

Object Files



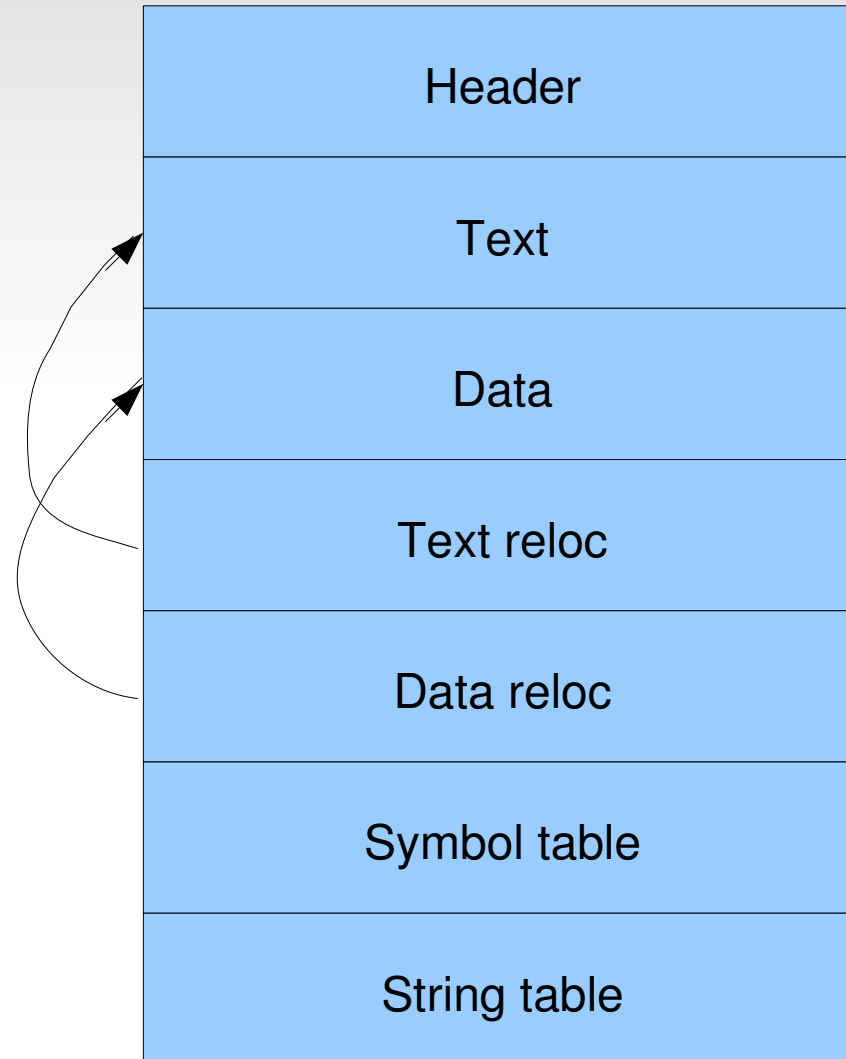
Tick

Feb 22'th 2008

File Formats

- a.out
 - .text .bss .data
- COFF
 - Sys III
 - Section
- ELF
 - Multi sections

a.out



ELF



ELF

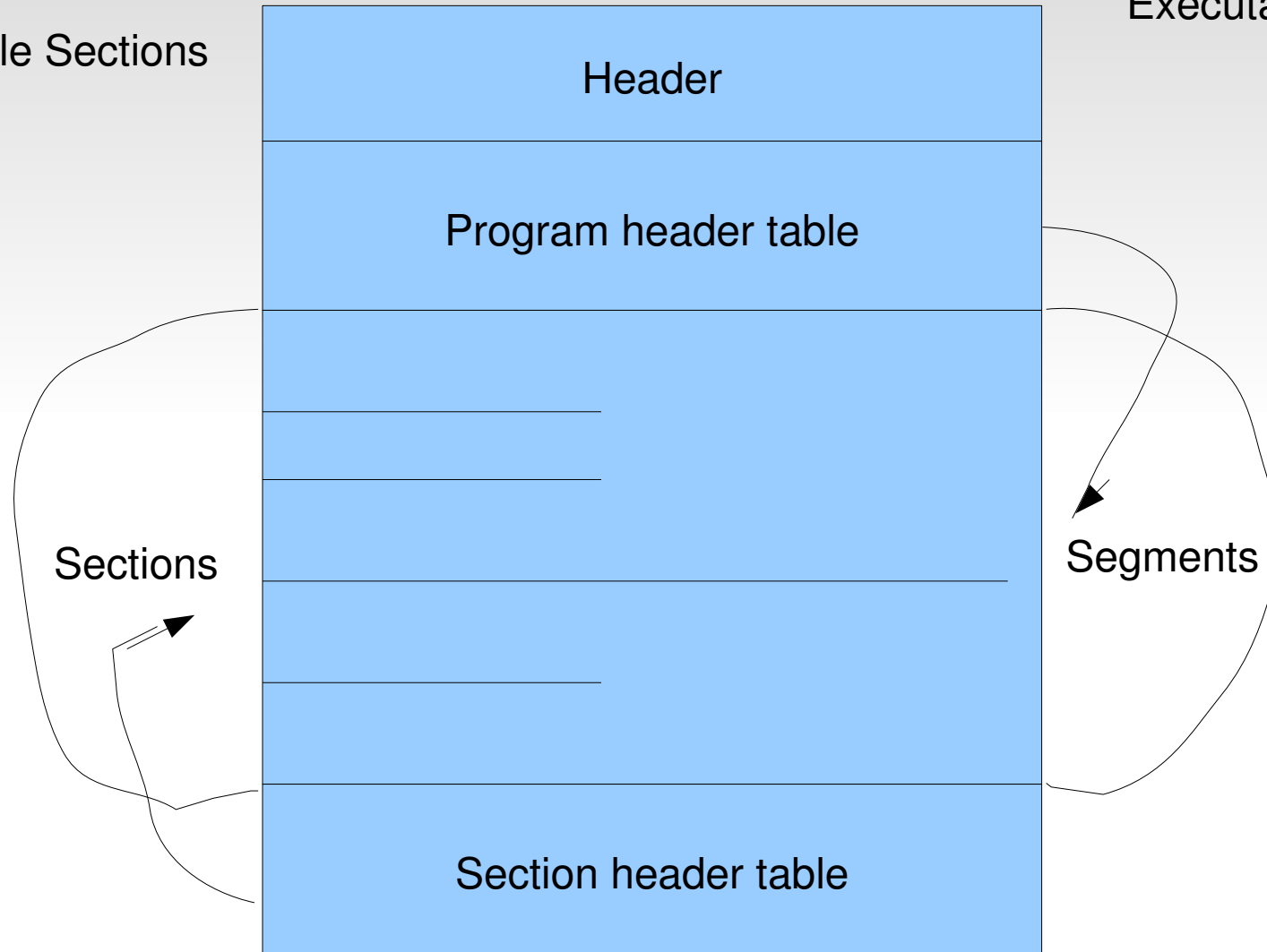
- Designd for a better support of cross-compilation, dynamic linking, and good support for C++
- Debug format DWARF
- Address is related to section
- Types:
 - Relocatable
 - Execuatable
 - Shared Object

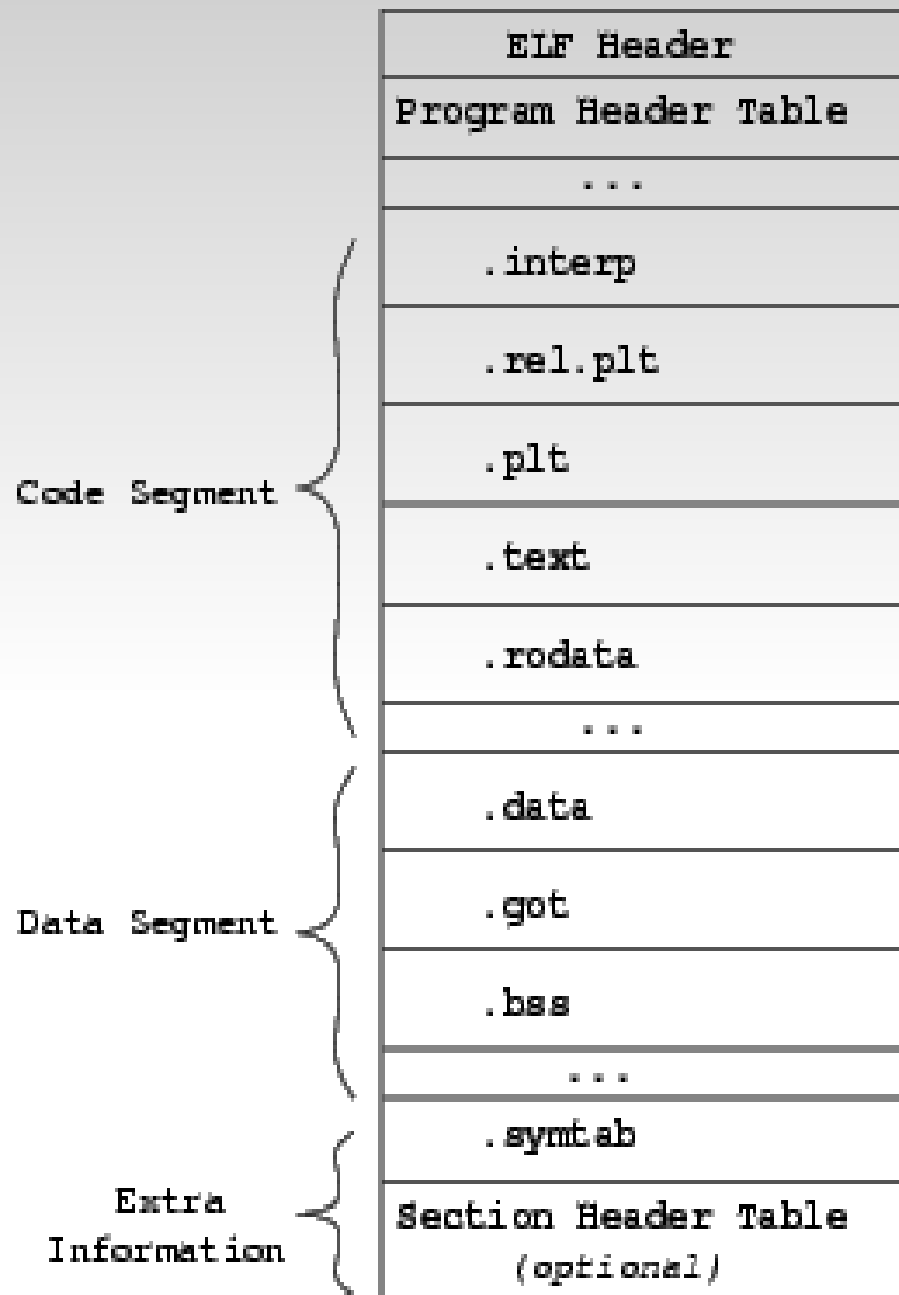


ELF

Linkable Sections

Executable Segments

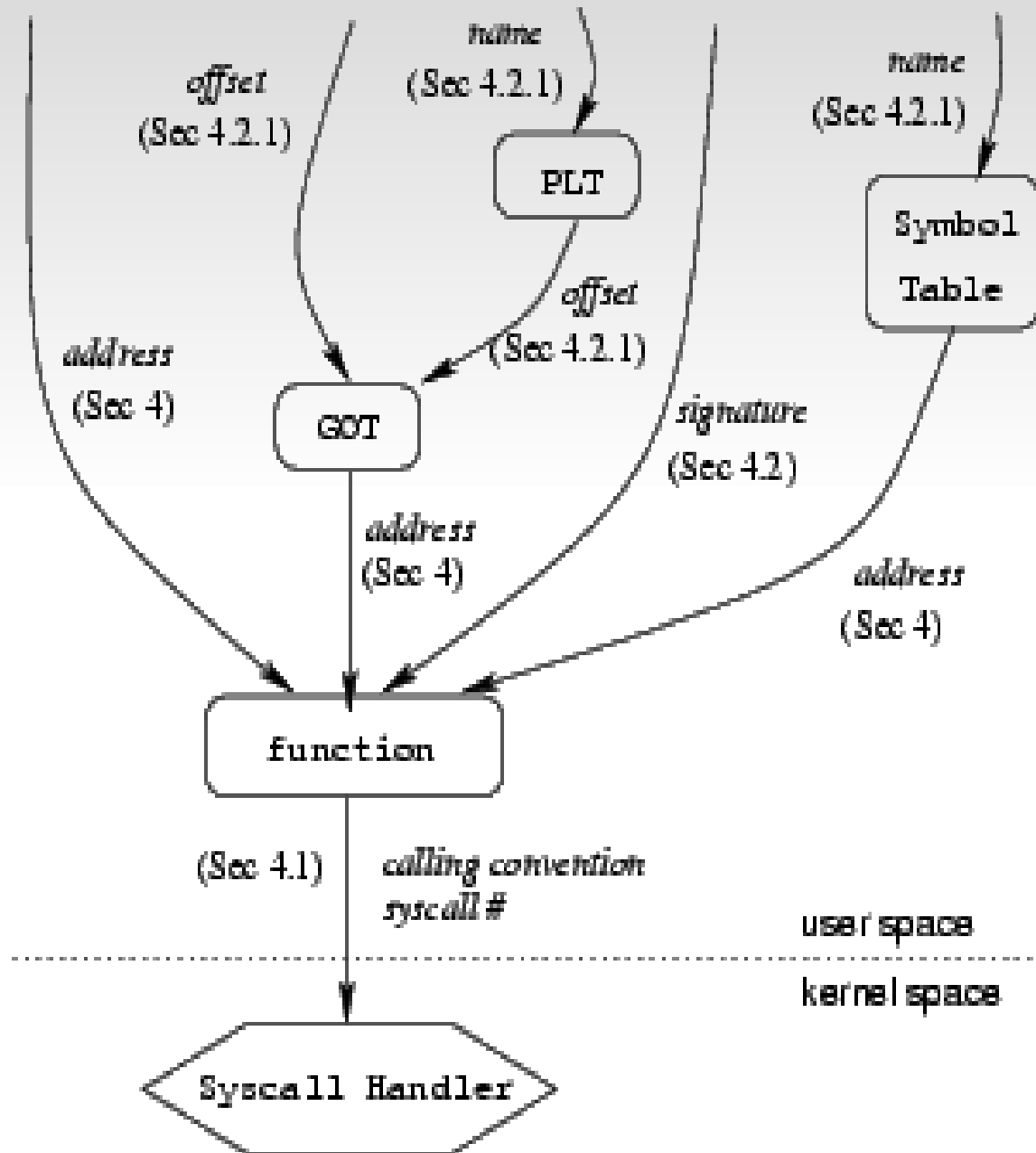




Loading Dynamically linked program

- Dynamic linker ld.so
- Finding Libraries
- Shared library initialization
 - PLT procedure linking table
 - GOT global symbol table

Function call



Experiments & Observations

~Q&A~
Thanks

Process Control Block

- A process in an operating system is represented by a data structure known as a process control block (PCB) or process descriptor. The PCB contains important information about the specific process including
 - The current state of the process i.e., whether it is ready, running, waiting, or whatever.
 - Unique identification of the process in order to track "which is which" information.
 - A pointer to parent process.
 - Similarly, a pointer to child process (if it exists).
 - The priority of process (a part of CPU scheduling information).
 - Pointers to locate memory of processes.
 - A register save area.
 - The processor it is running on.
- The PCB is a certain store that allows the operating systems to locate key information about a process. Thus, the PCB is the data structure that defines a process to the operating systems.

Reference

- <http://www.personal.kent.edu/~rmuhamma/OpSystems/Myos/processControl.htm>
- <http://www.freebsd.org/zh/FAQ/misc.html#AOUT-ELF>
- <http://www.study-area.org/cyril/opentools/opentools/x909.html>
- <http://www.tachyonsoft.com/elf.h>
- http://www.usenix.org/events/sec05/tech/full_papers/linn/linn_html/
- http://www.linuxforums.org/misc/understanding_elf_using_readelf_and_objdump_3.html
- http://developers.sun.com/solaris/articles/linker_mapfiles.html
- <http://blog.linux.org.tw/~jserv/archives/001844.html>
- [Book] Linkers & Loaders

1978	1BSD	2000	HP-UX 11i	1991	RISC iX
1979	2BSD	1993	HP-UX BLS	1977	RT
1980	3BSD	1988	IBMAOS	1994	SCO UNIX
1980	4BSD	1985	IBMIX/370	2002	SCO UnixWare 7
1994	4.4BSD Lite 1	1985	Interactive 386/ix	1984	SCO Xenix
1995	4.4BSD Lite 2	1978	Interactive IS	1987	SCO Xenix System V/386
1992	386 BSD	2007	iPhone OS X	2001	Security-Enhanced Linux
1986	A/UX	2007	iPod OS X	2004	Silver OS
1989	Acom RISC iX	1983	IRIS GL 2	1983	Sinix
1988	Acom RISC Unix	1986	IRIX	1995	Sinix ReliantUnix
1990	AIX	1991	Linux	1990	Solaris 1
2000	AIX 5L	1994	Lites	1992	Solaris 2
1989	AIX PS/2	1977	LSX	1982	SPIX
1990	AIX/370	1999	Mac OS X	1982	SunOS
1989	AIX/6000	1999	Mac OS X Server	2004	Triance OS
1991	AIX/ESA	1985	Mach	1999	Tru64 Unix
1986	AIX/RT	1974	MERT	1995	Trusted IRIX/B
1990	AMiX	2002	MicroBSD	1998	Trusted Solaris
1995	ACS Lite	1977	Mini Unix	1991	Trusted Xenix
1992	ACS Reno	1984	Minix	1977	TS
2007	AppleTV	2005	Minix 3	1981	Tunis
1994	ArchBSD	2000	Minix-VMD	1980	UCLA Locus
1991	ASV	1985	MIPS OS RISC/os	1979	UCLA Secure Unix
1989	Atari Unix	2002	MirBSD	1988	Ultrix
1989	BOS	1996	Mk Linux	1984	Ultrix 32M
1979	BRL Unix	1998	Monterey	1982	Ultrix-11
1988	BSD Net/1	1988	more/BSD	1986	Unicos
1991	BSD Net/2	1983	mtXinu	1996	Unicos/mk
1991	BSD/386	1993	MVS/ESA OpenEdition	2002	Unicos/mp
1992	BSD/OS	1993	NetBSD	1993	Unicos-max
1978	CB Unix	1988	NeXTSTEP	1969	UNICS
1986	Chorus	1987	NonStop-UX	1981	UniSoft UniPlus
1988	Chorus/MiX	1994	Open Desktop	1979	UNIX 32V
1983	Coherent	2001	Open UNIX 8	1991	UNIX Interactive
1987	CTIX	1995	OpenBSD	1981	UNIX System III
1984	CXOS	2003	OpenDarwin	1982	UNIX System IV
1999	Darwin	1995	OpenServer 5	1983	UNIX System V
2000	Debian GNU/Hurd	2005	OpenSolaris	1984	UNIX System V Release 2
1995	DEC OSF/1 ACP	1996	OPENSTEP	1986	UNIX System V Release 3
2005	DesktopBSD	1996	OS/390 OpenEdition	1988	UNIX System V Release 4
1995	Digital Unix	1997	OS/390 Unix	1985	UNIX System V/286
2003	DragonFly BSD	1990	OSF/1	1986	UNIX System V/386
1984	Dynix	2005	PC-BSD	1971	UNIX Time-Sharing System
1993	Dynix/ptx	1982	PC/IX	1993	UnixWare
2003	ekkoBSD	1986	Plan 9	1998	UnixWare 7
1977	Eunice	1982	Plurix	1976	UNSW
2004	FireFly BSD	1977	PWB	1977	USG
1993	FreeBSD	1974	PWB/UNIX	1982	Venix
2006	FreeDarwin	1984	QNX	1980	Xenix OS
1986	GNU	2001	QNX RTOS	1984	Xinu
2001	GNU-Darwin	1996	QNX/Neutrino	1998	xMach
2005	Gnuppix GNU/Hurd-L 4	1981	QUNIX	2001	z/OS Unix System Services
1987	HPBSD	1997	ReliantUnix		
1982	HP-UX	1997	Rhapsody		

1981

1982

1983

