ELCE 2018
Review

Tim Bird - Senior Staff Software Engineer
Frank Rowand - Senior Staff Software Engineer
Sony Electronics
Who Am I?

• Sr. Staff Software Engineer at Sony Electronics
• Architecture Group Chair of the CE Workgroup at the Linux Foundation
• Creator and organizer of Embedded Linux Conference (started in 2005)
  • Chair of the Program Committee
• Worked at Sony Electronics, Sony Corporate, and Sony Mobile for 15 years
• Member of Linux Foundation Technical Advisory Board
• Have been working with Linux for 26 years
• E-mail: tim.bird@sony.com
Who Am I?

- Sr. Staff Software Engineer at Sony Electronics
- Open Source Software (OSS) advocate and resource
- Linux kernel maintainer of device tree (one of two)
- Previously contributor to Linux PREEMPT-RT
- Early engineer at MontaVista, pioneering embedded Linux company
- Previously at Hewlett Packard
  - Linux
  - HP-UX
  - HP-RT
  - NeXTSTEP on PA-RISC
  - MPE
Agenda

• Embedded Linux Conference 2018 overview
• Detailed session reports
• Observations on some topic areas
• Automated Testing Summit mini-report
• Resources
ELCE Overview
Event overview

• “Hot” topic areas this time
• Sony involvement in ELCE
• Technical showcase
ELCE 2018 Overview

• Edinburgh, Scotland, October 22-24

• Co-located with Open Source Summit Europe and Open IOT Summit Europe
  • Lots of smaller events as well (Security summit, KVM forum, Linux Kernel Maintainers Summit, etc.)

• About 2000 attendees, 800 of which were there for ELCE

• Almost all ELCE sessions were recorded and are available on YouTube.
  • See https://elinux.org/ELC_Europe_2018_Presentations
“Hot” topic areas this time

• Lots of different sessions:
  • 58 sessions and BOFS

• Hot topics:
  • Linux kernel driver and development issues (as usual)
    • Camera, Audio
  • Yocto Project
  • Realtime
  • Testing
  • Security
  • Networking
  • AI and deep learning (only 2 talks, but interesting new topic)
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Sony Involvement

• Program Committee: Tim Bird, Frank Rowand
• Presentation: Frank Rowand, "BoF: Devicetree"
• Closing game: Tim Bird, Frank Rowand
• Technical Showcase:
  • Paul Jones (Sony Europe Limited)
  • Masayuki Yamamoto (Sony Semiconductor Solutions Corporation)
  • TV tuner CXD2880 SPI I/F support in DVB-API
  • (tuner card for Raspberry Pi)
Sony Related Announcements at ELCE

• Sony Pictures Entertainment joins recently created Linux Foundation ASWF project
  • Academy Software Foundation
  • Focused on movie creation tools and technology
Technical Showcase
**TV tuner CXD2880 SPI I/F support in DVB-API**

Paul Johns / Sony Europe Limited  
Masayuki Yamamoto / Sony Semiconductor Solutions Corporation

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**What is demonstrated**

- Kodi (open source media player)
- Tynedand (open source channel server)
- DVB-API
- CXD2880 driver w/ SPI I/F (NEW)
- SPI hardware driver
- Raspberry Pi 3 (BCM2837)

**Hardware Information**

- TV tuner: Sony CXD2880  
- SoC: Broadcom BCM2837 on Raspberry Pi 3

**What was improved**

- SPL I/F supported TV tuner is now available in Linux kernel

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**Source code or detailed technical information availability**

- linux/drivers/media/dvb-frontends/cxd2880/  
- linux/drivers/media/spi/cxd2880-spi.c  
- In Linux Kernel 4.17 or later versions

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The CXD2880 receives DVB-T2/T signals and transfers an MPEG-2 transport stream via a SPI bus to the Raspberry Pi for picture decoding. An embedded MPEG-2 TS Packet ID (PID) filter reduces the data rate, which makes streaming over SPI possible. The CXD2880 driver is running in the Linux kernel space and has the common DVB API.

Single board computers have become popular. A low power TV tuner CXD2880 features SPI interface allowing direct attachment to a single-board computer such as Raspberry Pi to make your own TV receiver with open source software. It may also be extended to new broadcasting services.
Tim’s session report
Sessions Tim Saw

- Monday Keynotes – Jon Corbet
- Debos – Ana Guerrero
- Testing primer – Jan Simon
- CVE tracking – David Reyna
- Embedded Update tools – Jan Lubbe
- Grabbing AV in a board farm – Krysztof Opasiak
- Gaining Maturity in Open Source – Carl-Eric Mols (Sony Mobile)
- Teaching your test framework to speak Lava – Tim Orling
- Real-time testing with Fuego – Hirotaka Motai
- Year 2038 – Arnd Bergmann
- Poky-tiny – Alejandro Hernandez
- Closing Game
- Notes about private meetings
Monday Keynotes – Jon Corbet

- Commentary on Meltdown and Spectre
  - From a kernel process perspective
- Discussion of long-term stable model
- BPF explanations
- Good comments on recent Code of Conduct issue
  - Is part of ongoing maturing of development community
  - Goal is to have fun
Debos – Ana Guerrero

• Debos = tool for creating Debian images
• Can create images for lots of different architectures
• Creates images from base platforms, and set of binary packages
• Uses “fakemachine” and qemu for architectures different than the host
  • Also, for regular users to get root permissions needed to build image
• Interesting system, with recipes for some common boards
Testing primer – Jan Simon

• Good overview of Fuego, ptest, Lava, kernelci, labgrid, r4d
• Useful because it shows the pros and cons for each system
  • From perspective of AGL testing
• Fuego pros and cons:
  • (pro) lots of pre-packaged tests
  • (pro) low requirements on target
  • (pro) includes results parsers
  • (con) requires local ssh access to board
  • (con) assumes board is already installed and running (no provisioning)
  • (con) doesn't support board scheduling
• Very handy as maintainer to get other’s perceptions of project
CVE tracking

- by David Reyna
- Presented issues with tracking CVEs and doing security response
- Introduced new tool “SRTool” (Security Response Tool)
  - address pain points and inefficiencies in CVE handling
  - implement best practices
- Automate CVE source updates and other aspects of CVE handling
- Use for guided triage of incoming CVE
Embedded Update tools – Jan Lubbe

• Decent discussion (BOF) about issues with embedded Linux update systems

• See discussion notes at:
  • https://gist.github.com/jluebbe/d27b2289208791f3805adf69a0dac482

• Top discussion items:
  • Migrating user data across system updates
  • Alternatives to A/B updates for constrained systems
  • Detecting a successful update
  • Delta updates for bandwidth-constrained devices
    • open-vcdiff, rsync, casync, etc.
Grabbing AV in a board farm – Krysztof Opasiak

• by Krysztof Opasiak

• Uses cheap ($30) video/wifi transfer board (commodity) to capture HDMI output from board

• In order to have video start on DUT, you have to spoof some HDMI values
  • MuxPi did this
  • Something to do with HDMI EDID? - screen resolution

• There's an open hardware board to do HDMI multi-video capture, but it's expensive ($430).
  • Would like to see it simplified (by some hardware guru, presumably)
Gaining Maturity in Open Source

- By Carl-Eric Mols (Sony Mobile)
- (Not an ELCE talk – no video recording or slides)
  - But can probably ask Carl-Eric for them
- Description of different levels of corporate handling of OSS
- There are lots of discrete areas of OSS handling
- Provided interesting case studies for a few areas
  - What is required for “minimal” handling
  - What is required for mature handling
Teaching your test framework to speak Lava

• by Tim Orling
• Interesting idea to instrument other test frameworks test output
• Add a small amount of code so that LAVA can detect:
  • testcase boundaries
  • results
  • measurements
• Goal is to push upstream, so common results parsing is possible
• Projects instrumented:
  • pytest, bats (bash automated testing system), ptest
Real-time testing with Fuego – Hirotaka Motai

• by Hirotaka Motai
• Had a good overview diagram for Fuego (diagram)
• Added ftrace capture during cyclictest test.
• Easy to identify latency problem in graph of results.
• Made modifications to cyclictest for not exiting when breakout value was detected.
  • Will try to push upstream
  • But can send them to Fuego until they are accepted
• Used ftrace snapshot mode
• (Note to self) Would be a good candidate as a model for a generic Fuego monitoring feature.
Year 2038

- by Arnd Bergmann
- Review of status of year 2038 fixes in the kernel (and distros)
- Expect to finish kernel changes by mid-2019
- Still have lots of work left on distros (see next slide)
Progress bar, v4.19

- Driver code
- Core timer handling
- System calls
- Driver interfaces
- File systems
- Architecture specific
- C library
- Distros
Using Poky-tiny to create your own tiny distro

• by Alejandro Hernandez
• Reviewed poky-tiny features and sizes
• Updated with information about poky-tiny (for 2018)
• How to use bootchart2
• Petalinux = Xilinx Linux distro with tools for their customers
• How to apply poky-tiny principles to create:
  • petalinux-image-minimal from petalinux-image-full
  • Going from:
    • 28MB system with 42 second boot time, to
    • 7MB system with 4 second boot time
Closing Game
“Hallway track” – private meetings
Notes about Private meetings

- Had lots of private meetings and hallway conversations
- Sony people: TV, HQ OSS, Sony Mobile, Tuner hardware developer
- Linux Foundation people:
  - Event staff (for future events)
  - Jim Zemlin (LF Executive Director)
- TAB members:
  - Greg Kroah-Hartman, Steve Rostedt, Olof Johansson
- Linux leaders:
  - James Bottomley, Geert Uytterhoeven, Peter Zilstra, David Woodhouse, Pavel Machek
Private meetings aka "Hallway Track"

We highly value the hallway track, but often do not explain it very well

• Some people spend the majority of their time in the hallway track

• Highly dependent on who is at conference
  • Kernel Maintainers Summit implies some key maintainers
  • ELCE (and ELC) implies embedded developers, partners, vendors
    • kernel, tools, bootloaders, firmware, hardware, etc -- highly technical
  • Plumbers implies broad representation of technical areas and projects
  • OSS (NA, Japan, Europe) tends to be higher level, business, sysadmin, etc
Private meetings aka "Hallway Track"

• Methods to determine who will be at conference
  • Conference reputation (list on previous slide)
  • Co-located conferences
  • Look at speakers on the schedule when it is announced
  • Watch project mail lists for announcements of mini-conferences, summits, etc
  • Personal communication
Private meetings aka "Hallway Track"

• You may be able to take advantage of the hallway track even if you are not attending the conference
  • Contact people well before the conference to schedule a meeting on a day before or after the conference
    • People often make travel plans well in advance of the conference
  • Arrange a nearby meeting during the conference
    • The Sony Semiconductor team that wrote the driver for the Raspberry pi TV tuner card arranged to meet the media subsystem maintainer in a coffee shop during OSS Japan
  • A few of the OSS Japan attendees may also attend a Japan Technical Jamboree that is often soon after OSS Japan
Frank’s session report
Gaining momentum

• Using Linux in safety critical systems
  • Nicholas Mcguire | Building Safe Systems with Linux
  • Lukas Bulwahn | Collaborate on Linux for Use in Safety-Critical Systems?
  • Anas Nashif | Developing Open-Source Software RTOS with Functional Safety in Mind

• Deep Learning / AI
  • Andrea Gallo | Deep Learning Neural Network Acceleration at the Edge
  • Wu Zhiwen (Alex Wu) | Deep Learning in OpenCV
New protocol and subsystem

• Vinod Koul | Introduction to SoundWire
Good Advice

• Marc Zyngier | Getting Your Patches in Mainline Linux: What Not To Do (and a Few Things You Could Try Instead)
A different perspective on data visualization

• Dawn Foster | Kernel Mailing List Collaboration

OSS Europe (not ELCE), but I always find that her data visualization techniques inspire my creativity.

I recommend following the link from her slides to her blog. And talks at previous Linux Foundation conferences.
Automated Testing Summit mini-report
Automated Testing Summit 2018

• Private summit for Automated Testing system architects
  • https://elinux.org/Automated_Testing_Summit

• Organized by
  • Tim Bird (Sony, representing Fuego project)
  • Kevin Hilman (BayLibre, representing kernelCI project)

• About 40 attendees

• Test Stack Survey (preceding the summit)
  • see https://elinux.org/Test_Stack_Survey
  • Responses for 21 automated test systems (or major test efforts)
Agenda for summit

• Vision and problem definition
• Common glossary and diagram of Continuous Integration loop
• Specific stack parts:
  • Test definition
  • Build artifacts
  • Test Execution API
  • Run artifacts
    • Results format
    • Test log parser mechanisms
  • Board farm standards
• Wrap-up
Decisions and ongoing discussion

- Start with pdudaemon as first DUT control API consolidation point
- Continue to use automated-testing@yoctoproject.org as mail list for discussions
- Use elinux wiki for documents and standards
  - See https://elinux.org/Automated_Testing
- Arrange next face-to-face meetings at ELC Europe 2019 (Lyon France)
  - to include open sessions
- Minutes from ATS are available:
  - https://elinux.org/ATS_2018_Minutes
ELCE 2018 resources

• eLinux wiki – ELCE 2018 slides and videos
  • https://elinux.org/ELC_Europe_2018_Presentations

• eLinux wiki – ELCE 2018 Technical Showcase posters
  • https://elinux.org/ELC_Europe_2018_Presentations#Technical_Showcase_Posters

• LF playlist of ELCE 2018 (includes some keynotes not on wiki)
  • https://www.youtube.com/watch?v=f4dI FMxmYgo&list=PLbzoR-PLrL6qThA7SAbhVfuMb jZsJX1CY

• Previous ELC, ELCE, and Japan Jamborees
  • https://elinux.org/ELC_Presentations
Questions and Answers
Thanks!