

ALSA Status Quo

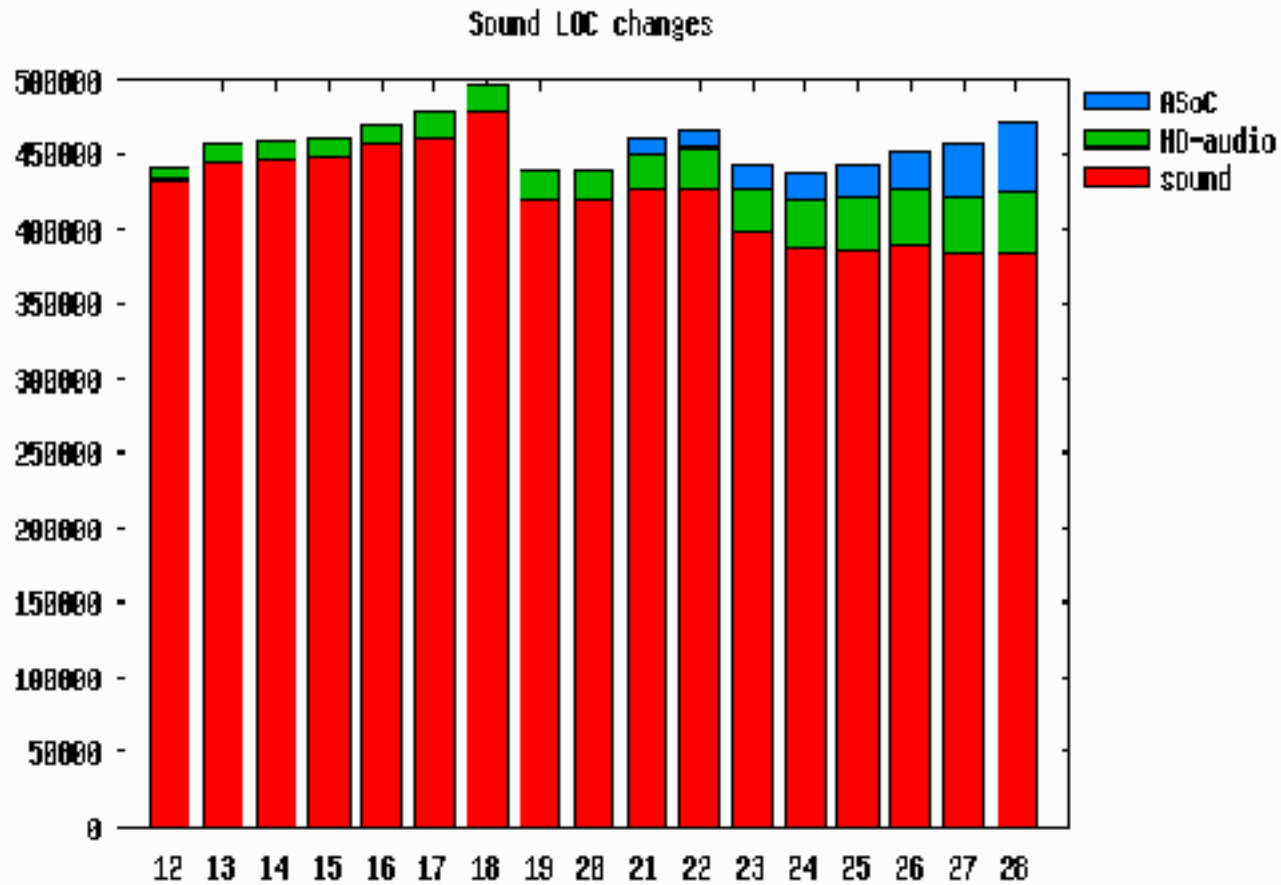
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Sound Drivers - LOC Changes

□ Hey, it becomes smaller!



○ ... except for HD-audio and ASoC

Trends in Drivers

- ❑ PCI sound cards are almost dying
 - Exception: SB X-Fi
- ❑ On-board HD-audio
- ❑ USB audio devices
 - cheaper, simpler
- ❑ FireWire devices for high-end
- ❑ Increasing works on embedded devices

HD-Audio

- New standard audio after AC97

- More flexible hardware design
 - Consists of small components ("widgets")
 - Dynamic widget connections
 - Configurable I/O pins

- Default configurations setup (via BIOS)
 - Define direction, position, role of each pin
 - Driver can guess the whole composition from pin configs

- Linux Driver Implementation
 - A generic parser of BIOS setup
 - Static "patch" code for each H/W-specific stuff

HD-Audio - Recent Development

- Improvement on DMA position workaround
 - 2.6.27 and later
 - Delayed wake-up by BDL fix-up
 - Workaround for known buggy controllers

- Fixes in auto-configuration
 - Still have many static configurations

- Partial support of HDMI
 - Only hardwares with SPDIF-HDMI connection
 - No HDMI 1.3

The (Big Fat) Problem

- The code size grows and grows
 - Static configurations in the driver
 - Intel made mistakes
 - ▷ Gave too much flexibility to chip vendors
 - ▷ Trusted BIOS vendors
 - I made mistakes
 - ▷ Underestimated variety of hardware configs
 - ▷ Trusted BIOS vendors

- Need to improve the generic codec support
 - Trim static configurations from the driver

Diet Plan: Dynamic Codec Parsing

- Need to pass extra information
 - BIOS is so often broken (as you know)
 - Windows uses *.INI file

- Sysfs interface
 - Verbs and fix-ups can be changed dynamically
 - Trigger re-configure
 - Can add hint strings

- User-space emulation code for debugging

- Planned: 2.6.29 (core support), later for diet

More Upcoming Development

- Independent analog I/O
 - e.g. VoIP during listening musics
 - Planned: 2.6.29

- Finer power-management
 - Audio-path-wise power control
 - Planned: 2.6.29 (partially) or later

- Multiple codec support
 - Rare case - two audio codecs with analog units
 - Create as individual card instances
 - Planned: 2.6.30 or later (if works)

What We Don't Have Yet

- **Better support of HDMI**

- LPCM support will be in 2.6.28
- CP - HDMI 1.3 requires collaboration with video

- **Conexant modems**

- Binary blobs in module
- Move out to user-space like slmodemd?

ASoC - ALSA System-on-Chip

- For embedded and small devices
 - Lead development by Wolfson opensource team

- Individual codec and machine drivers
 - About 40 codecs
 - Machine: at32, at91, au1x, blackfin, omap, etc.
 - DAI (digital audio information) links

- Enhanced support
 - Dynamic power-management
 - Click-pop noise reduction

ASoC - Recent Development

□ ASoC v2

- Re-designed infrastructure
- Planned: 2.6.29(?) or later

□ Scenario

- Abstraction layer to group control elements
- Dynamically switch between different use-cases

□ SALSA-library for small systems

- Pretty smaller than ALSA-lib (40kB vs 750kB)
- Source-level compatibility only

Other Upcoming Changes in Drivers

- **Unify AC97 audio and modem drivers**
 - intel8x0, via82xx, atiixp
 - Planned: 2.6.29

- **Better support of non-DMA transfer**
 - Simplified core codes for smaller systems
 - No mmap, emulated in alsa-lib
 - Planned: 2.6.30 or later

ALSA-Lib: Recent Changes

- For Standardization
 - LSB 3.2 Trial Use specification
 - Cleaned up unused / useless API functions

- New API additions
 - For PulseAudio
 - Monotone-timestamps
 - TODO: sync position API

Other User-space Stuff

- Initialization via alsactl init sub-command
 - Initialize the volume automatically after boot-up
 - Setup via udev-like config files

- Plugins work better
 - Lots of fixes in pulse plugin
 - Still problems with some commercial apps
 - ▷ Flash, Skype
 - Better sample-rate converters

Source Management Changes

- We use GIT now
- Whole kernel tree
- Daily merge to linux-next tree
 - From my sound-2.6.git tree on git.kernel.org

Challenges

- Adaptive wake-up mechanism
 - Allow other interrupt sources (e.g. hrtimer)
 - Non-periodical - timing queue?

- Better device-file handling
 - coupling with udev & persistent device names

- Clean-up memory management codes
 - Problems with non-coherent architectures
 - Reduce messes from driver codes

More Challenges

- FireWire I/O plugin
 - It's a missing piece

- Async handler with plugins
 - Async handler should be deprecated
 - Flash uses it; maybe some others too

- Mixer abstraction layer
 - Complex and ugly
 - Old-fashioned design
 - Long-standing bugs (e.g. "Mic Boost")

Much More Challenges

- Variable bitrate support
 - Mostly for non-linear/compressed formats

- Sync with V4L timestamps
 - How to couple/embed timestamps with a stream?

- ALSA-lib configuration messes
 - Ugly^W^W^unique syntax
 - It's static
 - ▷ Some IO-plugins require dynamic configs
 - ▷ Combination with HAL & others?

Resources

- **ALSA web**

- <http://www.alsa-project.org>

- **Sound git tree**

- <git://git.kernel.org/pub/scm/linux/kernel/git/tiwai/sound-2.6.git>

- **ASoC, Scenario**

- <http://opensource.wolfsonmicro.com/>

- **SALSA-Lib**

- <http://ftp.suse.com/pub/people/tiwai/salsa-lib/>