Linaro Connect Asia - Macau

Enabling the 64 bit ecosystem

George Grey, Linaro CEO

New Member Announcement

- Welcome to Qualcomm - Linaro Club member

TSC Representative: Matt Locke

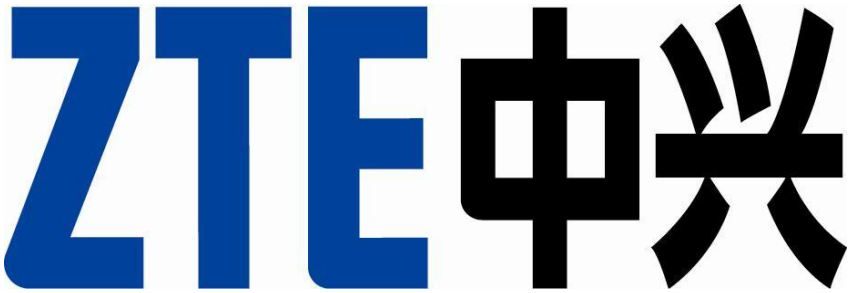
New Member Announcement

- Welcome to MediaTek - Linaro Club member

TSC Representative: James Lai

New Member Announcement

- Welcome to ZTE - Linaro Club member



Acting TSC Representative: Jill Guo

New Member Announcement

- Welcome to Comcast - Linaro Group member
  Founding member of LHG

LHG-SC Representative: Labeeb Ismail
Keynote: Tuesday 8.45am Sree Kotay, SVP

New Member Announcement

Welcome to Allwinner Technology - Linaro Group member
Founding member of LHG

LHG-SC Representative: To be confirmed

Linaro

CORE

ARM

HISILICON

CLUB

BROADCOM

FUJITSU

LG Electronics

QUALCOMM

MEDIATEK

SAMSUNG

life.augmented

TEXAS INSTRUMENTS

ZTE中兴

GROUP

Allwinner Technology

AMD

applied micro

CAVIUM

CANONICAL

CISCO

CITRIX

COMCAST

ENEA

facebook

freescale semiconductor

hp

LSI

MARVELL

montavista

nsn

redhat.

COMMUNITY

IBM

MOBSCOM

- TSC committee focused on mobile
  - Mobile has been key within Linaro since founding
  - Mobile agenda carried out by Linaro Working Groups & Platform team
  - MOBSCOM formed to focus on Linaro mobile roadmap and strategy
  - Open to Core/Club members
- Key technical topics
  - big.LITTLE
  - Android optimization
  - Android for ARMv8
  - QEMU
  - Chromium Browser

MOBSCOM

Linaro

Linaro Digital Home Group (LHG)

- Public launch planned Q2
- Work on core open-source software for digital home devices has started
- Leverages Linaro's shared engineering model
  - W3C EME Secure Media Playback for RDK and Android
  - Middleware and user-space stack
    DRM, DLNA, CVP-2, HTML5
  - LSK kernel version for STB/IPTV
  - Common media frameworks

Allwinner Technology ARM COMCAST

FUJITSU HISILICON life.augmented

Additional companies to
be announced at LHG public launch

SoC Vendors	STB/TV/IPTV/ Media OEMs & Operators

Group Members

http://www.linaro.org/engineering/lhg

Linaro

Enabling the 64-bit Open Source Ecosystem

Linaro

Markets for 64 bit Processors

- Mobile
- Digital Home
- Networking
- Server

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Software Ecosystem

- Linaro is building, validating and optimizing the key software enablers for ARMv8-A
- Work started in 2012 using models
- Now running on 64 bit hardware
- Goal is to enable open source and commercial ISVs to rapidly deploy applications when ARMv8-A hardware is publicly available

Linaro

Time is fleeting ...

Key Activities and Technologies

- Toolchain
- Linux Kernel and LSK
- Boot Architecture
- Security
- Virtualization
- Android 64
- Power Management & Thermal
- Middleware
- 64 bit Applications

Toolchain

- Linaro Toolchain (gcc)
  - Maintenance and performance optimizations
  - Also binutils, cortex-strings, eglibc, gdb, newlib, qemu
- Quarterly stable releases (Jan/Apr/Jul/Oct)
- Current stable release is gcc 4.8 with ARMv8 support
  - Source and binary releases
  - Tested and benchmarked using LAVA
  - Big-Endian version also available, used by LNG
- Monthly engineering releases
  - Latest ARMv8 features
- Linaro sponsoring GNU Cauldron
  - July 18-24th

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Linux Kernel

- LSK - Linaro Stable Kernel
  - Based on kernel.org LTS (currently Linux 3.10)
  - First formal release for ARMv8 as soon as member hardware is available for QA/validation
  - Standard Linux and Android versions
  - Given the amount of new technology we need to have a trusted process for incorporating new ARMv8 support and optimizations into the LSK, while maintaining product levels of stability
- linux-linaro Kernel
  - Latest tree used by working groups
  - Currently Linux 3.14 RC3
  - Includes 64-bit support
- Monthly releases from Linaro downloads page

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Boot Architecture

- Standard Boot Architecture for ARMv8
  - ARM Trusted Firmware
  - UEFI industry standard
  - ACPI system description
  - PSCI Power State Coordination Interface

- LEG leading the way for servers
  - SBSA (Server Base System Architecture) specification
  - LEG Server kernel now delivered, booting with only UEFI and ACPI
  - Critical for companies like Canonical and Red Hat to deliver a single distribution that will work across ALL member ARMv8-A SoCs
- Linaro and ARM are working together to provide validated reference implementations for all segments, including Android

Which Way?

FDT

ACPI

FDT and ACPI

- ACPI will take time to mature
- Servers are leading the way - UEFI/ACPI will be mandatory

- Other segments including LNG & mobile will take time to adopt ACPI and will use DeviceTree for now
- We expect the Linux kernel to support both FDT and ACPI
- Linaro will continue to support both for our members

Which Way?

U-Boot

UEFI

Boot Architecture - UEFI and U-Boot

- The embedded, mobile, digital home and networking segments are expecting to deliver ARMv8-A based products using U-Boot and, over time, UEFI. Our members are asking us to support both

- Linaro will therefore work on and support both U-Boot and UEFI for our members
- Engineering projects will include continuing to work on UEFI and ACPI upstreaming and improvements, as well as working to avoid fragmentation in U-Boot implementations

Maintainers

- ARM Trusted Firmware, UEFI and ACPI software are being developed in the open
  - ARM Github, Tianocore, ACPI
- We all want to avoid product forks and fragmentation
- The upstream maintainers are working with the community of users, who are themselves working on delivery of products at the same time
  - Balance between getting it right and fragmentation risk
- Linaro is actively helping members to accelerate development and hardening of these key components

Security

- Mission to create reference open source software driven by Mobscom and Segment Groups on member SoCs
  - W3C EME secure media playback
  - Secure key store
  - Secure boot
- Work with open source TEEs from ST and NVIDIA, and Trustonic TEE
- ARMv8 is a key goal
  - Leverage ARM Trusted Firmware
  - Work with TEE upstreams to ensure ARMv8 support
  - Keep Google informed on our progress

Virtualization

- Support for KVM and XEN for ARMv8
- Demonstrated at LCU-13 in Santa Clara
- Ongoing work program, largely driven by LEG to date
  - Guest Migration
  - PSCI support
  - Improved debugging tools
  - CI Loop and testing in LAVA

Android

Android for ARMv8

- No product announcement from Google as of today
- Intel have demonstrated Android running on 64 bit kernels but Google have not yet released a version of Android for 64 bit applications
- Members want to work together in Linaro on common Android software for ARMv8 to help accelerate deployment once Google does release a 64 bit version of Android
- ARM and others have contributed 64 bit technology related patches to AOSP

Android for ARMv8

- Current Linaro work
  - QEMU ARMv8 model for Android SDK - delivery by end of March
  - Optimized OpenSSL for ARMv8
  - Test and optimize Chromium ARMv8 browser
- 64 bit Kernel and existing Android user space running on models as tool for silicon bring-up and verification - not for product
  - Build device drivers for 64 bit now
  - Available to Club and Core members under NDA
- Early hardware bringup
  - No current public hardware to work on
  - Landing teams can work with members under NDA

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AARCH 64

android

Android for ARMv8

- High priority to build 64 bit user space from AOSP and implement in LAVA CI loop
- Key goal is to build, test, optimize and harden the 64 bit user space software in AOSP
- ARM, Linaro & Mobscom members will work on this project
- Android team will be significantly expanded following LCA14
  - Resources from Linaro
  - Resources from member assignees
  - Expect to have 15-20 engineers working on this

- For more information come to the Club/Core member-only “Android on ARMv8-A” session Thurs 2-4pm

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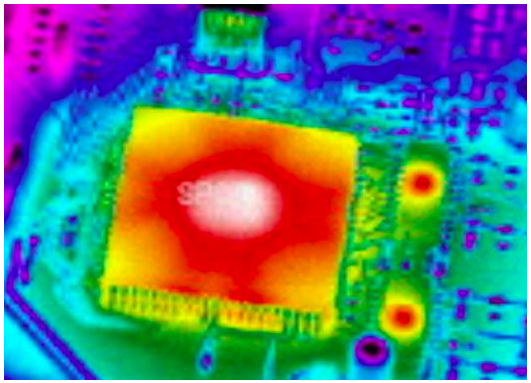
Power Management and Thermal

- Linaro is working with members on a work program for power management and thermal with key goals:
  - Establish frameworks upstream
  - Build reference implementations
  - Leverage existing member software technology
- Hardware platforms (v7 and v8)
  - big.LITTLE/HMP
  - 4/8/8+ multicore SoCs
  - CPU and GPU/IO processors



Middleware

- LAMP stack optimization
  - LEG driven analysis and optimization of key packages
  - Linaro-sponsored open source ARMv8 community effort led by Jon “Maddog” Hall
- OpenJDK 8 for ARMv8
  - Project developed in RedHat (Andrew Haley) and now a joint effort with Linaro (Ed Nevill)
  - Full high performance, enterprise class, implementation with C1 and C2 JITs
  - Demonstrated Hadoop running on ARMv8-A hardware
  - Available now at openjdk.java.net
  - Ongoing work on JCK testing

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Applications

- Enabling the 3rd party open source and commercial applications software vendors
  - Models will not cut it - we need available hardware
  - HP Discovery Lab or LAVA based access
- More needs to be done in this area - it does not feel like we are ready as a community
  - Can Linaro help?

What do we need

- Models only take us so far
- To be really effective we now need hardware to deliver these enablers
  - If necessary under NDA/LUL
- Please ensure that Linaro has early access to your hardware - this will benefit you as key enabling software will be delivered and validated on your own SoCs
- Now is the time to leverage Linaro and work together

ARMv7 and Cortex-M

- This keynote was about the 64 bit ecosystem!
- But, Linaro is also very active in the 32 bit world
  - See Roadmaps, Status and Downloads
- Sneak preview of new key topics for LCU-14
  - Ongoing discussions on “small” embedded Linux
    - Yocto/OE
    - Targeted at appliances, embedded, wearables
  - Ongoing discussions on IoT
    - Open source software for Cortex-M series

Thank you


AARCH 32
AARCH 64
applied micro X-Gene
CALXEDA EnergyCore
KVM
hadoop
MySQL
OPEN Compute Project
openembedded
openstack CLOUD SOFTWARE
PROGRAMMING REPUBLIC OF PERL
php
python
You Tube
Xen


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