

# **Moxa Swift User Manual for Computers With MIL 3.x**

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[www.moxa.com/products](http://www.moxa.com/products)

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# Swift for Computer with Moxa Industrial Linux 3 User Manual

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# Table of Contents

<b>1. Introduction</b>	<b>4</b>
Overview of Swift	4
Eligible Moxa Arm-based Model	5
<b>2. Getting Started</b>	<b>6</b>
Installing Swift	6
Prerequisites	6
Installation Procedure	8
Connecting Moxa Computer with Swift	9
Prerequisites	9
Setting Up Provisioning Environments	10
<b>3. Swift User Guide</b>	<b>11</b>
Constraints	11
Discover Moxa Computers	11
Scan the Connected Computers	11
Unlock the Connected Computers	12
Configure Moxa Computer	13
General Configuration	14
Network Configuration	14
Computer Interface Configuration	14
Security Configuration	14
Protocol Configuration	14
Custom Script Configuration	15
Snapshot & Backup Management	15
Install from System Image	16
Reboot/Reset	16
<b>4. Step-by-Step Provisioning Guide</b>	<b>17</b>

# 1. Introduction

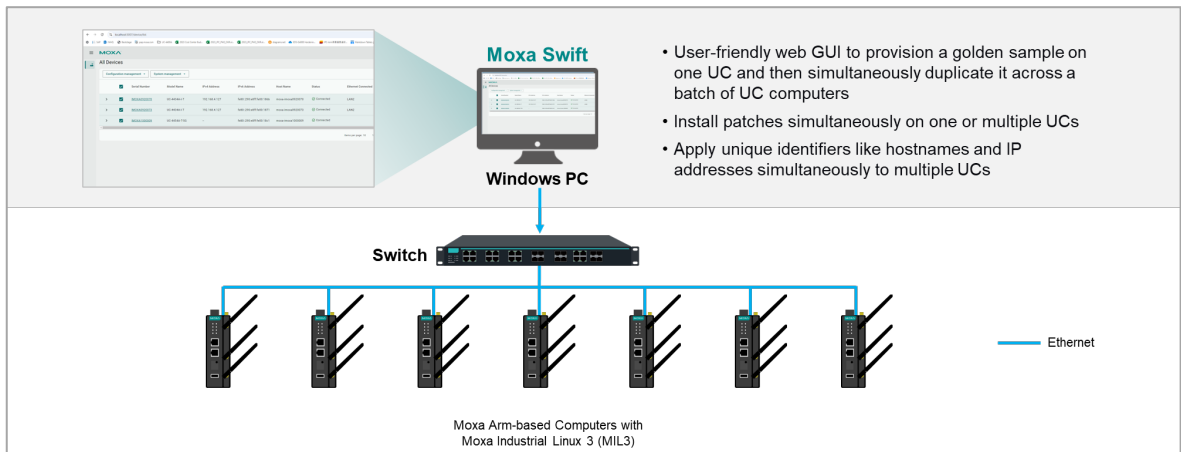
## Overview of Swift

Swift is a Windows-based provisioning tool designed explicitly for Moxa Arm-based computers. Its primary goal is to streamline the setup and deployment process, allowing users to efficiently create and distribute a golden image across multiple computers simultaneously. Swift's functionalities are divided into two main categories: device configuration and system management.

**Device Configuration:** This section allows users to tailor network settings, I/O interface configurations, security parameters, and protocol setups to meet specific operational requirements.

**System Management:** Swift facilitates the creation and restoration of system snapshots and backups, which can be utilized to generate a golden image for batch deployment, enhancing consistency and reliability across devices.

Swift is available for download from the Moxa website and is compatible with Windows 10 or newer operating systems.



# Eligible Moxa Arm-based Models

Swift leverages Moxa proprietary utilities such as Moxa Connection Manger (MCM), Moxa Computer Interface Manager (MCIM) and Moxa System Manager (MSM) in Moxa Industrial Linux 3.1 or above. Therefore, please make sure the Moxa Arm-based computer connected to Swift have Moxa Industrial Linux (MIL) 3.1 or above installed. If you have an existing UC-8200 Series with MIL 3.0, only upgrade features will be available in Swift. Once you upgrade your MIL 3.0 to the latest version, you can enjoy the Swift's full feature set.

Computer Series	Model Name	MIL Version Required
<a href="#">UC-8200 Series</a>	UC-8210-T-LX-S	MIL 3.1 and above
	UC-8220-T-LX	
	UC-8220-T-LX-US-S	
	UC-8220-T-LX-EU-S	
	UC-8220-T-LX-AP-S	
<a href="#">UC-1200A Series</a>	UC-1222A	MIL 3.1 and above
<a href="#">UC-2200A Series</a>	UC-2222A-T	MIL 3.1 and above
	UC-2222A-T-US	
	UC-2222A-T-EU	
	UC-2222A-T-AP	
<a href="#">UC-3400A Series</a>	UC-3420A-T-LTE	MIL 3.1 and above
	UC-3424A-T-LTE	
	UC-3430A-T-LTE-WiFi	
	UC-3434A-T-LTE-WiFi	
<a href="#">UC-4400A Series</a>	UC-4410A-T	MIL 3.1 and above
	UC-4414A-I-T	
	UC-4430A-T	
	UC-4434A-I-T	
	UC-4450A-T-5G	
	UC-4454A-I-T-5G	

## 2. Getting Started

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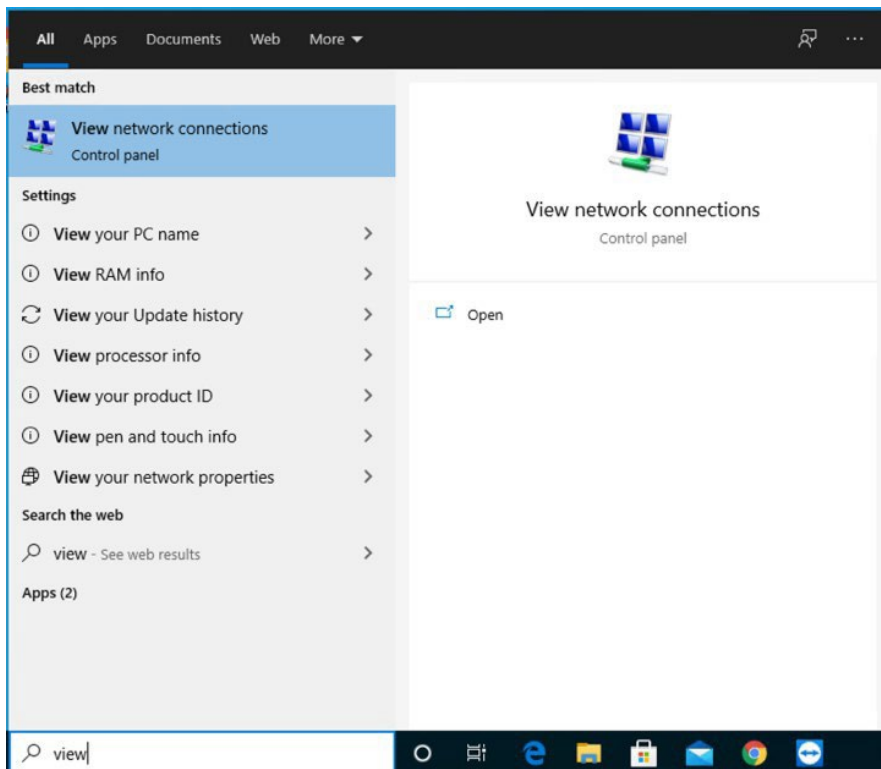
### Installing Swift

#### Prerequisites

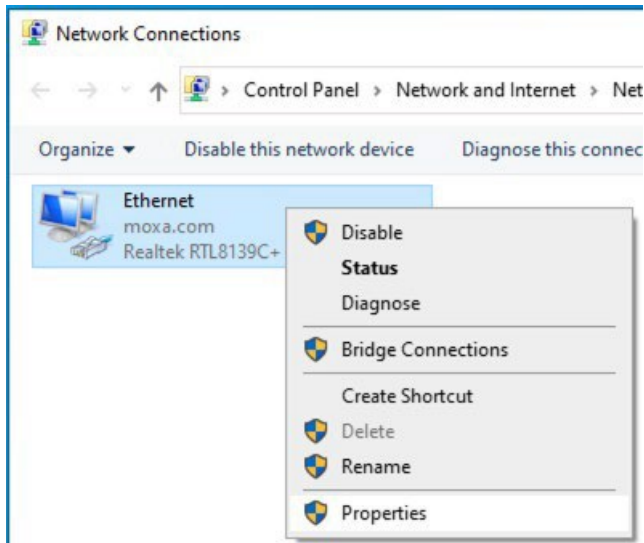
1. PC with Windows 10 or above OS
  - Windows 10 version 1809 or later
2. PC with one of the a supported browser installed
  - Chrome (latest version)
  - Firefox (latest version)
  - Edge (last 2 major versions)
  - Safari (last 2 major versions)
  - Firefox ESR (Extended Support Release)
3. Make sure Link-local IPv6 address on the PC is enabled.

To enable the Link-local IPv6 address, do the following:

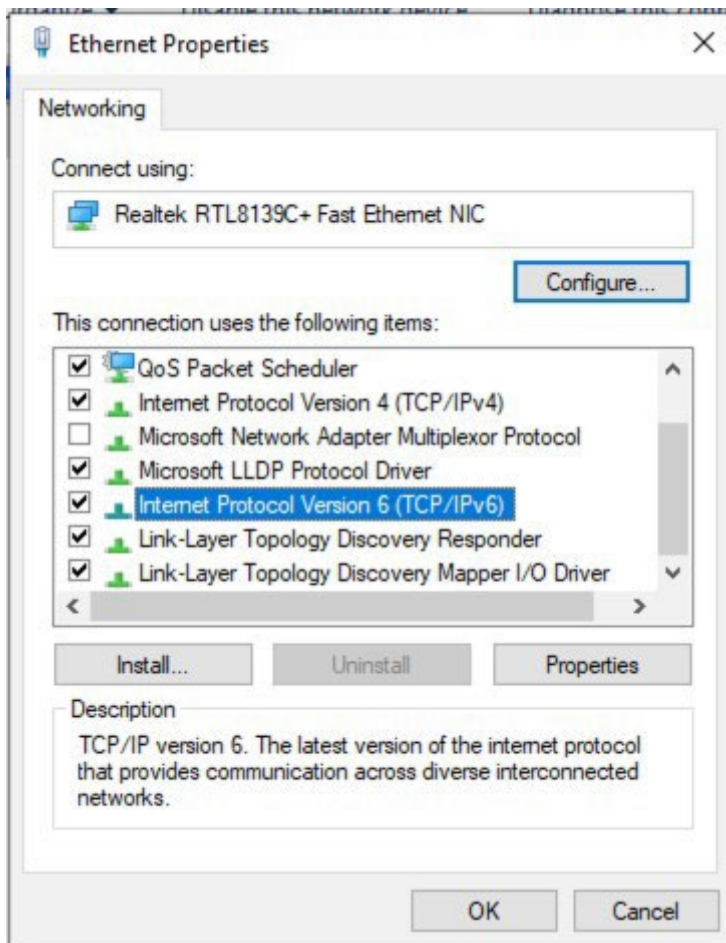
- a. In the Windows Search box, enter **view network connections** and click **Open**.



- b. Select the network adapter that will be used to discover Moxa devices, right-click the network adapter, and select **Properties**.



- c. Select the **Internet Protocol Version 6 (TCP/IPv6)** option.

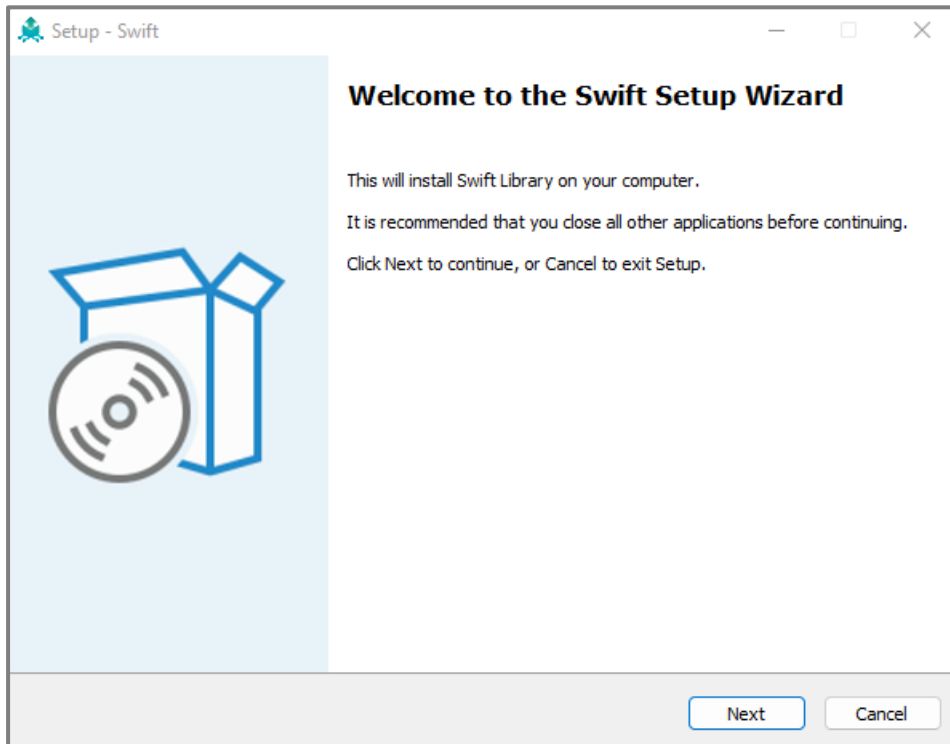


4. Click **OK** to apply the changes.

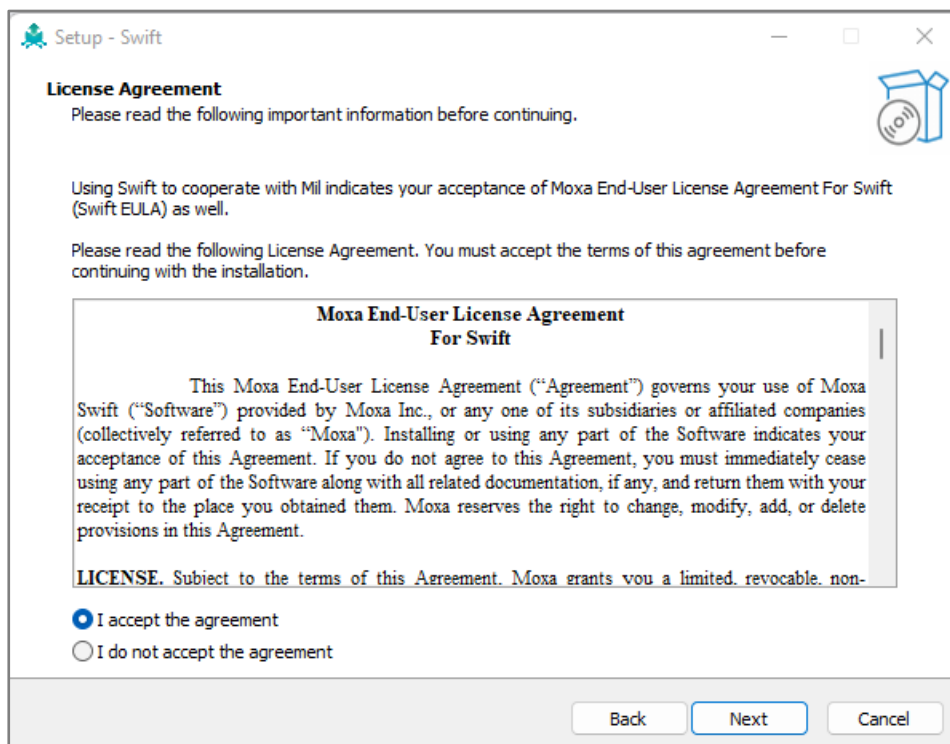
# Installation Procedure

To install the Swift Application on a Windows PC, do the following:

1. Download and run the Swift installation file.

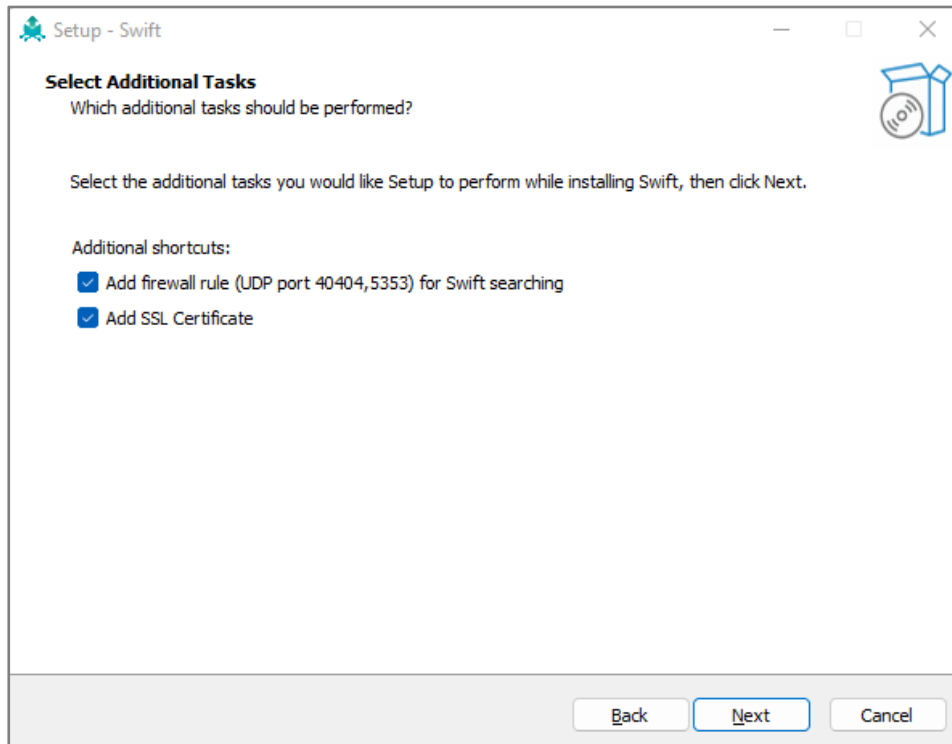


2. Click **Next**.
3. Review the End User License Agreement (EULA). If you agree to the terms, select the **I accept the agreement** option and then click **Next** to proceed.





4. Specify the folder where you would like to install Swift, and then click **Next** to continue
5. Choose the Start Menu folder where you would like to create the Swift shortcut, then click **Next** to continue.
6. Allow necessary ports and install SSL certificates to enable Swift to communicate with Moxa Arm-based computers, then click **Next** to continue.



7. After the installation process is complete, click **Finish**

## Connecting Moxa Computer with Swift

### Prerequisites

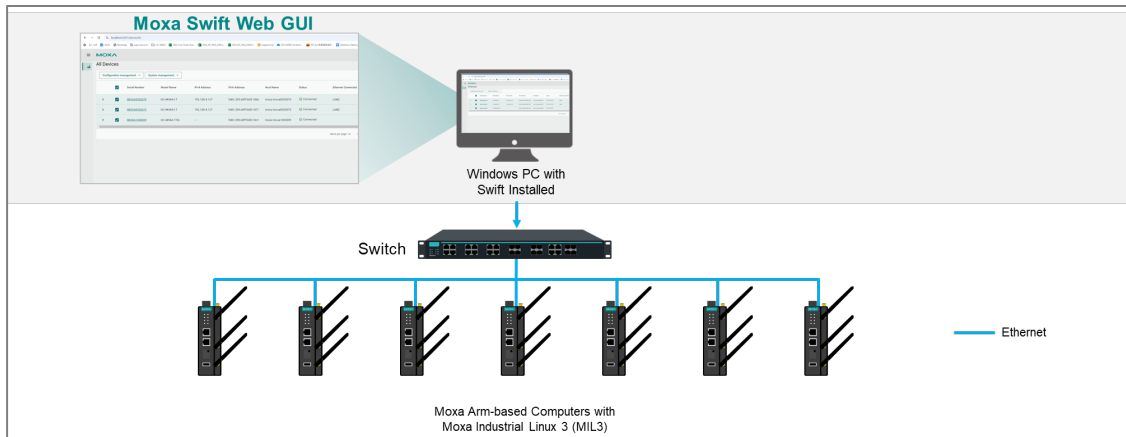
1. It is strongly recommended to connect Swift to the Moxa ARM-based computer using the Ethernet port named **LAN1**
  - Swift discovers the Moxa computer via IPv6. Since the LAN2 port on Moxa ARM-based computers with Moxa Industrial Linux (MIL) 3.1.x does not support IPv6 by default, it is recommended to connect via LAN1 to avoid confusion caused by different MIL versions
  - Below is the factory default IPv6 availability status for different series of Moxa ARM-based computers with various MIL versions

Computer Series	Pre-installed MIL Version	LAN1 IPv6	LAN2 IPv6
UC-8200	MIL 3.0.x	Available	Available
	MIL 3.1.x	Available	Not Available
	MIL 3.3.x or above	Available	Available
UC-1222A/2222A	MIL 3.1.x	Available	Not Available
	MIL 3.3.x or above	Available	Available
UC-3400A	MIL 3.3.x or above	Available	Available
UC-4400A	MIL 3.2.x or above	Available	Available

2. Prepare a switch that supports IPv6. The number of Ethernet ports on the switch should depend on how many Moxa ARM-based computers you plan to provision simultaneously

# Setting Up Provisioning Environments

1. Connect the Windows PC with Swift installed and all Moxa ARM-based computers (using LAN1 port) to the switch.



2. You are now ready to discover Moxa ARM-based computers using Swift.



## WARNING

Do not connect more than one Ethernet port from a single Moxa ARM-based computer to the switch. Swift is designed to handle connections through a single Ethernet port only.

# 3. Swift User Guide

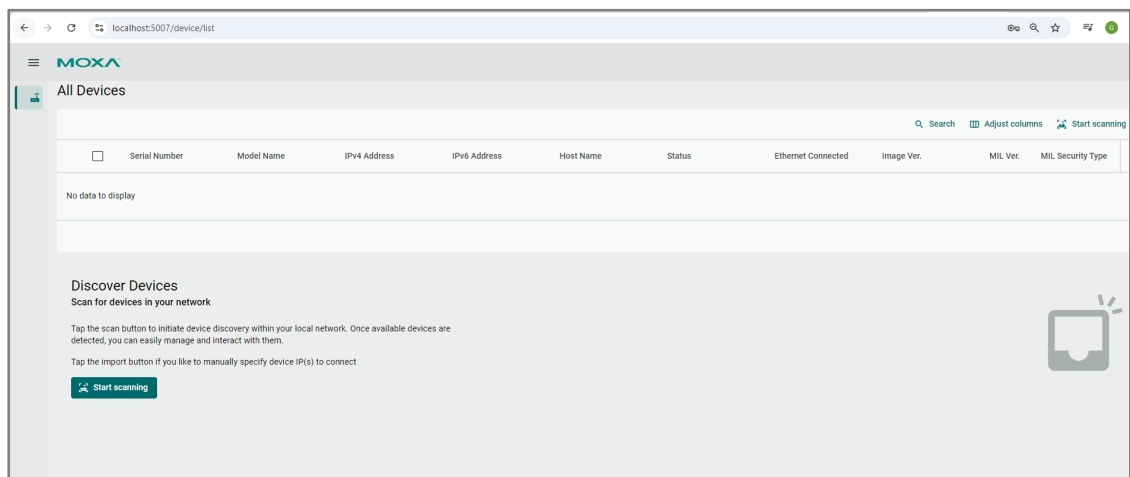
## Constraints

1. Only Moxa computer models that are supported and eligible for Swift should be connected to the same network as the Windows PC with Swift installed. Ethernet port from a single Moxa ARM-based computer to the Swift network. Swift is designed to handle connections through a single Ethernet port only.
2. A batch of Moxa ARM-based computers to be provisioned by Swift should share the same model name, root username, and password.

## Discover Moxa Computers

### Scan the Connected Computers

1. Swift does not automatically perform scanning upon launch. The user must manually trigger the scanning via the **"Start Scanning"** button.



### WARNING

Do not connect more than one Ethernet port from a single Moxa ARM-based computer to the switch. Swift is designed to handle connections through a single Ethernet port only.

2. All Moxa branded devices with IPv6 will appear in the scan results
  - The unsupported devices are only filtered out after the device is unlocked by entering the admin username and password. Therefore, to avoid confusion and enhance user experience, it is strongly recommended not to connect any unsupported Moxa devices (e.g., Moxa NPort, MGate) to the same network as the Windows PC with Swift installed.

	Serial Number	Model Name	IPv4 Address	IPv6 Address	Host Name	Status	Ethernet Connected	Image Ver.	MIL Ver.	MIL Security Type
>	<input type="checkbox"/>	-	-	fe80::290:e8ff:fe00:186b	-	-	-	-	-	-
>	<input type="checkbox"/>	-	-	fe80::290:e8ff:fe00:1871	-	-	-	-	-	-
>	<input type="checkbox"/>	-	-	fe80::290:e8ff:fe00:b7f9	-	-	-	-	-	-

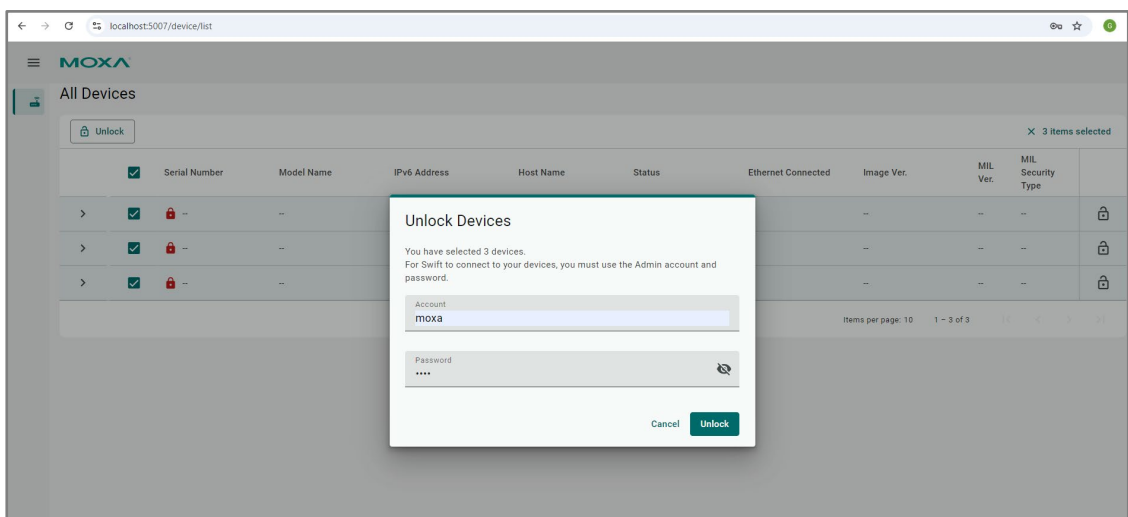
## Unlock the Connected Computers



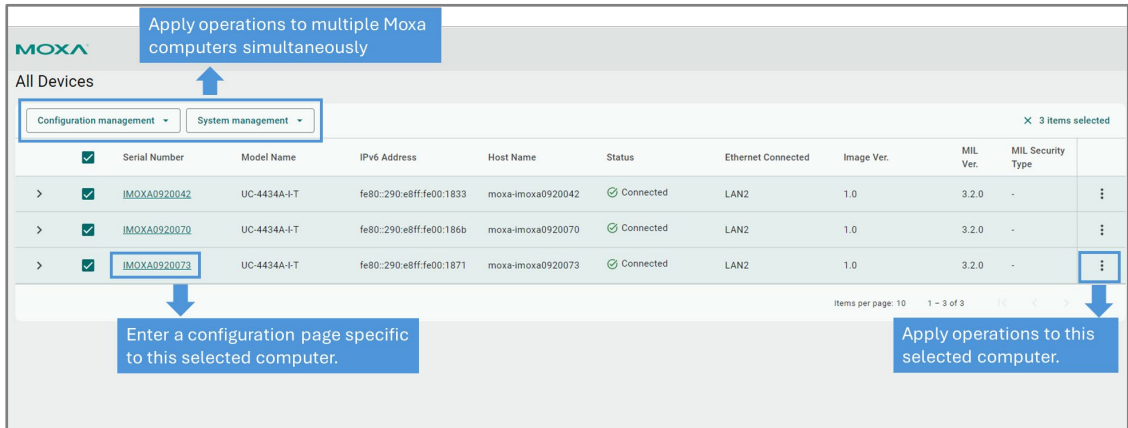
### ATTENTION

1. All Moxa computers to be unlocked should have the same root username and password
2. A lightweight Swift agent (/lib/systemd/system/moxa-swift-agent.service) will be automatically installed on Moxa computers for Swift to manage the devices. Consequently, the initial unlocking of the device may take between 20 to 50 seconds. The Swift agent uses the mDNS discovery protocol and SSH for communication between Swift and Moxa computers.

1. Check all the Moxa computers you would like to unlock.
2. After selecting the **"Unlock"** button, you will be prompted to enter the root username and password.
3. For Moxa computers fresh from the factory, entering the default username and password ("moxa/moxa") will prompt you to set a new password. For security purposes, this new password should be at least 8 characters long.



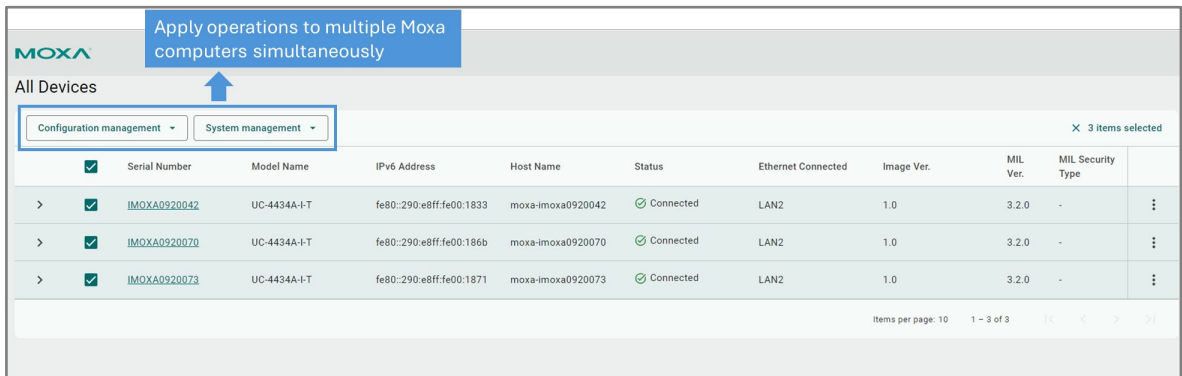
#### 4. GUI of the Unlocked State.



## Configure Moxa Computer

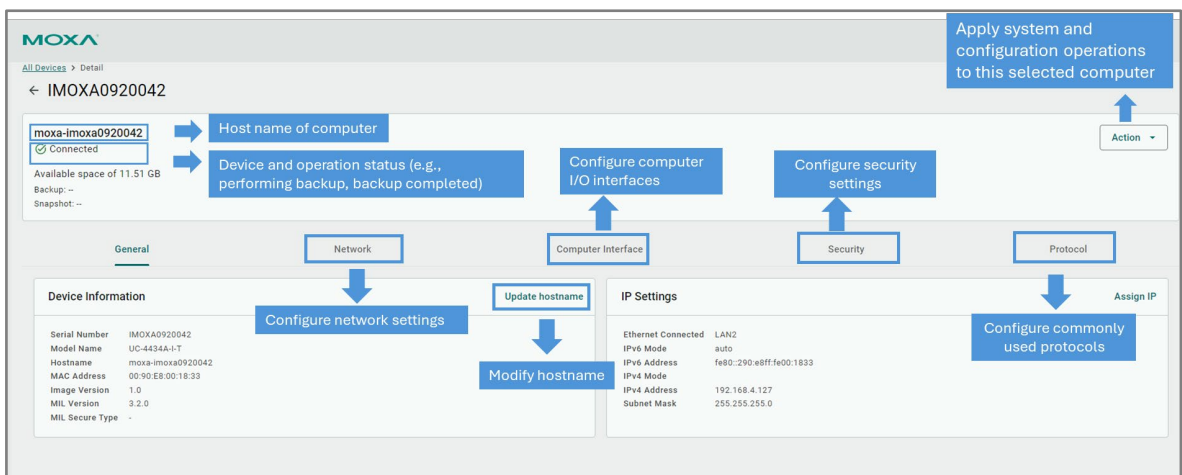
### Batch Device Operations:

Select multiple Moxa Computers of the same model and use the **Configuration Management** or **System Management** dropdown menu at the top to execute batch operations.



### Single Device Operations:

Click on the Serial Number hyperlink on main page to navigate to the configuration page of an individual device.



## General Configuration

Configuration	Description
<b>Update Hostname</b>	Modify the system's hostname to reflect changes or standardize naming conventions
<b>Change Root User Password</b>	Update the password for the root user account to enhance security.

## Network Configuration

Configuration	Description
<b>Ethernet, WiFi, and Cellular Network Settings:</b>	Configure individual network parameters to establish stable connections across Ethernet, WiFi, and Cellular interfaces.
<b>Connection Failover Priority</b>	Set prioritization rules for network failover to ensure seamless connectivity during network disruptions.

\*The above configuration is done via Moxa Connection Manager (MCM) in MIL

## Computer Interface Configuration

Configuration	Description
<b>Configure the serial port</b>	Configure the serial port's operation mode and baud rate
<b>Configure DI Event Script</b>	Set up scripts to execute based on digital input state changes, enabling automated responses to specific triggers.
<b>Configure the push-button's behavior</b>	<ul style="list-style-type: none"><li>• Enable/Disable button</li><li>• Configure button to default behavior<ul style="list-style-type: none"><li>➢ Short-press (1 second) to reboot</li><li>➢ Long-press (7-9 seconds) to reset to factory default</li></ul></li><li>• Set button to revert the system to a previously saved snapshot</li><li>• Set button to execute a custom script</li></ul>

\*The above configuration is done via Moxa Connection Manager (MCM) in MIL

## Security Configuration

Configuration	Description
<b>Set Invalid Login Attempts Threshold</b>	Configure the maximum number of unsuccessful login attempts before the system locks the account
<b>Configure Auto Session Termination for Inactivity</b>	Establish a time threshold for the automatic termination of inactive user sessions

## Protocol Configuration

Configuration	Description
<b>Enable/Disable mDNS</b>	Enabling mDNS (Multicast DNS) enhances device discovery, accelerating the process and enabling Swift to display the device's model name during discovery prior to unlocking the device with a username and password.
<b>Configure SNMP Protocol</b>	Set up the SNMP protocol to manage and monitor network devices effectively.

# Custom Script Configuration

For configurations not supported by the Swift GUI, use the "**Install from Self-defined Script**" function to apply your custom settings.

Install from Script/Package

Install from package and script
  Install from script
  Install from Debian package

---

Package to Install

browse package to install

---

Script to Install

browse script to install

---

Configuration	Description
<b>Install from package and script</b>	Upload both a package file and a corresponding Bash script that specifies the operations to be performed on the package file.
<b>Install from script</b>	Upload a Bash script that specifies the Linux operations to be executed on the Moxa computer.
<b>Install from Debian package</b>	Upload a Debian package for installation on the Moxa computer.



## WARNING

Please note that only **Bash scripts** are supported for custom configurations. It is strongly recommended to implement error code returns within your scripts. This enables Swift to accurately report the error status if the script does not complete successfully.

# Snapshot & Backup Management

Snapshot Actions	Description
<b>Create Snapshot</b>	A snapshot captures the current state and data of the Moxa computer, serving as a restoration point.
<b>Revert to Snapshot</b>	This allows you to revert the system to that specific state if needed.
<b>Delete Snapshot</b>	Delete the snapshot on the selected computer(s)

Backup Actions	Description
<b>Create Backup</b>	A backup saves the Linux kernel and root filesystem (rootfs) on your Moxa Arm-based computer. This backup can be exported and used to restore any Moxa computer of the same model running Moxa Industrial Linux (MIL) 3.1 or above
<b>Delete Backup</b>	Delete the backup stored in the internal storage of the selected computer(s).
<b>Download from Backup</b>	This feature enables you to download a backup from a Moxa computer to the Windows PC with Swift installed. You can then use this backup file as a golden image to simultaneously restore multiple Moxa computers of the same model.
<b>Install from Backup File</b>	Deploy the system by restoring from a selected backup file.

\*The above configuration is done via Moxa System Manager (MSM) in MIL

## Install from System Image

Install the **.img** file downloaded from Moxa official product website. This operation is done via **mx-bootloader-mgmt image\_auto\_install** command in MIL

## Reboot/Reset

Actions	Description
<b>Reset to Factory Default</b>	Revert the system to its original factory image.
<b>Reboot</b>	Reboot the system

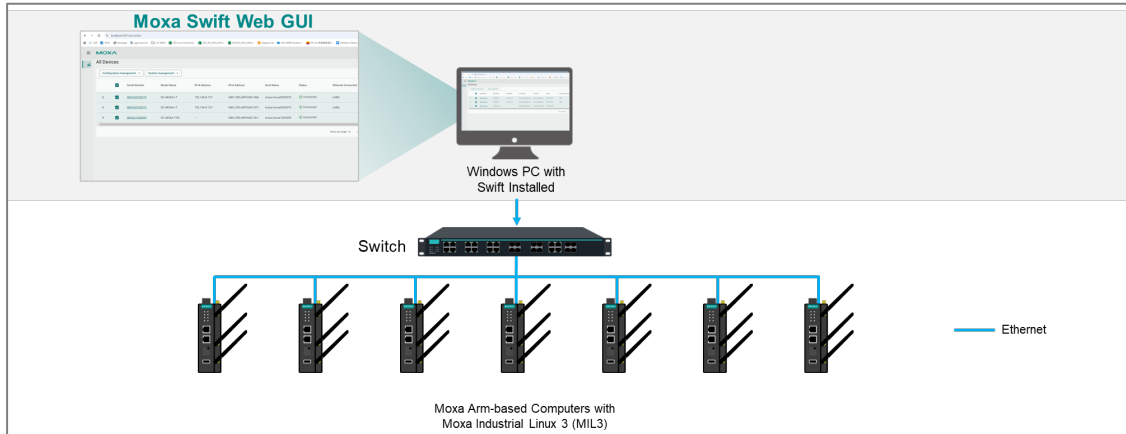


# 4. Step-by-Step Provisioning Guide

In this chapter, we will demonstrate how to use Swift to provision a golden image on a Moxa Arm-based computer (UC-4454A-T-5G) and then batch deploy that golden image to multiple UC-4454A-T-5G simultaneously.

## 1. Setup up environments:

Follow the steps outlined in the section [Getting Started](#) and [Setting Up Provisioning Environments](#).



2. Scan and unlock the Moxa Arm-based computer (e.g., UC-4454A-T-5G with IPv6 fe80::290:e8ff:fe00:1866 ) that you want to use to create a golden image.

The screenshot shows the 'All Devices' page in the Moxa Swift Web GUI. The table lists the following devices:

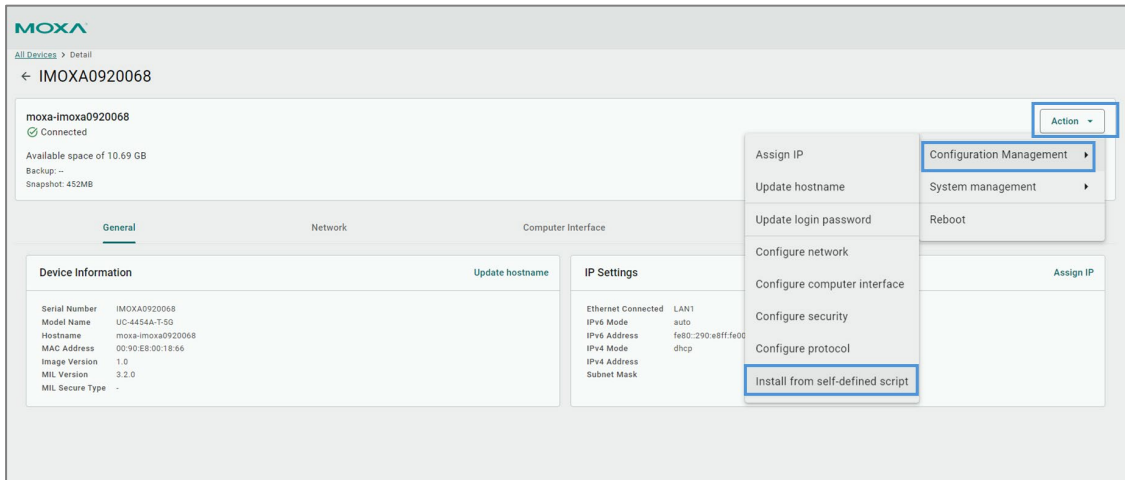
Serial Number	Model Name	IPv6 Address	Host Name	Status	Ethernet Connected	Image Ver.	MIL Ver.	MIL Security Type
IMQXA0920068	UC-4454A-T-5G	fe80::290:e8ff:fe00:1866	moxa-imoxa0920068	Connected	LAN1	1.0	3.2.0	-
--	UC-4454A-T-5G	fe80::290:e8ff:fe00:18c0	--	--	--	--	--	--
--	UC-4454A-T-5G	fe80::290:e8ff:fe00:18d6	--	--	--	--	--	--

3. Enter the device configuration page to configure the network, I/O interface, security, and protocol of the selected computer.

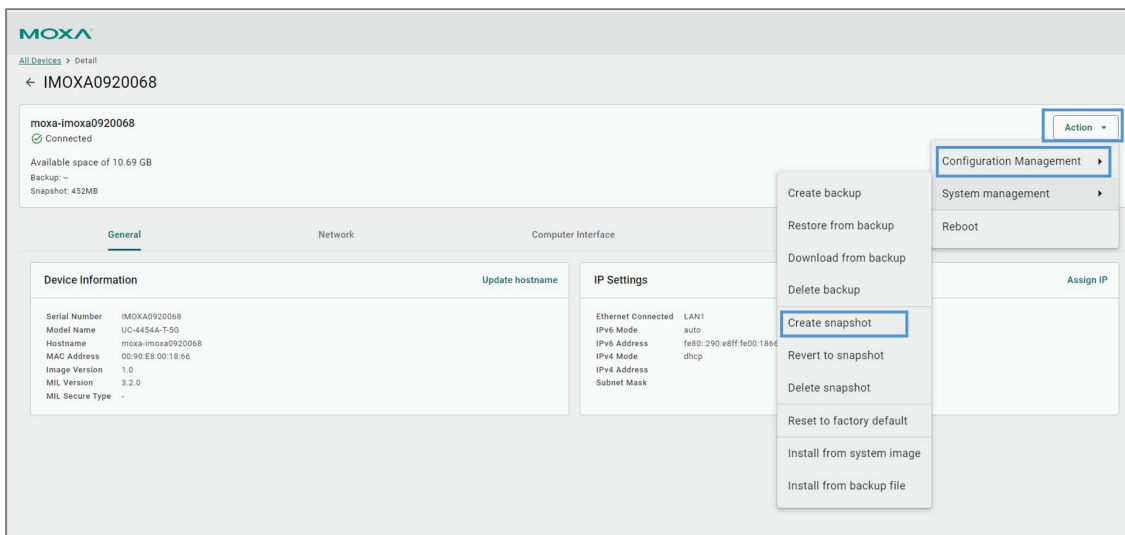
The screenshot shows the device configuration page for the selected device (IMQXA0920068). The configuration is divided into several sections:

- General:** Serial Number: IMQXA0920068, Model Name: UC-4454A-T-5G, IPv6 Address: fe80::290:e8ff:fe00:1866.
- Network:** Ethernet Connected: LAN1.
- Computer Interface:** IP Settings: Ethernet Connected: LAN1, IPv6 Address: fe80::290:e8ff:fe00:1866, IPv6 Address: fe80::290:e8ff:fe00:1866, IPv6 Address: fe80::290:e8ff:fe00:1866, IPv6 Address: fe80::290:e8ff:fe00:1866.
- Security:** MIL Security Type: --.
- Protocol:** --.

4. For configurations not covered by Swift or additional package installations, You can use the following methods:
  - **SSH to the Moxa Computer:** Connect via IPv6 fe80::290:e8ff:fe00:1866 and perform configurations or installations directly in the Linux shell.
  - **Use the "Install from Self-Defined Script" Function:** Leverage this feature in Swift to apply custom configurations.

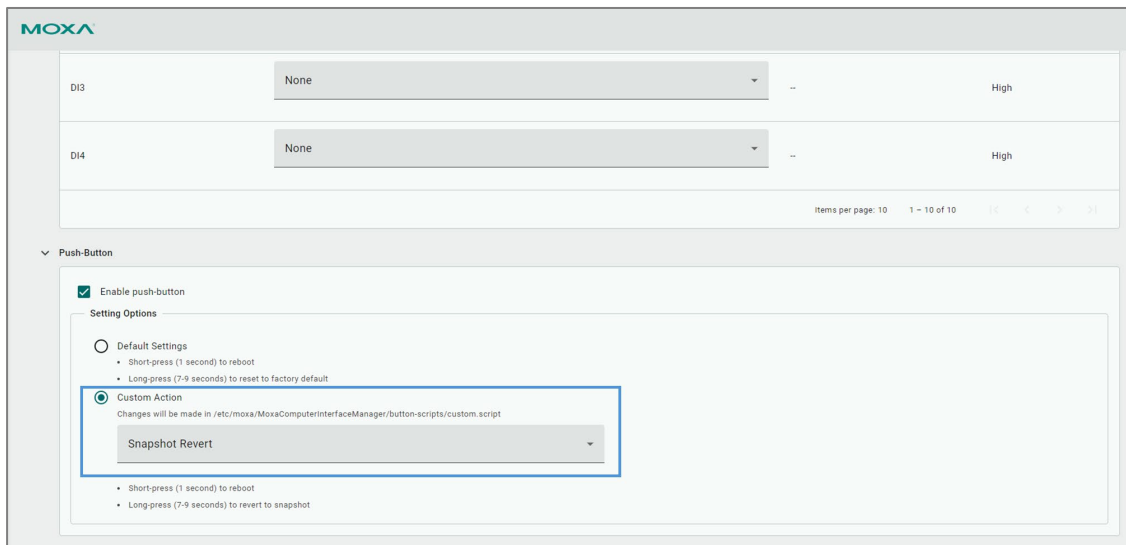


5. After completing all configurations, create a snapshot to serve as a restoration point.

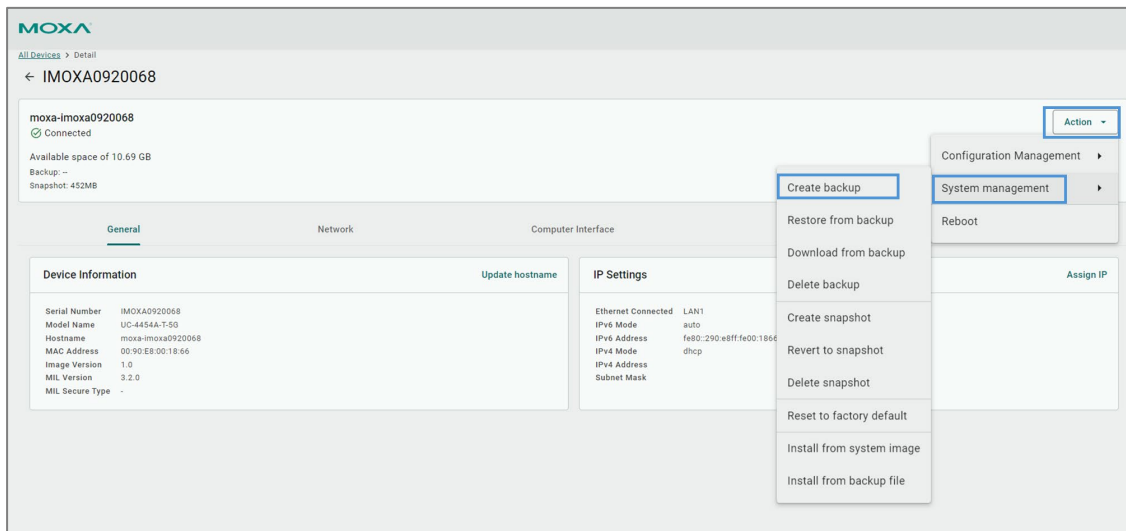


## 6. Configure Push Button action to revert to snapshot:

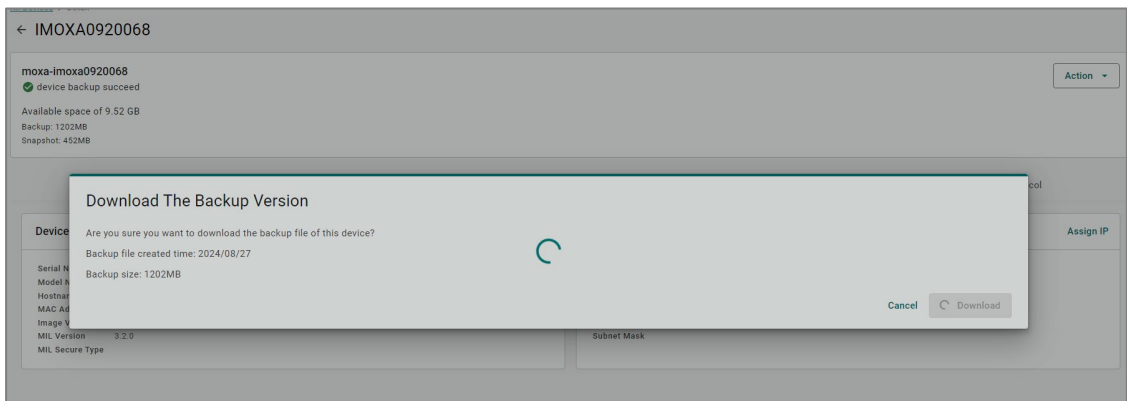
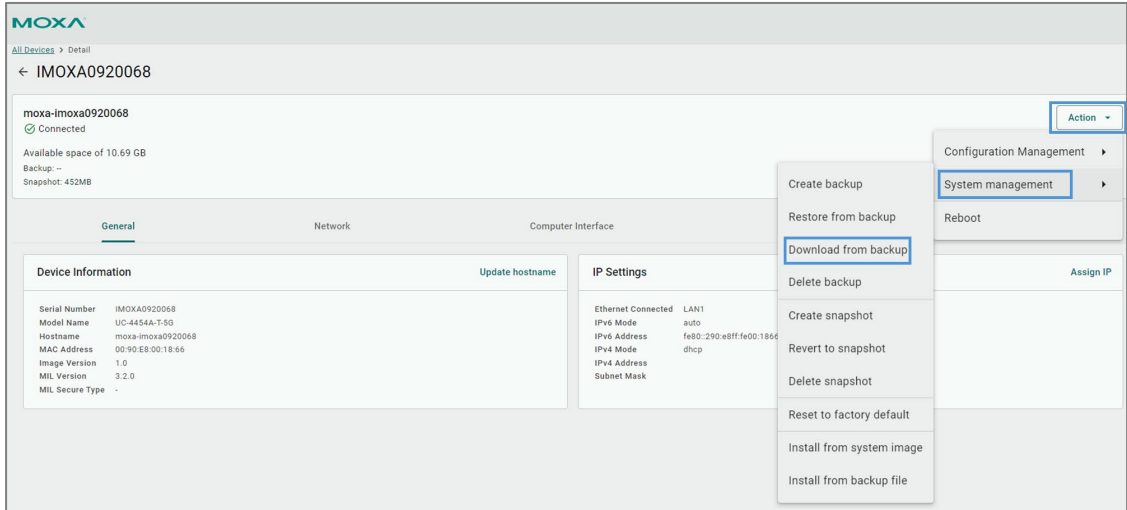
Set the push button (labeled as FN or RESET) on the Moxa computer to trigger a restoration to the snapshot. This will revert the system, including all your configurations and software, to the saved state.



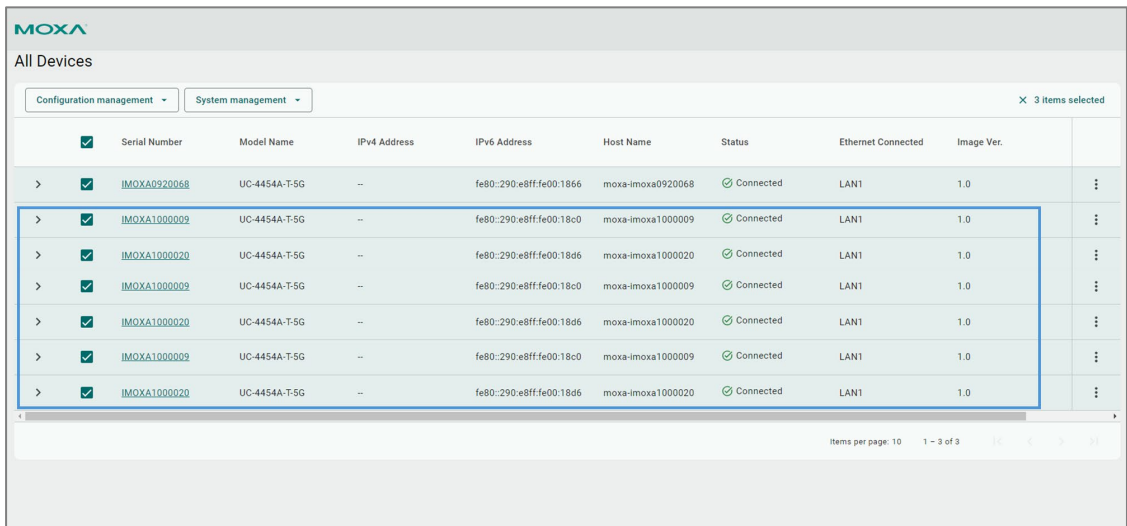
## 7. Now you are ready to create a golden image by using the "Create Backup" function.



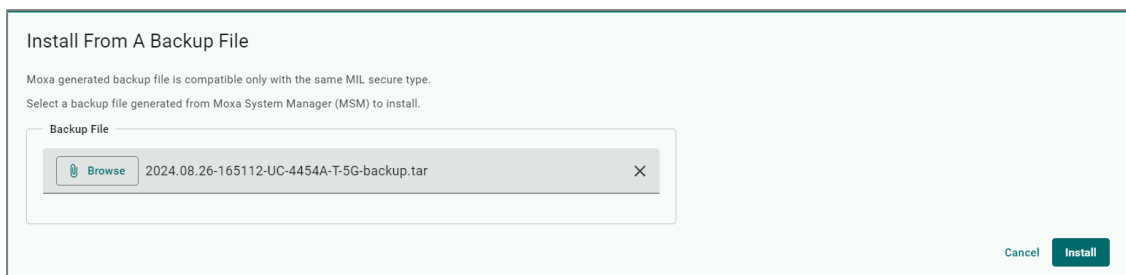
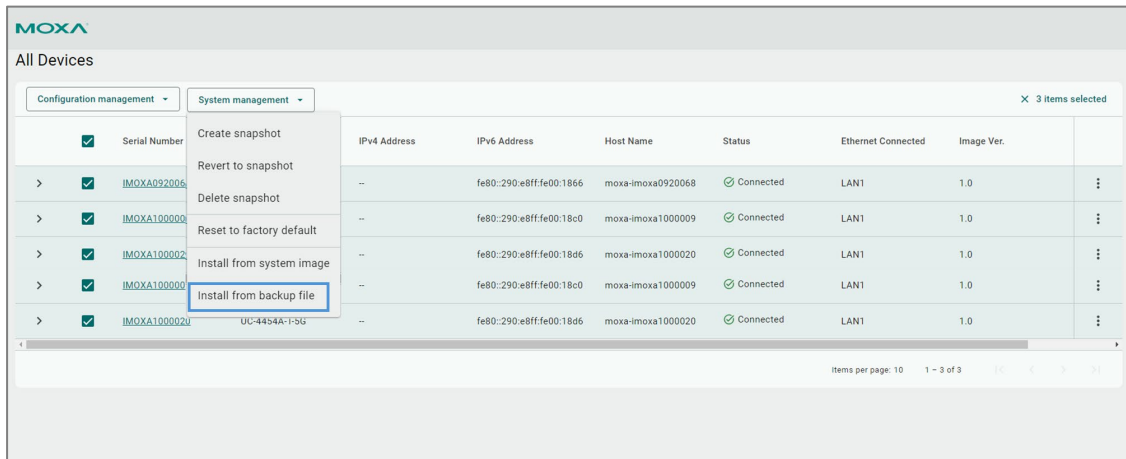
- Download the backup to the Windows PC with Swift installed. The backup file is in .tar format. For example **2024.08.26-165112-UC-4454A-T-5G-backup.tar**.



- Unlock all the other UC-4454A-T-5G you would like to provision with the golden image (**2024.08.26-165112-UC-4454A-T-5G-backup.tar**).



- Select all the other UC-4454A-T-5G and choose **"Install from Backup file"** from the **"System Management"** drop-down menu.



- The batch installation process will start. Please wait patiently until the process is complete.



- The batch installation process will start. Please wait patiently until the process is complete.



13. If you need to assign unique IPv4 addresses or customize hostnames for each Moxa computer, use the **"Assign IP"** and **"Update Hostname"** options from the **"Configuration Management"** dropdown menu to perform a batch assignment.

The screenshot shows the Moxa web interface for managing devices. A dropdown menu is open under 'Configuration management', with 'Assign IP' and 'Update hostname' highlighted. The table below shows three devices with their respective IP addresses, hostnames, and status.

Model Name	IPv4 Address	IPv6 Address	Host Name	Status	Ethernet Connected	Image Ver.
UC-4454A-T-5G	--	fe80::290:e8ff:fe00:1866	moxa-imoxa0920068	device backup succeed	LAN1	1.0
UC-4454A-T-5G	--	fe80::290:e8ff:fe00:18c0	moxa-imoxa1000009	device backup succeed	LAN1	1.0
UC-4454A-T-5G	--	fe80::290:e8ff:fe00:18d6	moxa-imoxa1000020	device backup succeed	LAN1	1.0



## WARNING

By default, only LAN1 on the Moxa computer is managed by the Moxa Connection Manager (MCIM). If you use the "Assign IP" function and select LAN2, LAN3, etc., those ports will also be managed by MCIM. However, some MIL customers may prefer to use the traditional networking services in Debian to manage Ethernet ports.

14. If you need to assign unique IPv4 addresses or customize hostnames for each Moxa computer, use the **"Assign IP"** and **"Update Hostname"** options from the **"Configuration Management"** dropdown menu to perform a batch assignment.