Metis Compute Board Release Notes

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Document revision history

Revision	Date	Description
1 – PRELIMINARY	2025-10-29	First Issue
2- PRELIMINARY	2025-12-10	Added release 1.3.1 which includes cumulative changes since release 1.2.2.

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1 Release Description

This v1.3.1 release marks a significant update to the Metis Compute Board BSP, incorporating all improvements since the previous major version (v1.2.2). It delivers enhanced system stability, optimized partitioning for broader compatibility, improved USB performance, and expanded multimedia capabilities. Key highlights include:

- Refined partition scheme for consistent bootloader behavior across supported configurations.
- Removal of unused partitions to simplify image generation and prevent ambiguity.
- Enhanced USB reliability through autosuspend management, ensuring full-speed operation for SuperSpeed devices.
- Audio-over-HDMI support with ALSA utilities and GStreamer integration for streamlined testing.
- Updated Metis driver aligned with the latest SDK for improved PCI handling and reset logic.
- Additional tools for performance benchmarking, including Flexible I/O Tester (fio).

Preparatory changes for future security and system resilience. For detailed product specifications and documentation, visit the Metis Compute Board page.

1.1 Release Qualification

This is a production-ready release of the BSP.

1.2 System Components

This release delivers an updated software stack designed to enhance system stability, performance, and hardware compatibility. The following components have been refreshed or introduced as part of this update

Kernel Version	Linux antelao-3588 6.1.148- rockchip-standard
Operating System	Yocto based Linux Voyager Linux 1.2.2 (jenkins_213)
Peripheral Drivers	Metis version 1.4.4
Pre-installed utilities	Winograd, Wireguard VPN, Nmcli network management, Flexible I/O Tester (fio)

1.3 Release 1.3.1 Cumulative Changes

Key improvements:

- USB performance improvement – resolved previous speed issues for SuperSpeed devices.
- Multimedia improvements – added audio-over-HDMI support via ALSA and GStreamer.
- Enhanced Metis driver – aligned with latest SDK for better PCI stability.
- Benchmarking tools – introduced Flexible I/O Tester (fio) for storage performance testing.
- Security & reliability – strengthened system services and prepared for future security integration.

1.3.1 Release 1.3.1

Aligned drivers to the latest SDK; improved system reliability and PCI handling; enhanced USB stability; added audio-over-HDMI and new benchmarking tools; optimized the partition scheme and removed unused components; updated bootloader and partition layout; added support for new RTC hardware; updated kernel and Metis driver; prepared security features via meta-security integration; delivered maintenance fixes/optimizations for OTA reliability, image generation, and bootloader configuration; included minor security and CI enhancements.

System & Distro Configuration

- Updated distribution version to v1.3.1
- Improved system reliability by ensuring pstore service waits for /var/lib volatile mount before execution.
- Added meta-security layer for future security enforcement and antivirus integration.
- Temporarily removed ClamAV from image for release readiness.
- Added Git hash to `/etc/os-release` for traceability.
- Ensured reproducible builds by disabling stamp caching for `os-release`.

Kernel & Drivers

- Aligned Metis driver with SDK 1.5.0, ensuring consistent PCI reset handling across supported configurations.
- Updated PCI device check script for broader compatibility.
- Adjusted U-Boot environment and Mender configuration for consistent operation across configurations.
- Fixed CPU stall issue in `linux-rockchip` by updating kernel SRCREV.

Testing & Diagnostics

- Disabled USB autosuspend via udev rules to resolve SuperSpeed USB enumeration issues on cascaded controllers.

Tools & Utilities

- Added Flexible I/O Tester (fio) for SATA performance benchmarking.
- Added `stress-ng` to the testing toolset.
- Added `iperf3` for network performance testing.
- Added `axelera-device` machine override for simplified `.bbappend` handling.

Audio & Multimedia

- Introduced ALSA utilities and enabled GStreamer plugins with ALSA support, enabling audio-over-HDMI testing.

Bootloader & Partitioning

- Optimized partition scheme for compatibility across supported boards.
- Removed unused trust partition from WKS file to prevent ambiguous behavior during image generation.
- Moved U-Boot environment to a dedicated partition with fixed size and position.
- Added support for boot_a and boot_b partitions in U-Boot and WIC layout.
- Implemented post-update script to flash boot.img into boot partition for compatibility with Rockchip boot process during Mender updates.
- Adjusted U-Boot SRC_URI alignment for consistency.
- Updated env_mender to optimize boot strategy using booting_android and bootm.

Android Tools

- Updated `android-tools` to fetch correct ADB ID using `cpuinfo`.
- Added `android-gadget-setup` for device serial identification.

1.4 Previous Changes

NOTE:

Required Update Path (BSP 1.2 → BSP 1.3)

Customers must perform a physical update over USB by connecting the SBC to a host system and flashing directly via USB.

OTA cannot be used for this transition.

1.4.1 Release 1.2.1

A maintenance release focused on bug fixes and incremental improvements to Mender workflows, partition handling, and overlayfs stability. Includes minor adjustments to CI reporting and container behavior.

Distro & User Environment

- Updated `DISTRO_VERSION` to `v1.2.1`.
- Exported additional system paths (`/sbin`, `/usr/sbin`) to all users.
- Updated `voyager-users.bbclass` to set consistent `PATH` for all users:
    - `/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin`

1.4.2 Release 1.2.0

Delivers a significant architectural shift with read-only rootfs, full Mender OTA integration, and new partitioning for factory and data persistence. Includes kernel upgrades, U-Boot consolidation, overlayfs support, CI improvements, Docker integration, and additional tools for stress and USB performance testing.

Distro & Versioning

- Bumped distro to `v1.2.0` (final) and intermediate tags (`rc1`–`rc4`) for development cycle.
- Added BSP version to image filenames.
- Introduced `cve-extra-exclusions` file documenting CVEs deemed impractical to resolve.

Kernel & Drivers

- Upgraded `linux-rockchip` kernel to `v6.1.148`.
- Fixed DTS Makefile typo.
- Updated `kernel-modules` to `v1.4.0-rc2` for Metis driver improvements.
- Updated CVE exclusion list to latest from Nanbield.

Bootloader (U-Boot)

- Added redundant environment and enlarged `fw_env.config` for Mender.
- Patched U-Boot to use device paths instead of UUIDs.
- Organized patches into board-specific directories.

Filesystem & Partitioning

- Transitioned rootfs to read-only.
- Updated `fstab` entries from `rw` to `ro`.
- Added overlayfs support for `/home` and `/etc`.
- Added factory and data partitions:
- Factory: persistent files (SSH keys, calibration data).
- Data: mutable storage and Mender updates.
- Adjusted WKS and Rockchip image handling:
    - Shortened partition names.
    - Ensured ext4 format and proper alignment.
- Removed obsolete `auto-extend-partition` recipe.
- Added preinit script to handle overlayfs edge cases.

Mender OTA Integration

- Added full Mender support:
    - `mender.inc`, `mender-config.inc`, and U-Boot integration.
    - Redundant rootfs for A/B updates.
- Added recipes:
    - `mender-files-setup`
    - `mender-commit-check`

- Customized `mender-systemd-growfs-data.service` to wait for udev settle.

Image & User Management

- Removed base `voyager-image`; maintained `voyager-image-weston`.
- Simplified user handling:
  - Moved logic to `voyager-users.bbclass`.
  - Unified Weston service file using global `WESTON_USER`.
- Simplified `EXTRA_USER_PARAMS`.

Graphics & GUI

- Fixed GPU variant for RK3588 (`MALI_VERSION=g13p0`) to support OpenCL 3.x.
- Added X11 forwarding in `sshd_config`.
- Weston service improvements:
  - Single service file for all boards.
  - Group permissions updated to `axelera`.

CI & Build Infrastructure

- Updated `meta-mend`:
  - Removed Java dependency.
  - Enabled PDF report generation via asynchronous API.
- Added `WS_ENABLE_PDF_REPORT` for CI artifact archiving.
- Added signer for `meta-arm` and switched to signed tag `yocto-4.0.6`.

Tools & Utilities

- Added `stress-ng` for memory performance testing.
- Added `u3loop` tool and suite for USB 3.0 benchmarking.
- Reintroduced package manager support for targeted driver updates.

Docker Integration

- Configured Docker to use `/data/docker` for container storage.
- Added `docker.service` with dependency on `data.mount`.
- Updated `daemon.json` for custom data root.

Security & SSH

- Moved SSH keys to `/factory/ssh` for persistence.
- Fixed read-only configuration issues in OpenSSH:
  - Switched to `sshd.socket`.
  - Linked `sshd_config_readonly` to `sshd_config`.

1.4.3 Release 1.1.0

Introduces major updates across the Voyager Linux platform, including new filesystem utilities, terminal enhancements with xfce4-terminal, kernel and driver updates, container workflow improvements, and integration of CVE scanning via meta-mend. Also adds networking tools, user credential changes, and Weston configuration refinements.

System & Distro Configuration

- Updated `DISTRO_VERSION` to `1.1.0` and ensured it reflects the latest tagged release in system metadata (`/etc/os-release`).
- Added BSP version to image filenames for traceability.
- Integrated `meta-mend` for CVE scanning and PDF report generation.
- Added support for CVE exclusions via `cve-extra-exclusions`.

Image & Filesystem Enhancements

- Added full `gzip` package (with `zgrep`) and `mkfs.ext4` via `e2fsprogs-mke2fs`.
- Added GNU `tar` for full archive support.
- Removed `auto-extend-partition` recipe (superseded by Mender).
- Added support for fixed-size rootfs and factory partition sizing.
- Added `overlayfs` as a distro feature.
- Updated Weston configuration to use `xterm-256color` for high-color support.

User Interface & Terminal

- Replaced `weston-terminal` with `xfce4-terminal` to support 24-bit color.
- Added `meta-xfce` layer and dependencies.
- Set default encoding of `xfce4-terminal` to UTF-8.

Kernel & Modules

- Upgraded to Linux kernel `v6.1.148`.
- Metis driver supports SDK `v1.4.0-rc2`.
- Addressed race conditions and IRQ threading for MSI mode.

Networking

- Added `networkmanager` and `nmcli`.
- Added `wireguard` tools and required kernel configurations.

User & Access Configuration

- Set root password to `AxeRoot2025`.
- Updated user passwords:
  - `antelao`: AxeAntelao2025
- Unified Weston service file using `${WESTON_USER}` variable.
- Ensured Weston runs under main platform user

Testing & Diagnostics

- Added support for `testusb` tool.
- Added `u3loop` tool and suite for USB 3.0 loopback benchmarking.
- Added `stress-ng` for memory performance evaluation.

Container & CI Integration

- Refactored `start_axelera.py` for better UX, error handling, and display detection.
- Enabled container version selection.
- Removed unnecessary mounts (`voyager-sdk`, `/dev/mali0`).
- Added persistent `shared` directory for host-container data exchange.
- Injected `JENKINS_BUILD_ID` into environment for traceability.
- Moved Mend variables to environment for CI override.
- Updated `meta-mend` SHA256 handling for optional builds.

Bootloader & U-Boot

- Added redundant rootfs support for A/B updates.
- Patched U-Boot to use device paths instead of UUIDs.
- Updated `fw_env.config` for compatibility across boards.

System Services & Init

- Fixed PCIe rescan scripting (removed `sudo` dependency).
- Mitigated `/var/tmp` type mismatch issue.
- Improved overlay mount handling for `/etc` and `/home`.
- Dropped `setup-directories` due to circular dependencies; replaced with post-processing.

1.5 Known Issues

1.5.1 Release v1.3.1

- **Resolved**: USB ports near power connector not functioning at full speed (addressed by USB autosuspend workaround in 1.3.1-rc0).
- Show stats not working with inference.py.

1.5.2 Release v1.2.2

- Show stats not working with inference.py
- USB ports (1) and (2) close to the power connector not functioning at full speed

1.6 Support

For further information and support please visit:

- **Axelera AI Community**: https://community.axelera.ai/
- **Axelera AI Customer Portal**: https://support.axelera.ai

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