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A word about kernel..

- An Operating System kernel provides a framework for programs to share the computer's hardware efficiently without any mess.

- GNU Hurd is a free software computer operating system kernel.
- Original kernel of GNU Project
- Released under the GNU General Public License.
- HURD is a mutually recursive acronym.
- HIRD of Unix-Replacing Daemons, where HIRD stands for HURD of Interfaces Representing Depth.

- It is also a play on the words herd of gnus, reflecting how it works.
- Consists of a set of servers or daemons, that work on top of a microkernel; together they form the kernel of GNU.

- The Hurd aims to surpass Unix kernels in functionality, security, and stability, remaining largely compatible with them.
- The Hurd requires a multiboot-compliant boot loader, such as GRUB (GRand Unified Boot Loader) .
- Hence an installer is essential.

history

- Development on the GNU operating system began in 1984
- Free GNU tools started to acquired popularity
- By the 1990s, the only major component missing was the kernel.
- Development on the Hurd began in 1990

- Based on the abandoned kernel of research TRIX operating system developed by Professor Steve Ward at MIT's Laboratory for Computer Science.
- Development of the Hurd has proceeded slowly.
- Hurd is still not considered suitable for production environments.

architecture

- The Hurd builds on top of a microkernel which is responsible for providing the most basic kernel services.
- Coordinating access to the hardware: the CPU process management and scheduling.
- RAM management.
- Input/output devices scheduling for sound, graphics, mass storage..

- In 2005, Hurd developer Neal Walfield finished the initial memory management framework for the L4/Hurd port.
- Marcus Brinkmann ported getting the process startup code working and allowing programs to run.
- In theory the microkernel design would allow all device drivers to be built as servers working in user space.

- The Hurd was initially developed to use GNU Mach as the microkernel.
- This was a technical decision made by RMS.
- From 2004 onward, various efforts were launched to port the Hurd to more modern microkernels.

- Since 2006 Hurd developers started thinking about using Coyotos as the microkernel.
- A number of traditional Unix concepts are replaced or extended in the Hurd.

- Under Unix every program running has an associated user id, which corresponds to the user that started the process.
- This decides the permissions for several actions.
- A Hurd process, runs under a set of user ids, which can contain multiple ids.
- A sufficiently privileged process can add and remove ids to another process.

- The effect of Unix mounting is achieved by setting up a filesystem translator.
- For example, the ftpfs translator allows a user to encapsulate remote FTP sites within a directory.



The Hurd is not the advanced operating system known to the planet.

But there are truly a lot of amazing features.

Its a free software..

- Under the GNU GPL
- Anyone can use, modify and redistribute it.

Its compatible..

- The Hurd provides a familiar programming and user environment.
- The Hurd uses the GNU C Library.
- Hurd is a modern Unix-like kernel.

Its built to survive..

- The Hurd has an Object-Oriented Structure without compromising its design.
- This helps the Hurd to be redesigned easily.

Its extensible..

- The Hurd is an attractive platform to become a kernel hacker.
- Every part of the system is designed to be modified and extended.

Its exists..

- The Hurd is a real software that works now, rather than a research project or a proposal.



Server Architecture

There are 24 servers, 18 core servers and 6 file system servers.

Core Servers

- auth (authentication server)
- crash (crash server)
- exec (execution server)
 - Translates an executable image.
- fifo (FIFO translator)
- new-fifo (new FIFO server)
- firmlink (the firmlink translator)
- fwd (forward server)
- hostmux (host multiplexer server)

- ifsock (server for sockets interface)
- init (init server)
- magic (magic server)
- null (null server): implements /dev/null and /dev/zero
- pfinet (pfinet server)
- pflocal (pflocal server)
- proc (process server)

- symlink (symbolic link translator)
- term (terminal server)
- usermux (user multiplexer server)

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Filesystem Servers

- The ext2fs server "ext2fs"
 - ext2 filesystem translator.
- The iso filesystem server "isofs"
 - translator for the ISO 9660 filesystem.
 - translates blocks of a CD or DVD to files and directories for the applications.

- The nfs server "nfs"
 - translator for Network File System
- The ufs server "ufs"
 - translator for the BSD filesystem of the same name, UFS
- "ftpts"
 - The ftp filesystem translator
- "storeio"
 - the storage translator



the GNU HURD installer

What the installer does..

Building Host Linux Environment

- Makes use of Linux 2.4 Kernel
- Busybox Compilation
- Creation of floppy Image
- Configuring syslinux
- Creation of ISO Image
- Boot From CD

Installation Script

- Detecting CDROM
- Mounting CDROM
- Partitioning the Disk
- Formatting the Disk
- Making swap partition
- Extracting the tarball
- Making fstab
- Configuring grub
- Boot into Hurd

Why HURD lagged behind ?

- Conflicts in opinions
- Kernel related issues
- Lack of proper Install
- **Lack of developers**

We need developers..



We need **you!**