



Linaro™ Update for MWC

Software Solutions for an Open Digital World



Agenda

- Linaro – Accelerating Product Development
- Linaro updates
 - Working Groups
 - Evaluation Builds
 - Test & Validation Farm



Open source revolution

- Billions of consumer devices rely on open source software
- OEMs and ODMs want chip vendors to offer the best open source support for their SoCs and to avoid low level fragmentation speeding their time to market
- This necessitates working together – kernel consolidation, aligned investment, defragmentation, aligned upstreaming, open source leadership



About Linaro

“to make it easier and quicker for ARM partners to deploy the latest technology into optimized Linux based products”

- Founded in June 2010
- Members align their open source strategy with Linaro
- Provides shared Leadership in open source

ARM

IBM

SAMSUNG

freescale
semiconductor

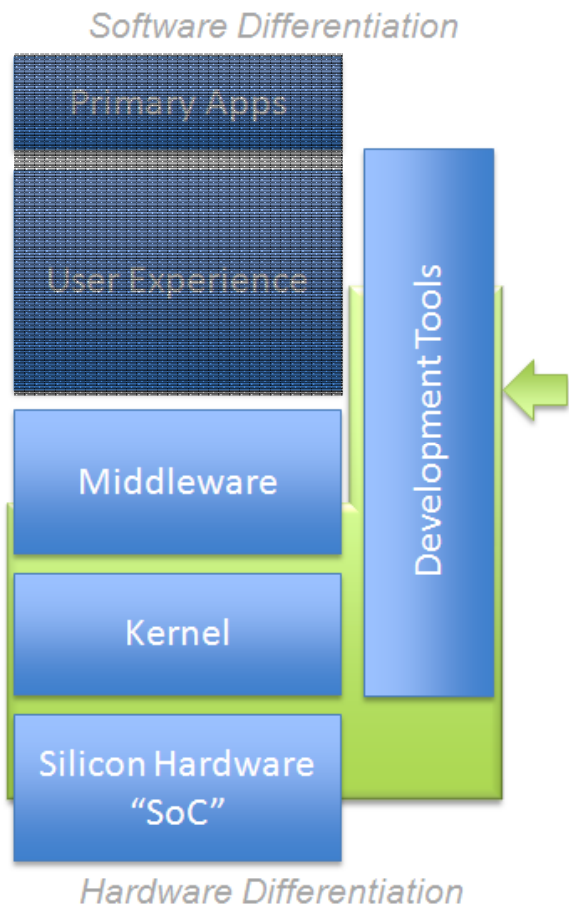
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INSTRUMENTS

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Linaro

What does Linaro do?



- Delivers a optimized code base
 - Kernel and vital middleware
 - Applied across all member SoCs
- Tools
 - Best compiler, debugger, profiler
- Enabled on the latest SoCs
 - Cortex A8, A9, & A15 processors
- Delivered upstream
 - Evaluation builds for key distributions – Android, Chrome, Ubuntu, Other Linux
 - Test & Validation framework for member SoCs



MeeGo



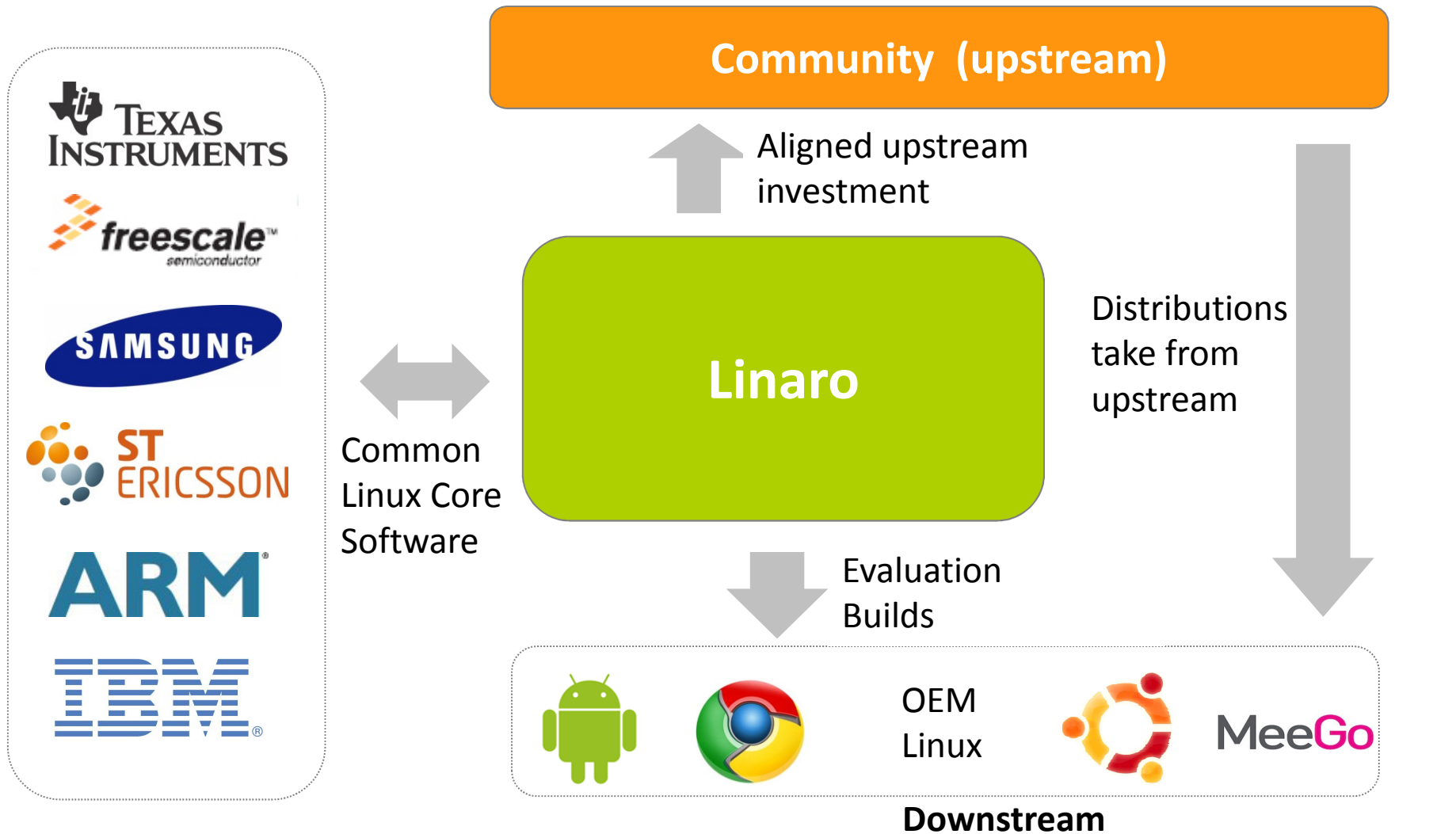
OEM
Linux



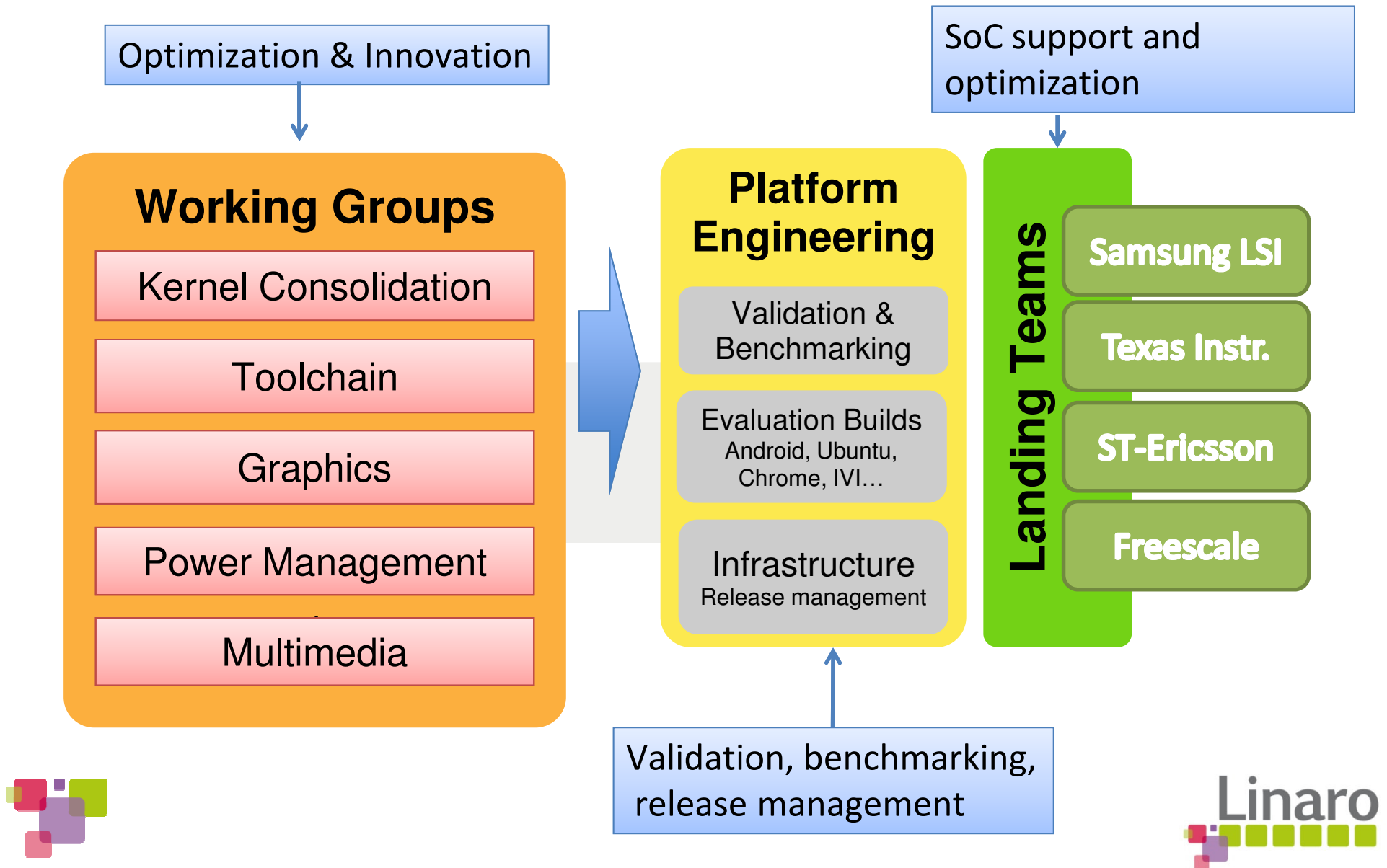
Linaro – NOT a distribution



Where does Linaro fit?

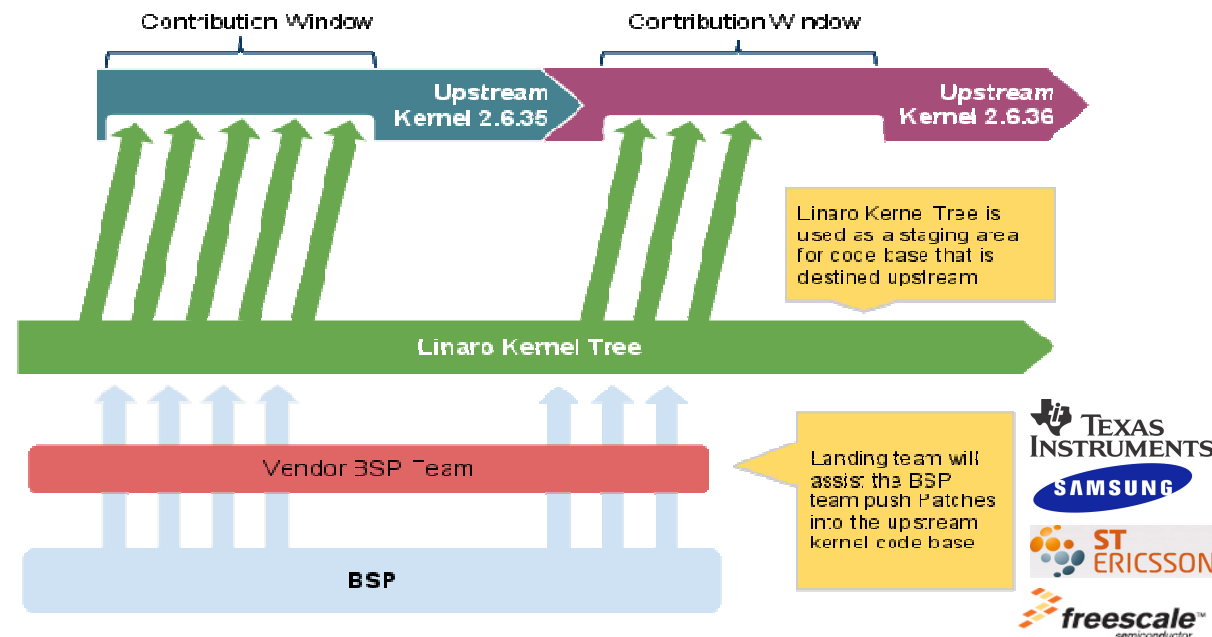


Engineering units



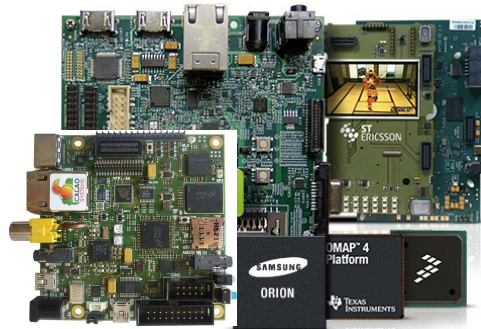
Working with Linaro

- Linaro kernel becomes members most advanced
- Vendor BSP and Linaro landing team engineers work together
- Get latest software on latest SoCs with upstream support



WGs: Alignment, Optimization, Leadership

- Aligned investment: boot, power mgmt, Float, kernel...
- Open source Leadership
- Latest software on latest HW



Optimization & Innovation



Working Groups

Kernel Consolidation

Toolchain

Graphics

Power Management

Multimedia



Linaro eval builds & test farms

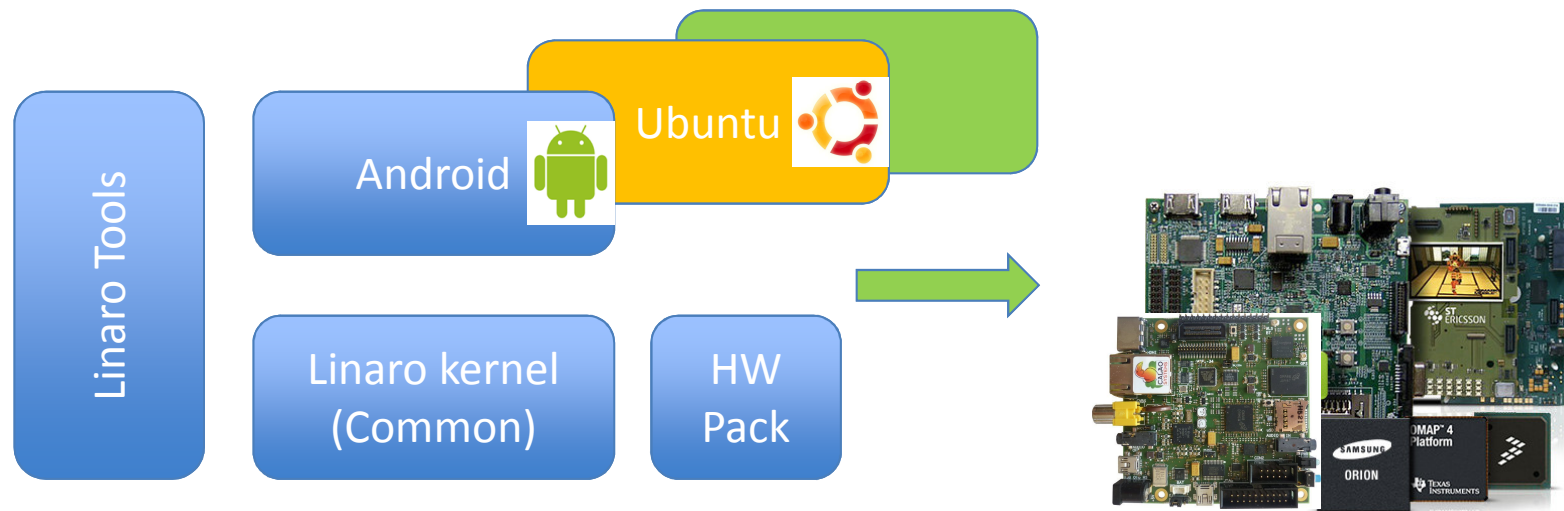


- Linaro evaluation builds push latest software into distributions
- Validation test farms monitor improvements in software quality
- Benchmarking ensures continuous improvements in performance



Linaro Evaluation Android Build

- Reduced TTM with streamlined integration
- Increased optimisation and benchmarking
- Validation on multiple hardware



Early Android for latest member hardware with Linaro optimisations

Test & Validation farm
Benchmarking



Evaluation Builds

- Builds of key distributions incorporating Linaro's technology
- Initial Evaluation builds (11.05)
 - Android 2.3 Gingerbread/Honeycomb
 - Ubuntu 11.04
 - Basic ARM Linux for creating custom distribution
 - Chrome (tbd)

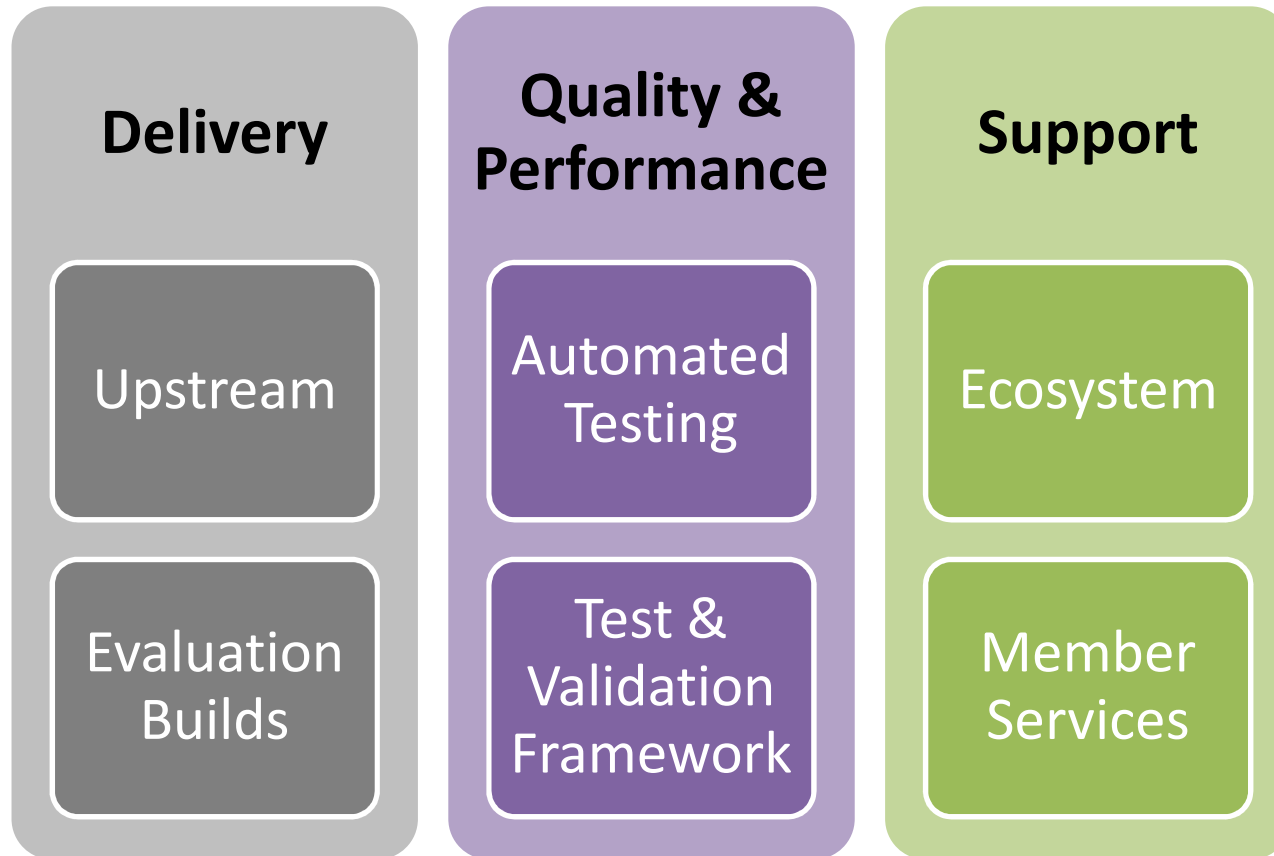


Benefits of Evaluation Builds

- Demonstrate the output of the working groups
- Real-life product-quality distributions for Linaro performance and regression testing
- Closer to understanding and delivering tangible deliverables that shorten the TTM
- Serve as basis for OEM/ODM commercialization
- Validate members silicon and reference designs
- Attract distribution owners to Linaro
- Attract a wider community audience



Linaro 2011



11.05: Working Group Deliverables

- Toolchain
 - Produce the best all-round v7 GCC compiler
 - EEMBC DENBench/ConsumerBench, SPEC CPU2006
 - linaro-gcc 4.5 & 4.6, linaro-gdb 7.2, cortexstrings 1.0
 - ARM-enhance/port qemu, libunwind, ltrace, gold, libgc
- Kernel
 - Linaro Linux and Linaro Android trees
 - Devicetree evaluation kernels
 - GPU and MM implementation guidelines
- Power Management
 - Standard ARM-enhanced management mechanisms
 - Hotplug, thermal and clock/regulator tree common interfaces
 - Allow custom engines to encode policies
 - Tools to demonstrate interfaces and debug behaviors



11.05: Working Group Deliverables

- Multimedia
 - A multimedia optimization workbench
 - ARM-enhanced JPEG and VP8 decoding
 - OpenMAX-standardized components
 - Free content for benchmarks and testing
- Graphics
 - OpenGL ES backends for Cairo, Skia, meegotouch-compositor, chromium-wm and compiz
 - Work with vendors and upstream to document a common ARM-standard acceleration framework



Quality & Performance

- Open source code has limited testing as it is created
- Linaro needs to quantitatively measure its performance & quality over time
 - Benchmarks
 - Power consumption under system loads
 - System stability
- Linaro engineering needs improved tools
 - Smoke testing
 - Regression testing
 - Automated testing with real distributions



Linaro Test & Validation

- We have started to develop our test & validation farm to benefit members & our own engineering
- Populated by member hardware
- Goals
 - Linaro 11.05
 - Running automated daily builds and smoke tests
 - Running daily benchmarks
 - At least 2 member boards
 - Linaro 11.11 and beyond
 - Automated performance tests on release and daily builds
 - Automated stability tests
 - Hardware from all members
 - Web dashboard available



11.05: Platform Team Deliverables

- Linaro Evaluation Builds (LEBs)
 - Minimal, Android, Ubuntu
 - Each on at least one member hardware platform
- Linaro Test and Validation framework
 - Daily LEBs deployed to member boards
 - Test suites covering kernel, toolchain and UI
- Linaro Hardware packs
 - TI Beagle OMAP3 & PandaBoard OMAP4
 - Freescale Babbage i.MX 51 and EVK i.MX 53
 - ST-Ericsson U8500
 - Samsung V310 Orion
 - Versatile Express/Elba
- ARM Porting Program
- x86-based cross-compilation environment



How Linaro delivers value

- Linaro provides a common platform for member SoCs and Linux distributions
 - Enables SiP, Distribution, OEM, ODM to focus on value add rather than common core code
- Multiplier effect of multiple member resources working on common code base
- Access to test & validation framework
- Support and services
- **Faster time to market for end products**



Roadmap

- Work with distributions to become the enablement channel for member SoCs
- Work with ARM to deliver open source support for Cortex A15
- Continue to work on ARM generic SoC optimization including toolchain support, NEON and SMP issues
- Support new market segments
 - IVI, DTV/STB, Server



Benefits to everyone

- SoC Vendors
 - Linaro makes Linux BSPs easier to create and support
 - Ability to accelerate TTM for new products through working inside Linaro before SoC release
- Distributions
 - Linaro enables rapid support for multiple SoCs for new distribution versions
- OEM/ODM
 - Software and tool reuse between projects
 - Faster TTM
- Carriers & Segment Leaders
 - Linaro enables a standardized ARM Linux core for segment specific distributions (mobile, IVI, STB, embedded etc.)



Summary

- Linaro is a not for profit software engineering company owned by ARM, IBM and SoC vendors
 - Delivers core Linux technology for ARM SoCs
 - Faster product TTM through better integration of ARM with upstream & distributions
 - Members get significant advantages of belonging to Linaro: Multiplier effect, latest software on latest SoCs, defragmentation & happy customers





www.linaro.org



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