

A Review of the 2006 Linux Kernel Summit & >linuxsymposium

Presented at the
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By Craig Ross, Linux Symposium

Outline

2006 Linux Kernel Summit

- Introduction to Linux Kernel Summit
- Historical Perspective & Future Plans

2006 Linux Symposium

- Introduction to >linuxsymposium
- Paper Review & Selection Process
- Review of Key Presentations
- Agenda for 2007

Introduction of Linux Kernel Summit

- An invitation only event which brings together the core Kernel development team, industry leaders, and key developers
- Event designed to further enterprise level development, Kernel enhancement and productivity
- Summit features presentations, round-table panel discussions, as well summary updates on key aspects of Kernel development
- The 80+ attendees include Linus Torvalds, Andrew Morton, Alan Cox, and the majority of the principal Kernel developers
- 2006 Topics included: Kernel quality, documentation, processor compatibility, memory and power management, embedded systems, security, and many others

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Linux Kernel Summit: Historical Perspective

- Summit held in two days prior to Linux Symposium with exception of 2001 when it was held in San Jose (only time it was held in the United States)
- Number of attendees has slowly increased from 50+ to 80+ since 2001
- Initially designed to bring together principle Kernel developers (read CABAL) in a forum that would allow them to exchange ideas and theories on the direction of Kernel development
- Event now sponsored and attended by not only these developers, but by industry leaders who represent the companies who are financing enterprise Linux development
- While scope has changed, topics such as security, power management, and quality control are still popular subjects

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Linux Kernel Summit: Future Plans

- The increased “depth” of the Kernel has prompted the Linux community to request that the Kernel Summit be opened to module maintainers and other developers
- The influx of 100+ additional attendees could make decision making and round-table discussions very difficult
- Dynamic would also change as key principles may opt not to attend the Summit or only attend following the “open” days
- Program committee is considering extending the Summit to three days to allow these developers the opportunity to speak to the principle maintainers
- While the 2007 Summit will be held in Ottawa, Canada, 2008 may see the principle Kernel developers gathering in the UK or elsewhere in Europe

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Introduction of >linuxsymposium

- The conference is held annually in Ottawa, Canada with the Desktop Developers’ Conference, and the Linux Kernel Summit
- Regarded as one of the most technical and educational Linux conferences in the world
- 2006 conference was attended by over 875 attendees from 30+ countries
- Single most gathering of Linux experts in the world
- In 8 years there have been over 600 presentations, tutorials, and BOFS...and over 50,000 bottles of beer consumed. ;)

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Paper Review & Selection Process

- The stages of the review & selection process
 - Selection of review committee
 - Call for Papers
 - Initial abstract and biography submission
 - Scaled grading by review committee
 - Final approval
 - Submission of complete papers for approved presentations
- Review committee selected annually, made up of principle Linux developers
- Call for Papers released in October, no limitations placed on submission topics
- Abstracts are usually representative of key aspects of Linux development at the time

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Paper Review & Selection Process

- Initial abstracts include two parts
 - Brief description of presentation
 - Preferred audience, technical requirements, etc.
- Review committee grades abstracts on scale of 1 to 10
- Abstracts listed to not include any speaker information
- Top graded abstracts listed for 2nd phase of selection and reviewed by committee before final approval
- Abstracts may be accepted under different category (BoFS)
- Authors of approved abstracts contacted and completed presentations submitted to be included in official proceedings
- Only 1/3 of the abstracts submitted are accepted

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Review: The Kernel Report

Jon Corbet, LWN

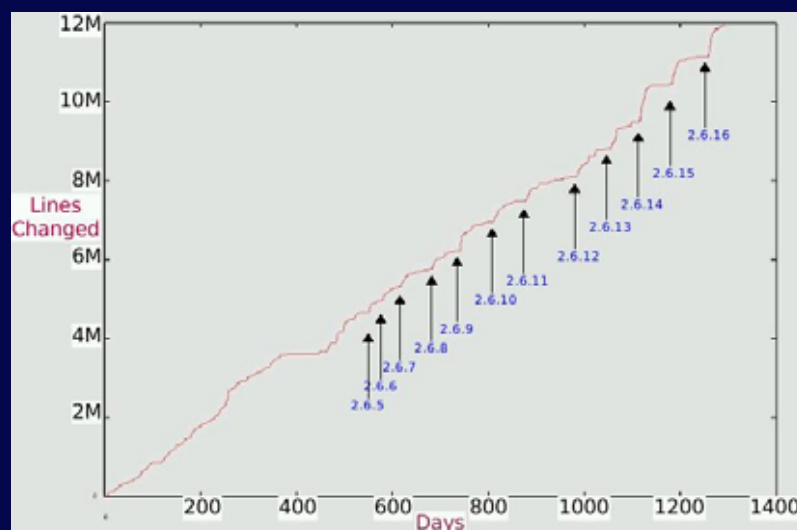
- Talk discusses three major topics:
 - Kernel Development Process
 - Year In Review
 - Future Predictions
- Kernel releases now follow an 8 week cycle
- Process starts with new features included in the “merge window” and ends with Linus deciding the window is “closed”.
- Kernel goes into release candidate mode with a focus on stabilization and bugfixing
- -rc kernels being released throughout the 8 weeks until major release
- 2.6.x kernels are major releases, with 2.6.x.y kernels being bug-fix releases.
- “Merge window” process introduced last year has produced predictable and stable kernel releases
- New features introduced quickly, and distributions are remaining up to date

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Review: The Kernel Report

Jon Corbet, LWN

Patch Rate



9,200 Lines Changed Per Day

Graph By Andrew Morton

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Review: The Kernel Report

Jon Corbet, LWN

- The number of patches has increased exponentially with the new “merge window” release cycle
- Kernel “quality” perceived as positive by most developers, others see too much focus on certain features, more bugs being introduced than fixed
- Majority of bug fixes for longstanding issues (I.e. recent security fixes for one and three year old security flaws)
- Lack of hardware access a key issue in bugs not being fixed
- No “bug manager” or direction unless corporate interest puts resources on fixing specific bugs
- Improved APIs, automated bug-catching, other tools are helping
- Suggestion to do major “bug fix” releases with no additional features

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Review: The Kernel Report

Jon Corbet, LWN

- Linux kernel 2.6.15 was released on Jan. 2nd, 2006, 15 years to the day after Linus bought his first development box to work on the kernel
- No roadmap or timetable for features, with development on a particular feature usually only coming when funded
- 2.6.18 merge window closed, new features include: new core time subsystem, serial ATA patch, kernel lock validator, and removal of `devfs`
- Switch to GPL version 3 unlikely as it would require consensus from all kernel developers

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Review: Why Userspace Sucks

Dave Jones, RedHat

- Talk discusses:
 - Efforts made to reduce boot time in Fedora Core (FC5)
 - Methods used in the process
 - Discoveries made during research
- Patched kernel to print record of all file accesses
 - 79,000 files touched on boot, and 26,000 opened
 - 23,000 files touched on shutdown, 7,000 opened
- Hardware Abstraction Layer (HAL) tracks hardware being added and removed from a system to allow desktop apps to locate and use
- HAL opened and reread some XML files as many as 54 times, CUPS (printer daemon) performed 2,500 `stat()` calls looking for every printer in existence
- X.org scans through all potential PCI addresses, and additional random PCI addresses before giving up
- X also touching and/or approx. 30% of installed fonts on a system

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Review: Why Userspace Sucks

Dave Jones, RedHat

- Timers: USB timer every 256 milliseconds
- Keyboard/mouse ports polled regularly to allow hot-pluggable hardware, and flashing cursor doesn't stop when X is running
- Patched kernel not required to test your own kernel, use `strace`, `Itrace`, and `Valgrind`
- Time saved by fixing previously mentioned issues was approx. 50%,
- New features and applications will consume saved system resources
- Regular extensive testing required to maintain healthy boot time

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Review: Update on Linux Standard Base

Mats Wichmann, Intel Corporation / LSB Project

- Topics covered:
 - Update on LSB
 - LSB stream vs. ISO stream
 - Information on certification process
- Linux Standard Base v3.1 released in two parts: 1. LSB core released in Nov. 2005, and 2. Modules being released in Apr. 2006
- Release split to allow it to meet International Standards Organization (ISO) deadlines to become an ISO specification
- ISO involvement prompted two separate LSB streams: 1. Frequently updated version administered by LSB, 2. ISO specification
- ISO specification exists to allow governments to specify it as in ISO standards compliance when releasing contract tenders for technology, which would allow LSB to become a requirement
- Documentation released under Free Documentation License, with dual-license documentation for ISO to retain it is an official standard under ISO direction

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Review: Update on Linux Standard Base

Mats Wichmann

- Maintaining ISO version of LSB difficult as specifics of specification cannot be changed as frequently as LSB evolving
- ISO update cycle approx. 18 months, which will result in ISO specification being outdated vs LSB specification
- Who gets certified: Any company with economic interest in certifying its distribution or software package
- Companies can keep their software compliant without going through certification process
- Certification is a “self-process” as funding isn’t available for labs
- LSB tools available online, with testing being completed in as quickly as a day, or longer if there are errors
- LSB role is regarded as passive, as it does not mandate standards that are not generally accepted
- Mandate to document and inform even under circumstances where better systems exist than the ones that are in use

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Review: Myths, Lies, and Truths about the Linux Kernel

Greg Kroah-Hartman

- Topics discussed:
 - Misconceptions about Linux
 - Facts about Linux
 - How to get involved
- *"My favorite nemesis is that plug and play is not at the level of Windows."* ~ Jeff Jaffe, CTO of Novell, April 3rd, 2006
 - Linux supports more devices and hardware "out of the box" than any other operating system, including being first to support USB2 and Bluetooth
 - 73% of the world's supercomputers run Linux
- *"Open Source development violates almost all known management theories."* ~ Dr. Marietta Baba, Dean of the Department of Social Science at Michigan State University
 - Linux kernel has no obvious design or roadmap

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Review: Myths, Lies, and Truths about the Linux Kernel

Greg Kroah-Hartman

- *"Linux is evolution, not intelligent design."* ~ Linus Torvalds
 - Evolution of Linux effected by immediate stimuli, not marketing requirements
 - Kernel Evolution: 6,000 patches per major release
- *"The Kernel needs a stable API or no vendors will make drivers for Linux."*
 - Linux doesn't want or need a stable API
- *"My driver is only for an obscure piece of hardware. It would never be accepted into the mainline kernel."*
 - There is an entire architecture being used by just two users, with many others only having one user
- Submit your code, there is a good chance someone else will use it

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Review: Myths, Lies, and Truths about the Linux Kernel

Greg Kroah-Hartman

- *"Closed Source Linux kernel modules are illegal."*
 - Linux distributions using closed source modules cause problems and prevent progress
 - Companies that have intellectual property they want to protect shouldn't use Linux
 - They should read the Kernel headers and check copyright (AMD, IBM, Intel, Etc.)
 - Nvidia, ATI, VMWare all violate the GPL
- *"It is hard to get code into the main Kernel tree"*
 - With 6,000 changes per release, so somebody is submitting code (just read *Documentation/HOWTO* and know what you're doing)
 - Check out Kernel Newbies (<http://www.kernelnewbies.org>), Kernel Janitors project, and Linux Kernel Mailing List

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Review: Myths, Lies, and Truths about the Linux Kernel

Greg Kroah-Hartman

- If you wish to submit code, spend time reading through existing code (*"you must learn to read music before you can write it."*)
- Be prepared to show your code, and don't be upset when someone provides you feedback
- What else can you do? Test Linus' nightly snapshots, submit problems to <http://bugzilla.kernel.org/>, and bug him until he feels bad :)
- Conclusions:
 - Linux supports more devices than anyone else
 - Linux progresses by evolution, not design
 - Closed source drivers are illegal
 - Linux can use help with code reviews and testing
 - Most importantly...total world domination is proceeding as planned

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Agenda for 2007

- 2006 Linux Symposium most successful and educational to date, 125+ scheduled talks, tutorials, BOFS and 25+ “impromptu” sessions
- “Impromptu” BOFS sections and tutorials very popular, will continue in 2007
- Additional hardware displays and “poster sessions” being considered
- Kernel focus most likely to continue, 2007 Call for Papers(CFP) may include “suggestions” for topics committee feels would interest Linux community
- Reports from Desktop Developers’ Conference and GCC Developers’ Summit also being considered
- Suggestions? Email info@linuxsymposium.org
- Interested in volunteering? Email volunteer@linuxsymposium.org

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Information & Questions

- For more information on the events and talks discussed please visit:

Linux Kernel Summit

<http://www.usenix.org/events/kernel06/>

Linux Symposium

<http://www.linuxsymposium.org/>

– **The Kernel Report**

Jon Corbet, LWN

<http://lwn.net/talks/ols2006/>

– **Why Userspace Sucks**

Dave Jones, Red Hat

<http://www.codemonkey.org.uk/projects/talks/ols2k6.tar.gz>

– **Update on Linux Standard Base**

Mats Wichmann, Intel / LSB Project

<http://www.freestandards.org/en/LSB>

– **Myths, Lies and Truths about the Linux Kernel**

Greg Kroah-Hartman, SuSE

http://www.kroah.com/log/linux/ols_2006_keynote.html

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