

# HPSS Release 4.5 and Release 5.1

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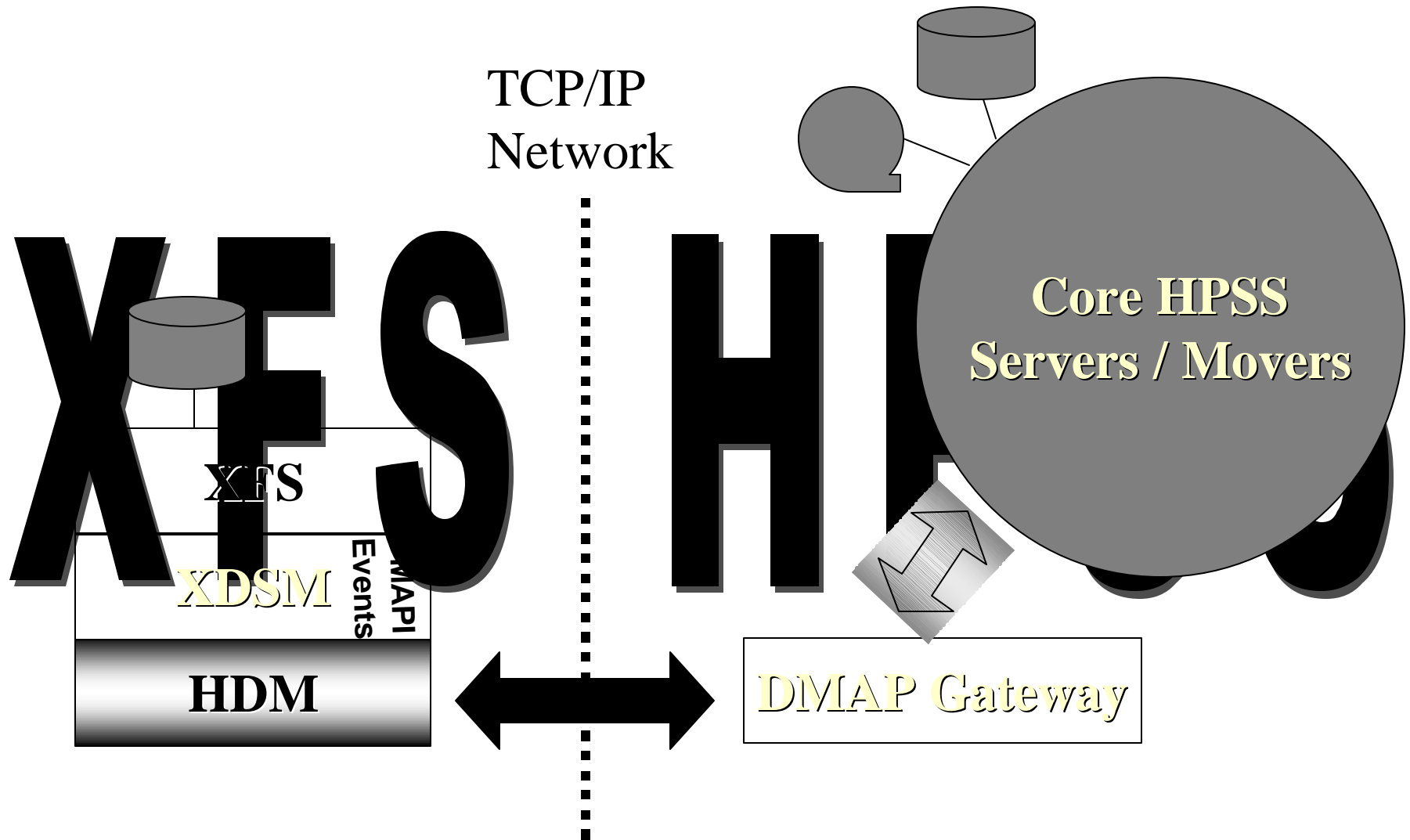
# Overview

- ✓ Available June, 2002
- ✓ Contents Summary
  - **DMAPI support for XFS.**
  - **Duplicate tape copy support for Tape Hierarchies.**
  - **SCSI LBA support.**
  - **Linux Mover support.**
  - **RAIDZONE OpenNAS support.**
  - **New Device Types.**
  - **NFS performance enhancements.**
  - **RAIT Mirroring support (pending STK release).**

# Overview

- ✓ Prerequisites:
  - AIX 5.1 (or 4.3.3) or Solaris 8.
  - RedHat Linux 7.2 for Linux Mover / Client support.
  - DCE 3.2 with PTF set 1.
  - DFS 3.1 with PTF set 4 (if DFS).
  - TXSeries 5.0 for AIX or TX Series 4.3 with PTF set 4 for Solaris.
  - Sammi 4.6.3.5.5 for AIX or 4.7 for Solaris.
  - Java 1.3
- ✓ Conversion from prior releases
  - Convert DMG filesets file and PVL drives metadata.
  - `hpss_convert_4v5` provided for conversion from HPSS 4.2 or 4.3.
  - HPSS 4.1.1 customers must first convert to 4.2.

# XFS Support



# XFS Support

- ✓ Implement an efficient, transparent interface for users to access their HPSS data.
- ✓ Strengths
  - Leverages existing HDM “archive” architecture.
  - XFS available for Linux (no licensing fee).
- ✓ Key requirements
  - Support HPSS access via XFS using DMAPI.
  - XFS / HPSS filesystems shall be accessible via NFS for transparent access.
  - Support archived fileset concept (rename / delete).
  - Support on Redhat Linux.

# XFS Support

- **Provide migration and purge of data from XFS based on policy.**
- **Stage data from XFS when data has been purged from XFS**
- **Support whole file migration.**
- **Support utilities for the following:**
  - Create XFS filesystem / fileset metadata in HPSS (create\_fsys, create\_fset).
  - Delete XFS fileset metadata in HPSS (delete\_fset).
  - Delete all files from HPSS side of XFS fileset (archdelall).
  - Remove “deleted” files older than a specified age from HPSS side (archivedel).
  - Recover files deleted from XFS filesets not yet deleted from HPSS (archiverec).
  - Query DMAP Gateway for stats and list of filesets (dmgetattr).
  - Query DMAP Gateway for attributes of a fileset (getfileset).

# XFS Support

- Perform HDM administration (hdm\_admin).
- Get DM attributes, regions, and extents of a file (getdmattr).
- Set DM attributes (setdmattr).
- Delete DM attributes (deldmattr).
- Retrieve information from XFS on active sessions and number of tokens (prtssess).
- List the HPSS names of all files in an archived XFS/HPSS fileset (archivelist).
- List the XFS names of all files in an XFS/HPSS fileset (archivedump).
- Compare archive dumps from HPSS and XFS and report inconsistencies (archivecmp).

# XFS Support

## ✓ XFS Pre-Configuration Steps

### – Install XFS kernel patch and user filesets.

- Obtain 'vanilla' 2.4.18 Linux kernel (<http://www.kernel.org>).
- Install XFS 1.1 kernel patch on vanilla 2.4.18 kernel (<http://oss.sgi.com/projects/xfs/>).
- Apply XFS/HPSS kernel patch (available from HPSS website).
- Build and boot new kernel.

### – Create DMAPI Device.

- XDASM for XFS requires a special device for communication between the kernel and userspace portions of the code. This device must be created using the command below:

```
% mknod /proc/fs/xfs_dmap_i c 10 140
```

# XFS Support

## ✓ Configure HDM

### – Configure HDM files.

- There are 5 file types used for configuration of the HDM:
  - **config.dat:** Configures HDM processes.
  - **policy.dat:** Configures migration and purge policies.
  - **gateways.dat:** Gateways allowed to contact HDM.
  - **security.dat:** (DFS Only) Configures remote cell user ID translation.
  - **filesystems.dat:** Tracks aggregates and filesets.
- The normal location for these configuration files is  
`/var/hpss/hdm/hdm1`

# XFS Support

- ✓ Steps to create an HPSS/XFS fileset:
  - Create a XFS filesystem.
  - Create an HDM filesystem entry.
  - Create an HPSS fileset.
  - Mount the file system.
  - Set permissions and owner for the XFS filesystem.

# XFS Support

- ✓ Create an XFS filesystem
  - **Create a disk partition, using fdisk, cfdisk, or sfdisk.**

For example: `% cfdisk /dev/hdb`

- Be sure to create a partition of type 83 (Linux).

- ✓ Create an HDM filesystem entry (**create\_fsys**).

Syntax: `create_fsys XFS <host> <port> <ftname> <path>  
<media> <option> <queue_size> <migrate> <purge> [key]`

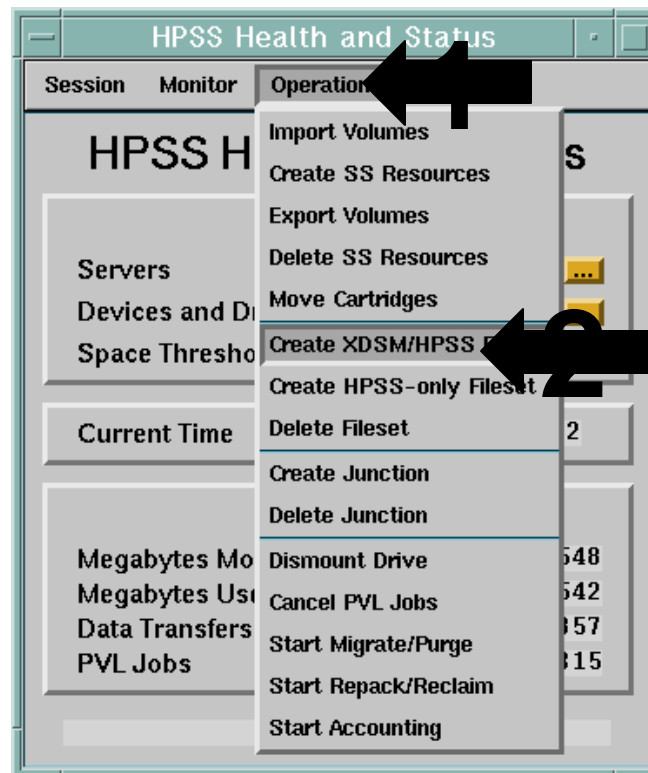
For example: `% create_fsys XFS sp3n01.clearlake.ibm.com  
6002 my_fileset /mnt/my_fileset "ide0(3,72)"  
archive/rename 10000 run wait 123abc`

Note: *This command should be executed on a machine declared as a gateway in gateways.dat. The command sends the request to HDM, which then adds the entry to the filesys.dat file.*

# XFS Support

## ✓ Create an HPSS fileset

- From SSM Health & Status, select “Operations” and then “Create XDSM/HPSS Fileset”.
- ‘XDSM’ is used here as a generic term to refer to either XFS or DFS managed filesets.



# XFS Support

- Fill in the information for your fileset & click “Full Create”.

Managed Filesystem Type: XFS

Fileset ID: 1079914467 ,, 1022262844

Filesystem ID: [Empty]

Filesystem Name: test\_ren

HPSS/DMAP TCP Port: 6002

HPSS/DMAP TCP Hostname: sally

User ID: 0

Group ID: 0

Global Mount Point: /mnt/test\_ren

Local Mount Point: [Empty]

DMAP Gateway: DMAP Gateway

File Family: [Empty]

Class of Service: [Empty]

Mount Point Name Server: Name Server 1

Permissions:

	r	w	x
User	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Group	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Other	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Full Create Only Create Dismiss

# XFS Support

- ✓ Mount the file system

- Use the 'mount' command with a few extra options to mount your filesystem:

Syntax: `mount -t xfs -o dmapi <partition> <mountpoint>`

For example: `% mount -t xfs -o dmapi /dev/hdb7  
/mnt/test_ren`

- ✓ Set permissions and owner for the XFS filesystem

- Now that the filesystem is mounted, use the 'chown' and 'chmod' commands to update the permissions on the filesystem's root directory.

For example:

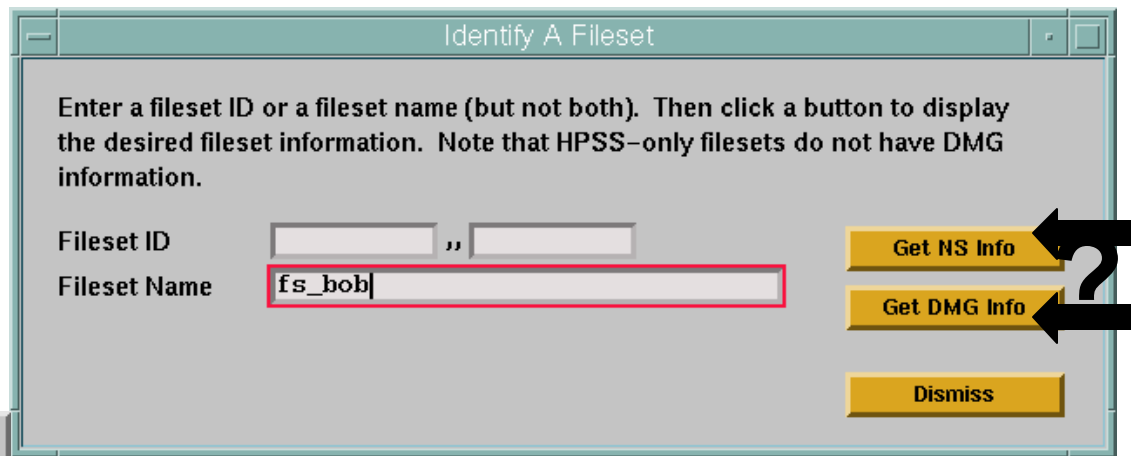
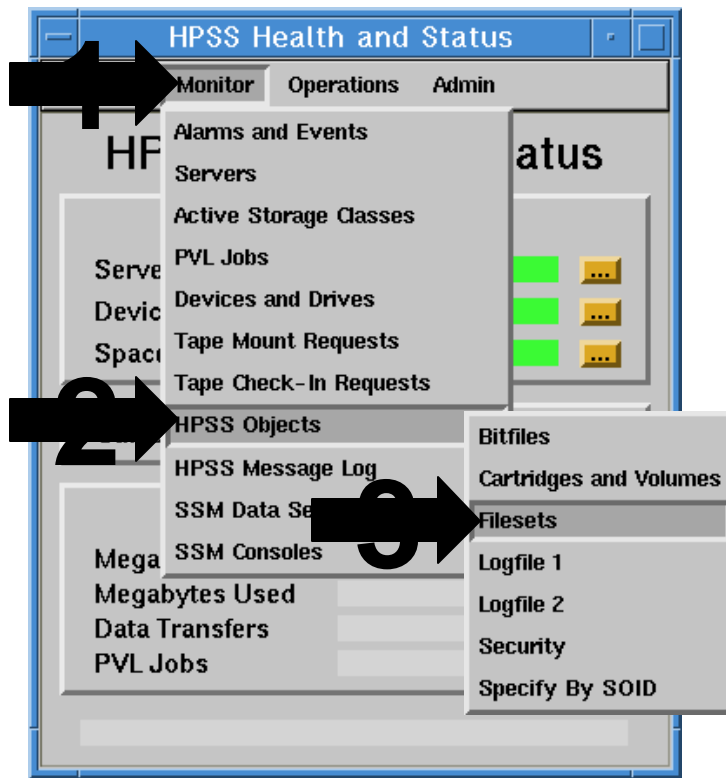
```
% cd /mnt
```

```
% chown hpss:hpss test_ren
```

```
% chmod 755 test_ren
```

# XFS Support

- ✓ From SSM Health & Status, select "Monitor", "HPSS Objects", and then "Filesets"



# Duplicate Tape Copy Support

- ✓ New migration options supported for tape:
  - **Migrate Volumes**
    - Default option. Same as option supported in the past.
    - Selects virtual volumes that are EOM with the largest free space for migration.
    - Segments are moved laterally to volume in same Storage Class for active segments or down the hierarchy for inactive segments.
    - Useful for managing space without running repack, but does not support multiple copies.
  - **Migrate Volumes and Whole Files**
    - Similar to Migrate Volumes option.
    - Also segments for the file on other tape volumes are migrated.
    - Useful for getting segments of a file on the same volume, but can result in large number of tape mounts.

# Duplicate Tape Copy Support

- ✓ Migrate Files
  - File versus volume based migration (similar to disk migration).
  - Individual files selected based on last write times and migration policy.
  - Files sorted by source tape volume prior to migration.
  - Files on source level are not purged.
  - Useful for maintaining a second copy of tape files. Source Storage Class must be manually repacked.
- ✓ Migrate Files and Purge
  - Similar to Migrate Files option.
  - Migrated files are purged from source level as soon as migrated.
  - Read and write times used to select candidate files.
  - Useful for moving inactive files into deep tape archive. Source Storage Class must be manually repacked.

# Duplicate Tape Copy Support

Migration Policy

## Migration Policy

### Basic Policy

Policy ID:

Policy Name:

Last Read Interval:  minutes (tape only)

Last Update Interval:  minutes

Free Space Target:  percent

Request Count:

Runtime Interval:  minutes

**Disk Options**

Migrate At Warning Threshold

Migrate At Critical Threshold

**Tape Options**

Migrate Volumes

Migrate Volumes and Whole Files

Migrate Files

Migrate Files and Purge

### Storage Subsystem-Specific Policy

Storage Subsystem:

Last Read Interval:  minutes (tape only)

Last Update Interval:  minutes

Free Space Target:  percent

Request Count:

Runtime Interval:  minutes

**Disk Options**

Migrate At Warning Threshold

Migrate At Critical Threshold

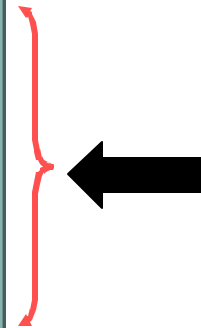
**Tape Options**

Migrate Volumes

Migrate Volumes and Whole Files

Migrate Files

Migrate Files and Purge



# SCSI-2 LBA Positioning

*Currently absolute address used to position before 1st byte of a file. Relative addresses are then used to position to a requested tape segment.*

- ✓ LBA positioning supported on devices supporting SCSI-2 Logical Block Addresses (LBAs) and the LOCATE command.
- ✓ Option selectable from device / drive configuration window.
- ✓ Destination LBAs calculated based on known LBAs and relative addresses.
- ✓ LOCATE command to position directly to the requested location
- ✓ Provides for faster positioning.

# SCSI LBA Positioning

Device And Drive Configuration

## Mover Device and PVL Drive Configuration

Device/Drive ID:

Device/Drive Type:

Mover:

PVR:

Controller ID:

Polling Interval:  seconds (make negative to disable)

Device Name:

Drive Address:

### Device Flags

<input checked="" type="checkbox"/> Read Enabled	<input checked="" type="checkbox"/> Locate Support	<input type="checkbox"/> Multiple Mover Tasks
<input checked="" type="checkbox"/> Write Enabled	<input checked="" type="checkbox"/> NO-DELAY Support	<input type="checkbox"/> SCSI-2 LBA Positioning ←
<input checked="" type="checkbox"/> Removable Media Support	<input type="checkbox"/> Write TM(0) to Sync	

Start New

Add Delete Update Dismiss

# Linux Mover Support

- ✓ Support Mover on Redhat Linux 7.2.
- ✓ Non-DCE Mover is used.
- ✓ System test performed for disk and LTO drives.  
Other tape support pending availability of drivers / hardware.

# RAIDZONE OpenNAS

- ✓ Support XFS on OpenNAS server through DMAPI interface. HDM installed on RAIDZONE node.
- ✓ Support HPSS Linux Mover on OpenNAS server.
- ✓ RAIDZONE OpenNAS provides:
  - **Switched node disk array technology.**
  - **Runs Linux Kernel and supports XFS.**
  - **Accommodates 5 to 15 hot swappable, 160 GB drives.**
  - **Supports redundancy with rapid recovery and redundant boot partitions.**

# New Device Types

- ✓ Provide support for the following devices:
  - IBM 3590H.
  - STK 9940B.

# NFS Performance Enhancements

- ✓ Removed checksum code (conditional compilation).
- ✓ Internal read retries. Hold reads for a short time in case data arrives from HPSS sooner than the client's timeout value.
- ✓ Support read-ahead. Prefetch next block in large files so data is in the datacache when accessed by client
  - (Read next block if actual data in the next block, the current block is uncached, or this is the last block cached for the file and haven't tried prefetch)**
- ✓ Allow data cache to perform concurrent IO streams for a single file.

# RAIT Mirroring

- ✓ Support RAIT Mirroring for STK 9840 and 9940.
- ✓ Feature pending formal release from STK.
- ✓ Configuration:
  - **Configure RAIT enabled PVR.**
    - PVR subtype and drive type for 'STK RAIT'.
    - 'Physical drive count' specified.
  - **Configure RAIT drive.**
    - STK -> '9840 RAIT' / '9940 RAIT' drive type.
  - **Create Storage Classes for each RAIT volume type.**
    - STK -> '9840 RAIT' / '9940 RAIT' media type -> 1+1 (data and parity volume count).
  - **Import RAIT volumes as a specific RAIT volume type.**
    - STK -> '9840 RAIT' / '9940 RAIT' media type -> 1+1.
    - Data and parity volume counts.
  - **Create VVs for each imported RAIT volume.**

# Release 5.1

- ✓ Target release date: 3/31/2003
- ✓ Major enhancements:
  - **New HPSS administrative graphical interface.**
    - Implemented as Java Client.
    - Demonstration to be provided by Deryl Steinert and Vicky White.
  - **Infrastructure Replacement:**
    - Replace SFS. Utilize DB2 database.
    - Eliminate need for Encina.
    - Reduce reliance on DCE.
    - Merge Name Server, Bitfile Server, Disk and Tape Storage Server, & part of Client API.
    - Eliminate nested and distributed transactions
    - Performance improvements expected.
    - Details to be provided by Dave Fisher.

# Release 5.1

## ✓ Prerequisites:

- **AIX 5.1 or Solaris 8.**
- **RedHat Linux 7.2 for Linux Mover / Client support.**
- **DCE 3.2.**
- **DB2 7.2.**
- **Java 1.3**

**Prerequisites are subject to change. Release numbers reflect a minimum level.**