

Crossmeta File Systems for Windows 2000, XP and 2003

Introduction

Crossmeta product runs on Microsoft Windows NT based platform and is a collection of various file systems that is available in other UNIX style operating systems. The software is a combination of several kernel mode drivers and command line programs to manage them. The key components of Crossmeta include:

- VFS kernel driver (cxvfs)
- NFS kernel driver (cxnfs)
- Linux-EXT2 kernel driver (ext2fs)
- SGI-XFS kernel driver (xfs)
- Linux-Reiserfs kernel driver (reiserfs)
- CXVFS manager service
- NFS portmapd service
- NFS mountd service
- Command line programs

Before you begin the installation of this product make sure you meet the following requirements.

- System running Microsoft Windows operating system. This product runs on Microsoft Windows 2000, XP and 2003.
- Administrative privileges are required to install this product.
- The drive letter V: is unassigned and is free for Crossmeta.
- There are no other programs actively use TCP/UDP port number 111.

Installation

The program comes with a setup program that will guide you through the installation. From the extracted files double-click on setup.exe program to launch the Crossmeta File System Installation Wizard. The installation involves several stages as described below.

Stage 1:

Creating the following kernel mode services programs:

- cxvfs (Crossmeta VFS kernel driver)
- cxnfs (Crossmeta NFS kernel driver)
- ext2fs (Crossmeta Linux-ext2fs kernel driver)
- xfs (Crossmeta SGI-xfs kernel driver)
- reiserfs (Crossmeta Linux-reiserfs kernel driver)

Windows service programs

- cxvfsmgr.exe (Crossmeta manager service program)
- portmapd.exe (RPC portmapper service program)
- mountd.exe (NFS mount daemon)

The services are created to be started manually. Otherwise a faulty kernel mode driver will prevent you from booting the system into operational state.

Stage 2:

This stage is for setting up the root file system. Currently the installation program prepares an ordinary file into root file system image. Using loopdev driver interface this file is made available as block device /dev/loop0 for kernel to mount as root file system. This root file system will contain the /bin directory, where the command line programs will be copied to. The root file system will be available in the V: drive, after the services are started.

Stage 3:

This stage is for setting up another file system image called the INODES file. This file system is useful for NFS server operation with Windows native file systems FAT, NTFS or CDFS and is primarily for generating inode number and caching of directory contents. You may skip this if you are not planning to run NFS file server with Windows file systems.

Stage 4:

In this stage the preferred authentication mechanism is selected. The program can automatically map the UNIX uid/gid to Windows SID, provided the user name is same for both. The file /etc/passwd is the user database file for mapping and

/etc/group is the group database file. For each user/group there has to be corresponding user/group in the Windows user profile. Otherwise uid/gid will be mapped to LOCAL SID. If user/group in Windows user profile is not present in /etc/passwd or /etc/group it will be mapped to uid/gid NOBODY (-2).

Note:

Even though the administration commands are installed in V:\bin directory during installation, you may find it useful to keep a copy of them in local drives.

Crossmeta Start/Stop

Start Crossmeta

By default the service programs are created with manual start option. To start the services start cxvfsmgr service. The root file system is now available from Windows V: drive. Typical startup would involve:

1. Start the cxvfsmgr service, which will in turn start the core services cxvfs, cxnfs.
2. The root file system is now available as V: drive and the command line programs are now available in V:\bin directory. Add this to the path environment variable to execute them.
3. You may use dmesg command to view the kernel startup messages.

```
C:\> net start cxvfsmgr
The Pavitrasoft Manager service is starting.
The Pavitrasoft Manager service was started successfully.

C:\> set path=%path%;v:\bin
C:\> mount -a
C:\> mount
C:\> dmesg
```

In the event the root file system was not cleanly shutdown, the root file system will be mounted for read only access. To repair the root file system run fsck on /dev/loop0. After this follow the instructions on how to stop and restart the drivers.

```
C:\> mount -a
C:\> fsck -y /dev/loop0
```

Stop Crossmeta

To stop the file system drivers, make sure there are no other programs using the files in V: drive. If umountall fails with error status, then it is

not possible to stop the file system drivers. Try to end the programs that may be using the V: drive and then retry unmounting all the file systems.

```
C:\> net stop cxvfmgr
Pavitrsoft Crossmeta manager service stopped successfully
C:\Program Files\crossmeta:> unmountall

C:\> net stop cxvfs
```

User Name Mapping

UNIX authentication for users is based on simple uid, gid numbers associated with each user and group. In Windows the user names are authenticated using Security Identifier (SID). Crossmeta can transparently map UNIX users to Windows users as long as they have the same name. For best results create the same UNIX user and group names in Windows Directory services too.

The program obtains the Window user name using Windows APIs and this means it will work with standard Microsoft Directory Services. For UNIX user/group names the program will first try to obtain from pwd database files /etc/passwd and /etc/group. If there is no entry the program can optionally obtain the user/group names from NIS server if it is configured for NIS operation.

1. Start Crossmeta services
2. Create the /etc/passwd and /etc/group file that represents the users and groups in your organization. These files are in V:\etc\group if using Windows programs. Usually you would copy them from existing UNIX servers.
3. If you had specified NIS domainname and servers during the installation process, the following entry is required in /etc/passwd file to enable NIS lookups.
+::::::
4. Run pwd_mkdb /etc/passwd to create pwd database files.
5. Stop Crossmeta services and restart them.
6. Run id program to verify that user mapping is working.

NIS Configuration

Reconfiguring NIS information requires changing the following registry values.
HKEY_LOCAL_MACHINE\Software\Pavitrsoft\crossmeta\sysctl\kern\nisdomainname
HKEY_LOCAL_MACHINE\Software\Pavitrsoft\crossmeta\sysctl\user\nisservers

The nisdomainname can be changed using `sysctl -w kern.nisdomainname="yoyonis"` too. The nisservers parameter takes hostnames that are separated by ":" if multiple NIS servers are available.

Creating new File Systems

To make a new file system, identify the device name where the new file system will be constructed. The device names are provided using the Device File System, which gets mounted automatically on /dev directory. If it is not already mounted, issue a mount command manually. For each hard drive configured in the system there would be node names da1...da<n> depending on the number of drives. Each partition on drive is represented as slice da1s1 ...da1s<n>, depending on the number of slices/partitions.

```
C:\> mount -a
C:\> mount
/dev/loop0 on /
devfs on /dev
```

It is also possible to construct file system image over ordinary file available in Windows, using the loopdev interface. The following example is for setting loop device loop1 for a file in C:\TEMP\test1.img. After this you can use /dev/loop1 to refer to this image file.

```
C:\> losetup loop1 c:\temp\test1.img
```

After you have successfully identified the device name proceed with the following command depending on the file system.

Filesystem	Command
FFS	newfs /dev/da4s1
EXT2FS	e2fsck /dev/da4s1
XFS	xfs_mkfs /dev/da4s1

Mount/Unmount File Systems

Manually start the file system driver, if it is not running already. Invoke the mount command as follows depending on the file system type.

Filesystem	Command
FFS	mount /dev/da4s1 /mnt
EXT2FS	mount -t ext2fs /dev/da4s1 /mnt
XFS	mount -t xfs /dev/da4s1 /mnt

reiserfs	Mount <code>-t reiserfs -o ro /dev/da4s1 /mnt</code> There is no read-write support for reiserfs.
winfs	<code>mount -t winfs C:\TEMP /mnt</code>
nfs	<code>mount -t nfs hostname:/share /mnt</code>

Note that the winfs requires the file system used for creating inodes to be mounted on /cachefs. To create this file system for FFS using file `c:\crossmeta\inodes` and a size of 40MB with maximum inodes, type the following commands.

```
C:\> newfs -s 83886080 -F c:\crossmeta\inodes -i 256 ino
C:\> losetup loop1 c:\crossmeta\inodes
C:\> mount /dev/loop1 /cachefs
```

You can use unmount command on the device name or directory to unmount the file system. If there are programs with open files unmount will fail with busy error code.

Repair File Systems

Each file system comes with a file system checker program. The command has to be run over the device name that is not mounted.

Filesystem	Command
FFS	<code>fsck -y /dev/da4s1</code>
EXT2FS	<code>e2fsck -y /dev/da4s1</code>
XFS	<code>xfs_repair /dev/da4s1</code>
Inode image	<code>fsck -y /dev/loop1</code>

To repair the root file system, this is usually /dev/loop0

```
fsck -y /dev/loop0
```

Then restart the Crossmeta services.

NFS Server Operation

Crossmeta provides NFS version 2 and 3 over UDP transport only. The NFS server operation is supported with Windows file systems made available using winfs and also with Crossmeta file systems FFS, ext2fs and XFS. To start the NFS server operation:

1. Add entries to the file /etc/exports


```

      /mnt -o ro
      /home/sam
      
```
2. Start the mountd service. This will start the dependent service portmapd and cxnfs. It is possible for portmapd to fail if there is another portmap program from different vendor. In that case you can disable the other portmap program or

you can start `mountd` from command line with `-d` option, so that it will not run as service program. If you do want this as service program then disable its dependency on `portmap` or disable the other `portmap` program.

CIFS Server Operation

Crossmeta supports sharing of directories using Microsoft Lanmanager Server. You can even share a directory used by NFS client thereby acting as NFS gateway. This allows Windows users to access them without installing NFS client software.

To add a new windows share:

1. Browse the V: drive folder using Windows Explorer
2. Right Click on the directory that has to be shared
3. Click on Sharing
4. Configure the Sharing tab and click Apply to start sharing

Troubleshooting
