Migrating From Raspberry Pi OS to Moxa Industrial Linux (MIL)

Moxa Industrial Linux (MIL) is an industrial-grade Linux distribution built on Debian Stable. It is designed for long-term stability, security, and productization in industrial applications.

Why migrate from Raspberry Pi OS to Moxa Industrial Linux (MIL)?

A Long-term Support Strategy Brings Long-term Stability for Industrial Applications

Stable Architecture:

- MIL is developed based on Debian Stable, inheriting its robust version control and architecture, making it well-suited for long-term industrial deployments.

10-year Support:

- MIL follows a generational versioning model, releasing a new generation every 4 years with a 10-year maintenance life cycle:
  - First 4 years: Two official releases per year with new features tailored for industrial environments.
  - Final 6 years: Entering stable maintenance mode, focusing on CVE patches and bug fixes to ensure long-term reliability.

Comparison With Raspberry Pi OS:

- The Raspberry Pi OS provides frequent updates but lacks a clear long-term support commitment. Security updates typically rely on the user community, which may be insufficient for building stable and reliable industrial applications.

Industrial-Grade OT Design of Moxa Computers and Cybersecurity Support

Purpose-built for Industrial Environments:

- Moxa industrial computers feature built-in support for DIs/DOs, RS-232/422/485, and CAN interfaces as well as a TPM v2.0 module. The computers are engineered to operate reliably in harsh environments and come with temperature tolerance over a wide range, EMI shielding, vibration resistance, and stable power delivery. MIL is optimized to run on these industrial computers, providing 10-year long-term support and compliance with IEC 62443-4-2 Security Level 2 requirements for cybersecurity for Moxa computer with MIL3 and higher.

Industrial Modules:

- MIL is purpose-built for OT environments and industrial deployments. It includes built-in modular software tools for interface control, networking, system maintenance, security diagnostics, and software updates.

Module	Description
Moxa Computer Interface Manager (MCIM)	Unified CLI interface for managing various non-standard I/O hardware (DIs/DOs, buttons, disks, buzzers, RS-232/422/485 modes), simplifying the hardware control logic.
Moxa Connection Manager (MCM)	Manages Ethernet, Wi-Fi, and cellular connections with profile prioritization, DHCP server, Keep-Alive, and Failover/Failback functions, as well as traffic monitoring and diagnostics, ensuring high availability of networks.
Moxa System Manager (MSM)	Offers full-system snapshot, backup, and restore functions, as well as automatic failback, factory reset, and decommission mechanisms.
Moxa Bootloader Manager (MBM)	Enables secure bootloader mode switching (Developer/Production), version checking, signature validation, upgrade management, and model compatibility verification.
Moxa Software Updater (MSU)	Provides online/offline OTA updates with delta comparisons, version info display, progress tracking, error reporting, and data export to JSON files.
Moxa Guardian (MG)	Performs security diagnostics to assess IEC 62443-4-2 Security Level 2 compliance. Provides config diff analysis and one-click remediation to strengthen device security.

Cybersecurity Support

Security Standards Compliance:

- MIL is designed with security in mind from the ground up. MIL3 complies with IEC 62443-4-2 Security Level 2 for UC-1200A, UC-2200A, UC-3400A, UC-4400A models and is certified for UC-8200 Series.
- The UC-2200A, UC-3400A, UC-4400A, and V3400 Series come preloaded with a wireless module and MIL3, and are compliant with EU RED Article 3.3, which addresses wireless communication security
- We are also preparing MIL3 and future versions to comply with the EU Cyber Resilience Act (CRA) requirements by 2026, ahead of the mandatory enforcement starting in 2027.

Comparison with Raspberry Pi OS:

- The Raspberry Pi OS provides basic security updates but lacks comprehensive cybersecurity compliance tailored for industrial environments. Enterprises must bear the additional cost and efforts required for integration and validation activities to achieve compliance.

Lean Design for Cost-effective Productization

- MIL offers lean installation images, eliminating unneeded components to lower the exposure to cyberattacks surface and maintenance costs. Without requiring Snap or platform registration, MIL ensures seamless, native, and ongoing support and updates.

Seamless Raspberry Pi OS Compatibility for Easy Migration

- MIL aligns with the Raspberry Pi OS, specifically the *.deb format, APT package management, and systemd architecture, allowing reuse of most CLI scripts and deployment tools as is. Developers can adapt quickly, and compared to Yocto or Buildroot, MIL's Raspberry Pi OS compatibility reduces migration costs and the learning curve.

Common Migration Questions From Raspberry Pi OS Users

Q1: Can I reuse my existing Python / Shell scripts?

Yes, most scripts can be reused directly. MIL supports Python, bash, and the systemd framework. Since MIL and Raspberry Pi OS are both based on the Debian architecture, the migration to MIL is effortless.

Q2: Can I still use my existing GPIO/serial control programs?

If you use standard Linux APIs or tools like libgpiod, compatibility is generally good. MIL also provides the Moxa Computer Interface Manager (MCIM) tool, which further simplifies I/O control operations.

Q3: Does MIL support a graphical user interface (GUI)?

By default, MIL is a lightweight command-line (CLI)-based system ideal for embedded and industrial applications requiring high efficiency. If a GUI is needed, you can install the X server and a desktop environment via APT package management.

Q4: Can I install packages using Debian's APT package management?

Yes, MIL is fully compatible with Debian's APT package management system and provides access to 20,000+ open-source packages. You can install software, as you would on Raspberry Pi OS, for development or customization.

Q5: Does MIL provide security updates and CVE patches?

Yes. MIL provides 10 years of free security updates, integrating Debian patches and Moxa-maintained updates via the MIL APT server, accessible over the air (OTA) and free of cost.

Q6: Can I test MIL before deployment?

Yes, contact your Moxa regional sales representative to arrange compatibility tests prior to deployment.

Q7: Is documentation and support available?

Yes, contact us to receive an evaluation form so that our technical team can evaluate your requirements and provide tailored support and integration guidance. For additional information, visit our Software & Documentation page.

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Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With over 35 years of industry experience, Moxa has connected more than 111 million devices worldwide and has a distribution and service network that reaches customers in more than 91 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa's solutions is available at www.moxa.com.