

Course Introduction

Wang Xiaolin

June 10, 2013

Theory vs. Practice

“which came first, the chicken or the egg?”

OS Concepts: theories about how OS works

Linux System Analysis:

- ▶ implementation
- ▶ engineering
- ▶ practice
- ▶ OS concepts + Programming(c, assembly)

OS Fundamentals

Linux Kernel

Assembly and C Programming

Lab References

Web Resources



Course web site



Course discussion board



Wikipedia



OSDev

Grading

No exam!

$$\text{Final mark} = \begin{cases} 1/3 & \text{assignments} \\ 1/3 & \text{class participation} \\ 1/3 & \text{project} \end{cases}$$

Assignments: Lab works

Class participation:

- ▶ Class attendance
- ▶ Using Linux to do your daily work
- ▶ Asking questions
- ▶ BBS posting
- ▶ ...

Project:

- ▶ Follow **Orange'S** to write a simple OS
- ▶ Write something meaningful

Linux Kernel Development

— Google Tech Talks

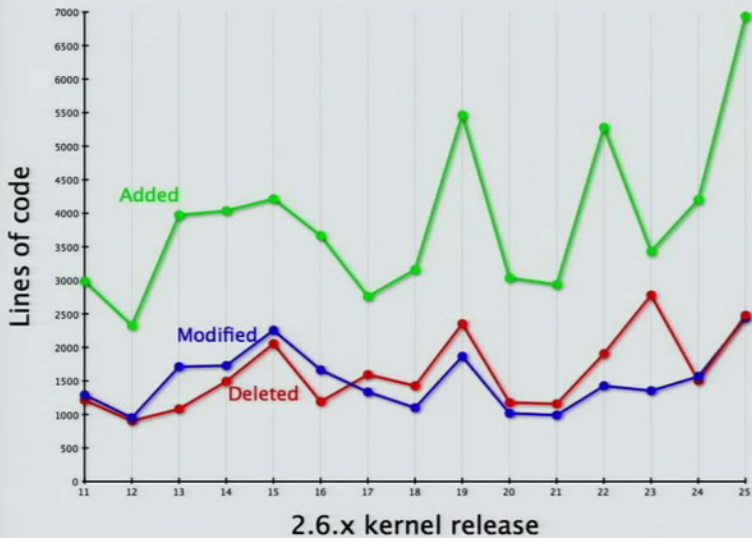


Google Tech Talks — Greg Kroah Hartman on the Linux Kernel

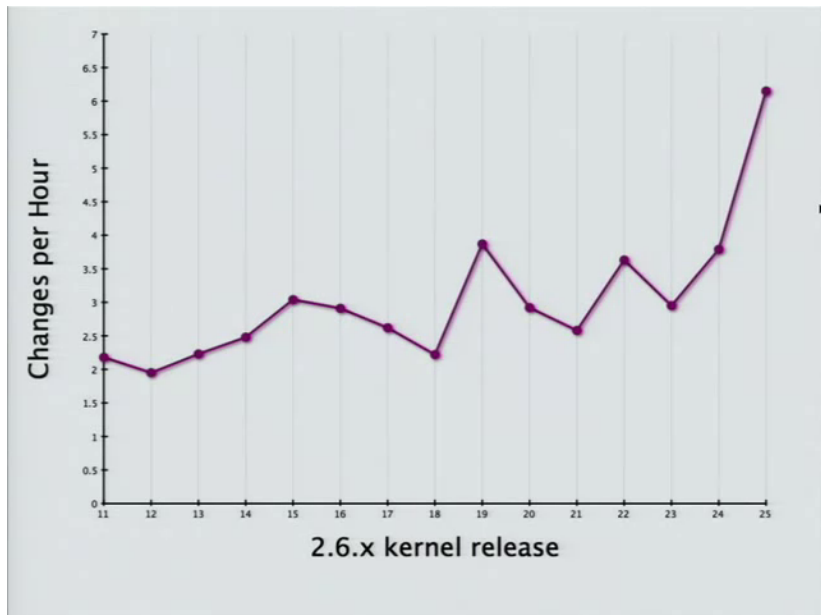
Lines of Code

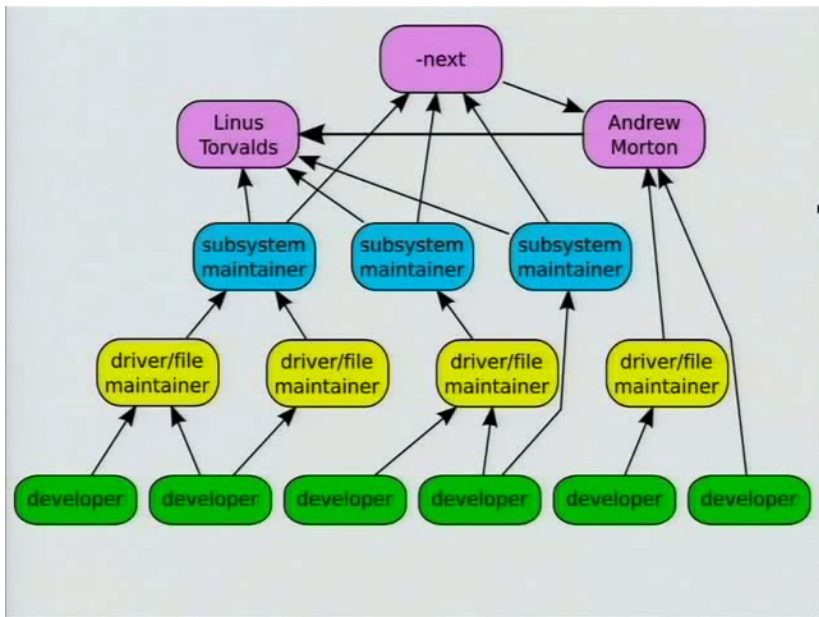
Per day 2007 - 2008

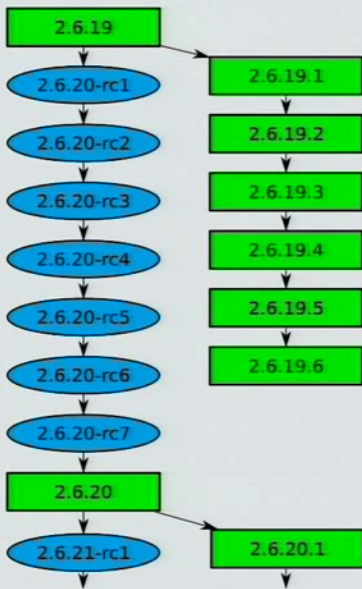
- ▶ 4,300 lines added
- ▶ 1,800 lines removed
- ▶ 1,500 lines modified



3.69 Changes Per Hour







- ▶ New releases every $2\frac{3}{4}$ months
- ▶ 9.2 million lines as of the 2.6.25 release
- ▶ 2399 developers (2.6.20 ~ 2.6.25)

Top developers by quantity

Adrian Bunk	754
Al Viro	698
Thomas Gleixner	656
David S. Miller	655
Bart Zolnierkiewicz	637
Paul Mundt	610
Ralf Baechle	604
Ingo Molnar	596
Patrick McHardy	554
Tejun Heo	530

Kernel releases 2.6.20 - 2.6.25

42 N. Mau 29 Matt Helsley (6.2K) [RFC][PATCH] Replacing the /proc/spid/self/exe symlink code

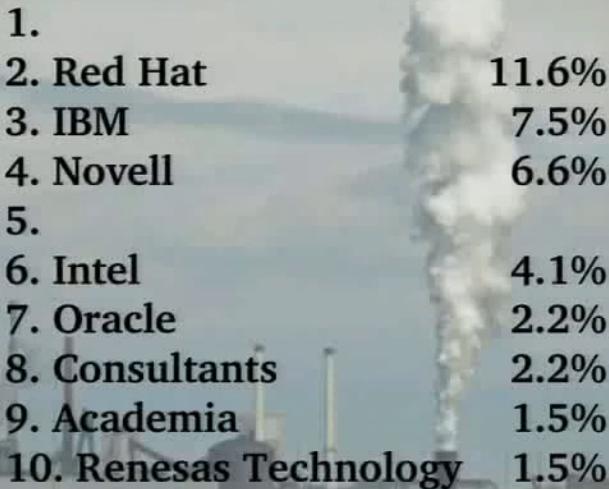
Top Signed-off-by:

Andrew Morton	9086
Linus Torvalds	8960
David S. Miller	4926
Jeff Garzik	2960
Ingo Molnar	2489
Greg Kroah-Hartman	2098
Thomas Gleixner	1098
Mauro Carvalho Chehab	1822
Paul Mackerras	1675
John Linville	1461

Kernel releases 2.6.20 - 2.6.25

42.11.11 mar 23 matt mls@su 18.2K [RFC][PATCH] Replacing the /proc/cpuinfo/extra sublink code

Who is funding this work?

- 
- 1.
 2. Red Hat 11.6%
 3. IBM 7.5%
 4. Novell 6.6%
 - 5.
 6. Intel 4.1%
 7. Oracle 2.2%
 8. Consultants 2.2%
 9. Academia 1.5%
 10. Renesas Technology 1.5%

Kernel releases 2.6.20 - 2.6.25

Who is funding this work?

1. "Amateurs"	18.5%
2. Red Hat	11.6%
3. IBM	7.5%
4. Novell	6.6%
5. Unknown individuals	5.5%
6. Intel	4.1%
7. Oracle	2.2%
8. Consultants	2.2%
9. Academia	1.5%
10. Renesas Technology	1.5%

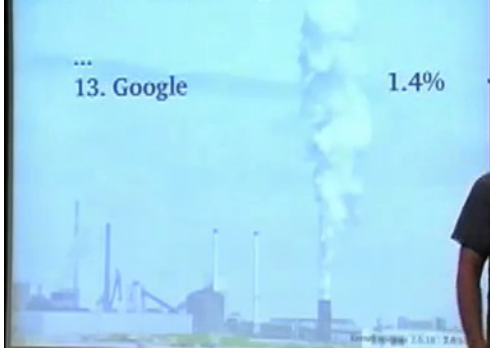
Copyright © 2006 2.6.2006 2.6.2006

Who is funding this work?

...

13. Google

1.4%



Without Andrew

...
40. Google



27 Google employees contributed to the kernel in 2007-2008

g:Quit d:Del u:Undel s:Save m:Mail r:Reply g:Group ?:Help

Google employee contributions

11.	Andrew Morton	507
149.	David Rientjes	67
324.	Paul Menage	24
398.	Ken Chen	18
658.	Matt LaPlante	7
770.	Aaron Durbin	5
770.	Oleg Ryjkov	5
852.	Tim Hockin	4
958.	Martin Bligh	3
958.	Suleiman Souhlal	3

42 N May 29 Matt Helsley (8.2K) [RFC][PATCH] Replacing the /proc/{pid}/self/exe symlink code

Mutt: =linux-kernel [Msgs:7969 New:7550 Inc:8 48M]---(threads/reverse-date-received)---(0x)---

Kernel releases 2.6.20 - 2.6.25

q:Quit d:Del u:Undel s:Save m:Mail r:Reply g:Group ?:Help

Google employee contributions

1127. Arve Hjønnenvåg 2

1127. Brian Swetland 2

1127. Gwendal Grignou 2

1417. Al Borchers 1

1417. David Smith 1

1417. Ethan Solomita 1

1417. Jeff Bailey 1

1417. Joshua Wise 1

1417. Maciej Zenczykowski 1

42 N May 25 Matt Helsley [8.2K] [PFC][PATCH] Replacing the /proc/*pid*/self/exe symlink code
---Mutt: =linux-kernel [Msgs:7969 New:7590 Inc:8 48M]---(threads/reverse-date-received) (0%)
Kernel releases 2.6.20 - 2.6.25

Google employee contributions

1417. Masoud Asgharifard Sharbiani 1
1417. Mike Chan 1
1417. Ollie Wild 1
1417. Priyanka Gupta 1
1417. Ranjit Manomohan 1
1417. Rohit Seth 1
1417. Sam Jansen 1
1417. Warren Turkal 1

42 N May 29 Matt Heisley (8.2K) [RFC][PATCH] Replacing the /proc/{pid}/self/exe symlink code
---Mutt: =linux-kernel [Mega:7969 New:7990 Inc:8 48M]---(threads/reverse-date-received)---(0%)---
Kernel releases 2.6.20 - 2.6.25

New stuff in 2.6.26

Korina driver
superH MX-G
SH-MobileR2 CPU support
Solution Engine SH7721
AKM YL9200
Kwikbyte KD9260
Olimex 5AM9-L9280
emQbit ECR AT91
Digi ra921x processor
Nias SMX crypto
AMCC PPC460EX
Emerson KS6560
WindRiver SBC8641D
Logitech Rumblepad 2
Renesas SH7760 I2C
SuperH Mobile I2C
PCI Express ASPM
security= boot option
NAT for SCTP, SCCP and UDP-lite
network window scaling w/ synccookies
network namespace work
mesh networking for mac80211
SELinux permissive types
realtime group scheduler work
SunOS binary support removed
read-only bind mounts
kdbb
PAT for x86
inode.getsecid()
ipc.getsecid()
ieee80211 MAC removed
generic semaphores
ata_port_operations inheritance

ns_to_ktime()
struct class device removed
SEQ_SKIP allowed from show()
Wolfson WM9713 codecs
TI DAVINCI AC97
Emagic Audiolwerk 2
x86 PC speakers
Asus AV100 (Xonar DX)
Micron MT9M001
Micron MT9V022
PXA27x Quick Capture
Kworld ATSC 120 tuners
cx23417 MPEG encoders
Integrant ITD1000 tuners
Philips TDA10040HN demodulators
Philips SAA7171/3/4 a/v decoders
Auvitek AUR522 demodulators
Samsung SH1411-based tuners
Xen framebuffer
Xen keyboard
Xen mouse
Wolfson Microelectronics touchscreens
wireless Xbox 360 controller
Zhen Hua PPM-4CH transmitters
SPCP8x5 USB to serial
NCR 53c9x SCSI controller
Freescale 8610 and 5121 display
Intel 965G/965GM
TI OMAP sound controller
Eee PC function keys
Intel IXP4xx Ethernet
basic braille screen reader support
OLPC XO architecture support

virtual files in /proc/pid/mountinfo
/proc/vmallocinfo
NUMA for SPARC Niagara
Xen balloon driver
/dev/mem support removed
KVM for x390
KVM for PowerPC 440
KVM for ia64
perprocess secure bits
getrusage() USAGE_THREAD
partions with NBD
audit open file tests
/sys/class/bdi
shared writable mappings for FUSE
ioremap() always uncached on x86
/sys/kernel/slab/NAME/order
WARN_ON taints kernel
get_info() for /proc removed
proc_create_data()
object debugging infrastructure
Solarflare Comm Solarstorm SFC4000
Hauppauge HVR-1600 TV tuner card
WiFi are you doing reading this
ISP 1760 USB host controller
Cypress c67x00 OTG controller
Intel PXA 27x USB controller
DEFINE_KLIST()
KLIST_INIT()
klist_add_after()
klist_add_before()
div_u64 and friends
sysfs streq
MODULE_FORCE_LOAD