

Updating Moxa Industrial Linux

Moxa Software Updater (MSU) is a Moxa utility for performing both offline and online software upgrades to update the MIL version on Moxa computers. For offline upgrades, two types of upgrade packages are available: the **Upgrade Pack** and the **Refresh Upgrade Pack**.

- The **Upgrade Pack** **upgrades** the system while preserving user data and configurations. It contains only the differences between the current and target versions, making it significantly smaller in size.
- The **Refresh Upgrade Pack** performs a full system upgrade by wiping all user data and restoring the system to its factory default environment. This pack contains all the files from the target version and is, therefore, larger in size.

MSU is available starting from MIL 3.2. For all MIL versions after MIL 3.2 (e.g., MIL 3.3), Moxa will release software update packs on the [UC computer website](#) for you to download.

Moxa Software Updater (MSU) includes built-in integrity and authenticity checks. Each upgrade pack is accompanied by a **SHA-512 hash file** and a **digitally signed version** of that hash (.sha512 and .sha512.bin.signed). During the upgrade process, the system automatically verifies the **SHA-512 hash** of the upgrade package to ensure file integrity. It then validates the **digital signature** using a trusted public key to confirm the authenticity of the package. If either the hash or signature verification fails, the upgrade process is immediately aborted to prevent tampering or unauthorized updates.



NOTE

The Moxa Industrial Linux (MIL) kernel and Moxa developed packages are available pre-configured on the Moxa APT repository when updates via APT is enabled. However, we first recommend using **mx-sw-updater** command to resolve issues due to dependencies of packages and update the MIL3 kernel followed by APT package update. If you want to exclusively upgrade from the APT repository, run the **apt full-upgrade** command to minimize dependency issues.

To use Moxa Software Updater (MSU), run the command **# mx-sw-updater [command]**

Command and Usage	Description
configure [flags]	<p>The mx-sw-updater configure command sets up an offline upgrade pack</p> <p>(root required). It prepares the upgrade or refresh pack and verifies it with a signature file. This step ensures that the package and metadata are copied and configured to the device's local cache before upgrading.</p> <p>Key Flags</p> <ul style="list-style-type: none"> • -p, --path: Specifies the path to the upgrade pack or refresh upgrade pack. • -s, --signature: Provides the path to the signature file for verification. If not specified, it will attempt to find a matching signature file in the same directory.
clear	Clear the package and metadata copied to the device's local cache after the upgrade
update	The mx-sw-updater update command fetches the latest metadata from the MOXA Apt Repository to the device's local cache. This command ensures that the system's package information is up-to-date and ready for installing or upgrading packages.
upgrade[flags]	<p>The mx-sw-updater upgrade command updates the system to a target official version while preserving user data and configurations, with options to perform the upgrade using a local package or remote APT server with automatic recovery. This command requires root privileges.</p> <p>Key Flags</p> <ul style="list-style-type: none"> • -l, --latest: Upgrade to the newest version in the local cache • --remote: Upgrade remotely via the APT server (default option). • --local: Upgrade using the local upgrade pack • --system-failback: Performs the upgrade with system failback enabled to ensure auto system recovery if the upgrade fails. • -r, --release <string>: Upgrades to a specified target version (e.g., -r v1.1).
Refresh-upgrade [flags]	<p>The mx-sw-updater refresh-upgrade command upgrades the system by wiping all user data and restoring it to the factory default environment.</p> <p>Unlike the mx-sw-updater upgrade command, which preserves user data, the refresh-upgrade command resets the system to its original state. This command supports only local upgrades and requires root privileges.</p> <p>Key Flags</p>

	<ul style="list-style-type: none"> • -l, --latest: Upgrade to the newest version in the local cache. • --system-failback: Performs the upgrade with failback enabled, ensuring automatic system recovery if the upgrade fails. • -r, --release <string>: Upgrade to a specified target version (e.g., -r V1.1).
show [flags]	<p>The mx-sw-updater show command displays details about the upgrades that have been added to the device's local cache via the mx-sw-updater configure and mx-sw-updater update commands. The details include the version number, supported Moxa computer models, and the changelog.</p> <p>Key Flags</p> <ul style="list-style-type: none"> • -a, --all: Shows information of all available upgrades. • -l, --latest: Displays information of the newest upgradable version. • -r, --release <string>: Shows details of a specified upgradable version (e.g., -r V1.1). • --from <string>: Specifies the starting version for a range. • --to <string>: Specifies the ending version for a range. <p><i>Note: The --from and --to flags can be used together to display information for a range of versions</i></p>
status [flags]	<p>The mx-sw-updater status command provides information about the current status of upgrade packages that have been added to the device's local cache via the mx-sw-updater configure and mx-sw-updater update commands, allowing users to check the availability and progress of various software updates.</p> <p>Key Flags</p> <ul style="list-style-type: none"> • -a, --all: Shows the status of all available upgrades. • -l, --latest: Displays the status of the newest upgradable version. • -r, --release <string>: Shows the status of a specified upgradable version (e.g., -r V1.1). • --from <string>: Specifies the starting version for a range. • --to <string>: Specifies the ending version for a range. <p><i>Note: The --from and --to flags can be used together to display the status for a range of versions</i></p>
list [flags]	<p>The mx-sw-updater list command is used to display information about software packages, including installed packages, upgradable packages in the local cache, and differences between versions.</p> <p>Key Flags</p> <ul style="list-style-type: none"> • -l, --latest: Lists all packages from the newest upgradable version in the local cache • -s, --system: Lists all packages currently installed on the system. • -r, --release <string>: Lists all packages from a specified upgradable version (e.g., -r V1.1). • -c, --compare <stringArray>: Show the changed packages between

	<p>two specified versions (e.g., -c V1.0 -c V1.1). If the second version is not specified, it compares the specified version with the installed system packages.</p> <ul style="list-style-type: none"> • --detailed: Shows both changed and unchanged packages. This flag is to be used with -c, --compare. • --no-fixed: Display output without fixed-length formatting.
Verify [flags]	<p>The mx-sw-updater verify command is used to verify the integrity and authenticity of an upgrade pack or refresh-upgrade pack by checking its digital signature. This ensures that the upgrade package has not been tampered with and is valid before performing any system upgrades.</p> <p>Key Flags</p> <ul style="list-style-type: none"> • -p, --path <string>: Specifies the path to the upgrade pack or the refresh upgrade pack. • -s, --signature <string>: Specifies the path to the signature file for verification. If not specified, the command will try to find the .sha512.bin.signed file in the same directory as the upgrade pack.

Example of Upgrading UC-4400A System from V1.0 (MIL 3.2) to V1.1 (MIL 3.3)

Here's an example of using **mx-sw-updater** to upgrade a UC-4434A-I-T from image V1.0 to V1.1:

1. Download the V1.1 upgrade packs from Moxa website and copy the files to the target UC-4434A-I-T computer
 - moxa-UC-4400A_MIL3_V1.1-upgrade-pack.sha512
 - moxa-UC-4400A_MIL3_V1.1-upgrade-pack
 - moxa-UC-4400A_MIL3_V1.1-upgrade-pack.sha512.bin.signed

```
root@moxa-imoxa0920070:/home/moxa# ls -l
moxa-UC-4400A_MIL3_V1.1-upgrade-pack
moxa-UC-4400A_MIL3_V1.1-upgrade-
pack.sha512
moxa-UC-4400A_MIL3_V1.1-upgrade-pack.sha512.bin.signed
```

If you intend to perform a full system upgrade that wipes all user data and restores the system to its factory default settings, download the refresh upgrade pack instead:

- moxa-UC-4400A_MIL3_V1.1-refresh-upgrade-pack
 - moxa-UC-4400A_MIL3_V1.1-refresh-upgrade-pack.sha512.bin.signed
 - moxa-UC-4400A_MIL3_V1.1-refresh-upgrade-pack.sha512
2. Copy and configure the upgrade pack and its metadata to the UC-4434A-I-T's local cache using the **mx-sw-updater configure -p moxa-UC-4400A_MIL3_V1.1-upgrade-pack** command.

```
root@moxa-imoxa0920070:/home/moxa# mx-sw-updater configure -p moxa-UC-4400A_MIL3_V1.1-upgrade-pack
INFO[2024-10-13T04:24:44Z] configure successfully
```



NOTE

Replace step one and two with **mx-sw-updater update** command if you intend to perform the upgrade remotely via the Moxa APT repo.

3. Check what packages will be upgraded by applying V1.1 upgrade pack using the **mx-sw-updater list --compare V1.1** command.

```
root@moxa-imoxa0920070:/home/moxa# mx-sw-updater list --compare V1.1 INFO[2024-10-13T11:08:01Z] compare two packages: system and 1.1
```

Name	Arch	Version	NewVersion	Status
emwicon-wmx7205-d...	arm64	5.10.194-cip39-rt...	5.10.214-cip46-rt...	upgraded
libmcm0	arm64	1.4.26-1+deb11	1.5.14-1+deb11	upgraded
libmm-glib0	arm64	1.20.4+moxa1-1+deb11	1.20.4+moxa2-1+deb11	upgraded
linux-headers-5.1...	arm64	5.10.194-cip39-rt...	5.10.214-cip46-rt...	upgraded
linux-image-5.10...	arm64	5.10.194-cip39-rt...	5.10.214-cip46-rt...	upgraded
linux-kbuild-5.10...	arm64	5.10.194-cip39-rt...	5.10.214-cip46-rt...	upgraded
modemmanager	arm64	1.20.4+moxa1-1+deb11	1.20.4+moxa2-1+deb11	upgraded
moxa-bootloader-m...	all	2.3.0-1+deb11	2.5.0-1+deb11	upgraded
moxa-computer-int...	arm64	1.34.2-1+deb11	1.37.0-1+deb11	upgraded
moxa-connection-m...	arm64	1.4.26-1+deb11	1.5.14-1+deb11	upgraded
moxa-image-archiv...	all	1.5.0+deb11	1.7.0-1+deb11	upgraded
moxa-mil-base-sys...	all	3.2.0-2-1+deb11	3.3.0-1+deb11u2	upgraded

4. Upgrade system to V1.1 with auto-recovery enabled using the **mx-sw-updater upgrade --local --system-failback** command. For remote upgrades via the Moxa APT repo, use **mx-sw-updater upgrade --remote --system-failback** instead.

```
root@moxa-imoxa0920070:/home/moxa# mx-sw-updater upgrade --local --system-
failback
INFO[2024-10-13T11:32:22Z] current version: V1.0, target version: 1.1
Would you like to continue? (y/N)y
Synchronize boot files...
      0  0%  0.00kB/s   0:00:00 (xfr#0, to-chk=0/2)
      0  0%  0.00kB/s   0:00:00 (xfr#0, to-chk=0/2)

Start creating replica...
  150,208,843 99% 97.63MB/s 0:00:01(xfr#133, to-chk=0/269)

Type: replica
Create Time: 2024.10.13-11:32:35
Size: 145MB
The system failback has been enabled and the replica has been created
successfully.
```

Known Issue

Running `mx-sw-updater upgrade --local` may fail if the device does not have Internet access.

Root Cause

The default installation behavior of *moxa-software-updater* (following APT package management) also installs packages marked as *Recommends*. These are not mandatory for standard releases but may require Internet access.

Workaround

Before running the upgrade, disable installation of *Recommends* packages:

```
echo 'APT::Install-Recommends "false";' | sudo tee /etc/apt/apt.conf.d/99no-
recommends
```

After the upgrade, remove this temporary setting:

```
sudo rm -f /etc/apt/apt.conf.d/99no-recommends
```

5. Reboot the computer after the upgrade is complete.

```
Setting up moxa-connection-manager (1.5.14-1+deb11) ...
Setting up moxa-computer-interface-manager (1.37.0-1+deb11) ...
Setting up moxa-bootloader-manager (2.5.0-1+deb11) ...
*** moxa-bootloader-manager successfully updated. ***
Setting up moxa-mil-base-system-arm64 (3.3.0-1+deb11u2) ...
Installing new version of config file /etc/mil_build ...
Installing new version of config file /etc/mil_release ...
Installing new version of config file /etc/mil_version ...
Setting up moxa-uc-4400a-base-system (3.3.0+deb11u1) ...
Installing new version of config file /etc/moxa-version.conf ...
Processing triggers for libc-bin (2.31-13+deb11u10) ...
Processing triggers for rsyslog (8.2102.0-2+deb11u1) ...
Processing triggers for dbus (1.12.28-0+deb11u1) ...
INFO[2024-10-13T11:36:07Z] upgrade successfully, please reboot the system to
take effect
root@moxa-imoxa0920070:/home/moxa# reboot
```

6. Verify the system has been upgraded to V1.1 by using the mx-ver comma

```
root@moxa-imoxa0920070:/home/moxa# mx-ver
UC-4434A-I-T MIL3 version 1.1 Build 24093010
```