackup 5.1 for compatibility purposes and have no co-existence issues.

NetBackup Environment Requirements

However, for NetBackup 5.0 media servers, this does not apply. In NetBackup versions 5.0 GA, MP1, MP2, and MP3, if the media server and the client were the same machine, you would not be able to restore on the client. A fix was introduced for this issue in NetBackup version 5.0 MP1. Therefore, any media server that you want to coexist in a NetBackup 6.0 configuration must be at a version level of 5.0 MP1 or greater. (For more information about this fix, please refer to TechNote 278153, on the VERITAS support web site. The following is a link to this document, <http://support.veritas.com/docs/278153>.)

For customers who are currently at 5.0GA and do not want to upgrade to 5.0 MP1, you can perform the following work-around on your machine.

Create the file `/usr/openv/netbackup/NOSHM` on a UNIX machine and `install_path\NetBackup\NOSHM` on a Windows machine.

By creating this touchfile, you will likely see a performance degradation for backups and restores.

VERITAS recommends that you remove this file after you have upgrades to 5.0 MP1 or greater or upgrade to NetBackup 6.0.

- ◆ All components (master server, media server, client, console, and agent) on an *individual* system must be at the same version.
- ◆ Backup images created under an older version of NetBackup will always be recoverable with a newer version of NetBackup.

NetBackup Environment Requirements

This section provides vital information to help you ensure that your NetBackup environment has the proper amount of memory allocated to your servers to safely and efficiently back up and restore all of the data you want archived and in a timely fashion.

The following subsections provide the actual binary sizes of NetBackup server and client software so you know what the actual footprint of NetBackup is for each supported platform. The remaining sections contain VERITAS recommendations on memory allocations to provide you with the best backup and restore experiences.

Binary Sizes

The following table shows the approximate binary size of the NetBackup and Media server software, and the NetBackup client software requirements for each platform and operating system supported by NetBackup.

NetBackup Environment Requirements

Hardware Type	Operating System	NetBackup and Media Server	NetBackup Client
HP9000 PA-RISC	HP-UX 11.0	999 MB	307 MB
HP9000 PA-RISC	HP-UX 11.i v1 (11.11)	999 MB	307 MB
HP9000 PA-RISC	HP-UX 11.i v2 (11.23)	999 MB	307 MB
HP - Integrity	HP-UX 11.i v2 (11.23) IA-64	1100 MB	354 MB
HP Alpha	Open VMS Alpha 6.1 — 8.2	--	15 MB
HP VAX	Open VMS VAX 5.5 — 7.3	--	15 MB
HP Tru64/Alpha	Tru64 5.1b, 5.1b2	877 MB	210 MB
IBM	AIX 5.1 RS/6000, SP, pSeries (32/64 bit)	1735 MB	281 MB
IBM	AIX 5.2 (32/64 bit)	1735 MB	281 MB
IBM	AIX 5.3 (32/64 bit)	1735 MB	281 MB
Intel 32-bit/Novell	Novell 5.1 SP5	--	3.12 MB (a)
Intel 32-bit/Novell	Novell 6.0 SP2, and SP3	--	3.12 MB (a)
Intel 32-bit/Novell	Novell 6.5 and 6.5 SP2	21 MB	3.12 MB (a)
Intel 32-bit/Windows	Windows 2000, SP4	653 MB	128 MB
Intel 32-bit/Windows	Windows 2000 SAK	653 MB	128 MB
Intel 32-bit/Windows	Windows 2000 SAK Business Server	653 MB	128 MB
Intel 32-bit/Windows	Windows XP, SP2	--	128 MB
Intel 32-bit/Windows	Windows 2000 Client - Citrix MetaFrame XPs, XPa, XPe	--	128 MB
Intel 32-bit/Windows	Windows 2000 Client - Citrix MetaFrame 1.8	--	128 MB
Intel 32-bit/Windows	Windows 2003, SP1, Standard, Enterprise, DataCenter, and Web editions	653 MB	128 MB

NetBackup Environment Requirements

Hardware Type	Operating System	NetBackup and Media Server	NetBackup Client
Intel 32-bit/Windows	Windows 2003 Client - Citrix Access Suite 3	653 MB	128 MB
Intel 64-bit/Windows	Windows XP, SP2	--	256 MB
Intel 64-bit/Windows	Windows 2003, SP1, Standard, Enterprise, DataCenter, and Web editions	1150 MB	256 MB
IBM z800/900 (31-bit mode)	Linux Red Hat 3.0	--	10 MB
IBM z800/900 (31-bit mode)	Linux SuSE 9.0	--	10 MB
Intel 32-bit/FreeBSD	FreeBSD 5.3	--	9 MB
Intel 32-bit/Linux	Linux Red Hat AS/ES 2.1, 3.0, 4.0	620 MB	207 MB
Intel 32-bit/Linux	Linux Red Hat WS 2.1, 3.0	--	207 MB
Intel 32-bit/Linux	Linux SuSE 9.0 and 9.2 Desktop	--	207 MB
Intel 32-bit/Linux	Linux SuSE SLES 8.0 and 9.0	620 MB	207 MB
Intel 64-bit/Linux	Linux Red Hat AS/ES 3.0		229 MB
Intel 64-bit/Linux	Linux Red Hat AS/ES 4.0	699 MB	229 MB
Intel 64-bit/Linux	Linux SuSE SLES 8.0		229 MB
Intel 64-bit/Linux	Linux SuSE SLES 9.0	731 MB	229 MB
Intel 32-bit/UNIX	Solaris 8, 9, 10	--	137 MB
AMD 64/UNIX	Solaris 9, 10	--	137 MB
Macintosh	MacOS X Server 10.3	--	10 MB
SGI	IRIX 6.5.23, 24, and 6.5.26	--	33 MB
Sun	Solaris 8, 9, 10 (SPARC and Fujitsu PRIMEPOWER)	792 MB	241 MB

a. Add 1 MB of space for the NetWare GUI on a Windows system.

Other NetBackup Compatibility Lists

The VERITAS support web site contains multiple compatibility lists that contain up-to-date information about which platforms and operating systems support the various products and features of NetBackup. To view these lists, follow the procedure described on page 24 of this chapter. The following list outlines many of the compatibility lists that you can view from your web browser.

- ◆ NetBackup Access Control Platform Support
- ◆ NetBackup 6.0 Advanced Client
- ◆ VERITAS Bare Metal Restore (BMR) Compatibility
- ◆ NetBackup 6.0 Database Agent Compatibility
- ◆ NetBackup Operations Manager (NOM) Compatibility
- ◆ NetBackup Encryption
- ◆ NetBackup Shared Storage Option (SSO)
- ◆ NetBackup Supported Peripheral Compatibility Lists
- ◆ Platforms Supporting the NetBackup Administration Consoles for UNIX
- ◆ NetBackup Vault

NetBackup Access Control Compatibility List

The following table contains a list of platforms, the associated operating systems, and version levels, that NBAC Authentication (AT) and Authorization (AZ) supports on NetBackup Enterprise Server and NetBackup Server systems at the time of this product release. It is possible for this information to change after the product is released. VERITAS documents these changes and posts them on the VERITAS support web site, <http://support.veritas.com>.

Vendor/Platform	Operating System and Version	Server	Client	NBAC	NBAC
				AT	AZ
HP9000 - PA-RISC	HP-UX 11.0	X	X	X	X
HP9000 - PA-RISC	HP-UX 11.i v1 (11.11)	X	X	X	X
HP9000 - PA-RISC	HP-UX 11.i v2 (11.23)		X	1	-
HP - Integrity	HP-UX 11.i v2 (11.23) IA-64	X	X	-	-

Other NetBackup Compatibility Lists

Vendor/Platform	Operating System and Version	Server	Client	NBAC AT	NBAC AZ
HP Alpha	Open VMS Alpha 6.1 — 8.2		X	-	-
HP VAX	Open VMS VAX 5.5 — 7.3		X	-	-
HP Tru64/Alpha	Tru64 5.1b, 5.1b2	X	X	X	X
IBM	AIX 5.1 RS/6000, SP, pSeries (32/64 bit)	X	X	X	X
IBM	AIX 5.2 (32/64 bit)	X	X	X	X
IBM	AIX 5.3 (32/64 bit)	X	X	X	X
Intel 32-bit/Novell	Novell 5.1 SP5		X	-	-
Intel 32-bit/Novell	Novell 6.0 SP2 and SP3	X	X	-	-
Intel 32-bit/Novell	Novell 6.5 and 6.5 SP2	X	X	-	-
Intel 32-bit/Windows	Windows 2000, SP4	X	X	X	X
Intel 32-bit/Windows	Windows 2000 SAK	X	X	1	-
Intel 32-bit/Windows	Windows 2000 SAK Business Server	X	X	1	-
Intel 32-bit/Windows	Windows 2000 Client - Citrix MetaFrame XPs, XPa, XPe		X	-	-
Intel 32-bit/Windows	Windows XP, SP2		X	X	-
Intel 32-bit/Windows	Windows 2003, SP1, Standard, Enterprise, DataCenter, and Web editions	X	X	X	X
Intel 32-bit/Windows	Windows 2000 Client - Citrix MetaFrame 1.8		X	-	-
Intel 32-bit/Windows	Windows 2003 Client - Citrix Access Suite 3		X	-	-

Other NetBackup Compatibility Lists

Vendor/Platform	Operating System and Version	Server	Client	NBAC AT	NBAC AZ
Intel 32-bit/Windows	Windows Storage Server 2003	X	X	X	X
Intel 32-bit/Windows	Virtual Server 2005 - Hosts and virtual Operating Systems that are supported NetBackup clients		X	-	-
Intel 64-bit/Windows	Windows XP SP2		X	-	-
Intel 64-bit/Windows	Windows 2003, SP1, Standard, Enterprise, DataCenter, and Web editions	X	X	X	X
EM64T or AMD64/Windows	32-bit Windows 2003, SP1	X	X	-	-
VMware	VMware		X	-	-
VMware	VMware ESX version 2 Client		X	-	-
Intel 32-bit/FreeBSD	FreeBSD 5.3		X	-	-
Intel 32-bit/Linux	Red Flag Linux Data Center 4.1	X	X	-	-
Intel 32-bit/Linux	Linux Red Hat AS/ES 2.1, 3.0, 4.0	X	X	X	X
Intel 32-bit/Linux	Linux Red Hat WS 2.1, 3.0		X	-	-
Intel 32-bit/Linux	SuSE 9.0, 9.2 Desktop		X	-	-
Intel 32-bit/Linux	Linux SuSE SLES 8.0 and 9.0	X	X	X	X
IBM z800/900 (31-bit mode)	Linux Red Hat 3.0		X	-	-
IBM z800/900 (31-bit mode)	Linux SuSE 9.0		X	X	-
IA64/Linux	Linux Red Hat AS/ES 3.0		X	-	-
IA64/Linux	Linux Red Hat AS/ES 4.0	X	X	X	X
IA64/Linux	Linux SuSE SLES 8.0		X	-	-

Other NetBackup Compatibility Lists

Vendor/Platform	Operating System and Version	Server	Client	NBAC AT	NBAC AZ
IA64/Linux	Linux SuSE SLES 9.0	X	X	X	X
EM64T or AMD64/Linux64	Linux Red Hat AS/ES 3.0		X	-	-
EM64T or AMD64/Linux64	Linux Red Hat AS/ES 4.0		X	-	-
EM64T or AMD64/Linux64	Linux SuSE SLES 8.0		X	-	-
EM64T or AMD64/Linux64	Linux SuSE SLES 9.0	X	X	-	-
Intel 32-bit/UNIX	Solaris 8 (X86)		X	-	-
Intel 32-bit/UNIX	Solaris 9 (X86)		X	-	-
Intel 32-bit/UNIX	Solaris 10 (X86)		X	-	-
AMD64/UNIX	Solaris 9		X	-	-
AMD64/UNIX	Solaris 10		X	-	-
Macintosh	MacOS X Server 10.3, 10.4		X	-	-
SGI	IRIX 6.5.23, 24 and 6.5.26		X	-	-
Sun	Solaris 8 (SPARC & Fujitsu PRIMEPOWER)	X	X	X	X
Sun	Solaris 9 (SPARC & Fujitsu PRIMEPOWER)	X	X	X	X
Sun	Solaris 10 (SPARC & Fujitsu PRIMEPOWER)	X	X	X	X

1. This platform only supports the client component of VxSS.

NetBackup Advanced Client

NetBackup Advanced Client provides data protection services for snapshot data. It also supports offhost backup over Fibre Channel networks (in addition to conventional backups to locally attached devices). The VERITAS Support web site contains tables that

list the platforms, operating systems, and snapshot methods that Advanced Client supports for certain backup methods. The following list identifies some of these backup methods.

- ◆ Local backups using a snapshot
- ◆ Offhost backup (via an alternate backup client, media server copy, or third party copy) using a snapshot
- ◆ Instant recovery using persistent snapshots
- ◆ Disk Array Snapshot methods
- ◆ File system performance backup using Flashbackup

These backup methods are described in the *NetBackup Advanced Client System Administrator's Guide*.

The VERITAS support web site includes a compilation of notes on Advanced Client. These notes include up-to-date lists of supported operating systems and peripherals, and assistance for some of the configuration procedures found in the *NetBackup Advanced Client System Administrator's Guide*. To locate this information, do the following:

▼ **To obtain Advanced Client information on the Web**

1. Go to <http://support.veritas.com>.
2. In the search field in the upper, right corner of the web page, enter the following:
Advanced client configuration
3. Click ">" search icon.

The full title of the document is:

VERITAS NetBackup (6.0) Advanced Client Configuration and Compatibility

NetBackup Bare Metal Restore Compatibility Lists

NetBackup Bare Metal Restore supports a subset of the systems supported by NetBackup. For more information, see the following subsections.

Other NetBackup Compatibility Lists

NetBackup Versions for BMR

The following are the NetBackup client and server versions used with BMR:

NetBackup Master Server	BMR Boot Server	NetBackup/BMR Client	NetBackup Client Version in the SRT
NetBackup 6.0	NetBackup 6.0 Client	NetBackup 6.0	NetBackup 6.0

BMR Supported Hardware Components and Architectures

The following table shows the hardware supported by BMR.

Platform	Network Interface	Architecture	Processors	Disk Controllers	Notes
AIX	Ethernet	chrp	uniprocessor or multiprocessor	SCSI	
HP-UX	Ethernet	series 700, series 800	uniprocessor or multiprocessor	SCSI	
Linux	Ethernet	AMD 32, Intel 32	uniprocessor or multiprocessor	SCSI, IDE	1
Solaris	Ethernet	sun4u, sun4us	uniprocessor or multiprocessor	SCSI, IDE	
Windows	Ethernet cards with DOS drivers	AMD 32, Intel 32	uniprocessor or multiprocessor	SCSI, IDE	1

1. AMD64 and EM64T are not supported.

BMR Supported Operating Systems

The following table shows the operating systems supported by BMR for servers and clients.

Operating System	Version	Master Server	Boot Server	Client	Notes
AIX	5.1, 5.2	X	X	X	
AIX	5.3	X	X		

Other NetBackup Compatibility Lists

Operating System	Version	Master Server	Boot Server	Client	Notes
HP-UX	11.00, 11.11 (11i)	X	X	X	1
Linux	Red Hat Linux Advanced Server 2.1	X			
Linux	Red Hat Enterprise Linux AS 3.0, Red Hat Enterprise Linux ES 3.0, Red Hat Enterprise Linux WS 3.0	X	X	X	2
Linux	SuSE Linux Enterprise Server 8	X	X	X	
Solaris	8, 9	X	X	X	
Solaris	10	X	X		
Windows 2000	Professional, Server, Advanced Server	X	X	X	3
Windows 2003	Standard, Enterprise, Web Edition	X	X	X	3
Windows XP	Home Edition, Professional			X	

1. Only HP-UX versions that contain VxFST embedded in the OS are supported by BMR.
2. The `compat-libstdc++` library is required on Red Hat Linux 3.0 systems. Refer to your Linux distribution documentation to locate this library.
3. For Active Directory (AD) servers, normal (non-authoritative) and primary AD restores (which are the most common types of AD restores) are done without additional manual intervention. However, some additional steps are required for authoritative AD restores. See Microsoft documentation for authoritative Active Directory restores.

BMR Supported Shared Resource Tree (SRT) Versions

Bare Metal Restore shared resource trees support specific versions of client operating system software, and BMR boot servers support specific versions of operating systems in the SRTs. The following are the supported levels.

Client OS Level	SRT OS Level	Boot Server OS Level	Notes
AIX 5.1	AIX 5.1	AIX 5.1, 5.2, 5.3	1
AIX 5.2	AIX 5.2	AIX 5.2, 5.3	1

Other NetBackup Compatibility Lists

Client OS Level	SRT OS Level	Boot Server OS Level	Notes
HP-UX 11.0	HP-UX 11.0	HP-UX 11.0, 11.11	1
HP-UX 11.11	HP-UX 11.11	HP-UX 11.11	
Linux	RHEL 3.0	RHEL 3.0	
Linux	SLES 8	SLES 8	
Solaris 8	Solaris 8	Solaris 8, 9, 10	1
Solaris 9	Solaris 9	Solaris 9, 10	1
Windows 2000	Windows 2000	Windows 2000, Windows Server 2003	1
Windows Server 2003	Windows Server 2003	Windows Server 2003	
Windows XP Home, Pro	Windows XP Pro	Windows Server 2003	

1. The boot server must be at the same or higher operating system version level than the SRT it holds. For example, an AIX 5.1.0.12 boot server cannot hold an AIX 5.1.0.25 SRT.

BMR Supported File Systems and Volume Managers

The following table shows the file systems and volume managers supported by BMR.

Platform	File Systems	Volume Managers	Striping, Mirroring, RAID	Notes
AIX	Native AIX JFS and JFS2 on all AIX versions	Native AIX LVM	LVM Striping, LVM Mirroring	
	VERITAS File System 3.4 and 4.0	VERITAS Volume Manager 3.2 and 4.0	VxVM Striping, Mirroring, RAID	1
HP-UX	Native HFS, JFS 3.3 (VERITAS VxFS 3.3)	Native HP LVM	LVM Striping, LVM Mirroring	2, 3
	VERITAS File System 3.5	VERITAS Volume Manager 3.5	VxVM Striping, Mirroring, RAID	
Linux	EXT2, EXT3	Native Partitioning, LVM		4, 5, 6

Other NetBackup Compatibility Lists

Platform	File Systems	Volume Managers	Striping, Mirroring, RAID	Notes
Solaris	UFS	Solstice Disk Suite 4.2.1 on Solaris 8	Striping, Mirroring, RAID	7
		Solaris Volume Manager on Solaris 9	Striping, Mirroring, RAID	8
	VERITAS File System 3.5 and 4.0	VERITAS Volume Manager 3.5 and 4.x	VxVM Striping, Mirroring, RAID	1, 9
Windows 2000, Windows XP, Windows 2003	FAT32, NTFS	Windows Logical Disk Manager	Striping, Mirroring, RAID	10
		VERITAS Storage Foundation for Windows 4.0 and 4.1	VxSFW Striping, Mirroring, RAID	11

1. If a VERITAS Volume Manager 4.0 managed disk has the Cross Platform Data Sharing (CDS) attribute enabled and you map that disk to an IDE disk, the CDS capability will be lost. For more information, see the VxVM administrator's guide.
2. BMR supports only HP-UX versions that contain embedded versions of VxVM and VxFS; therefore, you do not have to install separate versions of VxVM and VsFS in an HP-UX SRT.
3. JFS 3.3 is the version of the VERITAS File System (VxFS 3.3.2) shipping on HP-UX since December 1999.
4. Support for Linux multidevices is limited, and BMR may not restore some configurations exactly.
5. If the root file system is created on a Linux multidevice, when performing a dissimilar disk restore you must map the root file system and retain the original level (for example, if the original level is RAID-1 the mapped file system must be RAID-1 also). If the level is changed, the kernel may panic and the system may not recover.
6. To perform system-only restores on Linux systems, use the dissimilar disk restore feature to map the original system volumes to the target disks (even if you are performing a normal self restore).
7. BMR does not recreate SDS database replicas. BMR only restores SDS concatenated volumes spanning a single slice and SDS mirrored volumes composed of submirrors that each span a single slice. Each of these is recreated by breaking the volume down to a single underlying slice. Dissimilar disk restore can be used on the underlying slice. After the restore, SDS is disabled.
8. SVM database replicas, disk sets, and volumes are fully recreated, and SVM remains active after a BMR restore.
9. For mixed versions of VxVM and VxFS, install the latest version of the VERITAS licensing software into the SRT.

Other NetBackup Compatibility Lists

10. FAT32 supported on client systems only; NTFS required on BMR master and boot servers.
11. To restore dynamic system volumes using VERITAS Storage Foundation for Windows (SFW), you must edit the restore configuration to restore the system volume as a basic partition. If you do not edit the configuration, BMR will enter dissimilar disk restore mode and force you to map the system volume as a basic partition.

BMR VxVM and VxFS Dependencies on Solaris

Solaris Bare Metal Restore clients have specific requirements for the versions of the VERITAS Volume Manager (VxVM) and VERITAS File System (VxFS). The client VxFS and VxVM major version numbers must match those in the shared resource tree (SRT) but do not need to match each other. For example, a client with VxVM 4.0 MP1 and VxFS 3.5 should be restored with an SRT with VxVM 4.0 GA and VxFS 3.5.

Note that VxVM and VxFS are only required in the SRT if the restore produces VxVM volumes or VxFS file systems. For example, neither VxVM nor VxFS would be required to do a system-only restore in which the system disks do not have VxVM volumes nor VxFS file systems. Another example is a dissimilar disk restore during which no VxVM volumes nor VxFS file systems will be created and restored.

The following are the Solaris patch and package prerequisites for VxVM and VxFS on Solaris operating systems. Note that the Solaris patches may already be installed in the operating system on the Solaris installation media. If the Solaris CD date is earlier than that listed in the following table, the patches will have to be manually applied.

Solaris OS Version	VxVM/VxFS Versions	Prerequisites
Solaris 8 versions earlier than 02/2002	VRTSvxvm 3.5	Solaris patch 108528 (replacement for 110383)

BMR SAN Support Matrix

The following table shows the host bus adapters (HBAs) that have been tested and known to coexist with BMR. The (internal) system drives can be restored, and then the SAN drives can be restored manually or automatically.

Operating System	QLogic 2200	Emulex LP8000	JNI FCI-1063	Cambex PC1000	IBM 6228 & 6229	HP A5158A	Notes
AIX		X		X	X		1
HP-UX		X				X	

Other NetBackup Compatibility Lists

Operating System	QLogic 2200	Emulex LP8000	JNI FCI-1063	Cambex PC1000	IBM 6228 & 6229	HP A5158A	Notes
Solaris	X	X	X				2
Windows 2000	X	X					3, 4
Windows 2003	X	X					3, 4

1. The agent that collects the client configuration may produce warnings if the SAN-attached volumes are not available. You must resolve the problems that caused those warnings so that BMR will be able to restore the SAN-attached volumes. VERITAS recommends that you back up the client after correcting the conditions that caused the warning.
2. If you use the QLogic 2200 HBA, do *not* add the drivers for this HBA to the SRT. Some Sun hardware comes with built-in QLogic SCSI adapters, and the QLogic 2200 HBA driver is known to conflict with them.
3. The BMR boot media *may* determine that a SAN-attached disk is the first disk. Because BMR uses the first disk for the restore partition, BMR will restore the operating system onto this SAN-attached disk. Although this situation is possible, VERITAS is unaware of this ever occurring.
4. You can configure the restore to allow you to select the disk to use for the restore by editing the `BmrEnv.ini` file that is generated after a prepare to restore operation. Set the `PICKBOOTDISK` environment variable to `YES` in the `BmrEnv.ini` file to enable this selection process.

BMR Supported Cluster Solutions

The following table shows the BMR master server and boot server support for cluster environments. For information about the specific clustering software versions supported, see the NetBackup 6.0 Cluster Compatibility document on the VERITAS support web site.

Operating System	Master Server	Boot Server
AIX	X	
HP-UX	X	
Linux	X	
Solaris	X	X
Windows	X	X

Other NetBackup Compatibility Lists

BMR Disk Space Requirements

The following are guidelines for disk space used by BMR.

Item	Description	Sizes	Notes
BMR master server executable files	/usr/opensv/netbackup/bin (UNIX) <i>install_path</i> \NetBackup\bin (Windows)	AIX 800 MB HP-UX 250 MB Linux 150 MB Solaris 150 MB Windows 2000 300 MB Windows 2003 300 MB	1
BMR master server database		Less than 1 MB per client	
BMR boot server executable files	One per platform (AIX, Windows) One per subnet (Solaris and HP-UX)	AIX 300 MB HP-UX 125 MB Linux 50 MB Solaris 75 MB Windows 2000 300 MB Windows 2003 300 MB	2, 3
Shared resource trees	Varies by platform: Typically one SRT per OS level to be restored (such as, AIX 5.1, 5.2)	AIX 250-600 MB HP-UX 150-500 MB Linux 100-150 MB Solaris 250-600 MB Windows 2000 350-500 MB Windows 2003 500-700 MB	
Restore logs	On the master server, stored in: /usr/opensv/netbackup/logs/bmrrst (UNIX) <i>install_path</i> \NetBackup\logs\bmrrst (Windows)	20 - 40 MB per client per restore	
Reusable temporary data	BMR stores files and data that may be reused in the following directories on both master and boot servers: /usr/opensv/netbackup/baremetal/server/data (UNIX) <i>install_path</i> \NetBackup\server\data (Windows)	Varies from 2 MB on a master server to 32 MB on a Linux master and boot server combination	

1. Includes the BMR client executable files.

2. One per subnet on Solaris unless using Solaris relay boot servers.
3. When main and boot servers are on the same system, add them up.

NetBackup Database Agent Platform Support

The VERITAS support web site contains the most current platform support information for NetBackup database agents. You can use the following procedure to locate this information.

1. Go to <http://support.veritas.com>.
2. In the search field in the upper, right corner of the web page, enter the following:
Database Agent Compatibility

3. Click ">" search icon.

A new web page appears, populated with various NetBackup compatibility lists. A document with a title similar to the following should appear in this list:

NetBackup (6.0) Enterprise Server / Server 6.x Database Agent Compatibility

Or, you can perform the following steps to located the latest database agent compatibility lists.

1. Go to <http://support.veritas.com>.
2. Select **NetBackup Products** in the Select Product Family window.
3. Select **NetBackup Enterprise Server** in the Select Product window.
4. On the web page that appears, click on **Compatibility & Reference**.

A new web page appears, populated with various NetBackup compatibility lists. A document with a title similar to the following should appear in this list:

NetBackup (6.0) Enterprise Server / Server 6.x Database Agent Compatibility

Other NetBackup Compatibility Lists

NetBackup Operations Manager

See the following sections for supported NOM server platforms, managed NetBackup master servers platforms, email clients, web browsers, and other software components.

Platforms Supported for the NOM Server

NetBackup Operations Manager server software can be installed on the following operating system platforms:

Operating System	Supported Versions	Notes
Microsoft Windows	Microsoft Windows 2000 SP4	No 64 bit support
Microsoft Windows	Microsoft Windows 2003 SP1	No 64 bit support
Sun Solaris	Solaris 8	No 64 bit support
Sun Solaris	Solaris 9	No 64 bit support

NetBackup Managed Master Server Platforms Supported by NOM

NetBackup Operations Manager software supports management and monitoring of NetBackup master servers on the following operating systems:

Operating System	Supported Versions	Notes
Microsoft Windows	Microsoft Windows 2000 SP4	No 64 bit support
Microsoft Windows	Microsoft Windows 2003 SP1	No 64 bit support
Sun Solaris	Solaris 8	No 64 bit support
Sun Solaris	Solaris 9	No 64 bit support

Component Levels Supported for NOM

NetBackup Operations Manager requires the following minimal levels for these software components. NOM has been verified with these versions and upgrading them may impact NOM operation.

Component	Supported Versions	Notes
VxSSAT	4.2.2.20	VERITAS Authentication Service
VxPBX	1.2.2.41	VERITAS Private Branch Exchange
VRTSweb	4.2	VERITAS Web Server
VRTSjre	1.4	VERITAS JRE redistribution
VRTSicsco	1.2.3.18	VERITAS Infrastructure Core Services Common

Email Clients Supported by NOM

NetBackup Operations Manager email uses SMTP protocol for sending email (JavaEmail API). It conforms to specification RFC 822 (Standard for the Format of ARPA Internet Text Messages) and RFC 2045 (Multipurpose Internet Mail Extensions). All email clients conforming to these standards should work with NOM.

Some of the HTML email viewers, like Yahoo, strip off the HTML header and attach their own header when displaying emails. This corrupts the NOM emailed reports.

Web Browsers Supported by NOM

The NetBackup Operations Manager user interface (the NOM console) is supported with the following web browsers:

Web Browser	Supported Versions	Notes
Microsoft Internet Explorer	6.0 or higher	Supported on Microsoft Windows.
NetScape	7.1 or higher	Supported on Microsoft Windows.

Other NetBackup Compatibility Lists

NetBackup Encryption

The following list shows the policy types that support encryption for this release.

- ◆ AFS
- ◆ DB2
- ◆ DataStore
- ◆ Informix-On-BAR
- ◆ LOTUS_NOTES
- ◆ MS-Exchange
- ◆ MS-SharePoint
- ◆ MS-SQL-Server
- ◆ MS-Windows
- ◆ Oracle
- ◆ SAP
- ◆ Split-Mirror
- ◆ Standard
- ◆ Sybase

If you use one of the following policy types, you will not be able to select the encryption check box in the policy attributes interface.

- ◆ DataTools-SQL-BackTrk
- ◆ FlashBackup
- ◆ FlashBackup-Windows
- ◆ NDMP
- ◆ NetWare
- ◆ OS/2
- ◆ Vault

NetBackup Shared Storage Option (SSO)

Supported Server Platforms:

- ♦ Tru64 UNIX
- ♦ Windows
- ♦ AIX
- ♦ HP-UX
- ♦ Enterprise Linux¹
- ♦ SPARC/Solaris

1. Enterprise Linux from Red Hat and SuSE.

Supported Robot Types

There is a distinction between standard Media Manager supported robot types and supported robot types for SSO. SSO is supported *only* with the following Media Manager robot types:

- ♦ ACS, TLH, and TLM (these are API robot types)
- ♦ TL8 and TLD

Media Manager robot types ODL, TL4, and TSH are *not* supported for SSO.

SSO is also supported for standalone (non-robotic) drives.

NetBackup Supported Peripherals Compatibility Lists

NetBackup supports a variety of robots on different platforms. Each robot type classifies the devices and peripherals either by their physical characteristics, by their media type, or by the communication methods used by their underlying robotics. (See the *NetBackup Media Manager System Administrator's Guide* for more information about the robot types.) The following list identifies the supported robot types at the release of NetBackup 6.0.

ACS ... Automated Cartridge System	TLD ... Tape Library DLT
ODL ... Optical Disk Library	TLH ... Tape Library Half-inch
TL4 ... Tape Library 4MM	TLM ... Tape Library Multimedia
TL8 ... Tape Library 8MM	TSH ... Tape Stacker Half-inch

As with many products, soon after a given release, additions and deletions can occur to the list of supported robot types. To determine if any new robot types have been added to this list, you can search the VERITAS support web site for the most current information on

Other NetBackup Compatibility Lists

the supported peripherals and robot types that are applicable with NetBackup 6.0. To locate the supported platform information on the VERITAS support web site, perform the following procedure.

1. Go to <http://support.veritas.com>.
2. In the search field in the upper, right corner of the web page, enter the following:
Robot Type Compatibility (To see a list of supported robots.)
Virtual Tape Compatibility (To see locate the Virtual Tape compatibility list.)
3. Click ">" search icon.

A new web page appears, populated with various NetBackup compatibility lists. A document with a title similar to the following should appear in this list:

VERITAS NetBackup (tm) 4.5, 5.x, and 6.x Robot Type Compatibility List

Or, you can perform the following steps to located the latest database agent compatibility lists.

1. Go to <http://support.veritas.com>.
2. Select **NetBackup Products** in the Select Product Family window.
3. Select **NetBackup Enterprise Server** in the Select Product window.
4. On the web page that appears, click on **Compatibility & Reference**.

A new web page appears, populated with various NetBackup compatibility lists. A document with a title similar to the following should appear in this list:

- *VERITAS NetBackup (tm) 4.5, 5.x, and 6.x Robot Type Compatibility List* contains the list of supported robots and peripherals for NetBackup 6.0.

- *NetBackup (tm) Virtual Tape Compatibility* contains the virtual tape compatibility list for NetBackup 6.0.

Additional Notes for Supported Peripherals

As previously announced, the LMF, RSM, TSD, and TS8 robotic daemons have been decommissioned in this release of NetBackup. This item serves as a final reminder. Any devices once configured as TSD and TS8 are now supported by the TLD and TL8 daemons. Any new device configuration done via the Device Discovery Wizard will not use TSD or TS8.

NetBackup Support for Files Greater than Two Gigabytes

Devices previously configured as RSM may be used with another supported robot type, depending on whether the specific device is listed in the NetBackup Compatibility lists.

NetBackup Vault

NetBackup Vault supports the same operating systems and versions as NetBackup with following exceptions:

- ◆ Inline Tape Copy does not support the following destination storage types:
 - ◆ NDMP
 - ◆ Third-party copies
 - ◆ Optical devices
- ◆ Inline Tape Copy does not support storage units that use a QIC (quarter-inch cartridge) drive type.
- ◆ A single Inline Tape Copy operation cannot use destination storage devices on multiple media servers.

NetBackup Support for Files Greater than Two Gigabytes

The current version of NetBackup supports file sizes greater than two gigabytes on the following client systems. To view the version levels of the operating systems, refer to the NetBackup supported platform table on page 26.

- ◆ HP Tru64
- ◆ FreeBSD
- ◆ HP-UX
- ◆ IBM AIX
- ◆ Linux
- ◆ Mac OS X Server (as NetBackup client)
- ◆ Novell NetWare
- ◆ SGI IRIX
- ◆ Sun Solaris
- ◆ Microsoft Windows 2000, XP (32 and 64 bit), 2003

Platforms Supporting the NetBackup Administration Consoles for UNIX

Platforms Supporting the NetBackup Administration Consoles for UNIX

VERITAS supports only the window managers in the following table when using NetBackup Java. There are a number of user interface anomalies using the various window managers available on UNIX platforms. Many of these problems are documented as Java bugs. Most of these problems are because of unusual or non-standard window manager configurations and occur randomly and infrequently. In the most common cases of misplaced or shifted components within a dialog, simply resizing the dialog repaints the display and causes the interface to display correctly. Although CDE, MWM and OLWM have the most reported bugs, this is largely due to their popularity; do not use `fvwm` or `twm` instead.

VERITAS has seen the best overall performance with the CDE window manager and recommends this window manager on the non-Linux UNIX platforms. For more information on how to improve performance of your NetBackup-Java Administration Console environment, refer to the *NetBackup System Administrator's Guide, Volume I*.

The following table identifies the platforms that support the NetBackup Administration Console for UNIX and the NetBackup-Java Client GUI in this release.

Platforms Supporting NetBackup-Java Administration Console and NetBackup-Java Administration Client GUI

Platform	NetBackup-Java Administrative Console	NetBackup-Java Client GUI	Supported Window Managers (UNIX)
Intel 32-bit/Windows Windows 2000 (SP4), XP, 2003 (SP1)	Yes	Yes	NA
Sun Solaris 8, 9, 10 (SPARC & Fujitsu PRIMEPOWER)	Yes	Yes	CDE, Motif
Intel 32-bit/UNIX Solaris 8 (x86), 9 (x86), 10 (x86)	Yes	Yes	CDE, Motif
HP9000 - PA-RISC HP-UX 11.0, 11.i v1 (11.11)	Yes	Yes	CDE, Motif
HP Tru64/Alpha HP Tru64 5.1b, 5.1b2	Yes	Yes	CDE
Intel 32-bit/Linux Linux Red Hat AS/ES 3.0, 4.0	Yes	Yes	GNOME/Enlightment KDE/KWM

Platforms Supporting the NetBackup Administration Consoles for UNIX

Platforms Supporting NetBackup-Java Administration Console and NetBackup-Java Administration Client GUI

Platform	NetBackup-Java Administrative Console	NetBackup-Java Client GUI	Supported Window Managers (UNIX)
Intel 32-bit/Linux Linux SuSE SLES 8.0, 9.0	Yes	Yes	GNOME/Enlightment KDE/KWM
IBM z800/900 Linux SuSE 9.0	Yes	Yes	GNOME/Enlightment KDE/KWM
IBM AIX 5.1 RS/6000, 5.2, 5.3	Yes	Yes	CDE

Additional NetBackup-Java Administration Console - Supported Platform Information

NetBackup-Java Administration Console for AIX is only supported on the CHRP platform.

The Java run-time environment (JRE) for the AIX platform is only supported on IBM's Common Hardware Reference Platform (CHRP) machines. On an AIX host, the NetBackup installation will check to ensure the host is a CHRP machine. If not, the NetBackup-Java Administration Console code will not be installed. Java 1.4 is the minimum level of JRE necessary for the NetBackup-Java Administration Console to run on a CHRP platform.

Platforms Supporting the NetBackup Administration Consoles for UNIX



NetBackup Product Dependencies

This chapter provides information on the product dependencies of NetBackup 6.0. It is important that you verify that your operating system is up-to-date with all of the latest patches and upgrades before you install NetBackup. This section is a guide to inform you of known operating systems that require a patch or upgrade. For your convenience and whenever possible, a link is provided for each patch that will direct you to the proper web site where you can find the patches and upgrades that you need to install.

The following table contains a list of platforms, the associated operating systems, and version levels, that NetBackup supports. If your operating system version is older than those shown in this chapter, then you should refer to previous versions of the NetBackup Release Notes documents to determine if a known dependency exists for your operating system version. (Refer to the VERITAS Support web site, <http://support.veritas.com>, to download a previous revision of the NetBackup Release Notes.)

Operating System Patches and Updates

The following table provides the known, minimum operating system (OS) patches and updates. It is possible that a patch listed here has been superceded by a more recent patch released by the vendor. VERITAS recommends that users visit the support website of a particular vendor for their latest patch information.

OS Patches and Updates

Hardware Type	OS – Version	Patch	Description
SPARC/ UltraSPARC	Solaris – 8	108993-20 or later	This patch resolves a mutex unlock issue with multi-threaded programs. Additional information can be found at http://sunsolve.sun.com .

Operating System Patches and Updates

OS Patches and Updates (continued)

Hardware Type	OS – Version	Patch	Description
		109041-04 ¹	This patch resolves a problem where NetBackup Java Administration Console hangs before entering the Scheduling Service.
		SUNWsan package (see your vendor to obtain) 109529-06 (or later)	If using Advanced Client with VxVM 3.2 Release, then users need to install this patch.
		111413-02 (or later)	Users must install the SUNWsan package and patch 109529 before installing patch 111413. Users can then install VxVM. The order of these steps is important.
		110722-01 (or later)	If using Advanced Client with VxVM 3.2 Release, then users need to install this patch. If users have Sun's Alternate Pathing (AP), they must install Solaris patch 110722-01 for VxVM 3.2 to co-exist with the AP driver version 2.3.1. However, users must also upgrade AP. Please see DMP Coexistence with Alternate Pathing before installing VxVM.
		108528-08	The 4354397 <code>semop ()</code> hangs because of a signal that is received. A conflict exists between GUID code that SMUX and SIG FCL uses. SMUX GUID code is based on SIG FCL so both were creating semaphore with the same ID.
		110383-01	The 4354397 <code>semop ()</code> hangs because of a signal that is received. A conflict exists between GUID code that SMUX and SIG FCL uses. SMUX GUID code is based on SIG FCL so both were creating semaphore with the same ID.
		108434-15, 108435-15, 109147-28, 108528-29, 108989-02, 108993-33, 110386-03, 111023-03, 111317-05, 113648-03, 115827-01, 116602-01	These patches are necessary to run a multi-threaded program on Solaris 8.
		JRE 1.4 ² (required OS patches)	These fixes to the Operating System are required to ensure proper operation of the VERITAS NetBackup-Java Administration Console.

Operating System Patches and Updates

OS Patches and Updates (continued)

Hardware Type	OS – Version	Patch	Description
Intel x86	Solaris – 8	108994-20 or later	This patch resolves a mutex unlock issue with multi-threaded programs. Additional information can be found at http://sunsolve.sun.com .
		109042-04 ¹	This patch resolves a problem where NetBackup Java Administration Console hangs before entering the Scheduling Service.
		108529-08	The 4354397 <code>semop()</code> hangs because of a signal that is received. A conflict exists between GUID code that SMUX and SIG FCL uses. SMUX GUID code is based on SIG FCL so both were creating semaphore with the same ID.
		110397-01	The 4354397 <code>semop()</code> hangs because of a signal that is received. A conflict exists between GUID code that SMUX and SIG FCL uses. SMUX GUID code is based on SIG FCL so both were creating semaphore with the same ID.
		109148-34 (or later), 108529-29, 108990-02, 108994-48 (or later), 110400-03, 111024-03, 111318-06 (or later), 113649-04 (or later), 115828-01, 116603-01	These patches are necessary to run a multi threaded program on Solaris 8.
		JRE 1.4 ² (required OS patches)	These fixes to the Operating System are required to ensure proper operation of the VERITAS NetBackup-Java Administration Console.
HP	HP-UX 11.00	PHKL_29385 (or later)	Required to run NetBackup Advanced Reporter on HP-UX 11.00
	HP-UX 11.00	PHNE_26771 (or later)	On HP/UX 11.0, if a connection is initiated re-using the port number used by a previously closed connection that is in TIME_WAIT, the new connection times out. The above fix has been added to eliminate the conditions that lead to the connection time-out problem experienced via the NetBackup-Java Administration Console.

Operating System Patches and Updates

OS Patches and Updates (continued)

Hardware Type	OS – Version	Patch	Description
	HP-UX 11.00	PHSS_30969 ³	This is a recommended critical patch from HP that is required for successful NetBackup client backups.
	HP-UX 11.00	PHCO_28425	This is a recommended critical patch from HP that is required for NetBackup to use VxSS.
	HP-UX 11.00	PHSS_24627 ³	This patch is necessary to enable any C++ runtime code to work properly.
	HP-UX 11.00	PHKL_28766 ³	This patch will allow HP-UX 11.00 mmap() to use large files from 2GB to 4GB.
	HP-UX 11.00 with IPR0103 and IPR0106 ⁵	PHSS_24044	Allow POLL_INTERVAL to be set to zero in /var/stm/config/tools/monitor/dm_stape.cfg. This disables the dm_stape monitor within the Event Monitoring System.
	HP-UX 11.00	JRE 1.4 ⁴ (required OS patches)	These fixes to the Operating System are required to ensure proper operation of the VERITAS NetBackup-Java Administration Console.
	HP-UX 11.11	PHSS_22898 ³ (replaced by 26946)	These patches are necessary to enable any C++ runtime code to work properly.
	HP-UX 11.11	PHKL_25227 ³ (replaced by 26233)	Patch which allow HP-UX 11.11 mmap() to use large files from 2GB to 4GB.
	HP-UX 11.11	PHCO_29029	This is a recommended critical patch from HP that is required for NetBackup to use VxSS.
	HP-UX 11.11	PHSS_30970 ³	This is a recommended critical patch from HP that is required for successful NetBackup client backups.
	HP-UX 11.11 with IPR0103 and IPR0106 ⁵	PHSS_24045	Allow POLL_INTERVAL to be set to zero in /var/stm/config/tools/monitor/dm_stape.cfg. This disables the dm_stape monitor within the Event Monitoring System.

Operating System Patches and Updates

OS Patches and Updates (continued)

Hardware Type	OS – Version	Patch	Description
	HP-UX 11.11	JRE 1.4 ⁴ (required OS patches)	These fixes to the Operating System are required to ensure proper operation of the VERITAS NetBackup-Java Administration Console.
Intel x86	Red Hat Linux 7	glibc (RHBA-2000:079-04)	The NetBackup-Java Administration Console segfaults on Red Hat Linux 7 when it is started. This is a known Red Hat Linux 7 issue. You must install at least the glibc (RHBA-2000:079-04) fix from Red Hat (http://www.redhat.com).
		ncurses.5.2-12	If you do not have this installed, you will see the following error when trying to start the NetBackup menu interface on the client: error while loading shared libraries: libncurses.so.5: cannot open shared object file: No such file or directory. The error appears to be more serious on a server, because license keys will appear invalid, when the real problem is that ncurses is not installed.
Intel x86	Red Hat Linux ES 3.0	compat-libstdc++-7.3-2.96.128	If you do not have this installed, you will see the following error when trying to execute some of the binaries on the client: error while loading shared libraries: libstdc++-libc6.2-2.so.3: cannot open shared object file: No such file or directory. The error appears to be more serious on a server, because license keys will appear invalid, when the real problem is that the package is not installed.

Operating System Patches and Updates

OS Patches and Updates (continued)

Hardware Type	OS – Version	Patch	Description
IA64/Linux	Red Hat Linux 4.0	compat-libstdc++-33-3.2.3-46.1	This operating system compatibility package is a patch requirement if you are installing on Linux IA 64 systems running Red Hat 4.0.
		compat-libstdc++-33-3.2.3-47.3.i686.rpm	This is also true for IA64 Red Hat 4.0. Users of this platform, should also install the second patch package listed (compat-libstdc++-33-3.2.3-47.3.i686.rpm) because it contains the library libstdc++.so.5, which is available in C.D. 4 of Red Hat 64 bit installation. If users do not install the second patch, they will receive error while starting VxPB, such as: . /pbx_exchange: error while loading shared libraries: libstdc++.so.5: cannot open shared object file: No such file or directory.
AIX	(All versions)	4330-02 (or later)	For AIX 5.0, the NetBackup-Java Administration Console requires the AIX 5100-03 Recommended Maintenance Level. This maintenance package is intended for customers who already have AIX 5.0 installed. The AIX 5100-03 maintenance package can be downloaded from, http://techsupport.services.ibm.com/server/nav?fetch=ffa5e , using APAR number IY32749 (PTF U484854). If you are a licensee of AIX 5.0, you can obtain an update CD dated 10/2002 by contacting your point of sale. In addition, you also need APAR IY35108 (for AIX 5.0) or APAR IY35844 (for AIX 5.2) to fix a thread safety problem with the AIX dup2 system call.
AIX	AIX 5.1 (64-bit)	APAR IY27467 (Emergency Fix)	This patch can be found on www.ibm.com web site and by entering, "IY27467" in the search field.
Caution You must install this IBM patch prior to installing NetBackup. Installing and running NetBackup Media Server on an AIX 5.0 64-bit operating system can result in core dumps and system crashes if this patch is not installed.			

OS Patches and Updates (continued)

Hardware Type	OS – Version	Patch	Description
X86/ Windows	2000 SP 2	Obtain from Microsoft	Required on all 2000 machines in order to install. Install will notify user if not at required level

Note: The following list contains URLs to other vendor's web sites. Changes to these sites can occur without notification. If a URL is no longer valid, please contact the vendor directly for assistance.

1. For information about the Sun patch bundles, refer to: <http://sunsolve.sun.com>.
2. For information about the operating system patches for Java 1.4 that are associated with Sun Solaris, refer to: <http://sunsolve.sun.com/pub-cgi/show.pl?target=patches/J2SE>.
3. For information about the HP patches, refer to: <http://us-support.external.hp.com/common/bin/doc.pl>.
To check for the existence of a patch, use the following command syntax: 'swlist -l patch {PATCHNAME}'.
If the patch is in a bundle, use the following syntax: 'swlist -l bundle {PATCHNAME}'.

NOTE: VERITAS recommends that you do not install the following HP-UX patches for NetBackup 6.0: PHSS_30967 (for HP-UX 11.00), and PHSS_30968 (for HP-UX 11.11).

HP-UX patches PHSS_30969 (for HP-UX 11.00) and PHSS_30970 (for HP-UX 11.11) may cause problems in programs that have the `setuid` bit set. For more information about HP patches, you can also go to: <http://www1.itrc.hp.com>.
4. For information about the java patches associated with HP, refer to: <http://www.hp.com/products1/unix/java/patches/index.html>.
5. Using the patch IPR0106 works fine, however, VERITAS recommends you upgrade to IPR0109.

Other Patch Information

1. If you have a system running HP-UX 11.00 and install the PHKL_26239 or PHKL_27800 patches, you will experience problems with Block-level Incremental Backups. This problem does not occur with these patches on systems running HP-UX 11.11.
2. HP-UX patches PHSS_30969 (HP11.00) and PHSS_30970 (hp 11.i v1 or 11.11) can cause problems with programs that have the `setuid` bit set. Hewlett Packard is working to resolve this problem. To obtain the latest information about HP-related patches, go to the Hewlett Packard's IT Resource Center web site at, <http://www1.itrc.hp.com>.

Product Dependencies

Product Dependencies

The following tables define the product-related dependencies associated with this release.

Product Related Dependencies

Dependency	Vendor	Description
Internet Explorer 5.0 or higher	Microsoft	Required for Explorer Extension in the Windows NetBackup GUI. If this is not available, the installation will fail.
VxVM 3.2 or higher for Solaris 7, 8, and HP-UX 11i	VERITAS	Required for Advanced Client - VxVM being used on client.
VxVM 3.5 or higher for Solaris 9	VERITAS	Required for Advanced Client - VxVM being used on client.
VxVM 3.3.1 SP1 HF3 or higher for Windows 2000	VERITAS	Required for Advanced Client - VxVM being used on client.
VxFS 3.4 or higher for Solaris 8	VERITAS	This is required for Advanced Client - VxFS file system being used on client.
VxFS 3.5 or higher for Solaris 9	VERITAS	This is required for Advanced Client - VxFS file system being used on client.
VxFS 3.3 or higher for HP-UX 11i	VERITAS	This is required for Advanced Client - VxFS file system being used on client.
Online JFS 3.3 or higher for HP-UX	HP website	This is required for Advanced Client - Online JFS file system being used on HP-UX 11i client.
VxFS 3.5 or higher or Online JFS 3.3 or higher for HP-UX 11i	HP website	This is required for VxFS_Checkpoint snapshots in Advanced Client - VxFS file system being used on HP-UX 11i client.
Oracle 8i or above with RMAN proxy copy capability	Oracle	This is required to use Oracle DB Agent with Advanced Client.

Product Dependencies

Product Related Dependencies

TimeFinder release for Solaris or HP-UX; SYMAPI Library release 4.2-154 or higher for Solaris or HP-UX	EMC	<p>This is required for Advanced Client - TimeFinder snapshots.</p> <p>Note The SYMAPI Library is installed on the host but the TimeFinder firmware gets installed on the EMC Symmetrix disk array - NOT on the host where NetBackup is installed.</p>
RAID Manager Library version 01-03-03/01 or higher for Solaris or HP-UX; ShadowImage release for Solaris or HP-UX	Hitachi Data Systems	<p>This is required for Advanced Client - ShadowImage snapshots.</p> <p>Note The RAID Manager Library is installed on the host but the ShadowImage firmware gets installed on the HDS 7700/9900 array - NOT on the host where NetBackup is installed.</p>
RAID Manager Library version 01-03-03/01 or higher for Solaris or HP-UX; BusinessCopy release for Solaris or HP-UX	HP	<p>This is required for Advanced Client - BusinessCopy snapshots.</p> <p>Note The RAID Manager Library is installed on the host but the BusinessCopy firmware gets installed on the HP XP256 and 512 series disk arrays - NOT on the host where NetBackup is installed.</p>
LibAttach version 1.1 for Windows 2000	StorageTek	<p>Required to control ACSLS robotics on Windows NT and Windows 2000 platforms.</p> <p>IBM moved the ACL interfaces to libc starting with AIX 5.1F, known as AIX 5.1 Maintenance level 3 (ML3). If the build server is brought up to ML3 you would then see bos.rte.libc at 5.1.0.28 level or higher, which means the change is applied to the system.</p>

Supported versions of VxFS and VxVM

Supported versions of VxFS and VxVM

The following table shows the different versions of VxFS and VxVM that VERITAS NetBackup supports, and the corresponding operating systems for each.

Versions VxFS and VxVM Currently Supported by VERITAS NetBackup

Operating System	Version of VxFS	Version of VxVM
AIX 5.1, 5.2, 5.3	VxFS 3.4.2 ¹	VxVM 3.2 ¹
HP-UX 11.00	VxFS 3.3	VxVM 3.1
HP 11.00, 11.11	VxFS 3.5	VxVM 3.5
HP-UX 11.11 (11i v1)	VxFS 3.3 and 3.5	VxVM 3.1, 3.2, and 3.5
Linux Red Hat AS/ES 3.0	VxFS 3.4 update 1 or higher ¹	VxVM 3.2 update 1 or higher ¹
Linux Red Hat WS 3.0	VxFS 3.4 update 1 or higher ¹	VxVM 3.2 update 1 or higher ¹
Solaris 8	VxFS 3.4, 3.5, and 4.0	VxVM 3.1, 3.2, 3.5, and 4.0
Solaris 9	VxFS 3.5, 4.0, and 4.1	VxVM 3.5, 4.0, and 4.1
Solaris 10	VxFS 4.1	VxVM 4.1
Windows 2000 and 2003	--	VxVM 3.1HF3 (Hot Fix 3)

1. Advanced Client only supports VxFS and VxVM 4.0 and later on these platforms.

Note NetBackup has improved its integration with the VERITAS File System (VxFS) product to ensure interoperability on all supported VxFS versions. If running a VxFS version prior to VxFS 4.0 then new VxFS libraries need to be installed on the client in order to backup systems running VxFS.

You must download the appropriate VxFS libraries to your system using the VERITAS support web site. Use the procedure described in TechNote number 262225 to guide you through this process.

Supported versions of VxFS and VxVM**Improved Integration with VERITAS File System (VxFS)**

Platform(s)	VxFS 4.1	VxFS 4.0	VxFS 3.5	VxFS 3.4	VxFS 3.3
Solaris 8	NA	X	X	X	NA
Solaris 9	NA	X	X	NA	NA
Solaris 10	X	NA	NA	NA	NA
HP-UX 11.0	NA	NA	NA	NA	X
HP-UX 11.11 (11.iv1)	NA	NA	X	NA	X

Supported versions of VxFS and VxVM



Operational Notes

The following notes explain important aspects of NetBackup 6.0 operations that may not be documented elsewhere. For additional operational information about this release, you can refer to Tech Note number 278130 on the VERITAS support web site. This Tech Note will contain the latest information relating to this product release. Here is a link to this document, <http://support.veritas.com/docs/278130>.

In addition, VERITAS has supplied a Release Impact Bulletin that contains other NetBackup 6.0 site preparation information. Here is a link to this document, <http://support.veritas.com/docs/278132>.

Note References to UNIX also apply to Linux, unless otherwise stated.

NetBackup Installation Notes

The following items offer additional information that may help you install NetBackup or use NetBackup after you have installed the product.

NetBackup CD-ROM Changes

1. In the next NetBackup Minor release, VERITAS will delivering NetBackup in both CD-ROM and DVD media formats. In addition, in the next major release, NetBackup will only be available on DVD media.
2. All UNIX clients are no longer present on every server CD, they are on a separate CD. Each server package now only contains the client types that belong to that server's hardware class. To load additional UNIX clients on a server, the user must install them from the new UNIX Clients CD.
3. The duplicate definition of a Linux client is no longer being created.

NetBackup Installation Notes

VERITAS has been providing a duplicate definition for Linux clients. This allowed the user to define a client as INTEL/Red Hat2.4 or Linux/Red Hat2.4. The ability to do this is being removed in NetBackup 6.0. Existing client definitions will remain unchanged.

Note VERITAS suggests you update any existing policies containing clients configured as "INTEL Red Hat2.4" to "Linux Red Hat2.4".

4. The NetBackup manual set are now located on a separate documentation CD.
5. Permissions have been changed so that in most cases a root user may install from UNIX NetBackup CD images mounted via NFS.
6. In this release of NetBackup all compressed files are compressed using gzip. The installation of these files requires that gunzip, as well as gzip, be installed on the machine before NetBackup is installed. For all UNIX platforms, except HP-UX, the binaries are expected to be in /bin or /usr/bin and that directory is expected to be part of the root users PATH variable. On HP-UX the gzip and gunzip commands are expected to be in /usr/contrib/bin. Installation scripts will add that directory to the PATH variable. These commands must be present to have successful UNIX installations.

General Installation Items

1. NetBackup has added a new port.

NetBackup 6.0 contains features that are dependent on a new Infrastructure Core Service (ICS) product called, VERITAS Private Branch Exchange (PBX).

PBX helps limit the number of TCP/IP ports used by many new features in NetBackup. In addition, it allows all socket communication to take place while connecting through a single port. The PBX port number is 1556. For more information about PBX and configuring NetBackup ports, refer to the *NetBackup System Administration Guide, Volume I*.

Because PBX is required for all NetBackup products, its installation is part of the NetBackup installation procedure unless it is already present on the system.

For UNIX NetBackup server installs (initial and upgrade) are now dependent on the VERITAS common component Private Branch Exchange (PBX), which is located on the Infrastructure Core Service (ICS) CD. After the NetBackup files are copied to disk, the install checks for the presence of PBX. Whether PBX is currently installed causes one of the following to happen:

- ◆ If a version of PBX already exists, the installation procedure uses that version of PBX and continues.
- ◆ If PBX does not exist, you see a message similar to the following:

The following package(s) are missing and must be installed before NetBackup can be installed:

VRTSspb

The missing package(s) are located on the VERITAS Infrastructure Core Services (ICS) CD, which is included in the NetBackup media kit.

- a. In a different window, unmount/eject the NetBackup Server software installation CD.
- b. Mount the ICS CD that contains the PBX software.
- c. From the original window where you began installing NetBackup, enter the full CD pathname to the ICS install script (the directory where the `installics` script is located).
- d. The NetBackup install script attempts to install PBX automatically.

The NetBackup script also checks to make sure the PBX daemon (`pbx_exchange`) is running or it will stop so the user can investigate and start it. Because CD swapping may be required, the user cannot initiate the NetBackup installer while the current working directory is within the NetBackup CD directory. The user should change directory to `/` and enter the full path name to the install script.

For Windows systems: If you choose to do a typical installation of NetBackup the following takes place in the installer:

- ◆ If a version of PBX exists, the installer will determine if the current version is newer than the version included in the NetBackup installation. If the version included in the NetBackup installation is newer, it will be installed and the same Chapter 1, Before You Begin Installing NetBackup 7 default conditions that had existed, will be used with this newer version. If the version included with the NetBackup installation is older, no changes will be made. The latest version will always be the one used.
- ◆ If no version of PBX exists, one will be installed silently with NetBackup. A default port number will be used along with a default configuration.

If you chose to do a custom installation of NetBackup, the installer determines if a version of PBX already exists. The following occurs based on whether a version of PBX already exists:

NetBackup Installation Notes

- ◆ If a version of PBX already exists, the installer will determine if the current version is newer than the version included in the NetBackup installation. If the version included in the NetBackup installation is newer, it will be installed and the same default conditions that had existed, will be used with this newer version. If the version included with the NetBackup installation is older, no changes will be made.

In addition, you will not be allowed to change the port number because changing the port number would likely cause other VERITAS products to fail.

- ◆ If no version of PBX exists, one will be installed silently with NetBackup. A default port number will be used along with a default configuration.

In addition, you have the ability to change the port number.

When uninstalling NetBackup, PBX will be uninstalled with NetBackup if no other VERITAS product is dependent on it. If there is a dependency from another product, PBX will not be uninstalled.

2. Port usage for NetBackup 6.0

With this release of NetBackup, network administrators need to open a PBX port in following directions for backup and restore jobs finish successfully.

- ◆ Master (EMM host) server...to...PBX port...to...the Media server
- ◆ Media server...to...PBX port...to...Master (EMM host) server

A PBX port needs to be opened in both directions between master and media servers.

3. In NetBackup 6.0, the scan utility on UNIX only resides in `/usr/opensv/volmgr/bin/scan` and no longer resides in `/usr/opensv/volmgr/bin/goodies/scan`.

For Windows, the scan utility only resides in `install_path\volmgr\bin\scan.exe`.

4. Mac OS X 10.2 and later has the capability to use `/etc/services` in addition to NetInfo services. Previous to NetBackup 6.0, the client pushing scripts added the NetBackup port numbers to the NetInfo services. As of NetBackup 6.0, the client pushing scripts are changed to check for NB entries `/etc/services` first, then NetInfo. If entries are not found in either place, `/etc/services` is updated. If entries are found in either location, no changes are made.

The Apple supplied `/etc/services` file for Mac OS X 10.3 includes NetBackup service entries. If you installed a NetBackup pre-6.0 client on a Mac OS X 10.3 or later system, it's possible that NetBackup entries for `bprd`, `bpcd`, `vopied`, `vnetd` and `bpjava-msvc` may exist in both `/etc/services` and NetInfo. This is not harmful, but you may delete the NetInfo entries if they also exist in `/etc/services`.

5. UNIX media servers are now allowed to push NetBackup client software and database agents to a client using the `-ClientList` option on the `update_clients/update_dbclients` commands. Previously, only master servers could push software. This feature also applies to pushing NetBackup UNIX add-ons such as Advanced Client and Encryption. Refer to the appropriate product's System Administrator's Guide for more information.
6. In most cases, UNIX installation trace files are written to directory `/usr/opensv/tmp` in addition to the directory specified by the `TMPDIR` environment variable (which defaults to `/tmp`).
7. A local UNIX client install attempts to provide defaults for the server and client name. If a `bp.conf` file already exists, the first `SERVER` entry will be the default server name and the existing `CLIENT_NAME` will be the default client name. If `bp.conf` does not exist, the user is prompted for the server name and the value returned by the `hostname` command is used as the default for the client name. The user can override both of these defaults.
8. Previously, the client binaries in directories `/usr/opensv/netbackup/client/<hw>/<os>` were stored as individual files. Now, most of those files are contained within a tar file compressed with `gzip`.
9. The following questions have been removed from a UNIX NetBackup server installation:
 - ◆ Do you want to create policy and schedule examples that you can view or use when you are configuring your own policies and schedules?

The `template_normal` and `template_weekend` policies are no longer created by default. If the user still wishes to create them, run this command:

`/usr/opensv/netbackup/bin/goodies/pltemplates netbackup`
 - ◆ Do you want to update the NetBackup software on the clients?

The server install no longer pushes client software. However, the procedure to push client software to the client (`update_clients` command) remains the same. Refer to the UNIX Installation Guide for more information.
 - ◆ Do you want to start the Media Manager device daemon processes?

The Media Manager device daemon processes are started when appropriate.

For example, the Media Manager device daemon processes are started on a server install for initialization purposes, and they will stop running when no device entries are present for the server in the EMM database. In addition, on new installs, no devices are configured until the devices have been added. Unless

NetBackup Installation Notes

devices are configured, the device daemons will shut down, as appropriate, with messages logged into the system log and the Event Viewer. On an upgrade installation, existing devices are not configured until `nbpushdata` is run.

- ◆ If the installation needed to add entries to `/etc/services`, the user was presented the opportunity to change them during the install.

The `/etc/services` file is changed, if necessary, during the install.

10. On a UNIX initial NetBackup server install, a symbolic link is no longer created from `/usr/opensv/netbackup/client/Linux` to `/usr/opensv/netbackup/client/INTEL` or from `/usr/opensv/netbackup/client/SGI` to `/usr/opensv/netbackup/client/C910_920`. Any Linux clients configured using the INTEL hardware class or SGI clients configured using the C910_920 hardware class should be changed to use the Linux and SGI hardware classes, respectively.

11. Man pages are not installed on UNIX clients.

NetBackup man pages are installed only on the UNIX NetBackup server. If you want to provide man pages for the commands on UNIX client workstations, you can find troff source for them in the directory, `/usr/opensv/netbackup/bin/goodies/man`.

12. Installing using terminal services or a remote desktop connection.

When installing via a remote desktop connection, the source media must either be on a device local to the machine (either the machine's CD-ROM drive or copied to its hard drive), or a UNC network path. Installs are not supported in situations where the source media location is on a mapped network drive from within a terminal services session.

13. The operating system may open a GUI window (for example, File Manager on a Solaris system,) when the CD-ROM is inserted into the drive. VERITAS recommends that you do not use this window to install NetBackup products because unpredictable results may occur. Follow the installation instructions provided in the NetBackup 6.0 documentation set.

NetBackup Cluster

1. For VCS Windows (SFW-HA 4.1, SFW-HA 4.2), VERITAS recommends that users make sure patch 278307 is installed prior to installing or upgrading to NetBackup 6.0. The patch is available at <http://support.veritas.com/docs/278307>.
2. When launching the NetBackup Administration Console, VERITAS recommends that you login to the server using the virtual name associated with NetBackup.

CLIENT_NAME changes

1. UNIX initial NetBackup server installations now always have a CLIENT_NAME entry in bp.conf (previously media servers did not). The CLIENT_NAME entry matches whatever the user entered for the local SERVER entry EXCEPT if a virtual name was entered. In that case, whatever the hostname command returns is what is used for the CLIENT_NAME. (Previously, the master server CLIENT_NAME entry was equal to the hostname minus any domain name.)

For restores to work like one would expect, the client name specified in a backup policy must match the name specified by CLIENT_NAME.

Note UNIX upgrade installations do not change the existing CLIENT_NAME entry.

NetBackup Documentation Changes

1. Updates and enhancements have been made to the nbemmcmd command/man page that supersedes what is documented with the release of the NetBackup 6.0 documentation set. Because this is a new and important command for our NetBackup 6.0 customers, an update of this command has been documented in a TechNote that can be viewed from the VERITAS support web site. The TechNote number is 278592. Here is a link to this document, <http://support.veritas.com/docs/278592>.
2. The following note in the bprecover command in the NetBackup Command documents states that bpdbrm and bprd must be stopped before running the bprecover -wizard command.

Note Stop bpdbrm and bprd before using this command. Also, ensure that bpcl is running on any system that is being recovered.

Internationalization and Localization Notes

This note is not exactly correct. The note should state that these two processes should be stopped when recovering an offline backup only.

NetBackup Encryption

1. NetBackup supports push installs for Encryption software. However, the receiving clients must be NetBackup version 6.0. Push installs to earlier client versions are not supported.

Internationalization and Localization Notes

1. After installing NetBackup on Solaris and Linux systems, VERITAS recommends that you stop and start the NetBackup services in the native locale shell. The NetBackup installation starts some of the NetBackup services in the C locale.
2. NetBackup 6.0 provides the following Internationalization support levels.

- ◆ Level 1: English support

NetBackup operates in English in native operating systems. The operating system runtime LC_CTYPE can be in one of the native encodings for NetBackup. Users can select English files and directory names for backup and restore, across all major 5 platforms. The contents underneath the selected directories can be in any multibyte characters. (All user inputs are English.)

- ◆ Level 2: Homogeneous encoding support

NetBackup operates in one native encoding. The operating system runtime LC_CTYPE can be in one of the supported native encodings. User inputs are in the same encoding of LC_CTYPE. (Limited support for this in this release.)

- ◆ Level 2.1: UNIX Heterogeneous platform support

- Level 2.1.1: File and directory name

NetBackup operates in one native encoding in native operating systems. File and directory names can be multi-byte characters in backup and restore selections, across UNIX heterogeneous platforms.

- Level 2.1.x: Other user inputs (NetBackup Entities / NetBackup Object Names)

This level is not supported in this release of NetBackup. NetBackup entity user inputs are limited to English at this release.

NetBackup Bare Metal Restore

1. If you create a shared resource tree (SRT) using an original equipment manufacturer (OEM) Windows CD that contains hot fixes, during restore you may see “Missing File” messages. Bypass the missing file messages by pressing the **Esc** key. These errors do not affect recovery.
2. When performing a restore of a Solaris client that contains VxVM version 4.0 devices, if the restore is performed with a media boot based SRT that contains VxVM 4.0, error messages similar to the following may show up in the restore log:

```
VxVM ERROR V-5-2-9126 file_crc: open fails - No such file or
directoryVxVM
ERROR
```

```
V-5-2-9002 apm_keyget: invalid APM crc
```

These messages are erroneous and can be ignored.

3. After a dissimilar system restore on a Microsoft Windows system, networking is not configured until an administrator logs in to the system. Before the login, Windows may try to reach Active Directory servers, which may delay the appearance of the Windows login prompt.
4. The following are command changes:
 - ◆ The **bmrconfig** command replaces **bmrmap** and **bmreditcfg**.
 - ◆ The new **bmrepadm** command manages external procedure scripts.
 - ◆ The new **bmrprep** command replaces **bmrrestore**.
 - ◆ The new **bmrs** command manages resources in the BMR database. Some of the **bmrnewcfg** command functionality has been integrated into the new **bmrs** command.
 - ◆ The new **bmrsrtadm** command replaces the **bmrscopysrt**, **bmrcreatesrt**, and **bmrmkcdimage** commands. (On Microsoft Windows systems, the **bmrsrtadm** command launches a wizard that helps you perform SRT tasks.)
 - ◆ The following commands are no longer user commands:
 - ◆ **bmrsavecfg**
 - ◆ **bmrsetupclient**
 - ◆ The following commands are no longer used and are retired:
 - ◆ **bmracceptfi**
 - ◆ **bmrscopysrt**

General NetBackup Operational Notes

- ◆ bmrcreatesrt
- ◆ bmrmkcdimage
- ◆ bmrnewcfg
- ◆ bmrrestore
- ◆ lm_keyins

General NetBackup Operational Notes

1. The changes that have occurred in NetBackup between 5.1 version and NetBackup 6.0 are great and in some cases invisible to the user. To help our users understand some of the product changes that have occurred, VERITAS has identified the `external_*.txt` files and `vnetd` log directory that have either been renamed or moved from NetBackup 5.x to NetBackup 6.0.

- ◆ The following Media Manager definition files have moved:

In NetBackup 5.0 and 5.1, these files were located in the `/usr/opensv/share` directory on UNIX servers, and in the `install_path\NetBackup\share` directory on Windows servers.

For NetBackup 6.0, these files are located in the `/usr/opensv/var/global` directory on UNIX servers and the `install_path\NetBackup\var\global` directory on Windows servers.

- ◆ `device_mappings.txt`
- ◆ `external_densities.txt`
- ◆ `external_drivetypes.txt`
- ◆ `external_mediatypes.txt`
- ◆ `external_robotics.txt`
- ◆ `external_types.txt`
- ◆ The debug log directory for `vnetd` has moved for UNIX servers:

In NetBackup 5.0 and 5.1, the debug log directory was `/usr/opensv/log/vnetd`. In NetBackup 6.0, the directory is `/usr/opensv/netbackup/logs/vnetd`. If the old directory exists and the new directory does not, `vnetd` will log to the old directory. If the old directory exists and the new directory exists, `vnetd` will log to the new directory.

2. In NetBackup 6.0, a new `-x` option was added to `bpps`.

`bpps` functions prior to NetBackup 6.0:

- ◆ `bpps` with no options showed NetBackup processes only.
- ◆ `bpps -a` showed NetBackup and Media Manager processes.

New `bpps` function included in NetBackup 6.0:

- ◆ `bpps -x` shows NetBackup and Media Manager processes (same as `-a`) plus some additional shared VERITAS processes, such as `pbx_exchange`, `vxatd` and `vxazd`.

3. A policy can contain more than one schedule. VERITAS recommends, however, that you do not mix calendar-based and frequency-based schedule types within the same policy. Under some conditions, combining the schedule types can cause unexpected results.
4. Backup jobs and all kinds of duplicate jobs (including vault, staging and synthetics) will be accounted for when determining the current concurrent job/drive count for the write side of the storage unit. The "Maximum Concurrent Write Drives" and "Maximum Concurrent Jobs" storage unit attributes will apply to backup jobs and all kinds of duplicate jobs.
5. The NDMP tape server controlling the tape drive for backup jobs and all kinds of duplicate jobs (including vault, staging and synthetics) will match the "NDMP host" specified in an NDMP storage unit.
6. VERITAS supports only those commands, man pages, options, and parameters that are documented. If a command is not documented, then VERITAS does not support it.
7. NetBackup performs multi-streamed restores from multi-streamed backups if sufficient resources exist. For example, a multi-streamed backup sends separate images to separate tapes. A user requests to restore data from that backup. As long as there are sufficient tape drives to access the media, the data is restored concurrently from multiple images on multiple tapes.

NetBackup Access Control

1. For members of the `NBU_Operator` user group to continue viewing media and device information, run the following command:

```
bpnbaz -Upgrade60
```

Running this command brings the NetBackup 5.x permissions for the `NBU_Operator` user group up to the expected configuration for 6.0.

NetBackup Cluster Support

2. VERITAS recommends that the NBAC NBU_Security Admin group never be modified.
3. The NBAC feature will initially contain the following groups: NBU_Security Admin, NBU_Admin, NBU_Operator, NBU_User, and Vault Operator.

NetBackup Cluster Support

VERITAS recommends that you follow the installation and configuration instructions provided in the NetBackup documentation set included in your package. For more information on configuring NetBackup in a cluster environment, refer to the *NetBackup High Availability Systems Administrator's Guide*.

1. Do not use the old UNIX VCS NetBackup agent with NetBackup 5.1. Instead, use the UNIX VCS agent that is provided with this release. This agent is installed automatically by default.
2. The Activity Monitor in NetBackup Administration Console for Windows is not displaying services after a Windows Cluster failover. The Activity Monitor connects to the cluster and displays the services of the active node. At the time of the failover, this connection to the service manager becomes invalid. To get a new connection to the cluster server, which will then display the services running on the now active node, perform a **Refresh All** action from the **View** menu in the NetBackup Administration Console after a failover.
3. When adding a node to an existing NetBackup Group in an MSCS cluster, the Server registry entry on the existing nodes is not updated to contain the newly added node name. The registry entry HKLM\SOFTWARE\VERITAS\NetBackup\Config\Server on each node in the NetBackup Group should contain all the node names that NetBackup can run on.
4. Additional commands are required to properly freeze and unfreeze NetBackup in a SunCluster. This is due to Sun issue number 5017826. When NetBackup is started under pmf with automatic restarts enabled, pmf will intervene if the tag dies, irrespective of whether the monitor is enabled or not.

To freeze NetBackup, execute:

```
scrgadm -c -j scnb-hars -y Retry_count=0
scswitch -n -M -j scnb-hars
```

To unfreeze NetBackup, execute:

```
scswitch -e -M -j scnb-hars
```

```
scrgadm -c -j scnb-hars -y Retry_count=X
```

Where *X* is the default `Retry_count` value of 2, or whatever value you specified before installing NetBackup.

Catalog Recovery

1. In the NetBackup Troubleshooting Guide there are procedures for recovering NetBackup catalogs. Prior to starting these procedures, you must do the following for a clustered NetBackup server:

- ◆ VCS
Freeze the NetBackup group
- ◆ MSCS
Offline NetBackup resources
- ◆ SunCluster
Disable monitoring of NetBackup group
- ◆ TruCluster
Offline the NetBackup group and start NetBackup manually (outside of CAA control)

After you have recovered your catalogs you then do the following for a clustered NetBackup server:

- ◆ VCS
Clear any resource faults and bring NetBackup group resources online and unfreeze the group
- ◆ MSCS
Online NetBackup group resources
- ◆ SunCluster
Enable monitoring of NetBackup group
- ◆ TruCluster
Stop NetBackup processes (if any)
Start NetBackup group via CAA

NetBackup Database Agents

The following subsections contain general notes associated with various databases agents that NetBackup supports.

DB2 Agent

1. Adds support for backup up DB2 log files from a raw device

The new keyword value pair (PARTITIONTYPE RAW) is used only when restoring log files. Specifying this keyword causes the user exit program to search only for log files that were backed up from the raw device.

The following example shows the db2.conf parameters needed to restore from a raw device:

```

DATABASE SAMPLE
OBJECTTYPE DATABASE
POLICY db2-bkup
SCHEDULE Default-Application-Backup
ENDOPER

DATABASE SAMPLE
OBJECTTYPE ARCHIVE
POLICY db2-bkup
SCHEDULE Default-Application-Backup
PARTITIONTYPE RAW
ARCFUNC SAVE
#ARCFUNC COPY
#ARCDIR /vxdb2/db2/v8/db2v832d/templogs
#RETDIR /vxdb2/db2/v8/db2v832d/templogs
ENDOPER
```

If all of the logs are from a raw device, only normal restore and recover steps are needed. If a *mixed* environment exists (that is, some logs are from a *normal* file system and some from a *raw* environment), you need to manually restore the log files from the file system before attempting a roll forward.

Note This requires the existence of the directory from which the logs were originally backed up. It might then be necessary to move these log to the proper DB2 directory before performing a DB2 roll-forward of the database, which requests the rest of the logs.

For more information, see the *NetBackup for DB2 System Administrator's Guide*.

2. NetBackup for DB2 supports the DB2 8.2 feature that enables you to use a vendor library to back up the archive log files. NetBackup includes library support for this feature in the nbdb2 library.

The presence of LOGARCHMETH1=VENDOR:path in your DB2 configuration causes the logs to be backed up using the library.

NetBackup for DB2 continues to support the back up of log files through the user exit program. When LOGARCHMETH1=VENDOR:path is specified in your DB2 configuration, NetBackup ignores ARCFUNC SAVE, ARCFUNC COPY, ARCDIR, RETDIR, and PARTITIONTYPE RAW keywords in the db2.conf file.

For more information, see the *NetBackup for DB2 System Administrator's Guide*.

Lotus Notes Agent

Requirements for Lotus R6.0.3 and Lotus R6.5.0 on Linux

Support for Lotus R6.0.3 and Lotus R6.5.0 on Linux requires a hotfix to resolve the following SPR: SPR#JCHN5QVL3E (which addresses a transaction log recovery issue).

Once the hotfix is installed on the Lotus Domino server, a change to the notes.ini file must be made in order for Domino to work properly with NetBackup.

- a. Add the following line to the end of the notes.ini file for each Domino partition:
DEBUG_SEMOP_ERRNO0_EINTR=1

Note The last character in ERRNO0 is a zero.

- b. Restart the Domino server partition

The hotfix was integrated into the R6.5.1 and R6.0.4 releases. In these releases, customers need to set the flag DEBUG_SEMOP_ERRNO0_EINTR in the notes.ini file. This flag allows retries to happen if and when the operating system returns an unexpected EINTR when LN is dealing performing semaphore operations. For additional information, refer to the following link:

NetBackup Database Agents

<http://www-10.lotus.com/ldd/r5fixlist.nsf/Search?SearchView&Query=JCHN5QVL3E>

Requirements for Lotus R6.0.3 or R6.5.0 on Solaris and AIX

Support for Lotus R6.0.3 or R6.5.0 requires an IBM hotfix to address SPR# JCHN5QVL3E, which involves a transaction log recovery issue. This issue has been fixed in R6.0.4 and R6.5.1. For additional information, see:

<http://www-10.lotus.com/ldd/r5fixlist.nsf/Search?SearchView&Query=JCHN5QVL3E>

Requirements for Lotus R6 and R6.5 on Linux

In addition to the requirement above, support for any version of Lotus R6 or R6.5 on Linux requires a change to the notes.ini file for Domino to work properly with NetBackup.

For each Domino partition, perform the following steps:

- a. Add the following line to the end of the notes.ini file:

```
DEBUG_SEMOP_ERRNO0_EINTR=1
```

(NOTE: The last character in ERRNO0 is a zero.)

- b. Restart the Domino server partition

Note For Lotus R6.5.5, R7.0, and going forward, the setting in notes.ini file is not required.

Requirements for Lotus R6.03 and Lotus R6.5.0 on Windows

Support for Lotus R6.0.3 and Lotus R6.5.0 on Windows requires a combination hotfix to resolve the following two SPRs: SPR#THUR5LPPW9 (which addresses a file path syntax) and SPR#JCHN5QVL3E (which addresses a transaction log recovery issue).

There is a single IBM hotfix available to address both issues. Previous Lotus hotfixes may need to be removed before installing this new combination hotfix. These issues have been fixed in R6.0.4 and R6.5.1. For additional information, see

<http://www-10.lotus.com/ldd/r5fixlist.nsf/Search?SearchView&Query=JCHN5QVL3E>

and

<http://www-10.lotus.com/ldd/r5fixlist.nsf/Search?SearchView&Query=THUR5LPPW9>

NetBackup Interfaces

NetBackup Administration Console for Windows

1. There is no support in the NetBackup Administration Console for Windows for administering pre-NetBackup 6.0 servers.

NetBackup Java Interfaces

General Notes

1. The copyright text in the 'About dialogs', located in the interfaces, is not available in the NetBackup 5.0 and NetBackup 5.1 versions of the interfaces that are packaged in this release. This data is available in the NetBackup 6.0 version of the interfaces in their respective 'About dialogs'.

2. Preserving Older Versions of Language Extension Files

During an upgrade install of NetBackup on a host that has a NetBackup Language Extension installed, the older version Language Extension files get saved and then re-installed. While this can be useful in these environments, it is possible that issues may occur, for example, you may see English instead of a different, expected language. This is an unsupported NetBackup configuration for the locale of the relevant Language Extension.

3. Improving NetBackup-Java GUI Performance

The user has the choice of running the NetBackup-Java console either locally on your desktop or remotely and displaying back to your desktop host. Which platform you are running the GUI from is a big factor when you are faced with performance issues. For information and helpful tips on how to improve the performance of your NetBackup-Java GUI Environment, refer to the *NetBackup Systems Administrator's Guide, Volume I*.

4. Long waits for application response, incomplete data, reduced functionality and/or unexpected error messages may be returned in the applications as a result of invalid NetBackup configurations or inadequate file system space in
/usr/opensv/netbackup/logs on the host specified in the login dialog or in the same directory on the host that the NetBackup-Java Administration Console was started. Following are some example results when these things occur.
 - ◆ No response during login

NetBackup Interfaces

- ◆ Cannot connect socket errors during login to the NetBackup Java application server (bpjava)
 - ◆ Reduced functionality in the NetBackup Java Administration Console, for example, only Backup, Archive and Restore and Files System Analyzer nodes in the tree
 - ◆ Error dialog with Unable to login, status: 35 cannot make required directory message
 - ◆ Error dialog with /bin/sh: null: not found (1) message
 - ◆ Empty warning dialogs
 - ◆ Error dialog with An exception occurred:
vrts.nbu.admin.bpmgmt.CommandOutputException: Invalid or unexpected class configuration data: <rest of the message varies>
5. Reduced functionality (only the Backup, Archive and Restore component available) or 'cannot connect' errors during initialization of the NetBackup-Java Administration Console will result if one or more of the NetBackup services or daemons on the host specified in the login dialog is not running.
 6. Restart NetBackup-Java Administrative Console after restart of daemons
After restarting daemons/services in Activity Monitor or via other commands, we recommend exiting all instances of the NetBackup-Java administration console and starting a new copy of it via the jnbSA command. If the VSM product has been installed and available in the GUI, the same applies for the VSM migrd daemon.
 7. Window managers configured for auto focus are not supported. Auto focus means that windows are activated (get the focus) when you position the mouse cursor over them. The following explains how to correctly set up a CDE environment.
In the CDE environment, use the Style Manager -- Window dialog to change the window behavior to Click In Window To Make Active. NetBackup Java does not run properly if the Style Manager has the following selected: Point in Window To Make Active.
 8. If you are not set up properly to display to a machine from where you are executing jnbSA, you see one of the following happen: nothing (it is probably displaying on the machine where jnbSA is executing), the command fails with no error message (that is, the OS command prompt is received) or the following error message is placed in the log file (the log file name is displayed to the window in which you executed the jnbSA command).

```
java.lang.InternalError: Can't connect to X11 window server
using "host_name" as the value of the DISPLAY variable.
```


Prior to starting `jnbSA`, be sure to execute the `xhost` command on the machine where you intend to see the user interface and set the `DISPLAY` environment variable on the machine executing `jnbSA` prior to starting `jnbSA`. Reference the man page for the `xhost` command for additional capabilities.

9. There is no support in the Administration console for administering pre-NetBackup 6.0 servers.

10. Evaluation software expiration and the NetBackup Java interface application.

Attempts to use the NetBackup Java Administration Console after an evaluation copy of NetBackup has expired results in the following error message being displayed in an error dialog and all the NetBackup Java applications except Backup, Archive, and Restore disabled.

Administrator applications are not accessible due to the following error: Unable to get the attribute table.

11. Administrative capabilities depend on licenses and user authorization

The existence of various administrative capabilities (for example, Vault Management in the Administration Console's tree) is dependent on whether it is licensed and/or a nonroot user has been authorized for it on the relevant NetBackup host. This is checked during each *change server* operation.

In addition, upon completion of any *change server* operation, the Backup, Archive, and Restore capability is not available as it is only available for tasks on the host specified in the console's login dialog.

12. VERITAS recommends that only one administrator work on an object at a time. Doing this eliminates the possibility of configuration conflicts if more than one administrator attempts administration tasks simultaneously on the same object. If this situation should occur, the last update made will prevail.

13. Deleting all license keys causes the administration console to be non-functional. You'll have to use the `bpminlicense` command to update the licensing database prior to use of the console.

14. Configuring Host Properties or Advanced Client Policies for a Client.

For the clients and media servers of a server that is the target of a change server, the server specified in the console login dialog is required to be in the server list of all clients and the media servers of the target change server host. If a client or media server does not have the console login server in its server list; Host Properties will not be available for the client or media server, Advanced Client policies cannot be created or modified with Policies and the Snapshot Backup Policy wizard cannot be used to create Advanced Client policies.

NetBackup Interfaces

15. Memory requirements to run the NetBackup-Java Administration Console

VERITAS recommends that you run the console (`jnbSA`, `jbpSA`, or Java Windows Display Console) on a machine with 1 gigabyte of physical memory and 256 megabytes of memory available to the application.

16. Remote display back of the NetBackup-Java Administration Console not recommended

VERITAS does not recommend running the NetBackup-Java Administration Console in any remote display back configuration. Problems have occurred with certain GUI controls (such as, incorrect combo box operations, very sluggish table scrolling with large numbers of rows, and table display problems with large numbers of rows). In addition, other serious problems have occurred with the GUI aborting or hanging caused by a Java Virtual Machine (JVM) failure due solely to the remote display back configuration. These JVM failures have most often been seen on the AIX platform.

Therefore, VERITAS can only recommend that you run the NetBackup-Java Administration Console on your local desktop for administering any NetBackup host (by specifying that remote host in the GUI's login dialog). The NetBackup-Java Administration Console runs on the Solaris Sparc, Solaris Intel, HP-UX, Tru64, AIX, Red Hat and SuSE Linux, and Windows platforms. For the Windows platform, installation is done using the **Install Java Administration Console** option in the NetBackup Windows installation GUI. Refer to Chapter 2 (Platforms Supporting the NetBackup Administration Consoles for UNIX) of this document for the supported versions of these platforms.

17. Access Management always available in the NetBackup Administration Console

With the NetBackup Access Control feature in this release, there is a new node in the NetBackup Administration Console titled Access Management. If you are not using this new feature and authorizing nonroot users for various administrator capabilities using the interface's Capabilities Authorization functionality, you will still see this node in the console's tree for any master or media server that is being administered. This behavior is expected, even when restricting nonroot user's per users authorization in the `auth.conf` file. The Access Management capability has to be configured and if it is not, all users will see an appropriate informative message in the right hand pane of the interface when accessing it.

Note NetBackup Access Control was not available until the first maintenance update of NetBackup 5.0.

18. An Invalid username error could indicate an invalid password or username.

The Windows platform API does not delineate between invalid passwords and invalid user names. The following error message could mean either an invalid password or invalid username. This error is received when attempting to login to the interface's application server on a Windows host.

```
Unable to login, status: 503
Invalid username
```

19. Multiple bpjava processes per instance of the console

For increased performance and support for better multi-tasking ability in the console, you will see multiple bpjava processes on the host specified in the login dialog. The number will vary depending on the tasks attempted in the console.

20. Remote display of the NetBackup-Java console in multi-byte locale environments is not supported.

Activity Monitor

1. Deleting large number of jobs

When deleting a large number of jobs, do not leave the Activity Monitor node or close the NetBackup Administration Console while any of the deleted jobs are still visible in the Jobs tab. If Activity Monitor is shut down by leaving the Activity Monitor node or by closing the NetBackup Administration Console while jobs are being deleted, some of the jobs may not be deleted.

2. The following message will be displayed if you stop the bpdbm daemon on the relevant server when Activity Monitor is active.

```
Activity Monitor failed and must be restarted.
To recover, first correct the problem described below and then
refresh.
```

```
Connection to bpjobd on server <server_name> failed.
```

The reason this message occurs is that stopping the bpdbm daemon will also stop the bpjobd process. Upon successful startup of bpdbm (which will start bpjobd), you can use the refresh button on the toolbar to refresh the Activity Monitor job data. The refresh button is only available upon lost communications with the job daemon, bpjobd.

NetBackup Media Manager

File System Analyzer & Storage Migrator

1. The File System Analyzer and Storage Migrator utilities of the NetBackup-Java Administration Console will only be available upon specifying the root account in the console's login dialog. Nonroot usage of these utilities is not supported.

Host Properties

1. The label, "Re-read interval for available drives," is used for a different function in NetBackup 6.0 than it was in previous versions. In NetBackup 6.0 this setting specifies the frequency of polling disk storage units (DSUs) for capacity. In previous versions of NetBackup this label enables users to look for *available* tape drives.

Backup, Archive, and Restore

1. On the Task Progress tab, the Status column of the Tasks Performed list may be empty or all jobs listed with status of In Progress. When the `DISALLOW_SERVER_FILE_WRITES` option is set in the `bp.conf` file, this status column is blank. You can check the status of the task by selecting it to be displayed in the progress log file in the bottom area of the Task Progress section.
2. The end date/time for searching backups is initially set to midnight of the current day. If the application is left open over multiple days, the end date needs to be updated in order to see backups that have occurred after the initial end date.

NetBackup Media Manager

Media and Device Selection (MDS)

The following items describe the changes for the Media and Device Selection feature of EMM.

1. Job queuing: If NetBackup determines that resources are not currently available to run a job, the job will enter the *Queued* state. NetBackup will periodically attempt to acquire resources and run queued jobs. The following are some of the reasons as to why a job can enter a *Queued* state:
 - ◆ Media is in use"
 - ◆ Drives are in use"
 - ◆ Media server is offline

- ◆ Robotic library is down on server
- ◆ Maximum job count has been reached for the storage unit

Refer to the Media and Device Selection (MDS) VxUL debug logs to determine why a job is in a queued state

For UNIX:

```
/usr/opensv/netbackup/bin/vxlogview -i 111 -o 143 -D -N 1
```

For Windows:

```
install_path\netackup\bin\vxlogview -i 111 -o 143 -D -N 1
```

2. The following tpconfig command changes have been made for this release of NetBackup:

- ◆ You can use the tpconfig command to set the robot in a “pend if robot down (PIRD)” mode. The PIRD mode is set on a robot and media server connection, and tells NetBackup to *pend* mount requests to the robot even if it is "DOWN" (Refer to the *NetBackup Media Manager System Administrator's Guides* for more information on when a robot should be set in a PIRD state).
- ◆ You can now use the command, tpconfig -update robot 0 -roptype tld -pird yes, to set the robot in a PIRD state on the media server on which tpconfig is being run.
- ◆ You can now use the command, tpconfig -update robot 0 -roptype tld -pird no to clear the PIRD state of the robot on the media server on which tpconfig is being run.
- ◆ You can use the command, tpconfig -d to determine if the robot is in a PIRD state. "PIRD = yes" means that the robot is in a PIRD state

```
# ./tpconfig -d
```

```
Id  DriveName          Type  Residence
```

```
Drive Path Status
```

```
*****
```

```
0  QUANTUM.SUPERDLT1.00 dlt3  TLD(0)  DRIVE=2
```

```
/dev/rmt/1cbn UP
```

Currently defined robotics are:

```
TLD(0)      robotic path = /dev/sg/c2t0l0,
```

```
PIRD = yes
```

NetBackup Media Manager

3. It will not be possible in NetBackup 6.0 to manually assign storage-unit directed mount requests to drives of another storage unit.
4. Access based on host, user ID, and group ID for volume pools are not supported in NetBackup 6.0. When allocating media from volume pools, NetBackup disregards the pool host, pool user, and pool group attributes of the volume pool.
5. NetBackup will clean shared drives based on the configured cleaning frequency of the drive. Prior to NetBackup 6.0, frequency-based cleaning was not supported for shared drives.
6. The following new pending action has been added in NetBackup 6.0.
"MEDIA IN INACCESSIBLE DRIVE"

A mount request pends with the above action if the media required to satisfy the mount request is in a drive that has no usable paths configured. This may include disabled paths, NDMP paths where the media server does not have NDMP credentials to access the NDMP tape server, paths on "OFFLINE" media servers, and so on.
7. Media and Device Selection (MDS) debug logs are in VxUL format with an originator ID of 143 and a file ID of 111.
8. All error and status information (including read, write, position and robotic errors, TapeAlert information etc) reported to EMM from media servers are stored in the error database in EMM. The read, write, position errors were stored in the error history file on the local media server in pre NetBackup 6.0. The `nbemmcmd` executable can be used to view and prune the EMM error database. Refer to the `nbemmcmd` usage for details on how to view and prune the EMM error database information.
9. MDS will take into account media read, write and position errors across all the media servers while evaluating the error history to determine whether to freeze a media or down a drive. Accounting for errors across all the media servers enables NetBackup to make a better decision as to whether to freeze the media or down the drive. This is different than pre NetBackup 6.0 where only the error history of the local media server was used to freeze media or down drives.

Media Management Interfaces

The following media management interface changes have occurred in NetBackup for this release.

1. Media Manager command line interfaces (such as, `vmadd`, `vmdelete`, `vmchange`, etc.) now operate on the EMM Server as the host argument (`-h` option). For back-level server support (NetBackup 5.x) using that same option, they still connect to the host referred to as the volume database host. The default host target for the `-h` option has been changed to be the EMM server rather than the local host.
2. Media management error messages have been improved for better problem diagnosis. The Java and Windows GUI interfaces, the menu user interface, and the command line interfaces now have error messages that provide more explanation. Additionally, detailed error codes from the EMM server component are provided. The improved error messaging is not available when connecting to back-level servers (NetBackup 5.x).
3. The `vmquery -assignbyid` and `-deassignbyid` options now work only for non-NetBackup media. Non-NetBackup media includes media used by VERITAS Storage Migrator, VERITAS Data Lifecycle Manager, or users working outside of the NetBackup policy framework (for example, those who use `tpreq` directly). This change improves database consistency. Deassignment of NetBackup media can be accomplished using the `bpexpdate` command, as needed. Before NetBackup 6.0, deassignment of NetBackup media using the `vmquery` interface could lead to potential volume/media database conflicts, because that interface did not affect media states in the NetBackup media database.
4. The command, `vmchange -m media_id -n num mounts/cleans` has been split into two independent usage methods. When targeting volume database hosts (`-h` option) that are NetBackup 5.x servers the previous functionality will be preserved. For NetBackup 6.0 servers, the command `vmchange -m media_id -clean num cleanings` can be used to set the number of cleanings for a cleaning tape. For NetBackup 6.0 servers, the `vmchange -n` option will only affect non-cleaning tapes.
5. The Media Manager commands (`vmadd`, `vmdelete`, `vmquery`, etc.) have been enhanced to do the following:
 - ◆ Return new error codes for EMM-specific problems. The new error codes can diagnose CORBA communication and database problems.
 - ◆ Validate the range of values passed in by a command-line option. For example, instead of `vmchange` cutting off the end of a volume description that is too long for the database to hold, the command now provides error text stating that the description provided is too long.
6. The `vmglob` command now supports a new option, `-get_emmport` that will retrieve the EMM Port setting from a local or remote EMM Server. This is an additional parameter that is needed to connect to an EMM Server.

NDMP Configuration Interfaces

1. NDMP credentials have been incorporated into the centralized EMM database. These credentials include the user name, password, and encrypted key attributes which were previously stored on each media server. NetBackup 6.0 allows users to have options for configuring global, filer-specific, and media server-filer specific credentials, where before, only media server-filer specific credentials were allowed.
2. You can now manage NDMP credentials per-filer or per-NetBackup-Master in addition to being managed on a per NetBackup server to NDMP host basis.
3. The NDMP license key is not required to add NDMP host credentials. NetBackup supports the use of some NDMP protocols to manage some clients' volume snapshots and this functionality does not require a NDMP license.
4. The `tpconfig` menu has been enhanced to include NDMP credential information.
5. The `tpautoconf` command line has been enhanced to include the `-probe` and `-verify` functionality of `set_ndmp_attr`

Device Support

1. The device mappings files, update procedure, has changed for NetBackup 6.0, with those attributes now being centralized into the EMM database. The `tpext` utility needs to be run to update the EMM database with new versions of device mappings and external attribute files. For release upgrades and for new installations, this update procedure is done automatically. The change is in the steps that need to be done to update EMM for new device support as is done outside of the NetBackup maintenance pack procedure, for instances when changes are needed to add or update NetBackup's recognition of specific device attributes. In previous releases, device mappings files needed to be updated on all the media servers. The `device_mappings` files are not shipped on the CD-ROMs, rather they are created during the install process after the `tpext` command had completed and during the initialization of `ltid`.
2. NetBackup 6.0 requires pass-through access to each and every tape drive. A drive will be rejected if its pass-through path does not work (if it is being used for write operations).

Pass-through is critical for:

- a. SCSI Reserve/Release.
- b. Fibre Channel error recovery.
- c. Block position checking (NetBackup compares actual tape position to expected tape position). This detects unplanned rewinds and/or tape driver configuration problems.
- d. WORM media support.
- e. Auto-discovery of devices.

The NetBackup 5.1 release requires pass-through once WORM support is enabled. NetBackup 6.0 requires pass-through by default. (Auto-discovery has been creating pass-through paths for several releases now.)

Multi-path Tape Device Support

1. Multiple device control paths can be discovered, automatically configured, and manually configured for tape drives. This applies to direct SCSI-control or NDMP-controlled drives. Discovered drive paths are enabled by default. They can be disabled or configured up/down by an administrator or operator. Previous to NetBackup 6.0, only one path to a tape drive was available per host, and the available drive states were limited to UP or DOWN.

Shared Storage Option

1. Shared Storage Option (SSO) device allocation and remote drive scanning communications between media servers has been eliminated. In NetBackup 6.0, these communications are routed to the centralized EMM server, making it easier to implement firewalls or other security mechanisms.
2. Media servers no longer *register* with the Device Allocator (DA). Media server availability for drive scanning and job scheduling is now "detected" through the use of a Media Server machine state. (For example, the media server now tells the EMM server if it is online or offline.)
3. Drives are no longer *reserved* with the Device Allocator (DA). The DA is fully aware of what drives are being shared by what servers. In addition, the DA has real-time information about the status of all of these drives.

NetBackup Media Manager

4. Scan host failover does not require re-registration. In fact, a media server can be dynamically assigned as scan host for each drive that it shares, individually.
5. NetBackup 6.0 media servers do not require intra-media-server communication to share drives. In other words, there is no longer any remote scanning of drives on NetBackup 6.0 media servers and thus no need to connect to one another, unless required for other reasons such as for robotic control.
6. Users can no longer configure a drive as shared or not shared. This is done automatically by NetBackup, based upon the configuration(s) of a device across all hosts.
7. The NetBackup Shared Storage Option can now be applied to NDMP attached drives.
8. The Shared Storage Option can now be applied to a NetBackup Server as well as a NetBackup Advanced Server. If a drive is configured with paths both locally and through a NDMP host or through more than one NDMP host, this will require the SSO license as this drive is now being shared among multiple hosts.

Enterprise Media Manager Database

1. Inconsistencies between multiple volume database hosts and media databases across media servers are now readily identifiable. In this release, the EMM database provides for centralized and merged tape and optical volume and media records. During the master or media server upgrade process, all volume and media attribute records for a given domain are merged into the EMM database. When multiple media ID's or inconsistent volume/media states are detected, a conflict state is noted. Media in conflicting states may require administrator action to resolve. Media in these conflicting states are identifiable through media management interfaces (`vmquery`, `vmadm` menu, and the NetBackup Java/Windows Administration Consoles). See the `nbemmcmd` command line interface for addressing situations with media conflicts.
2. Scratch pools are defined as a volume (media) pool attribute rather than as a `vm.conf` configuration entry. Before NetBackup 6.0, scratch pools had associated `SCRATCH_POOL` entries in the Media Manager configuration file, `vm.conf`. In NetBackup 6.0, the scratch pool designation is a pool attribute in the EMM database, configurable through the media management interfaces (`vmpool`, `vmadm` menu, and the NetBackup Java/Windows Administration Consoles).
3. The NetBackup catalog data has been consolidated and centralized from a number of sources to be stored in the EMM database. In this release, these files are no longer part of the NetBackup infrastructure.
 - ◆ `globDB` - previously stored global (centralized) device attributes

- ◆ ltidevs - previously stored tape and optical disk drive attributes
- ◆ robotic_def - previously stored robotic library / standalone drive residence attributes
- ◆ .namespace.chksum - previously stored NDMP attributes
- ◆ ruleDB - previously stored barcode rule attributes
- ◆ poolDB - previously stored volume pool attributes
- ◆ volDB - previously stored tape and optical disk volume attributes
- ◆ mediaDB - previously stored media attributes
- ◆ storage_units - previously stored storage unit attributes
- ◆ stunit_groups - previously stored storage unit group attributes
- ◆ SSOhosts - previously stored Shared Storage Option hosts having assigned tape drives
- ◆ errors - media errors database

Back-level media servers, which are not master servers, volume database hosts, device allocator hosts, or global device database hosts, may continue to contain data used by NetBackup infrastructure as part of a mixed version NetBackup configuration.

4. Users can no longer configure volume database hosts other than the EMM server using `tpconfig`. In addition, `tpconfig` will no longer display volume database host information, only the EMM server name.

Device Configuration Interfaces

1. The following changes have been incorporated into the `tpconfig` command in the area of device configuration:
 - ◆ The `tpconfig` command line output has been changed.
 - ◆ Multiple paths
`tpconfig` output has been changed to display multiple device control paths.
 - ◆ (Windows Server only) Port/Bus/Target/LUN in place of Device Name
Due to changes in the Windows operating system, device persistence can no longer be guaranteed by accessing a statically configured device name (for example, Tape0). Access of devices on Windows requires dependence on non-dynamically changing device attributes. For NetBackup 6.0, Windows devices are now statically configured with a Port, Bus, Target, and LUN

NetBackup Media Manager

rather than with a device name. These P/B/T/L attributes are captured during device configuration and stored in the EMM database. The `tpconfig` interface now displays these on Windows servers in place of the device name. NetBackup dynamically retrieves the current device name across Plug-and-Play events, which may have caused the mapping of device names to drive addresses to change.

- ◆ Internal tables output change

The undocumented option `-tables` option no longer shows a "Type=0" entry. Previously, the entry was used to list attributes associated with the standalone volume database host.
 - ◆ `tpconfig -dl` output now includes serial number
 - ◆ The `tpconfig` command line has been expanded to provide the ability to add/update/delete additional paths for a drive by name.
 - ◆ The `tpconfig` menu interface (available only on UNIX) has been expanded to provide the ability to add/update/delete additional paths for a drive by name.
2. The command, `vmglob -delete`, will now delete the entire device configuration, not just the former global device database (globDB) pieces. In NetBackup 6.0, the device configuration (`ltidevs`, `robotic_def`, and so on) on local servers has been merged with the centralized device configuration (globDB), with all of it going into the EMM database. If `vmglob -delete` is run, there is no longer any device configuration, and `tpconfig -d` is expected to no longer return any data. **WARNING:** deleting the device configuration will cause tape-based jobs (for example, backups, restores, etc) to no longer function.
 3. Changing the robot type for a robot from one server will cause the robot type to be changed for all drives in that robot on all servers. With all device configuration attributes centralized in the EMM database, database consistency is maintained, ensuring that a robotic library's configured robot type is consistent across the domain.
 4. The shared drive wizard is no longer available in the NetBackup Administration Console. Drives are configured through the same interface regardless of whether or not the user intends to share them.
 5. Drives can now be configured to use more than one path on a single media server.
 6. Drives can now be configured as connected to more than one NDMP host from one or several media servers. Each of these connections is considered to be a separate drive "path".
 7. Drive status is now associated with a drive path, not just a drive and host pair. On the same host, there can be many paths, and they may have mixed drive statuses.

8. A new drive path status "DISABLED" has been created. This is for paths that are discovered by NetBackup but the user does not wish to configure for use.
9. Displays have been reformatted for `tpconfig` to display all paths for a drive. The `-d` display has been reformatted completely to ensure that all of the pertinent information for device configuration is shown as compactly as possible.
10. Display options have been added to `tpconfig` to retrieve path-specific information on a per-drivename basis.
11. The automatic device configuration utility, `tpautoconf`, will detect and configure multiple paths to a drive on a single Media Server.
12. The NetBackup device daemon (and NetBackup Device Manager service), `ltid`, is capable of automatically correcting multiple local drive paths at startup.

Test Utilities

1. Robotic test utilities (`xxxtest`) now obtain device paths directly from the EMM server. Before NetBackup 6.0, the robotic test utilities obtained device paths from the `robtest` interface or through the command line. In NetBackup 6.0, individual robotic test utilities will still accept device paths specified by the user. Continuing in NetBackup 6.0, `robtest` will still invoke the robotic test utilities as a single interface point requiring no parameters.

Activity Monitor Interface

1. The NetBackup Activity Monitor will now display additional job types, including jobs for tape drive cleaning, optical media formatting, physical media inventory, and device diagnostic tests.
2. If there was no cleaning tape defined or zero cleanings left for the cleaning tape for the robotic drive, `tpclean` would return the following message in previous versions:

No cleaning tape is defined in the device's robot or 0 cleanings remaining

This no longer happens in NetBackup 6.0 because this information/result now appears in the Activity Monitor instead.

Device Monitor Interface

1. Default display information for the `vmopr cmd` command line has been changed to include the status of all Media Servers, and all drives' paths on all media servers and all pending requests on all media servers. The `-d` option still provides the pre-NetBackup 6.0 display format and functionality.
2. Additional options have been added to the `vmopr cmd` command line to manage drive status per-path.
3. Additional options have been added to the `vmopr cmd` command line to display a drive's status per path.
4. The Device Monitor in the NetBackup Administration Console provides additional host/path specific information for drives, only when the drive is selected. The default display is an overview of all drives' status.

NetBackup Configuration File

1. The following NetBackup configuration file, `bp.conf` and equivalent Windows registry, entries are now stored in the EMM database and are no longer valid in `bp.conf` or the Windows registry:
 - ◆ `ALLOW_MULTIPLE_RETENTIONS_PER_MEDIA`
 - ◆ `DISABLE_STANDALONE_DRIVE_EXTENSIONS`
 - ◆ `MEDIA_ID_PREFIX`
 - ◆ `MEDIA_REQUEST_DELAY`
 - ◆ `MUST_USE_LOCAL_DRIVE`These entries are configurable using the `nbemmcmd` command line interface.
2. In this release, NetBackup now tracks the master server-to-media server relationship in the EMM database. This means that to change the master server for a given media server, the user must run `nbemmcmd` to update this relationship.
3. If you modify the first `bp.conf` `SERVER` or equivalent Windows registry entry (the master server) on a media server, the EMM database also needs to be updated. To update the EMM database, use `nbemmcmd -updatehost` to change the master server for a media server.

Media Manager Configuration File

1. The following Media Manager configuration file, `vm.conf`, entries are now stored in the EMM database and are no longer valid in `vm.conf`:
 - ◆ `DISALLOW_NONNDMP_ON_NDMP_DRIVE`
 - ◆ `DO_NOT_EJECT_STANDALONE`
 - ◆ `DRIVE_NAME_SEED`
 - ◆ `RETURN_UNASSIGNED_MEDIA_TO_SCRATCH_POOL`
 - ◆ `SCRATCH_POOL`
 - ◆ `SSO_SCAN_ABILITY`
 - ◆ `VAULT_CLEAR_MEDIA_DESC`

These entries are configurable using the `nbemmcmd` command line interface.

NetBackup "Touch" Files

The following touch files are now stored as configurable attributes in the EMM database and are no longer valid for directly affecting product behavior:

- ◆ `Install_path/netbackup/DONT_USE_SLAVE`
- ◆ `Install_path/netbackup/DRIVE_ERROR_THRESHOLD`
- ◆ `Install_path/netbackup/MEDIA_ERROR_THRESHOLD`
- ◆ `Install_path/netbackup/TIME_WINDOW`
- ◆ `Install_path/volmgr/NO_STANDALONE_UNLOAD`

These entries are configurable using the `nbemmcmd` command line interface.

NetBackup Commands

1. The following commands have been removed from NetBackup:
 - ◆ `vmconf` - replaced by multiple device configuration interfaces
 - ◆ `vmmedia` - replaced by multiple media management interfaces
 - ◆ `vmdb_dump` - replaced by `nbdb_dump` to dump the EMM database
 - ◆ `vmdb_merge` - replaced by `nbemmcmd` to merge EMM databases
 - ◆ `vmdb_compact` - obsolete with EMM database infrastructure in NetBackup 6.0

NetBackup Storage Units

- ◆ `vmdb_cat` - an internal utility that was mistakenly included in the install package
2. The following commands have been added to NetBackup:
 - ◆ `tpext` - updates the EMM database with new external device attributes
 - ◆ `nbpushdata` - moves portions of the NetBackup internal catalog data into the EMM database, merging with existing database records as appropriate. This is used as part of the process for upgrading master and media servers to NetBackup 6.0.
 - ◆ `nbemmcmd` - used to manage host entries, configuration options, and other miscellaneous attributes in the EMM database

Storage Unit Configuration

1. The maximum fragment size of a disk storage unit has increased from 2 gigabytes to .5 terabytes.

If a media server of a previous release has Disk Storage Units (DSUs) configured with a different maximum fragment size, upon upgrade, the storage units are not automatically increased to the new default of 524,288 megabytes. To make the best use of the storage unit, consider increasing the fragment size on upgraded storage units.

2. The `bpstuuadd` command line option `-dspath` is no longer valid or supported.

NetBackup Storage Units

Disk Storage Units

One enhancement made to Disk Storage Units (DSUs) is a checkbox that has been added on the “New Storage Unit” dialog. This checkbox is called, “This directory can exist on the root file system or system disk.” Setting this field allows backups to occur on the root file system. This is not the best practice because, allowing backups to occur on the root file system could cause the file system to fill and eventually crash the server. This checkbox encourages users to designate a different location to allow backups.

NetBackup Vault

1. Vault and profile names are now case-sensitive. Because directory names are not case sensitive on Microsoft Windows systems, session directories will be created in the same vault\sessions*vault_name* directory for two or more vaults that have names that differ only in case.
2. The Vault Properties dialog is now named Vault Management Properties.
3. Because of changes in NetBackup associated with the new Enterprise Media Manager, you do not have to specify a volume database host in the Vault Robot dialog.
4. Vault Operator Access on UNIX.

If you do not configure NetBackup Access Management, you can still set permissions on UNIX systems so that non-root users can use the operational commands in the Vault Operator Menu to inject and eject tapes and generate reports. The most efficient way to accomplish this is to add the users to whom you want to grant access to a single user group, then give that group permission to execute some of the executable files.

Note Giving users access to the Vault Operator Menu also gives them the capability to change report destinations. If you do not want non-root users to view reports and change report destinations, do not give them access to the Vault Operator Menu. For example, you may not want non-root users to see the Recovery Report or to be able to change to whom reports are e-mailed.

Note Giving users special privileges may violate your organization's computer and network security policies and allow access to private information. Check with your system administration or computer security staff to ensure that you are not violating security policies.

- a. Create a UNIX group and add the appropriate users to this group. This group will be referred to as *opsgroup* in the following commands.
- b. Log in to the system on which the NetBackup master server is installed and execute the following commands as root:

```
# cd /usr/opensv/volmgr/bin
# chgrp opsgroup vmchange vmquery vmupdate
# chmod 4550 vmchange vmquery vmupdate
# cd /usr/opensv/netbackup/bin
# chgrp opsgroup vltrun
```

NetBackup Operations Manager

```
# chmod 4550 vltrun
# cd /usr/opensv/netbackup/bin/admincmd
# chgrp opsgroup bpimagelist bpimmedia bpmedia bpmedialist
# chmod 4550 bpimagelist bpimmedia bpmedia bpmedialist
```

- c.** Log in to all systems on which NetBackup media servers are installed that control a robot and execute the following commands as root:

```
# cd /usr/opensv/volmgr/bin
# chgrp opsgroup vmchange vmquery vmupdate
# chmod 4550 vmchange vmquery vmupdate
```

- d.** If you are using ACSLS for robotic control, log in to the ACSLS server and modify the `.rhosts` file in the home directory of user `acsss`. The NetBackup installation process should have added an entry to the `.rhosts` file for the NetBackup master server that grants root access. Modify that entry to allow all users in the `opsgroup` access to the ACSLS server as user `acsss`:

```
master_server_name root <user1> <user2> . . . <userx>
```

- e.** If you are using ACSLS for robotic control, verify that the user accounts defined for the operations group exist on both the system on which the NetBackup master server is installed and on which the ACSLS server is installed. For simplicity, each user should have the same user ID on both servers. If both servers are using a naming service (such as NIS), you can skip this step.

To verify proper operation, log in as one of the non-root users on the system on which the NetBackup master server resides, start `vltopmenu`, and execute each menu option.

NetBackup Operations Manager

1. To log into NOM as the administrator, you must supply login credentials on the login screen. The default username and passwords for the administrator are `admin` and `Vxadmin`. It is recommended that you change the username and password after initial log in.

The initial domain name is `NOM_BuiltIn@FQHN`. *FQHN* is the fully qualified host name on which the NOM server and NOM web client are running.

2. NOM is a NetBackup operations management tool. NOM may be used optionally and allows managing and monitoring of multiple servers from a single web browser. The NetBackup Administration Console must still be used to configure NetBackup devices, job policies, and so on.

3. VxSS is required for the NOM server, unlike NetBackup where it is optional.
4. NOM currently does not support upgrade installations. NOM must be uninstalled before installing a newer version of the product. Upgrade installations will be available in the next major NetBackup release.
5. Starting with release 6.0 of NetBackup, NetBackup Service Layer (NBSL), and NBproxy components are installed as a part of NetBackup on master and media servers.

NOM requires and uses NBSL for all resource monitoring and managing, and control functions. There is an impact if NBSL stops running on a managed NetBackup server. If NBSL is stopped when changes are happening in NOM they may get lost.
6. The NOM server must have the NetBackup 6.0 client installed. NetBackup master server, media server, or client software can be installed on the NOM server to meet this requirement. NetBackup client software is used to back up and restore the NOM database and to view the VxUL logs written by NOM.
7. NOM server software does not have to be installed on the same server as NetBackup 6.0 server software.
8. When using the NOM console with some web browsers, you should disable popup blocking, or add the NOM server to the list of acceptable servers to view all of the NOM console windows and dialogs. The web browser should have active scripting enabled.
9. When an alert policy is created in a server group context, the behavior for different policies varies. For following policies, alerts are generated at the group level (based on consolidation from all servers in the group). For the rest of the alert policies, alerts are generated on a per server basis.
 - High Frozen Media
 - High Suspended Media
 - Low Available Media
 - High Down Drives
 - High Job Failure Rate
10. NOM is a new product based on a new architecture, data modeling, design, and implementation, and is not an incremental update to any existing VERITAS products. This means that GDM and NBAR installations cannot be upgraded to NOM installations.

NetBackup Operations Manager

Due to the substantial differences in architecture, design, implementation, and data model, the historical data from NBAR installations is not applicable and cannot be migrated to NOM. You may decide to run NBAR or GDM in parallel on NetBackup systems earlier than release 6.0 during a transition period to NetBackup release 6.0.

NetBackup Features End of Life

The purpose of this chapter is to notify our customer of changes in how VERITAS will support NetBackup features that may affect you. VERITAS will provide a notification of one major release before discontinuing support of an item. This section contains a list features that will not be supported as of the next Major Release of NetBackup. For a list of Supported Platforms and Databases that will not be supported at the next major release, refer to, Chapter 2, “Supported Platforms and Peripherals” on page 23.

Features, Enhancements, and Commands No Longer Supported

General NetBackup Features

1. With this release of NetBackup, VERITAS will replace all legacy versions of Global Data Manager and NetBackup Advanced Reporter with a new NetBackup management product that will combine many of the same benefits of these two separate products, while adding additional features as well. The current Global Data Manager and NetBackup Advanced Reporter products will continue to be maintained and supported according to established VERITAS Technical Support policies, however no new functionality will be added to these products. Customers will be encouraged to migrate from the legacy versions of Global Data Manager and NetBackup Advanced Reporter to the new NetBackup management product when it is made available with the next major release of NetBackup. While this new product will offer more advanced capabilities, customers should expect that some legacy functionality or historical data may no longer be available following the migration. VERITAS intends to provide a way for customers with active maintenance contracts to convert their licenses from the older products to the new product.
2. Multiple-Tape catalog backup, using the legacy offline catalog backup, is no longer supported in this release of NetBackup. Customers with large catalogs are able to use the new online catalog backup which supports tape spanning.

Features, Enhancements, and Commands No Longer Supported

3. With this release of NetBackup, VERITAS has replaced Intelligent Disaster Recovery (IDR) with the Bare Metal Restore (BMR) product. The BMR option offers an automated system recovery that is best suited for NetBackup. Therefore, VERITAS has dropped support for IDR in stages making sure to not alienate any back-level IDR clients still in need of support. The following list provides more information on the level of support that will be available.
 - ◆ VERITAS has dropped support for the IDR client in this release of NetBackup.
 - ◆ The IDR Server is still shipped with this release of NetBackup to support back-level IDR clients.
 - ◆ VERITAS is projecting that the IDR Server will be decommissioned in the next major release from NetBackup 6.0.
4. Dropped support of the `nonroot_admin` script in this release of NetBackup.

In NetBackup 5.0, VERITAS announced that the ability to authorize nonroot users for administrator capabilities via the `nonroot_admin` script would no longer be supported in NetBackup 6.0. All documentation has been removed. The NetBackup Access Control feature supersedes this method of granting administrator privileges to nonroot users.
5. The creation of ASCII catalog images is no longer supported in this release of NetBackup. This was announced at the release of NetBackup 5.0. However, ASCII catalog images created in prior releases may still be browsed with this release.
6. VERITAS no longer supports SGI IRIX as a master, media, or SAN media server in this release of NetBackup. However, support will continue for SGI IRIX as a client server.
7. The `bpclexclude` and `bpplexclude` commands previously located in `/usr/opensv/netbackup/bin/admincmd` have been removed from NetBackup 5.1.

NetBackup Commands no Longer Supported

The commands listed in this section are no longer supported with this release of NetBackup.

1. For this release of NetBackup, the `bephyinv` utility (Physical Inventory Utility) is no longer supported and its functionality has been transferred to the `vmphyinv` (Media Manager Physical Inventory) utility. The `vmphyinv` utility has been enhanced for this release of NetBackup.
2. The scratch pool configuration entry in the `vm.conf` file has been made obsolete with the addition of the new EMM feature for NetBackup 6.0.

3. The `bpstuuadd` command line option `-dspath` is no longer valid or supported.
4. The `bpsynth` command is no longer supported in NetBackup 6.0. A user can initiate a synthetic backup from the command line by using the `bpbackup` command (specifying a synthetic schedule). If you are a user that has `bpsynth` in one of your scripts, you can use the following in its place:

```
bpbackup -i -p policy_name -s schedule_name... [ -w]
```

End of Life Notifications

This section focuses on providing customers with ample notification about portions of the NetBackup product that will no longer be supported, used, or simply changed in the next major release of the product. The notification can be for NetBackup commands, files, directories, utilities, tools, or robots, terminology, etc.

Notification of NetBackup Commands for Next Major Release

The commands listed in this section will no longer be supported within the next major release of NetBackup.

1. The `set_ndmp_attr` file will not exist in the next major release of NetBackup. For NetBackup 6.0, this file will exist and retain all of its currently supported functionality. However, in the next major release of NetBackup, the functionality found in `set_ndmp_attr` will only exist in `tpconfig`.
2. In the next major release of NetBackup, Enhanced Authentication (`vopie` and `noauth` authentication methods) and Enhanced Authorization will no longer be supported. VERITAS recommends NetBackup Access Control (NBAC) for authentication and authorization.
3. VERITAS will drop support and remove the following commands from the NetBackup in the next major release of the product. These commands are: `bpauthorize`, `bpauthsync`, and `vopie_util`.
4. VERITAS plans to drop support and remove the following commands from the NetBackup product in the next release: `mmcrawl` and `vmnitlists`.
5. The `.namespace.chksum` file will not exist in the next major release of NetBackup. This file will become obsolete and its data will now be stored with the rest of the device configuration information in the EMM database.

End of Life Notifications

6. The `add_media_server` command will no longer be supported in the next major release of NetBackup.
7. NetBackup will no longer support the `bpbackupdb` command in the next major release of NetBackup.

General NetBackup Notifications

1. NetBackup 6.0 will not support NetLink 1.0. However, this version of NetBackup will support NetLink 2.0.
2. Please note that Enhanced Authorization and Authentication will be removed from the next major release of NetBackup.

Terminology End of Life

The items in this section provide notification of various terms that will no longer be used or referenced in NetBackup products starting with this release (NetBackup 6.0).

- ◆ Starting with NetBackup 6.0, the term “Global Device Database Host” is obsolete. The EMM server and EMM database take over these functions. In addition, the term, “Volume Database Host” is obsolete.
- ◆ The following commands that contain a *cl* were replaced with *pl*. The following table contains the old command names along side the new name that replaced it. The old names have been removed from all documentation and product code.

Old Command Name	New Command Name
<code>admincmd/bpclassnew</code>	<code>admincmd/bppolicynew</code>
<code>admincmd/bpclclients</code>	<code>admincmd/bpplclients</code>
<code>admincmd/bpcldelete</code>	<code>admincmd/bppldelete</code>
<code>admincmd/bpclexclude</code>	<code>admincmd/bpplexclude</code>
<code>admincmd/bpclinclude</code>	<code>admincmd/bpplinclude</code>
<code>admincmd/bpclinfo</code>	<code>admincmd/bpplinfo</code>
<code>admincmd/bpcllist</code>	<code>admincmd/bppllist</code>

End of Life Notifications

Old Command Name	New Command Name
admincmd/bpclsched	admincmd/bpplsched
admincmd/bpclschedrep	admincmd/bpplschedrep
admincmd/bpclschedwin	admincmd/bpplschedwin
admincmd/bpclvalid	admincmd/bpplvalid
goodies/cltemplates	goodies/pltemplates

- ◆ The term *slave server* has been changed to *media server*.
- ◆ The following terminology changes have been made in NetBackup 6.0.

NetBackup 5.x Term	New NetBackup 6.0 Term	Abbreviated Term
Global device database NetBackup Media Database Volume Database Standalone volume database host (local) device database	Enterprise Media Manager database	EMM database
Global device database host Volume Database Host Device Allocation Host	Enterprise Media Manager Server	EMM Server
MDM Domain	Enterprise Media Manager Domain	EMM Domain
volume database host (Device Allocation Host)	Enterprise Media Manager Device Allocator	EMM/DA
Volume versus media Volume Pool Volume Group	No Change	

Support Changes for Robot Types

The following robot types are no longer valid robot types for NetBackup 6.0. The following bullets describe the changes in this release.

End of Life Notifications

- ◆ Configurations that contained TSD and TS8 robot types will be automatically upgraded to TLD and TL8 configurations, respectively.
- ◆ Configurations involving LMF and RSM robot types will no longer function. LMF configurations may need to be retired or replaced with other robotic library hardware/software. RSM configurations can be retired, replaced, or manually converted to use robot types with direct-SCSI or other supported API-based robotic control methods.

Note These robot levels may still appear in the NetBackup Administration Console to offer back-level support to the user.

End of Life Notification for Catalog

1. The offline catalog backup feature will be removed in the next major release of NetBackup. Improved functionality is currently available to user with the new online catalog backup.
2. A future release may replace the current catalog archiving feature with equivalent but more integrated functionality. Customers who use this feature may need to make procedural adjustments as a result.
3. A future release may require customers to move from configuration option IDIRSTRUCT1 to option IDIRSTRUCT2 prior to upgrading.
4. NetBackup will no longer support BPSCHED_VERBOSE with this release.

Customers who currently have this directive in their bp.conf file must remove it and configure verbosity for the scheduler component in nblog.conf using the vxlogcfg tool.

End of Life Notification for Devices

The following devices will no longer be supported at the next major release of NetBackup.

- ◆ STK SN6000 device

Notification of Client Interface

1. Support of the Motif client interface

NetBackup no longer includes the Motif version of the client interface (xbp).

- ◆ The command line interface (bp) will continue to be supported. It is available on all UNIX client platforms.

- ◆ The Java client GUI interface (jbpSA) will continue to be supported. Refer to the Platforms Supporting the NetBackup Administration Consoles for UNIX subsection for a list of supported platforms.

Database Agent Notifications

The following sections identify various deprecation notices within the NetBackup database agents.

SAP Agent

1. The following parameters in the NetBackup for SAP configuration file, `initSID.utl`, have been deprecated:

- ◆ `- policy_log`
- ◆ `- sched_log`
- ◆ `- second_secondary_archive`

These parameters were used to create a second backup copy of archive logs. However, this solution was not integrated very well with SAP Tools. This would require additional administration related to keeping track of second backup copies. The same functionality can be achieved in the following additional ways:

- ◆ By using two `brarchive` commands in sequence
- ◆ By using inline tape copy
- ◆ `- check_directory_flag`

This parameter allowed directory and subdirectory backups in previous releases of NetBackup. Only the default behavior is now supported, such as not allowing directory and subdirectory backups. If a directory is specified in the input file the agent will exit with following error:

```
ERROR: SAP style backup of directory structure for < dir >
not supported
```

For more information, see the NetBackup for SAP System Administration Guide for Windows or the NetBackup System Administration Guide for UNIX.

SQL Server Agent

1. Microsoft SQL Server 6.5

NetBackup 6.0 for Microsoft SQL Server does not support the backup or restore of SQL Server 6.5. NetBackup 4.5 was the last release to support backup of SQL Server 6.5. NetBackup 5.0 and 5.1 are the last versions to support restore of SQL Server 6.5.

End of Life Notifications

Microsoft Exchange Server Agent

1. Microsoft Exchange 5.5

NetBackup 6.0 for Microsoft Exchange is the last release to support both backup and restore of Microsoft Exchange 5.5. Support for Exchange 5.5 will be deprecated in a future release of NetBackup.

Notification of AFS

AFS is no longer available from IBM, and IBM has announced that AFS support will end on April 30, 2006. AFS was not tested with NetBackup 6.0 clients and will not be supported. AFS will continue to be supported with NetBackup 5.x clients running under 5.x or 6.0 servers.

Related Documents

A

This appendix lists and describes the technical manuals that relate to NetBackup.

The CD-ROM for each NetBackup product has a copy of the related manuals in Adobe Portable Document Format (PDF). The PDF files are either in the root directory or the Doc directory on the CD-ROM.

To view the PDF copies of the manuals, you need an Adobe Acrobat reader, which you can download from the Adobe web site at <http://www.adobe.com>. VERITAS assumes no responsibility for the correct installation or use of the reader.

Release Notes

- ◆ *VERITAS NetBackup Storage Migrator Release Notes for UNIX*

StoMigrator_ReleaseNotes_UNIX.pdf

Provides information such as the platforms and operating systems that are supported and operating notes that may not be in the Storage Migrator manuals.

Installation Guides

- ◆ *VERITAS NetBackup Installation Guide for UNIX*

NetBackup_Install_UNIX.pdf

Explains how to install NetBackup software on UNIX-based platforms.

- ◆ *VERITAS NetBackup Installation Guide for Windows*

NetBackup_Install_Win.pdf

Explains how to install NetBackup software on Windows-based platforms.

- ◆ *VERITAS Security Services Installation Guide*

VxSS_InstallGuide.pdf on the VERITAS Security Services CD-ROM.

Explains how to install and configure the VERITAS Security Services.

System Administrator's Guides - Basic Product

- ◆ *VERITAS NetBackup Operations Manager Getting Started Guide*
NetBackup_OM_GS_Guide.pdf
Explains how to install the NetBackup Operations Manager software.

System Administrator's Guides - Basic Product

- ◆ *VERITAS NetBackup System Administrator's Guide for UNIX, Volume I*
NetBackup_AdminGuideI_UNIXServer.pdf
Explains how to configure and manage NetBackup on a UNIX server, including managing storage units, backup policies, catalogs, and host properties.
- ◆ *VERITAS NetBackup System Administrator's Guide for UNIX, Volume II*
NetBackup_AdminGuideII_UNIXServer.pdf
Explains additional NetBackup features such as access control and enhanced authorization and authentication. The guide also discusses using NetBackup with AFS and Intelligent Disaster Recovery (IDR).
- ◆ *VERITAS NetBackup System Administrator's Guide for Windows, Volume I*
NetBackup_AdminGuideI_WinServer.pdf
Explains how to configure and manage NetBackup on a Windows server, including managing storage units, backup policies, catalogs, and host properties.
- ◆ *VERITAS NetBackup System Administrator's Guide for Windows, Volume II*
NetBackup_AdminGuideII_WinServer.pdf
Explains additional NetBackup features such as access control and enhanced authorization and authentication. The guide also discusses using NetBackup with AFS and Intelligent Disaster Recovery (IDR).
- ◆ *VERITAS NetBackup Media Manager System Administrator's Guide for UNIX*
MediaMgr_AdminGuide_Unix.pdf
Explains how to configure and manage the storage devices and media on UNIX servers running NetBackup. Media Manager is part of NetBackup.
- ◆ *VERITAS NetBackup Media Manager System Administrator's Guide for Windows*
MediaMgr_AdminGuide_Win.pdf
Explains how to configure and manage the storage devices and media on Windows servers running NetBackup. Media Manager is part of NetBackup.
- ◆ *VERITAS Security Services Administrator's Guide*

VxSS_AdminGuide.pdf on the VERITAS Security Services CD-ROM.

Explains how to configure and manage core security mechanisms, including authentication, protected communications, and authorization.

System Administrator's Guides - Agents and Options

- ◆ *VERITAS NetBackup Advanced Client System Administrator's Guide*

NetBackup_AdminGuide_AdvancedClient.pdf

Explains how to install, configure, and use NetBackup Advanced Client. Advanced Client combines the features of snapshot backup, FlashBackup, BLI Agent, offhost backup, and Instant Recovery.

- ◆ *VERITAS NetBackup Advanced Client Quick Start Guide*

NetBackup_QuickStart_AdvancedClient.pdf

Provides first-time instructions for installing and configuring Advanced Client.

- ◆ *VERITAS NetBackup for DB2 System Administrator's Guide for UNIX*

NetBackup_AdminGuide_DB2_Unix.pdf

Explains how to install, configure, and use NetBackup for DB2.

- ◆ *VERITAS NetBackup for DB2 System Administrator's Guide for Windows*

NetBackup_AdminGuide_DB2_Win.pdf

Explains how to install, configure, and use NetBackup for DB2.

- ◆ *VERITAS NetBackup Encryption System Administrator's Guide*

NetBackup_AdminGuide_Encryption.pdf

Explains how to install, configure, and use NetBackup encryption software to provide file-level encryption of backups and archives.

- ◆ *VERITAS NetBackup for Informix System Administrator's Guide*

NetBackup_AdminGuide_Informix.pdf

Explains how to install, configure, and use NetBackup for Informix to back up and restore Informix databases that are on a UNIX NetBackup client.

- ◆ *VERITAS NetBackup for Lotus Notes System Administrator's Guide for Windows*

NetBackup_AdminGuide_LotusNotes_Win.pdf

Explains how to install, configure, and use NetBackup for Lotus Notes to back up and restore Lotus Notes databases and transaction logs on a Windows client.

System Administrator's Guides - Agents and Options

- ◆ *VERITAS NetBackup for Lotus Notes System Administrator's Guide for UNIX*
NetBackup_AdminGuide_LotusNotes_Unix.pdf
Explains how to install, configure, and use NetBackup for Lotus Notes to back up and restore Lotus Notes databases and transaction logs on a UNIX client.
- ◆ *VERITAS NetBackup for Microsoft Exchange Server System Administrator's Guide*
NetBackup_AdminGuide_MSExchg_Win.pdf
Explains how to configure and use NetBackup for Microsoft Exchange Server to perform online backups and restores of Microsoft Exchange Server.
- ◆ *VERITAS NetBackup for Microsoft SQL Server System Administrator's Guide for Windows*
NetBackup_AdminGuide_MSSQL_Win.pdf
Explains how to install, configure, and use NetBackup for Microsoft SQL Server to back up and restore Microsoft SQL Server databases and transaction logs.
- ◆ *VERITAS NetBackup for NDMP System Administrator's Guide*
NetBackup_AdminGuide_NDMP.pdf
Explains how to install, configure, and use NetBackup for NDMP to control backups on an NDMP host.
- ◆ *VERITAS NetBackup for Oracle System Administrator's Guide for UNIX*
NetBackup_AdminGuide_Oracle_Unix.pdf
Explains how to install, configure, and use NetBackup for Oracle to back up and restore Oracle databases that are on a UNIX NetBackup client.
- ◆ *VERITAS NetBackup for Oracle System Administrator's Guide for Windows*
NetBackup_AdminGuide_Oracle_Win.pdf
Explains how to install, configure, and use NetBackup for Microsoft Oracle to back up and restore Oracle databases that are on a Windows NetBackup Client.
- ◆ *VERITAS NetBackup for SAP System Administrator's Guide for UNIX*
NetBackup_AdminGuide_SAP_Unix.pdf
Explains how to install, configure, and use NetBackup for SAP on UNIX.
- ◆ *VERITAS NetBackup for SAP System Administrator's Guide for Windows*
NetBackup_AdminGuide_SAP_Win.pdf
Explains how to install, configure, and use NetBackup for SAP on Windows-based servers.
- ◆ *VERITAS NetBackup for Microsoft SharePoint Portal Server 2001 System Administrator's Guide for Windows*

NetBackup_AdminGuide_SharePointPortal2001.pdf

Explains how to install, configure, and use NetBackup for SharePoint Portal Server 2001 to back up and restore Sybase databases that are on a Windows NetBackup client.

- ◆ *VERITAS NetBackup for Microsoft SharePoint Portal Server 2003 System Administrator's Guide for Windows*

NetBackup_AdminGuide_SharePointPortal.pdf

Explains how to install, configure, and use NetBackup for SharePoint Portal Server 2003 to back up and restore Sybase databases that are on a Windows NetBackup client.

- ◆ *VERITAS NetBackup for SYBASE System Administrator's Guide for UNIX*

NetBackup_AdminGuide_Sybase_Unix.pdf

Explains how to install, configure, and use NetBackup for SYBASE to back up and restore Sybase databases that are on a UNIX NetBackup client.

- ◆ *VERITAS NetBackup for SYBASE System Administrator's Guide on Windows*

NetBackup_AdminGuide_Sybase_Win.pdf

Explains how to install, configure, and use NetBackup for SYBASE to back up and restore Sybase databases that are on a Windows NetBackup client.

- ◆ *VERITAS NetBackup High Availability System Administrator's Guide*

NetBackup_AdminGuide_HighAvailability.pdf

This guide provides information on how to install and configure NetBackup to work with different clustering solutions.

- ◆ *VERITAS NetBackup Bare Metal Restore System Administrator's Guide*

NetBackup_AdminGuide_BMR.pdf

Describes how to install, configure, and use Bare Metal Restore to protect and restore client systems. For UNIX, Windows, and Linux.

- ◆ *VERITAS NetBackup Vault System Administrator's Guide*

NetBackup_AdminGuide_Vault.pdf

Describes how to install, configure, and use logical vaults and profiles to duplicate backups, perform catalog backups, eject media, and generate reports. For UNIX, Windows, and Linux.

- ◆ *VERITAS NetBackup Storage Migrator System Administrator's Guide for UNIX*

StoMigrator_AdminGuide_UNIX.pdf

Explains how to configure and manage Storage Migrator on a UNIX system.

User's Guides

- ◆ *VERITAS NetBackup NetWare Media Server Option System Administrator's Guide for UNIX and Windows*

NetBackup_AdminGuide_NetWareServer.pdf

This comprehensive manual provides detailed information and procedures for installing, configuring, and using the VERITAS NetBackup NetWare Media Server Option.

User's Guides

- ◆ *VERITAS NetBackup Backup, Archive, and Restore Getting Started Guide*

NetBackup_BAR_GS_Guide.pdf

Explains how to use the NetBackup Backup, Archive, and Restore interface to perform basic backup and restore operations for UNIX, Windows, and Linux systems.

- ◆ *VERITAS NetBackup Vault Operator's Guide*

NetBackup_OperGuide_Vault.pdf

Describes procedures for sending tapes offsite, receiving tapes on site, and running reports on off-site media and vault jobs. For UNIX, Windows, and Linux.

- ◆ *VERITAS NetBackup Administrator's Guide for Novell NetWare Client*

NetBackup_AdminGuide_NetWare_Client.pdf

Explains how to install and use the NetBackup's NetWare Client software. With the NetWare Client, full and incremental backups can be scheduled to occur automatically and unattended under the control of the NetBackup master server. The NetWare Client also provides two methods for performing user-directed backups and restores: Target, which uses a character-based, menu-driven interface running on the NetWare server, and NonTarget, which uses the NetBackup for NetWare NonTarget Browser that is installed and run from a Windows computer.

Device Configuration Guide - Media Manager

- ◆ *VERITAS NetBackup Media Manager Device Configuration Guide for UNIX and Windows*

MediaMgr_DeviceConfig_Guide.pdf

Explains how to add device drivers and perform other system-level configurations for storage devices and media servers (or SAN media servers) that are supported by NetBackup Media Manager.

Troubleshooting Guide

- ◆ *VERITAS NetBackup Troubleshooting Guide for UNIX and Windows*

NetBackup_Troubleshoot_Guide.pdf

Provides troubleshooting information for UNIX- and Windows-based NetBackup products, including Media Manager.

NetBackup Commands

- ◆ *VERITAS NetBackup Commands for UNIX*

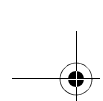
NetBackup_Commands_UNIX.pdf

Describes NetBackup and Media Manager commands and processes that can be run from a UNIX command line.

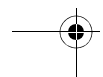
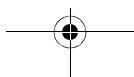
- ◆ *VERITAS NetBackup Commands for Windows*

NetBackup_Commands_Win.pdf

Describes NetBackup and Media Manager commands and processes that can be run from a Windows command prompt.



NetBackup Commands



Third-Party Copyright Appendix

B

Certain third-party software may be distributed, embedded, or bundled with the VERITAS product or recommended for use in connection with its installation and use. Such third-party software is separately licensed by its copyright holder. Use of the third-party software must be in accordance with its license terms. This appendix contains the licenses which govern the use of third-party software and its copyright holder's proprietary notices. VERITAS makes no representation or warranty of any kind regarding such third-party software. VERITAS offers no support for such third-party software and shall have no liability associated with its use.

Vendor

St. BERNARD Software, Inc.

Third-Party Software Program

Open File Manager

Proprietary Notices

Copyright (c) 2005 "St. Bernard Software" and "Open File Manager" are trademarks of St. Bernard Software Inc. All other trademarks are hereby acknowledged

Vendor

Sun Microsystems, Inc.

Third-Party Software Program

Java 2 Runtime Environment

Proprietary Notices

Copyright 2005 Sun Microsystems, Inc.,

License Text

Sun Microsystems, Inc.

Binary Code License Agreement for the JAVATM 2 RUNTIME ENVIRONMENT (J2RE), STANDARD EDITION, VERSION 1.4.2_X
SUN MICROSYSTEMS, INC. ("SUN") IS WILLING TO LICENSE THE SOFTWARE IDENTIFIED BELOW TO YOU ONLY UPON THE CONDITION THAT YOU ACCEPT ALL OF THE TERMS CONTAINED IN THIS BINARY CODE LICENSE AGREEMENT AND SUPPLEMENTAL LICENSE TERMS (COLLECTIVELY "AGREEMENT"). PLEASE READ THE AGREEMENT CAREFULLY. BY DOWNLOADING OR INSTALLING THIS SOFTWARE, YOU ACCEPT THE TERMS OF THE AGREEMENT. INDICATE ACCEPTANCE BY SELECTING THE "ACCEPT" BUTTON AT THE BOTTOM OF THE AGREEMENT. IF YOU ARE NOT WILLING TO BE BOUND BY ALL THE TERMS, SELECT THE "DECLINE" BUTTON AT THE BOTTOM OF THE AGREEMENT AND THE DOWNLOAD OR INSTALL PROCESS WILL NOT CONTINUE.

1.DEFINITIONS. "Software" means the identified above in binary form, any other machine readable materials (including, but not limited to, libraries, source files, header files, and data files), any updates or error corrections provided by Sun, and any user manuals, programming guides and other documentation provided to you by Sun under this Agreement. "Programs" mean Java applets and applications intended to run on the Java 2 Platform, Standard Edition (J2SETM platform) platform on Java-enabled general purpose desktop computers and servers.

2.LICENSE TO USE. Subject to the terms and conditions of this Agreement, including, but not limited to the Java Technology Restrictions of the Supplemental License Terms, Sun grants you a non-exclusive, non-transferable, limited license without license fees to reproduce and use internally Software complete and unmodified for the sole purpose of running Programs. Additional licenses for developers and/or publishers are granted in the Supplemental License Terms.

3.RESTRICTIONS. Software is confidential and copyrighted. Title to Software and all associated intellectual property rights is retained by Sun and/or its licensors. Unless enforcement is prohibited by applicable law, you may not modify, decompile, or reverse engineer Software. You acknowledge that Licensed Software is not designed or intended for use in the design, construction, operation or maintenance of any nuclear facility. Sun Microsystems, Inc. disclaims any express or implied warranty of fitness for such uses. No right, title or interest in or to any trademark, service mark, logo or trade name of

Sun or its licensors is granted under this Agreement. Additional restrictions for developers and/or publishers licenses are set forth in the Supplemental License Terms.

4.LIMITED WARRANTY. Sun warrants to you that for a period of ninety (90) days from the date of purchase, as evidenced by a copy of the receipt, the media on which Software is furnished (if any) will be free of defects in materials and workmanship under normal use. Except for the foregoing, Software is provided "AS IS". Your exclusive remedy and Sun's entire liability under this limited warranty will be at Sun's option to replace Software media or refund the fee paid for Software. Any implied warranties on the Software are limited to 90 days. Some states do not allow limitations on duration of an implied warranty, so the above may not apply to you. This limited warranty gives you specific legal rights. You may have others, which vary from state to state.

5.DISCLAIMER OF WARRANTY. UNLESS SPECIFIED IN THIS AGREEMENT, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT THESE DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

6.LIMITATION OF LIABILITY. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL SUN OR ITS LICENSORS BE LIABLE FOR ANY LOST REVENUE, PROFIT OR DATA, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, HOWEVER CAUSED REGARDLESS OF THE THEORY OF LIABILITY, ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE SOFTWARE, EVEN IF SUN HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event will Sun's liability to you, whether in contract, tort (including negligence), or otherwise, exceed the amount paid by you for Software under this Agreement. The foregoing limitations will apply even if the above stated warranty fails of its essential purpose. Some states do not allow the exclusion of incidental or consequential damages, so some of the terms above may not be applicable to you.

7.SOFTWARE UPDATES FROM SUN. You acknowledge that at your request or consent optional features of the Software may download, install, and execute applets, applications, software extensions, and updated versions of the Software from Sun ("Software Updates"), which may require you to accept updated terms and conditions for installation. If additional terms and conditions are not presented on installation, the Software Updates will be considered part of the Software and subject to the terms and conditions of the Agreement.

8.SOFTWARE FROM SOURCES OTHER THAN SUN. You acknowledge that, by your use of optional features of the Software and/or by requesting services that require use of the optional features of the Software, the Software may automatically download, install, and execute software applications from sources other than Sun ("Other Software"). Sun makes no representations of a relationship of any kind to licensors of Other Software. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL SUN OR ITS LICENSORS BE LIABLE FOR ANY LOST REVENUE, PROFIT OR DATA, OR FOR

SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, HOWEVER CAUSED REGARDLESS OF THE THEORY OF LIABILITY, ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE OTHER SOFTWARE, EVEN IF SUN HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Some states do not allow the exclusion of incidental or consequential damages, so some of the terms above may not be applicable to you.

9.TERMINATION. This Agreement is effective until terminated. You may terminate this Agreement at any time by destroying all copies of Software. This Agreement will terminate immediately without notice from Sun if you fail to comply with any provision of this Agreement. Either party may terminate this Agreement immediately should any Software become, or in either party's opinion be likely to become, the subject of a claim of infringement of any intellectual property right. Upon Termination, you must destroy all copies of Software.

10.EXPORT REGULATIONS. All Software and technical data delivered under this Agreement are subject to US export control laws and may be subject to export or import regulations in other countries. You agree to comply strictly with all such laws and regulations and acknowledge that you have the responsibility to obtain such licenses to export, re-export, or import as may be required after delivery to you.

11.TRADEMARKS AND LOGOS. You acknowledge and agree as between you and Sun that Sun owns the SUN, SOLARIS, JAVA, JINI, FORTE, and iPLANET trademarks and all SUN, SOLARIS, JAVA, JINI, FORTE, and iPLANET-related trademarks, service marks, logos and other brand designations ("Sun Marks"), and you agree to comply with the Sun Trademark and Logo Usage Requirements currently located at <http://www.sun.com/policies/trademarks>. Any use you make of the Sun Marks inures to Sun's benefit.

12.U.S. GOVERNMENT RESTRICTED RIGHTS. If Software is being acquired by or on behalf of the U.S. Government or by a U.S. Government prime contractor or subcontractor (at any tier), then the Government's rights in Software and accompanying documentation will be only as set forth in this Agreement; this is in accordance with 48 CFR 227.7201 through 227.7202-4 (for Department of Defense (DOD) acquisitions) and with 48 CFR 2.101 and 12.212 (for non-DOD acquisitions).

13. **GOVERNING LAW.** Any action related to this Agreement will be governed by California law and controlling U.S. federal law. No choice of law rules of any jurisdiction will apply.

14. **SEVERABILITY.** If any provision of this Agreement is held to be unenforceable, this Agreement will remain in effect with the provision omitted, unless omission would frustrate the intent of the parties, in which case this Agreement will immediately terminate.

15. **INTEGRATION.** This Agreement is the entire agreement between you and Sun relating to its subject matter. It supersedes all prior or contemporaneous oral or written communications, proposals, representations and warranties and prevails over any conflicting or additional terms of any quote, order, acknowledgment, or other communication between the parties relating to its subject matter during the term of this Agreement. No modification of this Agreement will be binding, unless in writing and signed by an authorized representative of each party.

SUPPLEMENTAL LICENSE TERMS

These Supplemental License Terms add to or modify the terms of the Binary Code License Agreement. Capitalized terms not defined in these Supplemental Terms shall have the same meanings ascribed to them in the Binary Code License Agreement. These Supplemental Terms shall supersede any inconsistent or conflicting terms in the Binary Code License Agreement, or in any license contained within the Software.

A. **Software Internal Use and Development License Grant.** Subject to the terms and conditions of this Agreement, including, but not limited to the Java Technology Restrictions of these Supplemental Terms, Sun grants you a non-exclusive, non-transferable, limited license without fees to reproduce internally and use internally the Software complete and unmodified (unless otherwise specified in the applicable README file) for the purpose of designing, developing, and testing your Programs.

B. **License to Distribute Software.** Subject to the terms and conditions of this Agreement, including, but not limited to the Java Technology Restrictions of these Supplemental Terms, Sun grants you a non-exclusive, non-transferable, limited license without fees to reproduce and distribute the Software, provided that (i) you distribute the Software complete and unmodified (unless otherwise specified in the applicable README file) and only bundled as part of, and for the sole purpose of running, your Programs, (ii) the Programs add significant and primary functionality to the Software, (iii) you do not distribute

additional software intended to replace any component(s) of the Software (unless otherwise specified in the applicable README file), (iv) you do not remove or alter any proprietary legends or notices contained in the Software, (v) you only distribute the Software subject to a license agreement that protects Sun's interests consistent with the terms contained in this Agreement, and (vi) you agree to defend and indemnify Sun and its licensors from and against any damages, costs, liabilities, settlement amounts and/or expenses (including attorneys' fees) incurred in connection with any claim, lawsuit or action by any third party that arises or results from the use or distribution of any and all Programs and/or Software.

C. **License to Distribute Redistributables.** Subject to the terms and conditions of this Agreement, including but not limited to the Java Technology Restrictions of these Supplemental Terms, Sun grants you a non-exclusive, non-transferable, limited license without fees to reproduce and distribute those files specifically identified as redistributable in the Software "README" file ("Redistributables") provided that: (i) you distribute the Redistributables complete and unmodified (unless otherwise specified in the applicable README file), and only bundled as part of Programs, (ii) you do not distribute additional software intended to supersede any component(s) of the

Redistributables (unless otherwise specified in the applicable README file), (iii) you do not remove or alter any proprietary legends or notices contained in or on the Redistributables, (iv) you only distribute the Redistributables pursuant to a license agreement that protects Sun's interests consistent with the terms contained in the Agreement, (v) you agree to defend and indemnify Sun and its licensors from and against any damages, costs, liabilities, settlement amounts and/or expenses (including attorneys' fees) incurred in connection with any claim, lawsuit or action by any third party that arises or results from the use or distribution of any and all Programs and/or Software.

D. **Java Technology Restrictions.** You may not modify the Java Platform Interface ("JPI", identified as classes contained within the "java" package or any subpackages of the "java" package), by creating additional classes within the JPI or otherwise causing the addition to or modification of the classes in the JPI. In the event that you create an additional class and associated API(s) which (i) extends the functionality of the Java platform, and (ii) is exposed to third party software developers for the purpose of developing additional software which invokes such additional API, you must promptly publish broadly an accurate specification for such API for free use by all developers. You may not create, or authorize your licensees to create, additional classes, interfaces, or subpackages that are in any way identified as "java", "javax", "sun" or similar convention as specified by Sun in any naming convention designation.

E. **Source Code.** Software may contain source code that, unless expressly licensed for other purposes, is provided solely for reference purposes pursuant to the terms of this Agreement. Source code may not be redistributed unless expressly provided for in this Agreement.

F. **Third Party Code.** Additional copyright notices and license terms applicable to portions of the Software are set forth in the THIRDPARTYLICENSEREADME.txt file. In addition to any terms and conditions of any third party open-source/freeware license identified in the THIRDPARTYLICENSEREADME.txt file, the disclaimer of warranty and limitation of liability provisions in paragraphs 5 and 6 of the Binary Code License Agreement shall apply to all Software in this distribution.

For inquiries please contact: Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, U.S.A. (LFI#135955/Form ID#011801)

Vendor

Sourceforge.net

Third-Party Software Program

JUnit

Proprietary Notices

JUnit 3.8.1 was developed by JUnit.org (<http://www.junit.org/>). JUnit is located in junit.jar.

License Text

JUnit 3.8.1 was developed by JUnit.org (<http://www.junit.org/>). JUnit is located in junit.jar.

Your use of JUnit 3.8.1 is subject to the terms and conditions of the Common Public License v 1.0 which is available at <http://oss.software.ibm.com/developerworks/opensource/license10.html>. More specifically:

THE ACCOMPANYING PROGRAM IS PROVIDED UNDER THE TERMS OF THIS COMMON PUBLIC LICENSE ("AGREEMENT"). ANY USE, REPRODUCTION OR DISTRIBUTION OF THE PROGRAM CONSTITUTES RECIPIENT'S ACCEPTANCE OF THIS AGREEMENT.

1. DEFINITIONS

"Contribution" means:

- a) in the case of the initial Contributor, the initial code and documentation distributed under this Agreement, and
- b) in the case of each subsequent Contributor:
 - i) changes to the Program, and
 - ii) additions to the Program;

where such changes and/or additions to the Program originate from and are distributed by that particular Contributor. A Contribution 'originates' from a Contributor if it was added to the Program by such Contributor itself or anyone acting on such Contributor's behalf. Contributions do not include additions to the Program which: (i) are separate modules of software distributed in conjunction with the Program under their own license agreement, and (ii) are not derivative works of the Program.

"Contributor" means any person or entity that distributes the Program.

"Licensed Patents " mean patent claims licensable by a Contributor which are necessarily infringed by the use or sale of its Contribution alone or when combined with the Program.

"Program" means the Contributions distributed in accordance with this Agreement.

"Recipient" means anyone who receives the Program under this Agreement, including all Contributors.

2. GRANT OF RIGHTS

- a) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free copyright license to reproduce, prepare derivative works of, publicly display, publicly perform, distribute and sublicense the Contribution of such Contributor, if any, and such derivative works, in source code and object code form.
- b) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free patent license under Licensed Patents to make, use, sell, offer to sell, import and otherwise transfer the Contribution of such Contributor, if any, in source code and object code form. This patent license shall apply to the combination of the Contribution and the Program if, at the time the Contribution is added by the Contributor, such addition of the Contribution causes such combination to be covered by the Licensed Patents. The patent license shall not apply to any other combinations which include the Contribution. No hardware per se is licensed hereunder.
- c) Recipient understands that although each Contributor grants the licenses to its Contributions set forth herein, no assurances are provided by any Contributor that the Program does not infringe the patent or other intellectual property rights of any other entity. Each Contributor disclaims any liability to Recipient for claims brought by any other entity based on infringement of intellectual property rights or otherwise. As a condition to exercising the rights and licenses granted hereunder, each Recipient hereby assumes sole responsibility to secure any other intellectual property rights needed, if any. For example, if a third party patent license is required to allow Recipient to distribute the Program, it is Recipient's responsibility to acquire that license before distributing the Program.
- d) Each Contributor represents that to its knowledge it has sufficient copyright rights in its Contribution, if any, to grant the copyright license set forth in this Agreement.

3. REQUIREMENTS

A Contributor may choose to distribute the Program in object code form under its own license agreement, provided that:

- a) it complies with the terms and conditions of this Agreement; and
- b) its license agreement:
 - i) effectively disclaims on behalf of all Contributors all warranties and conditions, express and implied, including warranties or conditions of title and non-infringement, and implied warranties or conditions of merchantability and fitness for a particular purpose;
 - ii) effectively excludes on behalf of all Contributors all liability for damages, including direct, indirect, special, incidental and consequential damages, such as lost profits;
 - iii) states that any provisions which differ from this Agreement are offered by that Contributor alone and not by any other party; and
 - iv) states that source code for the Program is available from such Contributor, and informs licensees how to obtain it in a reasonable manner on or through a medium customarily used for software exchange.

When the Program is made available in source code form:

- a) it must be made available under this Agreement; and
- b) a copy of this Agreement must be included with each copy of the Program.

Contributors may not remove or alter any copyright notices contained within the Program.

Each Contributor must identify itself as the originator of its Contribution, if any, in a manner that reasonably allows subsequent Recipients to identify the originator of the Contribution.

4. COMMERCIAL DISTRIBUTION

Commercial distributors of software may accept certain responsibilities with respect to end users, business partners and the like. While this license is intended to facilitate the commercial use of the Program, the Contributor who includes the Program in a commercial product offering should do so in a manner which does not create potential liability for other Contributors. Therefore, if a Contributor includes the Program in a commercial product offering, such Contributor ("Commercial Contributor") hereby agrees to defend and indemnify every other Contributor ("Indemnified Contributor") against any losses, damages and costs (collectively "Losses") arising from claims, lawsuits and other legal actions brought by a third party against the Indemnified Contributor to the extent caused by the acts or omissions of such Commercial Contributor in connection with its distribution of the Program in a commercial product offering. The obligations in this section do not apply to any claims or Losses relating to any actual or alleged intellectual property infringement. In order to qualify, an Indemnified Contributor must: a) promptly notify the Commercial Contributor in writing of such claim, and b) allow the Commercial Contributor to control, and cooperate with the Commercial Contributor in, the defense and any related settlement negotiations. The Indemnified Contributor may participate in any such claim at its own expense.

For example, a Contributor might include the Program in a commercial product offering, Product X. That Contributor is then a Commercial Contributor. If that Commercial Contributor then makes performance claims, or offers warranties related to Product X, those performance claims and warranties are such Commercial Contributor's responsibility alone. Under this section, the Commercial Contributor would have to defend claims against the other Contributors related to those performance claims and warranties, and if a court requires any other Contributor to pay any damages as a result, the Commercial Contributor must pay those damages.

5. NO WARRANTY

EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, THE PROGRAM IS PROVIDED ON AN "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, EITHER EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR CONDITIONS OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Each Recipient is solely responsible for determining the appropriateness of using and distributing the Program and assumes all risks associated with its exercise of rights under this Agreement, including but not limited to the risks and costs of program errors, compliance with applicable laws, damage to or loss of data, programs or equipment, and unavailability or interruption of operations.

6. DISCLAIMER OF LIABILITY

EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, NEITHER RECIPIENT NOR ANY CONTRIBUTORS SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE PROGRAM OR THE EXERCISE OF ANY RIGHTS GRANTED HEREUNDER, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7. GENERAL

If any provision of this Agreement is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this Agreement, and without further action by the parties hereto, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable.

If Recipient institutes patent litigation against a Contributor with respect to a patent applicable to software (including a cross-claim or counterclaim in a lawsuit), then any patent licenses granted by that Contributor to such Recipient under this Agreement shall terminate as of the date such litigation is filed. In addition, if Recipient institutes patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Program itself (excluding combinations of the Program with other software or hardware) infringes such Recipient's patent(s), then such Recipient's rights granted under Section 2(b) shall terminate as of the date such litigation is filed.

All Recipient's rights under this Agreement shall terminate if it fails to comply with any of the material terms or conditions of this Agreement and does not cure such failure in a reasonable period of time after becoming aware of such noncompliance. If all Recipient's rights under this Agreement terminate, Recipient agrees to cease use and distribution of the Program as soon as reasonably practicable. However, Recipient's obligations under this Agreement and any licenses granted by Recipient relating to the Program shall continue and survive.

Everyone is permitted to copy and distribute copies of this Agreement, but in order to avoid inconsistency the Agreement is copyrighted and may only be modified in the following manner. The Agreement Steward reserves the right to publish new versions (including revisions) of this Agreement from time to time. No one other than the Agreement Steward has the right to modify this Agreement. IBM is the initial Agreement Steward. IBM may assign the responsibility to serve as the Agreement Steward to a suitable separate entity. Each new version of the Agreement will be given a distinguishing version number. The Program (including Contributions) may always be distributed subject to the version of the Agreement under which it was received. In addition, after a new version of the Agreement is published, Contributor may elect to distribute the Program (including its Contributions) under the new version. Except as expressly stated in Sections 2(a) and 2(b) above, Recipient receives no rights or licenses to the intellectual property of any Contributor under this Agreement, whether expressly, by implication, estoppel or otherwise. All rights in the Program not expressly granted under this Agreement are reserved.

This Agreement is governed by the laws of the State of New York and the intellectual property laws of the United States of America. No party to this Agreement will bring a legal action under this Agreement more than one year after the cause of action arose. Each party waives its rights to a jury trial in any resulting litigation.

Source code for JUnit is available.

Vendor

Sun Microsystems, Inc.

Third-Party Software Program

Java Development Kit (JDK) including Java Runtime Environment
(also known as Java JAVATM 2 SOFTWARE DEVELOPMENT KIT or "J2SDK")

Proprietary Notices

Copyright 2005 Sun Microsystems, Inc.,

License Text

Sun Microsystems, Inc

Binary Code License Agreement

SUN MICROSYSTEMS, INC. ("SUN") IS WILLING TO LICENSE THE SOFTWARE IDENTIFIED BELOW TO YOU ONLY UPON THE CONDITION THAT YOU ACCEPT ALL OF THE TERMS CONTAINED IN THIS BINARY CODE LICENSE AGREEMENT AND SUPPLEMENTAL LICENSE TERMS (COLLECTIVELY "AGREEMENT"). PLEASE READ THE AGREEMENT CAREFULLY. BY DOWNLOADING OR INSTALLING THIS SOFTWARE, YOU ACCEPT THE TERMS OF THE AGREEMENT. INDICATE ACCEPTANCE BY SELECTING THE "ACCEPT" BUTTON AT THE BOTTOM OF THE AGREEMENT. IF YOU ARE NOT WILLING TO BE BOUND BY ALL THE TERMS, SELECT THE "DECLINE" BUTTON AT THE BOTTOM OF THE AGREEMENT AND THE DOWNLOAD OR INSTALL PROCESS WILL NOT CONTINUE.

1. DEFINITIONS. "Software" means the identified above in binary form, any other machine readable materials (including, but not limited to, libraries, source files, header files, and data files), any updates or error corrections provided by Sun, and any user manuals, programming guides and other documentation provided to you by Sun under this Agreement. "Programs" mean Java applets and applications intended to run on the Java 2 Platform Standard Edition (J2SE platform) platform on Java-enabled general purpose desktop computers and servers.

2. LICENSE TO USE. Subject to the terms and conditions of this Agreement, including, but not limited to the Java Technology Restrictions of the Supplemental License Terms, Sun grants you a non-exclusive, non-transferable, limited license without license fees to reproduce and use internally Software complete and unmodified for the sole purpose of running Programs. Additional licenses for developers and/or publishers are granted in the Supplemental License Terms.

3. RESTRICTIONS. Software is confidential and copyrighted. Title to Software and all associated intellectual property rights is retained by Sun and/or its licensors. Unless enforcement is prohibited by applicable law, you may not modify, decompile, or reverse engineer Software. You acknowledge that Licensed Software is not designed or intended for use in the design, construction, operation or maintenance of any nuclear facility. Sun Microsystems, Inc. disclaims any express or implied warranty of fitness for such uses. No right, title or interest in or to any trademark, service mark, logo or trade name of Sun or its licensors is granted under this Agreement. Additional restrictions for developers and/or publishers licenses are set forth in the Supplemental License Terms.

4. LIMITED WARRANTY. Sun warrants to you that for a period of ninety (90) days from the date of purchase, as evidenced by a copy of the receipt, the media on which Software is furnished (if any) will be free of defects in materials and workmanship under normal use. Except for the foregoing, Software is provided "AS IS". Your exclusive remedy and Sun's entire liability under this limited warranty will be at Sun's option to replace Software media or refund the fee paid for Software. Any implied warranties on the Software are limited to 90 days. Some states do not allow limitations on duration of an implied warranty, so the above may not apply to you. This limited warranty gives you specific legal rights. You may have others, which vary from state to state.

5. DISCLAIMER OF WARRANTY. DISCLAIMER OF WARRANTY. UNLESS SPECIFIED IN THIS AGREEMENT, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT THESE DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

6. LIMITATION OF LIABILITY. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL SUN OR ITS LICENSORS BE LIABLE FOR ANY LOST REVENUE, PROFIT OR DATA, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, HOWEVER CAUSED REGARDLESS OF THE THEORY OF LIABILITY, ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE SOFTWARE, EVEN IF SUN HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event will Sun's liability to you, whether in contract, tort (including negligence), or otherwise, exceed the amount paid by you for Software under this Agreement. The foregoing limitations will apply even if the above stated warranty fails of its essential purpose. Some states do not allow the exclusion of incidental or consequential damages, so some of the terms above may not be applicable to you.

7.TERMINATION. This Agreement is effective until terminated. You may terminate this Agreement at any time by destroying all copies of Software. This Agreement will terminate immediately without notice from Sun if you fail to comply with any provision of this Agreement. Either party may terminate this Agreement immediately should any Software become, or in either party's opinion be likely to become, the subject of a claim of infringement of any intellectual property right. Upon Termination, you must destroy all copies of Software.

8.EXPORT REGULATIONS. All Software and technical data delivered under this Agreement are subject to US export control laws and may be subject to export or import regulations in other countries. You agree to comply strictly with all such laws and regulations and acknowledge that you have the responsibility to obtain such licenses to export, re-export, or import as may be required after delivery to you.

9.TRADEMARKS AND LOGOS. You acknowledge and agree as between you and Sun that Sun owns the SUN, SOLARIS, JAVA, JINI, FORTE, and iPLANET trademarks and all SUN, SOLARIS, JAVA, JINI, FORTE, and iPLANET-related trademarks, service marks, logos and other brand designations ("Sun Marks"), and you agree to comply with the Sun Trademark and Logo Usage Requirements currently located at <http://www.sun.com/policies/trademarks>. Any use you make of the Sun Marks inures to Sun's benefit.

10.U.S. GOVERNMENT RESTRICTED RIGHTS. If Software is being acquired by or on behalf of the U.S. Government or by a U.S. Government prime contractor or subcontractor (at any tier), then the Government's rights in Software and accompanying documentation will be only as set forth in this Agreement; this is in accordance with 48 CFR 227.7201 through 227.7202-4 (for Department of Defense (DOD) acquisitions) and with 48 CFR 2.101 and 12.212 (for non-DOD acquisitions).

11.GOVERNING LAW. Any action related to this Agreement will be governed by California law and controlling U.S. federal law. No choice of law rules of any jurisdiction will apply.

12.SEVERABILITY. If any provision of this Agreement is held to be unenforceable, this Agreement will remain in effect with the provision omitted, unless omission would frustrate the intent of the parties, in which case this Agreement will immediately terminate.

13.INTEGRATION. This Agreement is the entire agreement between you and Sun relating to its subject matter. It supersedes all prior or contemporaneous oral or written communications, proposals, representations and warranties and prevails over any conflicting or additional terms of any quote, order, acknowledgment, or other communication between the parties relating to its subject matter during the term of this Agreement. No modification of this Agreement will be binding, unless in writing and signed by an authorized representative of each party.

SUPPLEMENTAL LICENSE TERMS

These Supplemental License Terms add to or modify the terms of the Binary Code License Agreement. Capitalized terms not defined in these Supplemental Terms shall have the same meanings ascribed to them in the Binary Code License Agreement. These Supplemental Terms shall supersede any inconsistent or conflicting terms in the Binary Code License Agreement, or in any license contained within the Software.

A.Software Internal Use and Development License Grant. Subject to the terms and conditions of this Agreement and restrictions and exceptions set forth in the Software "README" file, including, but not limited to the Java Technology Restrictions of these Supplemental Terms, Sun grants you a non-exclusive, non-transferable, limited license without fees to reproduce internally and use internally the Software complete and unmodified for the purpose of designing, developing, and testing your Programs.

B.License to Distribute Software. Subject to the terms and conditions of this Agreement and restrictions and exceptions set forth in the Software README file, including, but not limited to the Java Technology Restrictions of these Supplemental Terms, Sun grants you a non-exclusive, non-transferable, limited license without fees to reproduce and distribute the Software, provided that (i) you distribute the Software complete and unmodified and only bundled as part of, and for the sole purpose of running, your Programs, (ii) the Programs add significant and primary functionality to the Software, (iii) you do not distribute additional software intended to replace any component(s) of the Software, (iv) you do not remove or alter any proprietary legends or notices contained in the Software, (v) you only distribute the Software subject to a license agreement that protects Sun's interests consistent with the terms contained in this Agreement, and (vi) you agree to defend and indemnify Sun and its licensors from and against any damages, costs, liabilities, settlement amounts and/or expenses (including attorneys' fees) incurred in connection with any claim, lawsuit or action by any third party that arises or results from the use or distribution of any and all Programs and/or Software.

C.Java Technology Restrictions. You may not create, modify, or change the behavior of, or authorize your licensees to create, modify, or change the behavior of, classes, interfaces, or subpackages that are in any way identified as "java", "javax", "sun" or similar convention as specified by Sun in any naming convention designation.

D.Source Code. Software may contain source code that, unless expressly licensed for other purposes, is provided solely for reference purposes pursuant to the terms of this Agreement. Source code may not be redistributed unless expressly provided for in this Agreement.

E.Third Party Code. Additional copyright notices and license terms applicable to portions of the Software are set forth in the THIRDPARTYLICENSEREADME.txt file. In addition to any terms and conditions of any third party open-source/freeware license identified in the THIRDPARTYLICENSEREADME.txt file, the disclaimer of warranty and limitation of liability provisions in paragraphs 5 and 6 of the Binary Code License Agreement shall apply to all Software in this distribution.

For inquiries please contact: Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, U.S.A. (LFI#141623/Form ID#011801)

Vendor

Boris Fomitchey

Third-Party Software Program

STLport

Proprietary Notices

Copyright 1999,2000 Boris Fomitchev

License Text

License Agreement

Boris Fomitchev grants Licensee a non-exclusive, non-transferable, royalty-free license to use STLport and its documentation without fee.

By downloading, using, or copying STLport or any portion thereof, Licensee agrees to abide by the intellectual property laws and all other applicable laws of the United States of America, and to all of the terms and conditions of this Agreement.

Licensee shall maintain the following copyright and permission notices on STLport sources and its documentation unchanged :

Copyright 1999,2000 Boris Fomitchev

This material is provided "as is", with absolutely no warranty expressed or implied. Any use is at your own risk.

Permission to use or copy this software for any purpose is hereby granted without fee, provided the above notices are retained on all copies. Permission to modify the code and to distribute modified code is granted, provided the above notices are retained, and a notice that the code was modified is included with the above copyright notice.

The Licensee may distribute binaries compiled with STLport (whether original or modified) without any royalties or restrictions.

The Licensee may distribute original or modified STLport sources, provided that:

·The conditions indicated in the above permission notice are met;

·The following copyright notices are retained when present, and conditions provided in accompanying permission notices are met :

Copyright 1994 Hewlett-Packard Company

Copyright 1996,97 Silicon Graphics Computer Systems, Inc.

Copyright 1997 Moscow Center for SPARC Technology.

Permission to use, copy, modify, distribute and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation. Hewlett-Packard Company makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

Permission to use, copy, modify, distribute and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation. Silicon Graphics makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

Permission to use, copy, modify, distribute and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation. Moscow Center for SPARC Technology makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

Vendor

Philip Hazel

Third-Party Software Program

Perl Compatible Regular Expressions

Proprietary Notices

Regular expression support is provided by the PCRE library package, which is open source software, written by Philip Hazel, and copyright by the University of Cambridge, England.

The ftp site for the source is <ftp://ftp.csx.ac.uk/pub/software/programming/pcre/>

License Text

PCRE LICENCE

PCRE is a library of functions to support regular expressions whose syntax and semantics are as close as possible to those of the Perl 5 language.

Written by: Philip Hazel <ph10@cam.ac.uk>

University of Cambridge Computing Service,

Cambridge, England. Phone: +44 1223 334714.

Copyright (c) 1997-2003 University of Cambridge

Permission is granted to anyone to use this software for any purpose on any computer system, and to redistribute it freely, subject to the following restrictions:

1. This software is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
2. The origin of this software must not be misrepresented, either by explicit claim or by omission. In practice, this means that if you use PCRE in software that you distribute to others, commercially or

otherwise, you must put a sentence like this

Regular expression support is provided by the PCRE library package, which is open source software, written by Philip Hazel, and copyright by the University of Cambridge, England.

somewhere reasonably visible in your documentation and in any relevant files or online help data or similar. A reference to the ftp site for the source, that is, to <ftp://ftp.csx.cam.ac.uk/pub/software/programming/pcre/>

should also be given in the documentation. However, this condition is not intended to apply to whole chains of software. If package A includes PCRE, it must acknowledge it, but if package B is software that includes package A, the condition is not imposed on package B (unless it uses PCRE independently).

3. Altered versions must be plainly marked as such, and must not be misrepresented as being the original software.

4. If PCRE is embedded in any software that is released under the GNU General Purpose Licence (GPL), or Lesser General Purpose Licence (LGPL), then the terms of that licence shall supersede any condition above with which it is incompatible.

The documentation for PCRE, supplied in the "doc" directory, is distributed under the same terms as the software itself.

End

Vendor

JDOM Project

Third-Party Software Program

JDOM

Proprietary Notices

Copyright (C) 2000-2004 Jason Hunter & Brett McLaughlin. All rights reserved.

License Text

/*--

\$Id: LICENSE.txt,v 1.11 2004/02/06 09:32:57 jhunter Exp \$

Copyright (C) 2000-2004 Jason Hunter & Brett McLaughlin. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions, and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions, and the disclaimer that follows these conditions in the documentation and/or other materials provided with the distribution.
3. The name "JDOM" must not be used to endorse or promote products derived from this software without prior written permission. For written permission, please contact <request_AT_jdom_DOT_org>.
4. Products derived from this software may not be called "JDOM", nor may "JDOM" appear in their name, without prior written permission from the JDOM Project Management <request_AT_jdom_DOT_org>.

In addition, we request (but do not require) that you include in the end-user documentation provided with the redistribution and/or in the software itself an acknowledgement equivalent to the following:

"This product includes software developed by the JDOM Project <http://www.jdom.org/>."

Alternatively, the acknowledgment may be graphical using the logos available at <http://www.jdom.org/images/logos>.

THIS SOFTWARE IS PROVIDED "AS IS" AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE JDOM AUTHORS OR THE PROJECT CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS

OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

This software consists of voluntary contributions made by many individuals on behalf of the JDOM Project and was originally created by Jason Hunter <jhunter_AT_jdom_DOT_org> and Brett McLaughlin <brett_AT_jdom_DOT_org>. For more information on the JDOM Project, please see <<http://www.jdom.org/>>.

Vendor

Daniel Stenberg

Third-Party Software Program

Curl/LibCurl

Proprietary Notices

Copyright (c) 1996 - 2004, Daniel Stenberg, <daniel@haxx.se>. All rights reserved.

License Text

The curl license

COPYRIGHT AND PERMISSION NOTICE

Copyright (c) 1996 - 2004, Daniel Stenberg, <daniel@haxx.se>.

All rights reserved.

Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,

FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM,

DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization of the copyright holder.

Vendor

Apache Software Foundation

Third-Party Software Programs

Tomcat

Proprietary Notices

Portions of this program contain components from the Apache Software Foundation. These components are made available under the Apache License 2.0, a copy of which is provided herein.

License Text

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of,

publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

- (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and
- (b) You must cause any modified files to carry prominent notices stating that You changed the files; and
- (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and
- (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. **Disclaimer of Warranty.** Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. **Limitation of Liability.** In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. **Accepting Warranty or Additional Liability.** While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Vendor

Apache Software Foundation

Third-Party Software Programs

Apache Struts

Proprietary Notices

Portions of this program contain components from the Apache Software Foundation. These components are made available under the Apache License 2.0, a copy of which is provided herein.

License Text

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of,

publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Vendor

Apache Software Foundation

Third-Party Software Programs

obj

Proprietary Notices

Portions of this program contain components from the Apache Software Foundation. These components are made available under the Apache License 2.0, a copy of which is provided herein.

License Text

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal,

or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of,

publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Vendor

Apache Software Foundation

Third-Party Software Programs

Log4j

Proprietary Notices

Portions of this program contain components from the Apache Software Foundation. These components are made available under the Apache License 2.0, a copy of which is provided herein.

License Text

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of,

publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Vendor

Apache Software Foundation

Third-Party Software Programs

Axis

Proprietary Notices

Portions of this program contain components from the Apache Software Foundation. These components are made available under the Apache License 2.0, a copy of which is provided herein.

License Text

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If

You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

- (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and
- (b) You must cause any modified files to carry prominent notices stating that You changed the files; and
- (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and
- (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Vendor

Douglas C. Schmidt and his research group at Washington University and University of California, Irvine and Vanderbilt University

Third-Party Software Program

ACE (The Adaptive Communication Environment)

Proprietary Notices

"ACE(TM) is copyrighted by Douglas C. Schmidt and his research group at Washington University, University of California, Irvine, and Vanderbilt University Copyright (c) 1993-2003, all rights reserved."

License Text

Copyright and Licensing Information for ACE(TM), TAO(TM), CIAO(TM), and CoSMIC(TM)

ACE(TM), TAO(TM), CIAO(TM), and CoSMIC(TM) (henceforth referred to as "DOC software") are copyrighted by Douglas C. Schmidt and his research group at Washington University, University of California, Irvine, and Vanderbilt University. Copyright (c) 1993-2004, all rights reserved. Since DOC software is open-source, free software, you are free to use, modify, copy, and distribute--perpetually and irrevocably--the DOC software source code and object code produced from the source, as well as copy and distribute modified versions of this software. You must, however, include this copyright statement along with code built using DOC software.

You can use DOC software in proprietary software and are under no obligation to redistribute any of your source code that is built using DOC software. Note, however, that you may not do anything to the DOC software code, such as copyrighting it yourself or claiming authorship of the DOC software code, that will prevent DOC software from being distributed freely using an open-source development model. You needn't inform anyone that you're using DOC software in your software, though we encourage you to let us know so we can promote your project in the DOC software success stories..

DOC software is provided as is with no warranties of any kind, including the warranties of design, merchantability, and fitness for a particular purpose, noninfringement, or arising from a course of dealing, usage or trade practice. Moreover, DOC software is provided with no support and without any obligation on the part of Washington University, UC Irvine, Vanderbilt University, their employees, or students to assist in its use, correction, modification, or enhancement. A number of companies around the world provide commercial support for DOC software, however. DOC software is Y2K-compliant, as long as the underlying OS platform is Y2K-compliant.

Washington University, UC Irvine, Vanderbilt University, their employees, and students shall have no liability with respect to the infringement of copyrights, trade secrets or any patents by DOC software or any part thereof. Moreover, in no event will Washington University, UC Irvine, or Vanderbilt University, their employees, or students be liable for any lost revenue or profits or other special, indirect and consequential damages.

The ACE, TAO, CIAO, and CoSMIC web sites are maintained by the DOC Group at the Institute for Software Integrated Systems (ISIS) and the Center for Distributed Object Computing of Washington University, St. Louis for the development of open-source software as part of the open-source software community. By submitting comments, suggestions, code, code snippets, techniques (including that of usage), and algorithms, submitters acknowledge that they have the right to do so, that any such submissions are given freely and unreservedly, and that they waive any claims to copyright or ownership. In addition, submitters acknowledge that any such submission might become part of the copyright maintained on the overall body of code, which comprises the DOC software. By making a submission, submitter agree to these terms. Furthermore, submitters acknowledge that the incorporation or modification of such submissions is entirely at the discretion of the moderators of the open-source DOC software projects or their designees.

The names ACE(TM), TAO(TM), CIAO(TM), CoSMIC(TM), Washington University, UC Irvine, and Vanderbilt University, may not be used to endorse or promote products or services derived from this source without express written permission from Washington University, UC Irvine, or Vanderbilt University. Further, products or services derived from this source may not be called ACE(TM), TAO(TM), CIAO(TM), or CoSMIC(TM) nor may the name Washington University, UC Irvine, or Vanderbilt University appear in their names, without express written permission from Washington University, UC Irvine, and Vanderbilt University.

If you have any suggestions, additions, comments, or questions, please let me know.

Douglas C. Schmidt

Vendor

Apache Software Foundation

Third-Party Software Program

Xerxes C++

Proprietary Notices

Portions of this program contain components from the Apache Software Foundation. These components are made available under the Apache License 2.0, a copy of which is provided herein.

License Text

Apache License, Version 2.0

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

a. You must give any other recipients of the Work or Derivative Works a copy of this License; and

b. You must cause any modified files to carry prominent notices stating that You changed the files; and

c. You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

d. If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. **Submission of Contributions.** Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. **Trademarks.** This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. **Disclaimer of Warranty.** Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. **Limitation of Liability.** In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. **Accepting Warranty or Additional Liability.** While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");

you may not use this file except in compliance with the License.

You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software

distributed under the License is distributed on an "AS IS" BASIS,

WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.

See the License for the specific language governing permissions and

limitations under the License.

Vendor

IBM

Third-Party Software Program

ICU

Proprietary Notices

Copyright (c) 1995-2003 International Business Machines Corporation and others

All rights reserved.

License Text

ICU License - ICU 1.8.1 and later

COPYRIGHT AND PERMISSION NOTICE

Copyright (c) 1995-2003 International Business Machines Corporation and others

All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, provided that the above copyright notice(s) and this permission notice appear in all copies of the Software and that both the above copyright notice(s) and this permission notice appear in supporting documentation.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF

MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT,

NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization of the copyright holder.

All trademarks and registered trademarks mentioned herein are the property of their respective owners.

Vendor

Jacorb.org

Third-Party Software Program

JacORB

Proprietary Notices

None

License Text

GNU LIBRARY GENERAL PUBLIC LICENSE

Version 2, June 1991

Copyright (C) 1991 Free Software Foundation, Inc. 675 Mass Ave, Cambridge, MA 02139, USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

[This is the first released version of the library GPL. It is numbered 2 because it goes with version 2 of the ordinary GPL.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Library General Public License, applies to some specially designated Free Software Foundation software, and to any other libraries whose authors decide to use it. You can use it for your libraries, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library, or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link a program with the library, you must provide complete object files to the recipients so that they can relink them with the library, after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

Our method of protecting your rights has two steps: (1) copyright the library, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the library.

Also, for each distributor's protection, we want to make certain that everyone understands that there is no warranty for this free library. If the library is modified by someone else and passed on, we want its recipients to know that what they have is not the original version, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that companies distributing free software will individually obtain patent licenses, thus in effect transforming the program into proprietary software. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License, which was designed for utility programs. This license, the GNU Library General Public License, applies to certain designated libraries. This license is quite different from the ordinary one; be sure to read it in full, and don't assume that anything in it is the same as in the ordinary license.

The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is in some sense simply using the library, and is analogous to running a utility program or application program. However, in a textual and legal sense, the linked executable is a combined work, a derivative of the original library, and the ordinary General Public License treats it as such.

Because of this blurred distinction, using the ordinary General Public License for libraries did not effectively promote software sharing, because most developers did not use the libraries. We concluded that weaker conditions might promote sharing better.

However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, while the latter only works together with the library.

Note that it is possible for a library to be covered by the ordinary General Public License rather than by this special one.

GNU LIBRARY GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Library General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions: a) The modified work must itself be a software library. b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change. c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License. d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful. (For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things: a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.) b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution. c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place. d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things: a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above. b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Library General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. END OF TERMS AND CONDITIONS

Appendix: How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found. Copyright (C) <year> <name of author>

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Library General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU Library General Public License for more details.

You should have received a copy of the GNU Library General Public License along with this library; if not, write to the Free Software Foundation, Inc., 675 Mass Ave, Cambridge, MA 02139, USA.

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library `Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990 Ty Coon, President of Vice

That's all there is to it!

Vendor

The OpenSSL Project

Third-Party Software Program

OpenSSL

Proprietary Notices

Copyright (c) 1998-2003 The OpenSSL Project. All rights reserved.

License Text

License

This is a copy of the current LICENSE file inside the CVS repository.

LICENSE ISSUES

=====

The OpenSSL toolkit stays under a dual license, i.e. both the conditions of the OpenSSL License and the original SSLeay license apply to the toolkit.

See below for the actual license texts. Actually both licenses are BSD-style Open Source licenses. In case of any license issues related to OpenSSL please contact openssl-core@openssl.org.

OpenSSL License

Copyright (c) 1998-2003 The OpenSSL Project. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgment:
"This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<http://www.openssl.org/>)"
4. The names "OpenSSL Toolkit" and "OpenSSL Project" must not be used to endorse or promote products derived from this software without prior written permission. For written permission, please contact openssl-core@openssl.org.
5. Products derived from this software may not be called "OpenSSL" nor may "OpenSSL" appear in their names without prior written permission of the OpenSSL Project.
6. Redistributions of any form whatsoever must retain the following acknowledgment:
"This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org/>)"

THIS SOFTWARE IS PROVIDED BY THE OpenSSL PROJECT ``AS IS'' AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE OpenSSL PROJECT OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

=====

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software written by Tim Hudson (tjh@cryptsoft.com).

/

Original SSLeay License

/* Copyright (C) 1995-1998 Eric Young (eay@cryptsoft.com)

All rights reserved.

This package is an SSL implementation written by Eric Young (eay@cryptsoft.com). The implementation was written so as to conform with Netscapes SSL.

This library is free for commercial and non-commercial use as long as the following conditions are aheared to. The following conditions apply to all code found in this distribution, be it the RC4, RSA, lhash, DES, etc., code; not just the SSL code. The SSL documentation included with this distribution is covered by the same copyright terms except that the holder is Tim Hudson (tjh@cryptsoft.com).

Copyright remains Eric Young's, and as such any Copyright notices in the code are not to be removed. If this package is used in a product, Eric Young should be given attribution as the author of the parts of the library used. This can be in the form of a textual message at program startup or in documentation (online or textual) provided with the package.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgement:

"This product includes cryptographic software written by Eric Young (eay@cryptsoft.com)"

The word 'cryptographic' can be left out if the routines from the library being used are not cryptographic related :-).

4. If you include any Windows specific code (or a derivative thereof) from the apps directory (application code) you must include an acknowledgement:

"This product includes software written by Tim Hudson (tjh@cryptsoft.com)"

THIS SOFTWARE IS PROVIDED BY ERIC YOUNG ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

The licence and distribution terms for any publically available version or derivative of this code cannot be changed. i.e. this code cannot simply be copied and put under another distribution licence [including the GNU Public Licence.]

Vendor

Perl.org

Third-Party Software Program

Perl

Proprietary Notices

Copyright (C) 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, by Larry Wall and others

All rights reserved."

License Text

Preamble

The intent of this document is to state the conditions under which a Package may be copied, such that the Copyright Holder maintains some semblance of artistic control over the development of the package, while giving the users of the package the right to use and distribute the Package in a more-or-less customary fashion, plus the right to make reasonable modifications.

Definitions

"Package" refers to the collection of files distributed by the Copyright Holder, and derivatives of that collection of files created through textual modification.

"Standard Version" refers to such a Package if it has not been modified, or has been modified in accordance with the wishes of the Copyright Holder as specified below.

"Copyright Holder" is whoever is named in the copyright or copyrights for the package.

"You" is you, if you're thinking about copying or distributing this Package.

"Reasonable copying fee" is whatever you can justify on the basis of media cost, duplication charges, time of people involved, and so on. (You will not be required to justify it to the Copyright Holder, but only to the computing community at large as a market that must bear the fee.)

"Freely Available" means that no fee is charged for the item itself, though there may be fees involved in handling the item. It also means that recipients of the item may redistribute it under the same conditions they received it.

1. You may make and give away verbatim copies of the source form of the Standard Version of this Package without restriction, provided that you duplicate all of the original copyright notices and associated disclaimers.

2. You may apply bug fixes, portability fixes and other modifications derived from the Public Domain or from the Copyright Holder. A Package modified in such a way shall still be considered the Standard Version.

3. You may otherwise modify your copy of this Package in any way, provided that you insert a prominent notice in each changed file stating how and when you changed that file, and provided that you do at least ONE of the following:

a. place your modifications in the Public Domain or otherwise make them Freely Available, such as by posting said modifications to Usenet or an equivalent medium, or placing the modifications on a major archive site such as uunet.uu.net, or by allowing the Copyright Holder to include your modifications in the Standard Version of the Package.

b. use the modified Package only within your corporation or organization.

c. rename any non-standard executables so the names do not conflict with standard executables, which must also be provided, and provide a separate manual page for each non-standard executable that clearly documents how it differs from the Standard Version.

d. make other distribution arrangements with the Copyright Holder.

4. You may distribute the programs of this Package in object code or executable form, provided that you do at least ONE of the following:

a. distribute a Standard Version of the executables and library files, together with instructions (in the manual page or equivalent) on where to get the Standard Version.

b. accompany the distribution with the machine-readable source of the Package with your modifications.

c. give non-standard executables non-standard names, and clearly document the differences in manual pages (or equivalent), together with instructions on where to get the Standard Version.

d. make other distribution arrangements with the Copyright Holder.

5. You may charge a reasonable copying fee for any distribution of this Package. You may charge any fee you choose for support of this Package. You may not charge a fee for this Package itself. However, you may distribute this Package in aggregate with other (possibly commercial) programs as part of a larger (possibly commercial) software distribution provided that you do not advertise this Package as a product of your own. You may embed this Package's interpreter within an executable of yours (by linking); this shall be construed as a mere form of aggregation, provided that the complete Standard Version of the interpreter is so embedded.

6. The scripts and library files supplied as input to or produced as output from the programs of this Package do not automatically fall under the copyright of this Package, but belong to whomever generated them, and may be sold commercially, and may be aggregated with this Package. If such scripts or library files are aggregated with this Package via the so-called "undump" or "unexec" methods of producing a binary executable image, then distribution of such an image shall neither be construed as a distribution of this Package nor shall it fall under the restrictions of Paragraphs 3 and 4, provided that you do not represent such an executable image as a Standard Version of this Package.

7. C subroutines (or comparably compiled subroutines in other languages) supplied by you and linked into this Package in order to emulate subroutines and variables of the language defined by this Package shall not be considered part of this Package, but are the equivalent of input as in Paragraph 6, provided these subroutines do not change the language in any way that would cause it to fail the regression tests for the language.

8. Aggregation of this Package with a commercial distribution is always permitted provided that the use of this Package is embedded; that is, when no overt attempt is made to make this Package's interfaces visible to the end user of the commercial distribution. Such use shall not be construed as a distribution of this Package.

9. The name of the Copyright Holder may not be used to endorse or promote products derived from this software without specific prior written permission.

10. THIS PACKAGE IS PROVIDED "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The End

Vendor

Sun Microsystems, Inc.

Third-Party Software Program

JAVATM 2 SOFTWARE DEVELOPMENT KIT or "J2SDK", Standard Edition

Proprietary Notices

Copyright 2005 Sun Microsystems, Inc.,

License Text

Sun Microsystems, Inc. Binary Code License Agreement for the JAVATM 2 SOFTWARE DEVELOPMENT KIT (J2SDK), STANDARD EDITION, VERSION 1.4.2_X

SUN MICROSYSTEMS, INC. ("SUN") IS WILLING TO LICENSE THE SOFTWARE IDENTIFIED BELOW TO YOU ONLY UPON THE CONDITION THAT YOU ACCEPT ALL OF THE TERMS CONTAINED IN THIS BINARY CODE LICENSE AGREEMENT AND SUPPLEMENTAL LICENSE TERMS (COLLECTIVELY "AGREEMENT"). PLEASE READ THE AGREEMENT CAREFULLY. BY DOWNLOADING OR INSTALLING THIS SOFTWARE, YOU ACCEPT THE TERMS OF THE AGREEMENT. INDICATE ACCEPTANCE BY SELECTING THE "ACCEPT" BUTTON AT THE BOTTOM OF THE AGREEMENT. IF YOU ARE NOT WILLING TO BE BOUND BY ALL THE TERMS, SELECT THE "DECLINE" BUTTON AT THE BOTTOM OF THE AGREEMENT AND THE DOWNLOADER INSTALL PROCESS WILL NOT CONTINUE.

1. DEFINITIONS. "Software" means the identified above in binary form, any other machine readable materials (including, but not limited to, libraries, source files, header files, and data files), any updates or error corrections provided by Sun, and any user manuals, programming guides and other documentation provided to you by Sun under this Agreement. "Programs" mean Java applets and applications intended to run on the Java 2 Platform, Standard Edition (J2SE™ platform) platform on Java-enabled general purpose desktop computers and servers.

2. LICENSE TO USE. Subject to the terms and conditions of this Agreement, including, but not limited to the Java Technology Restrictions of the Supplemental License Terms, Sun grants you a non-exclusive, non-transferable, limited license without license fee to reproduce and use internally Software complete and unmodified for the sole purpose of running Programs. Additional licenses for developers and/or publishers are granted in the Supplemental License Terms.

3. RESTRICTIONS. Software is confidential and copyrighted. Title to Software and all associated intellectual property rights is retained by Sun and/or its licensors. Unless enforcement is prohibited by applicable law, you may not modify, decompile, or reverse engineer Software. You acknowledge that Licensed Software is not designed or intended for use in the design, construction, operation or maintenance of any nuclear facility. Sun Microsystems, Inc. disclaims any express or implied warranty of fitness for such uses. No right, title or interest in or to any trademark, service mark, logo or trade name of Sun or its licensors is granted under this Agreement. Additional restrictions for developers and/or publishers licenses are set forth in the Supplemental License Terms.

4. LIMITED WARRANTY. Sun warrants to you that for a period of ninety (90) days from the date of purchase, as evidenced by a copy of the receipt, the media on which Software is furnished (if any) will be free of defects in materials and workmanship under normal use. Except for the foregoing, Software is provided "AS IS". Your exclusive remedy and Sun's entire liability under this limited warranty will be at Sun's option to replace Software media or refund the fee paid for Software. Any implied warranties on the Software are limited to 90 days. Some states do not allow limitations on duration of an implied warranty, so the above may not apply to you. This limited warranty gives you specific legal rights. You may have others, which vary from state to state.

5. DISCLAIMER OF WARRANTY. UNLESS SPECIFIED IN THIS AGREEMENT, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT THESE DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

6. LIMITATION OF LIABILITY. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL SUN OR ITS LICENSORS BE LIABLE FOR ANY LOST REVENUE, PROFIT OR DATA, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, HOWEVER CAUSED REGARDLESS OF THE THEORY OF LIABILITY, ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE SOFTWARE, EVEN IF SUN HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event will Sun's liability to you, whether in contract, tort (including negligence), or otherwise, exceed the amount paid by you for Software under this Agreement. The foregoing limitations will apply even if the above stated warranty fails of its essential purpose. Some states do not allow the exclusion of incidental or consequential damages, so some of the terms above may not be applicable to you.

7. SOFTWARE UPDATES FROM SUN. You acknowledge that at your request or consent optional features of the Software may download, install, and execute applets, applications, software extensions, and updated versions of the Software from Sun ("Software Updates"), which may require you to accept updated terms and conditions for installation. If additional terms and conditions are not presented on installation, the Software Updates will be considered part of the Software and subject to the terms and conditions of the Agreement.

8. **SOFTWARE FROM SOURCES OTHER THAN SUN.** You acknowledge that, by your use of optional features of the Software and/or by requesting services that require use of the optional features of the Software, the Software may automatically download, install, and execute software applications from sources other than Sun ("Other Software"). Sun makes no representation of a relationship of any kind to licensors of Other Software. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL SUN OR ITS LICENSORS BE LIABLE FOR ANY LOST REVENUE, PROFIT OR DATA, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, HOWEVER CAUSED REGARDLESS OF THE THEORY OF LIABILITY, ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE OTHER SOFTWARE, EVEN IF SUN HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Some states do not allow the exclusion of incidental or consequential damages, so some of the terms above may not be applicable to you.

9. **TERMINATION.** This Agreement is effective until terminated. You may terminate this Agreement at any time by destroying all copies of Software. This Agreement will terminate immediately without notice from Sun if you fail to comply with any provision of this Agreement. Either party may terminate this Agreement immediately should any Software become, or in either party's opinion be likely to become, the subject of a claim of infringement of any intellectual property right. Upon Termination, you must destroy all copies of Software.

10. **EXPORT REGULATIONS.** All Software and technical data delivered under this Agreement are subject to U.S. export control laws and may be subject to export or import regulations in other countries. You agree to comply strictly with all such laws and regulations and acknowledge that you have the responsibility to obtain such licenses to export, re-export, or import as may be required after delivery to you.

11. **TRADEMARKS AND LOGOS.** You acknowledge and agree as between you and Sun that Sun owns the SUN, SOLARIS, JAVA, JINI, FORTE, and iPLANET trademarks and all SUN, SOLARIS, JAVA, JINI, FORTE, and iPLANET-related trademarks, service marks, logos and other brand designations ("Sun Marks"), and you agree to comply with the Sun Trademark and Logo Usage Requirements currently located at <http://www.sun.com/policies/trademarks>. Any use you make of the Sun Marks inures to Sun's benefit.

12. **U.S. GOVERNMENT RESTRICTED RIGHTS.** If Software is being acquired by or on behalf of the U.S. Government or by a U.S. Government prime contractor or subcontractor (at any tier), then the Government's rights in Software and accompanying documentation will be only as set forth in this Agreement; this is in accordance with 48 CFR 227.7201 through 227.7202-4 (for Department of Defense (DOD) acquisitions) and with 48 CFR 2.101 and 2.212 (for non-DOD acquisitions).

13. **GOVERNING LAW.** Any action related to this Agreement will be governed by California law and controlling U.S. federal law. No choice of law rules of any jurisdiction will apply.

14. **SEVERABILITY.** If any provision of this Agreement is held to be unenforceable, this Agreement will remain in effect with the provision omitted, unless omission would frustrate the intent of the parties, in which case this Agreement will immediately terminate.

15. **INTEGRATION.** This Agreement is the entire agreement between you and Sun relating to its subject matter. It supersedes all prior or contemporaneous oral or written communications, proposals, representations and warranties and prevails over any conflicting or additional terms of any quote, order, acknowledgment, or other communication between the parties relating to its subject matter during the term of this Agreement. No modification of this Agreement will be binding, unless in writing and signed by an authorized representative of each party.

SUPPLEMENTAL LICENSE TERMS

These Supplemental License Terms add to or modify the terms of the Binary Code License Agreement. Capitalized terms not defined in these Supplemental Terms shall have the same meanings ascribed to them in the Binary Code License Agreement. These Supplemental Terms shall supersede any inconsistent or conflicting terms in the Binary Code License Agreement, or in any license contained within the Software.

A. **Software Internal Use and Development License Grant.** Subject to the terms and conditions of this Agreement, including, but not limited to the Java Technology Restrictions of these Supplemental Terms, Sun grants you a non-exclusive, non-transferable, limited license without fees to reproduce internally and use internally the Software complete and unmodified (unless otherwise specified in the applicable README file) for the purpose of designing, developing, and testing your Programs.

B. **License to Distribute Software.** Subject to the terms and conditions of this Agreement, including, but not limited to the Java Technology Restrictions of these Supplemental Terms, Sun grants you a non-exclusive, non-transferable, limited license without fees to reproduce and distribute the Software, provided that (i) you distribute the Software complete and unmodified (unless otherwise specified in the applicable README file) and only bundled as part of, and for the sole purpose of running, your Programs, (ii) the Programs add significant and primary functionality to the Software, (iii) you do not distribute additional software intended to replace any component(s) of the Software (unless otherwise specified in the applicable README file), (iv) you do not remove or alter any proprietary legends or notices contained in the Software, (v) you only distribute the Software subject to a license agreement that protects Sun's interests consistent with the terms contained in this Agreement, and (vi) you agree to defend and indemnify Sun and its licensors from and against any damages, costs, liabilities, settlement amounts and/or expenses (including attorneys' fees) incurred in connection with any claim, lawsuit or action by any third party that arises or results from the use or distribution of any and all Programs and/or Software.

C. **License to Distribute Redistributables.** Subject to the terms and conditions of this Agreement, including but not limited to the Java Technology Restrictions of these Supplemental Terms, Sun grants you a non-exclusive, non-transferable, limited license without fees to reproduce and distribute those files specifically identified as redistributable in the Software "README" file ("Redistributables") provided that: (i) you distribute the Redistributables complete and unmodified (unless otherwise specified in the applicable README file), and only bundled as part of Programs, (ii) you do not distribute additional software intended to supersede any component(s) of the Redistributables (unless otherwise specified in the applicable README file), (iii) you do not remove or alter any proprietary legends or notices contained in or on the Redistributables, (iv) you only distribute the Redistributables pursuant to a license agreement that protects Sun's interests consistent with the terms contained in the Agreement, (v) you agree to defend and indemnify Sun and its licensors from and against any damages, costs, liabilities, settlement amounts and/or expenses (including attorneys' fees) incurred in connection with any claim, lawsuit or action by any third party that arises or results from the use or distribution of any and all Programs and/or Software.

D. Java Technology Restrictions. You may not modify the Java Platform Interface ("JPI", identified as classes contained within the "java" package or any subpackages of the "java" package), by creating additional classes within the JPI or otherwise causing the addition to or modification of the classes in the JPI. In the event that you create an additional class and associated API(s) which (i) extends the functionality of the Java platform, and (ii) is exposed to third party software developers for the purpose of developing additional software which invokes such additional API, you must promptly publish broadly an accurate specification for such API for free use by all developers. You may not create, or authorize your licensee to create, additional classes, interfaces, or subpackages that are in any way identified as "java", "javax", "sun" or similar convention as specified by Sun in any naming convention designation.

E. Distribution by Publishers. This section pertains to your distribution of the Software with your printed book or magazine (as those terms are commonly used in the industry) relating to Java technology ("Publication"). Subject to and conditioned upon your compliance with the restrictions and obligations contained in the Agreement, in addition to the license granted in Paragraph 1 above, Sun hereby grants to you a non-exclusive, nontransferable limited right to reproduce complete and unmodified copies of the Software on electronic media (the "Media") for the sole purpose of inclusion and distribution with your Publication(s), subject to the following terms: (i) You may not distribute the Software on a stand-alone basis; it must be distributed with your Publication(s); (ii) You are responsible for downloading the Software from the applicable Sun website; (iii) You must refer to the Software as Java™ 2 Software Development Kit, Standard Edition, Version 1.4.2; (iv) The Software must be reproduced in its entirety and without any modification whatsoever (including, without limitation, the Binary Code License and Supplemental License Terms accompanying the Software and proprietary rights notices contained in the Software); (v) The Media label shall include the following information: Copyright 2003, Sun Microsystems, Inc. All rights reserved. Use is subject to license terms. Sun, Sun Microsystems, the Sun logo, Solaris, Java, the Java Coffee Cup logo, J2SE, and all trademarks and logos based on Java are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries. This information must be placed on the Media label in such a manner as to only apply to the Sun Software; (vi) You must clearly identify the Software as Sun's product on the Media holder or Media label, and you may not state or imply that Sun is responsible for any third-party software contained on the Media; (vii) You may not include any third party software on the Media which is intended to be a replacement or substitute for the Software; (viii) You shall indemnify Sun for all damages arising from your failure to comply with the requirements of this Agreement. In addition, you shall defend, at your expense, any and all claims brought against Sun by third parties, and shall pay all damages awarded by a court of competent jurisdiction, or such settlement amount negotiated by you, arising out of or in connection with your use, reproduction or distribution of the Software and/or the Publication. Your obligation to provide indemnification under this section shall arise provided that Sun: (i) provides you prompt notice of the claim; (ii) gives you sole control of the defense and settlement of the claim; (iii) provides you, at your expense, with all available information, assistance and authority to defend; and (iv) has not compromised or settled such claim without your prior written consent; and (ix) You shall provide Sun with a written notice for each Publication; such notice shall include the following information: (1) title of Publication, (2) author(s), (3) date of Publication, and (4) ISBN or ISSN numbers. Such notice shall be sent to Sun Microsystems, Inc., 4150 Network Circle, M/S USCA12-110, Santa Clara, California 95054, U.S.A., Attention: Contracts Administration.

F. Source Code. Software may contain source code that, unless expressly licensed for other purposes, is provided solely for reference purposes pursuant to the terms of this Agreement. Source code may not be redistributed unless expressly provided for in this Agreement.

G. Third Party Code. Additional copyright notices and license terms applicable to portions of the Software are set forth in the THIRDPARTYLICENSEREADME.txt file. In addition to any terms and conditions of any third party open source/freeware license identified in the THIRDPARTYLICENSEREADME.txt file, the disclaimer of warranty and limitation of liability provisions in paragraphs 5 and 6 of the Binary Code License Agreement shall apply to all Software in this distribution.

For inquiries please contact: Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, U.S.A. (LFI#141496/Form ID#011801)

Vendor

Douglas C. Schmidt and his research group at Washington University and University of California, Irvine.

Third-Party Software Program

TAO

Proprietary Notices

"TAO(TM) is copyrighted by Douglas C. Schmidt and his research group at Washington University, University of California, Irvine, and Vanderbilt University Copyright (c) 1993-2003, all rights reserved."

License Text

Copyright and Licensing Information for ACE(TM), TAO(TM), CIAO(TM), and CoSMIC(TM)

ACE(TM), TAO(TM), CIAO(TM), and CoSMIC(TM) (henceforth referred to as "DOC software") are copyrighted by Douglas C. Schmidt and his research group at Washington University, University of California, Irvine, and Vanderbilt University. Copyright (c) 1993-2005, all rights reserved. Since DOC software is open-source, free software, you are free to use, modify, copy, and distribute--perpetually and irrevocably--the DOC software source code and object code produced from the source, as well as copy and distribute modified versions of this software. You must, however, include this copyright statement along with code built using DOC software.

You can use DOC software in proprietary software and are under no obligation to redistribute any of your source code that is built using DOC software. Note, however, that you may not do anything to the DOC software code, such as copyrighting it yourself or claiming authorship of the DOC software code, that will prevent DOC software from being distributed freely using an open-source development model. You needn't inform anyone that you're using DOC software in your software, though we encourage you to let us know so we can promote your project in the DOC software success stories..

DOC software is provided as is with no warranties of any kind, including the warranties of design, merchantability, and fitness for a particular purpose, noninfringement, or arising from a course of dealing, usage or trade practice. Moreover, DOC software is provided with no support and without any obligation on the part of Washington University, UC Irvine, Vanderbilt University, their employees, or students to assist in its use, correction, modification, or enhancement. A number of companies around the world provide commercial support for DOC software, however. DOC software is Y2K-compliant, as long as the underlying OS platform is Y2K-compliant.

Washington University, UC Irvine, Vanderbilt University, their employees, and students shall have no liability with respect to the infringement of copyrights, trade secrets or any patents by DOC software or any part thereof. Moreover, in no event will Washington University, UC Irvine, or Vanderbilt University, their employees, or students be liable for any lost revenue or profits or other special, indirect and consequential damages.

The ACE, TAO, CIAO, and CoSMIC web sites are maintained by the DOC Group at the Institute for Software Integrated Systems (ISIS) and the Center for Distributed Object Computing of Washington University, St. Louis for the development of open-source software as part of the open-source software community. By submitting comments, suggestions, code, code snippets, techniques (including that of usage), and algorithms, submitters acknowledge that they have the right to do so, that any such submissions are given freely and unreservedly, and that they waive any claims to copyright or ownership. In addition, submitters acknowledge that any such submission might become part of the copyright maintained on the overall body of code, which comprises the DOC software. By making a submission, submitter agree to these terms. Furthermore, submitters acknowledge that the incorporation or modification of such submissions is entirely at the discretion of the moderators of the open-source DOC software projects or their designees.

The names ACE(TM), TAO(TM), CIAO(TM), CoSMIC(TM), Washington University, UC Irvine, and Vanderbilt University, may not be used to endorse or promote products or services derived from this source without express written permission from Washington University, UC Irvine, or Vanderbilt University. Further, products or services derived from this source may not be called ACE(TM), TAO(TM), CIAO(TM), or CoSMIC(TM) nor may the name Washington University, UC Irvine, or Vanderbilt University appear in their names, without express written permission from Washington University, UC Irvine, and Vanderbilt University.

If you have any suggestions, additions, comments, or questions, please let me know.

Douglas C. Schmidt

