Qualcomm

Qualcomm Linux - Unified Platform for Distributions Development across SoCs

Viswanath Kraleti
Sr. Staff Engineer, Qualcomm

Pavan Kumar Kondeti
Sr. Staff Engineer, Qualcomm

@ OOSC 3.0 IIT Kanpur 2025

Agenda

Traditional BSP Software Delivery Model

Qualcomm Linux (QLI) Intiative

Benefits and Rationale for QLI

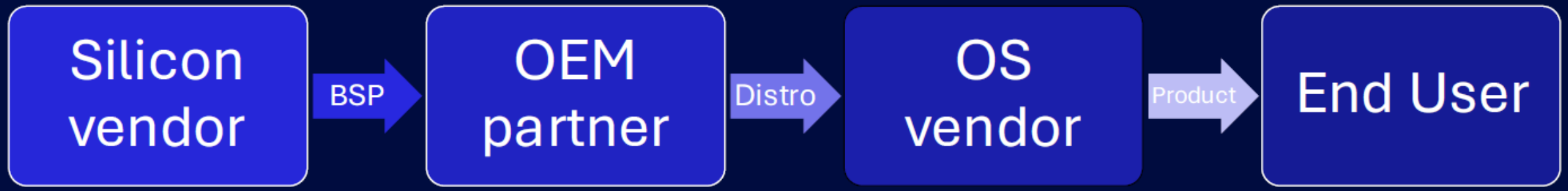
Ecosystem and Supported Platforms

Current Focus Areas

QLI Mainline Capabilities Demo

Traditional BSP model for software delivery

- SW updates are optional
- BSP is specific to a subset of HW platforms
- Major component versions rarely upgraded (e.g. Kernel, Firmware, Toolchain, core libraries)



Traditional BSP model for software delivery

	QLI mainline
Hardware enablement	On LTS - SW is stale by the time the product reaches customer
Disconnected SW releases	Releases are platform-specific, new releases drop support for older HW platforms
Developer Tooling	Tools and environments to build the SW go stale too
Bug Fixes	Backports harder because of upstream code changes
S/W Upgrades	Expensive

But… modern products are complex

- Device need OTA-capabilities - to receive security updates or rollbacks
- Pro-active, ongoing SW maintenance for devices in the field
- Hardened out-of-the-box to protect user data
- Comprehensive SBOM tracking for regulatory reasons

Patching old software

vs.

Significantly improved CI/CD on new software

Qualcomm Linux (QLI) Mainline

1. Componentization

Column Header
2 lines maximum

- Open-source developed in the public (e.g. Linux kernel, Yocto Project, Debian packages) as separate software components
- Upstream-first: Changes pushed to appropriate upstream project
- Common baseline of components for all supported HW platforms

2. Reference Distribution

Column Header
2 lines maximum

- Perpetual, up-to-date builds of supported distros containing the components for supported HW platforms
- Periodic commercial releases aligned to distro LTS
- Partners free to remix and reconfigure components

3. Robust CI/CD

Column Header
2 lines maximum

- Align with and support upstream testing projects (e.g. kernelci.org)
- Tested against older targets to provide upgrade paths to partner
- New platforms added to HW labs

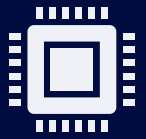
Why?

Product Lifecycles

For 2 to 10 years in some verticals

Software Updates

Software updates becoming mandatory



IP Reuse

Reduction in effort to enable new SOCs

Choice

Partners not restricted to Qualcomm-supported distros and versions

Qualcomm Linux Kernel - Introduction

- https://github.com/qualcomm-linux/kernel
- Hosts the qcom-next branch, which tracks the latest mainline kernel development for Qualcomm SoCs.
- Serves as an aggregator branch. The actual feature development occurs in topic-specific branches.
- The repository is updated regularly with each mainline release candidate (-rc), ensuring alignment with upstream progress.

Qualcomm Linux Kernel - Development

- https://github.com/qualcomm-linux/kernel-topics
- The repository hosts per-subsystem topic branches, each corresponding to a specific technology area.
- Each tech area may have one or more topic branches, serving as the central location for active development.
- These branches are integrated with automated checkers and CI/CD pipelines to ensure code quality and continuous validation.
- https://github.com/qualcomm-linux/kernel-config/blob/main/qcom-next.conf

Qualcomm Linux Mainline Links

- Qualcomm Linux GitHub
  - Linux Kernel qcom-next
  - Yocto
    - meta-qcom Yocto Layer
    - meta-qcom-3rdparty Yocto layer for selected partners
  - Qualcomm Debian image builder
  - Supported HW platforms: RB1, RB3Gen2, RB8 and more developer boards to come

Current Focus in QLI

- Add Support for more platforms
- Improve documentation
- Testing
  - CI/CD Smoke testing
  - IP Block-specific functional testing
  - End-to-end use case testing for core features
  - Continuous testing of core features and configurations
  - Distro-specific testing
  - SW Update (OTA) testing
- HW lab setups

Summary

	QLI mainline
New Hardware enablement	In Linux mainline
SW releases	Continuous updates to mainline Commercial releases aligned to LTS versions
HW + SW support	Becomes richer over time across HW + SW matrix
SW upgrade capabilities	Tested against older targets to provide upgrade path Components of BOM constantly upgraded and tested (API/ABI, functional)
ODM/OEM/Partners	Continuous testing of core features and configurations Focus on application improves TTM Choice of upgrading to newer versions of SW

DEMO TIME!!

HW platform: Qualcomm Dragonwing RB3 Gen 2 Kit

OS: Ubuntu Desktop 24.04 for QCS6490

Demo Model: YamNet - Qualcomm AI Hub

More Documentation

Thank you

Nothing in these materials is an offer to sell any of the components or devices referenced herein.

© Qualcomm Technologies, Inc. and/or its affiliated companies. All Rights Reserved.

Qualcomm and Snapdragon are trademarks or registered trademarks of Qualcomm Incorporated.
Other products and brand names may be trademarks or registered trademarks of their respective owners.

References in this presentation to “Qualcomm” may mean Qualcomm Incorporated, Qualcomm Technologies, Inc., and/or other subsidiaries or business units within the Qualcomm corporate structure, as applicable. Qualcomm Incorporated includes our licensing business, QTL, and the vast majority of our patent portfolio. Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of our engineering, research and development functions, and substantially all of our products and services businesses, including our QCT semiconductor business.

Snapdragon and Qualcomm branded products are products of Qualcomm Technologies, Inc. and/or its subsidiaries. Qualcomm patented technologies are licensed by Qualcomm Incorporated.

Follow us on:

For more information, visit us at qualcomm.com & qualcomm.com/blog