ADVANTECH
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Technical Insights

Nov, 2015

IXM: Faster Network Deployment

The latest trend in modern industrial environments is the fast deployment and flexibility of a networking topology. Upgrading firmware and setting the configuration of a large number of devices is a challenging job for both IT and SI (System Integrator) professionals. As a global leader of industrial networking technologies, Advantech is pleased to introduce the world's very first series of switches to make networking deployment and configuration more efficient. IXM technology on the EKI-7700 is the solution to fast network and configuration deployment.

IXM technology for EKI-7700 series switches provides a cross management and fast deployment function allowing switches to upgrade their firmware and restore configuration more efficiently. As long as you have a single EKI-7700 series managed switch, it can manage both EKI-7700 and EKI-5000 ProView series switches (For more information see the ProView switch introduction document).

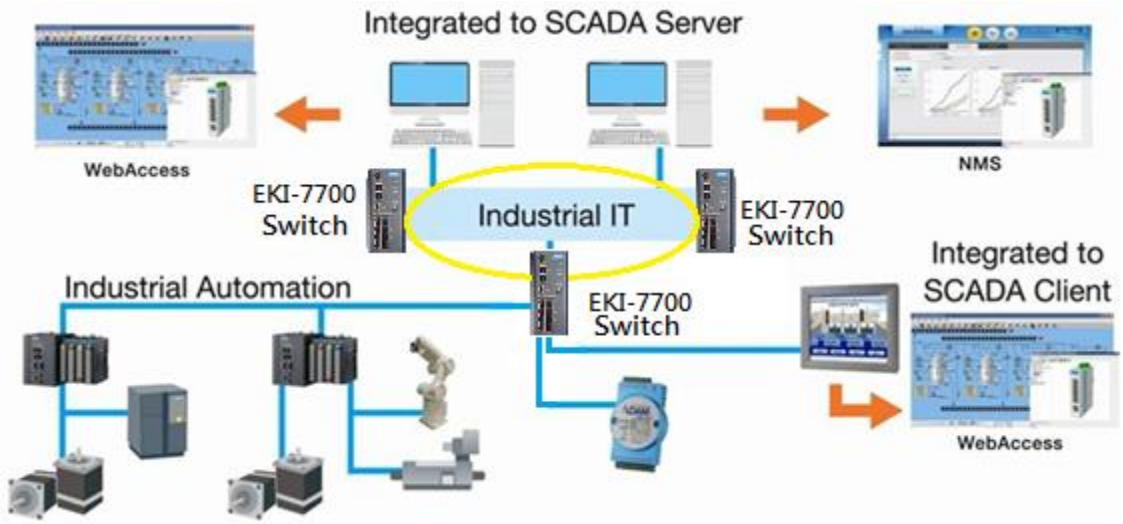


Figure 1. Typical IXM Application Topology

In order to allow more rapid networking deployment, IXM technology supports both mass firmware upgrades and flexible configuration restoration via a web GUI.

The EKI-7700s come with a jumbo frame function which supports packets up to 9216 Bytes. The benefit of jumbo frames is that they can carry more data in a packet. This makes it ideal for video surveillance.

EKI-7700 switches use the highest quality components, to be able to operate in a wide range of operating temperature from -40 to 75°C and Level 3 EMS protection against electromagnetic interference.

Key Functions

1. IXM provides auto IP assignment, mass firmware upgrades, mass and flexible restoration of configuration files.

2. Communication with NMS (Networking Management System) via SNMP.
3. PoE (Power over Ethernet) model supports IEEE802.3at with two 24~48VDC power inputs and P-Fail relay.
4. Supports Advantech X-ring and X-ring Pro technology
5. Supports IPv4 and IPv6

IXM provides Automatic IP assignment, Mass and Flexible Restoration of Configuration Files and Mass Firmware Upgrades,

In the following example, a web browser version of above, IE 9 above, Firefox 32, Chrome 43.0.2357.134 m is required.
A notebook computer with running Chrome is connected to an EKI-7710G-2CI (192.168.1.1), an EKI-7710G-2CI (192.168.1.2), an EKI-5729FI (192.168.1.3) and an EKI-5729FI (192.168.1.4) as shown below.

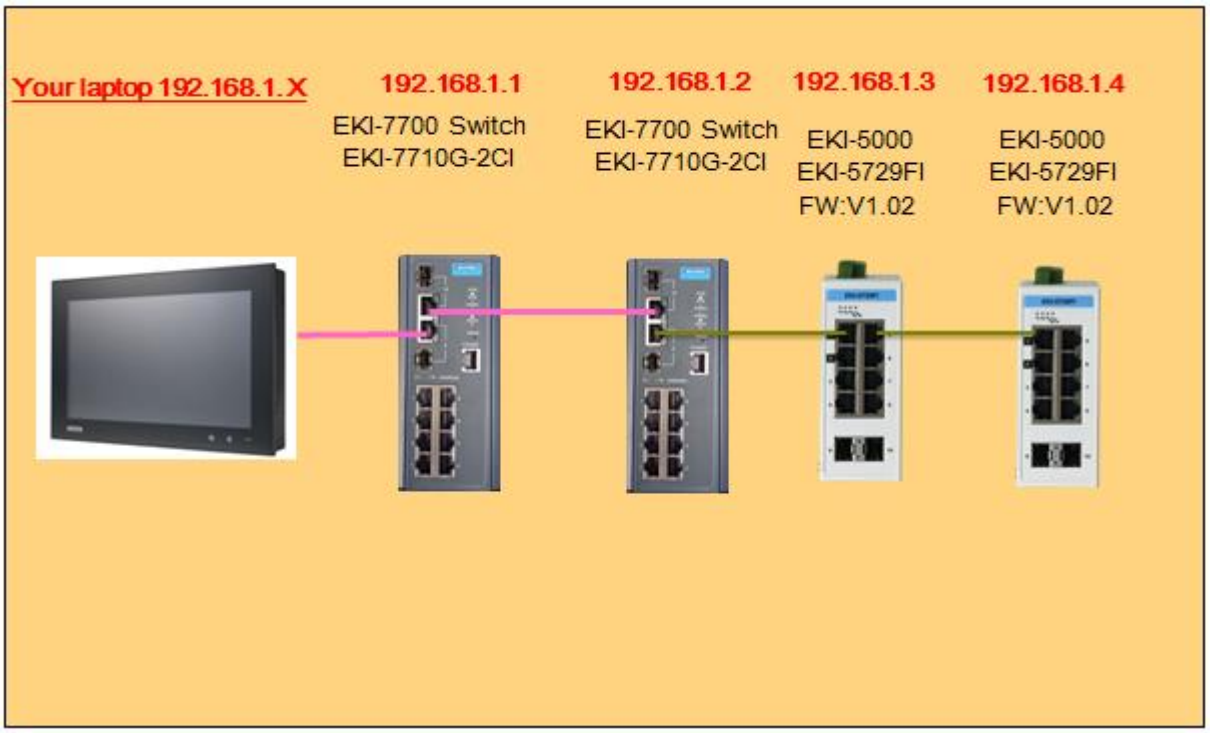


Figure 2. IXM Application Topology Example

We use the notebook to access the EKI-7710G-2CI Switch through default IP of 192.168.1.1 and use the GUI to make the changes. Select **Tools→IXM function** (see Figure 3). This opens the IXM function web page, now press **Scan** to discover all devices (see Figure 4). Four devices have been discovered.

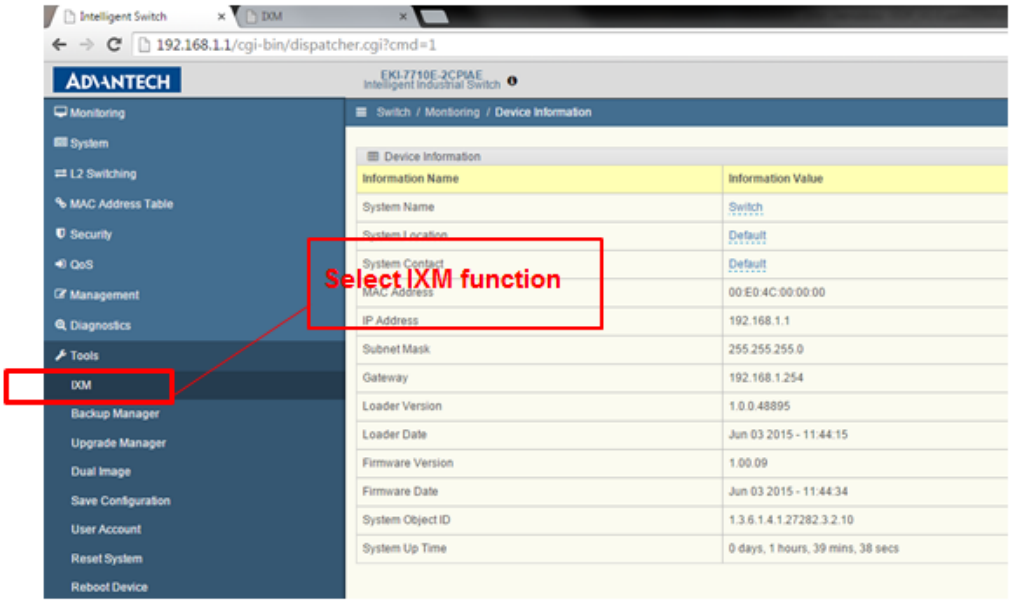


Figure 3. The IXM function in the web GUI

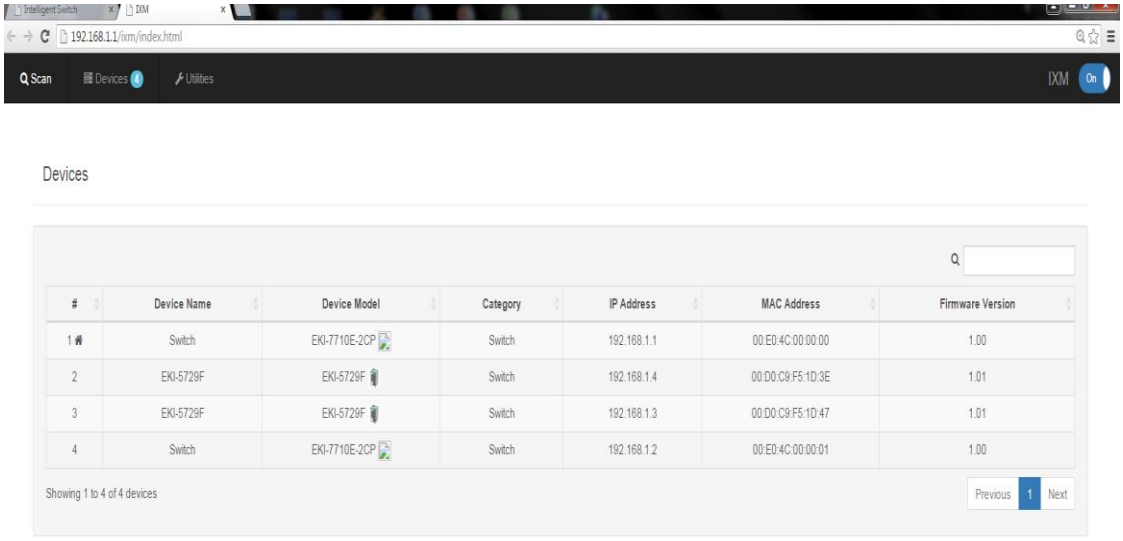


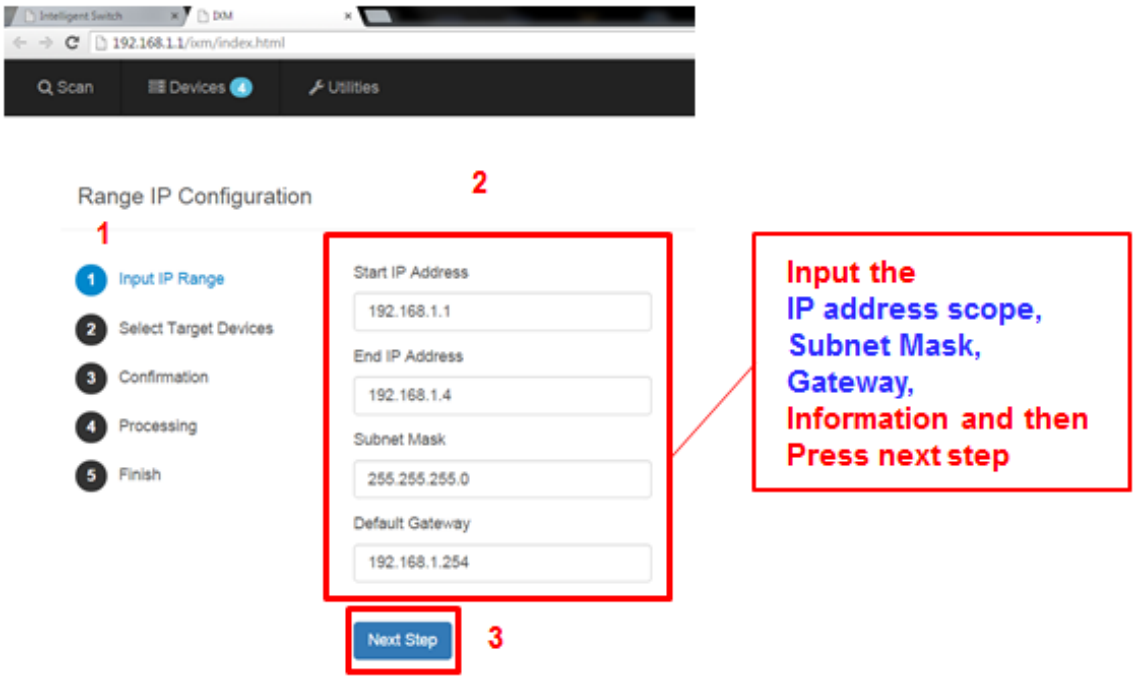
Figure 4. All of the devices discovered by IXM function

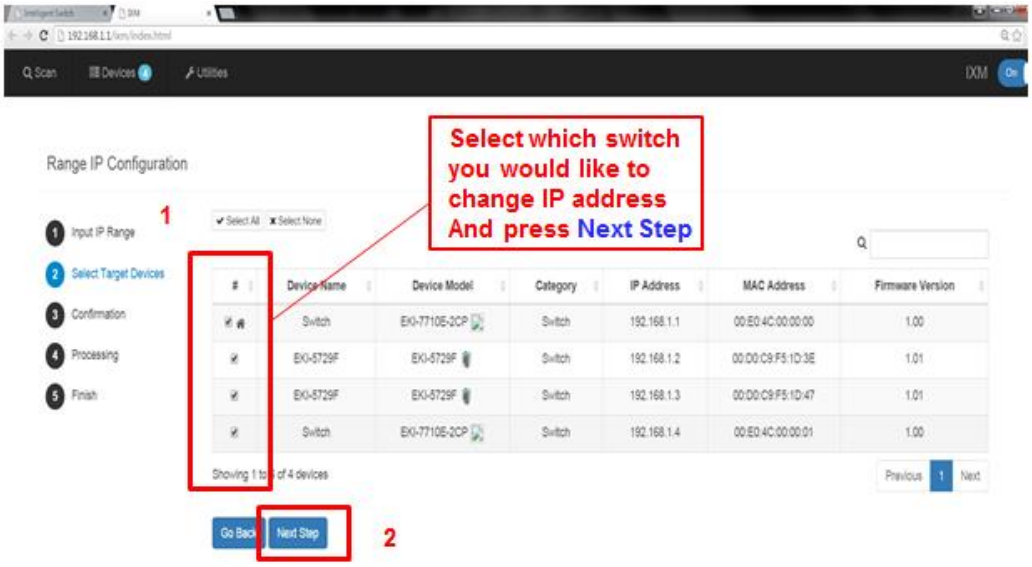
Below is an example of the IXM function.

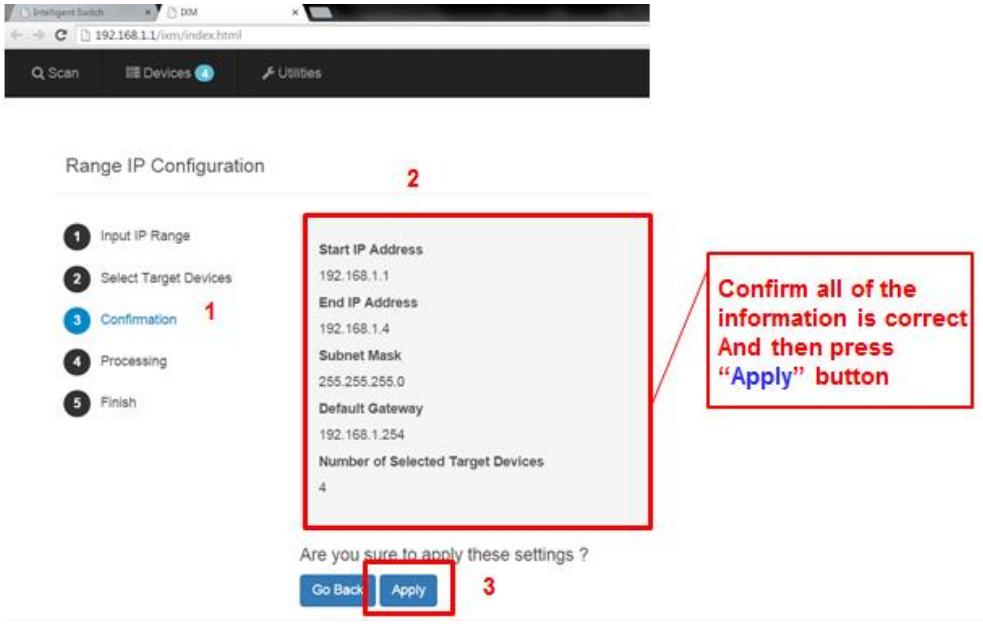
A. Auto IP Assignment

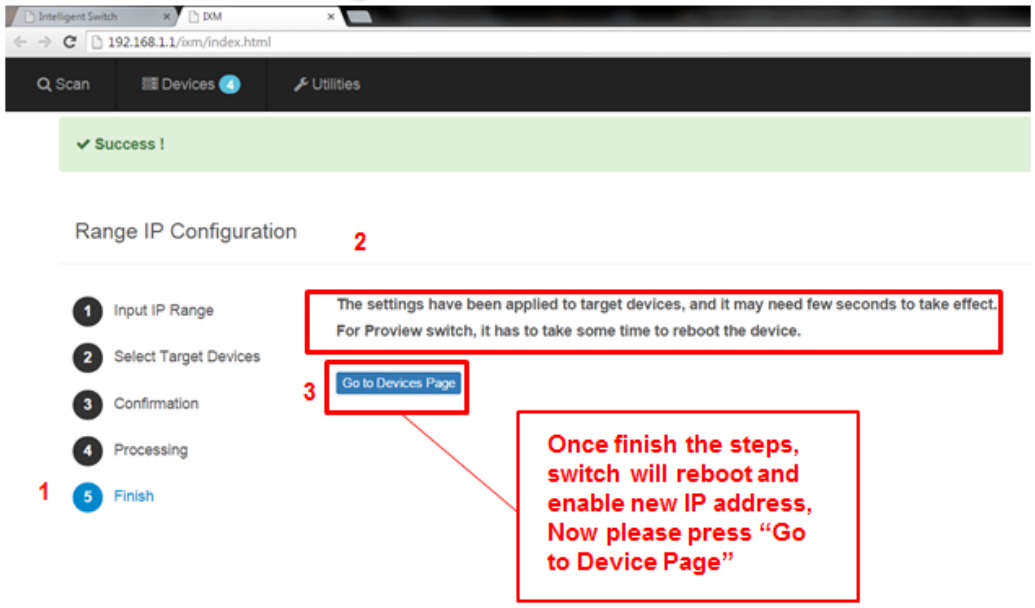
The **Auto IP assignment** function quickly completes the assigning of IP address across the network. The function assigns IP addresses to all the switches according from the IP segment range. If you need to configure more than 100 pcs, EKI-7700 switches this will speed up configuration.

Follow the five steps of the wizard to configure the IP addresses of all the switch's IP addresses.

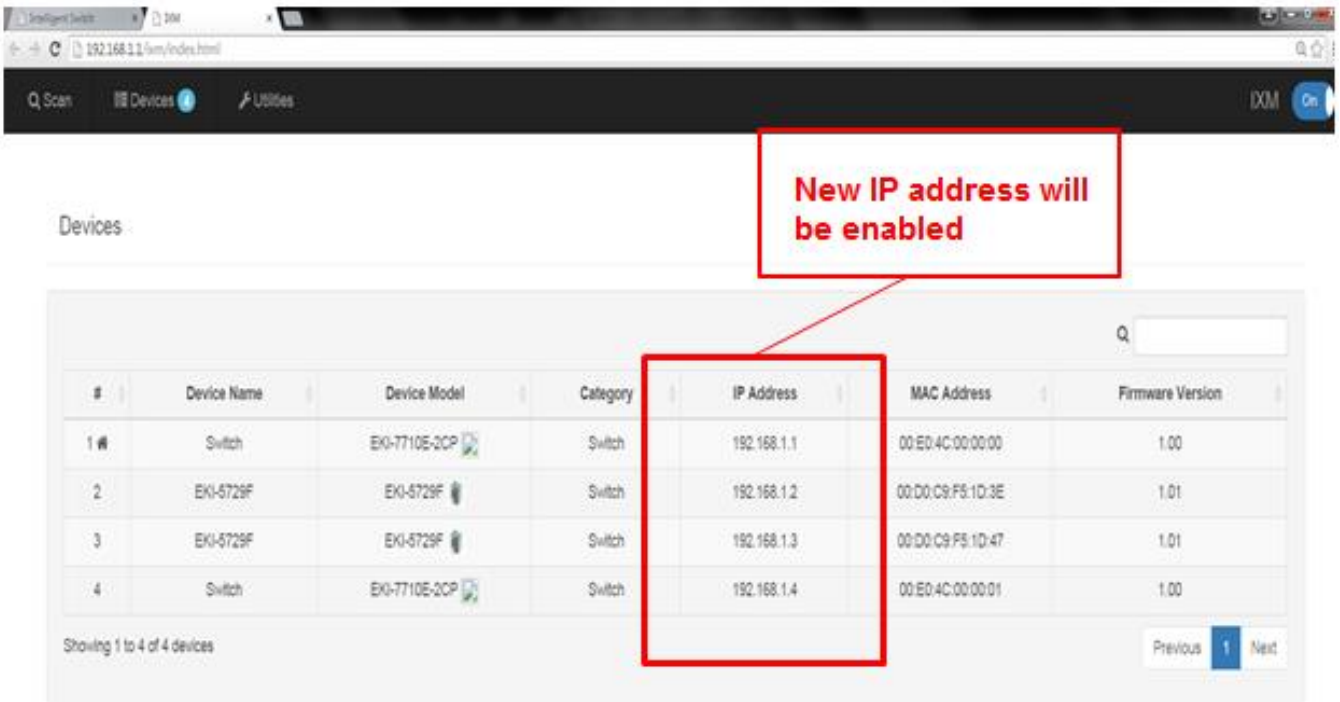



Scan
Devices
Utilities
Range IP Configuration
1 Input IP Range
2 Select Target Devices
3 Confirmation
4 Processing
5 Finish
1
Select which switch you would like to change IP address And press Next Step
Device Name
Device Model
Category
IP Address
MAC Address
Firmware Version
Go Back
Next Step
2


192.168.1.1/ixm/index.html
Scan
Devices
Utilities
Range IP Configuration
2
1 Input IP Range
2 Select Target Devices
3 Confirmation
1
4 Processing
5 Finish
Start IP Address
192.168.1.1
End IP Address
192.168.1.4
Subnet Mask
255.255.255.0
Default Gateway
192.168.1.254
Number of Selected Target Devices
4
Confirm all of the information is correct And then press "Apply" button
Are you sure to apply these settings ?
Go Back
Apply
3

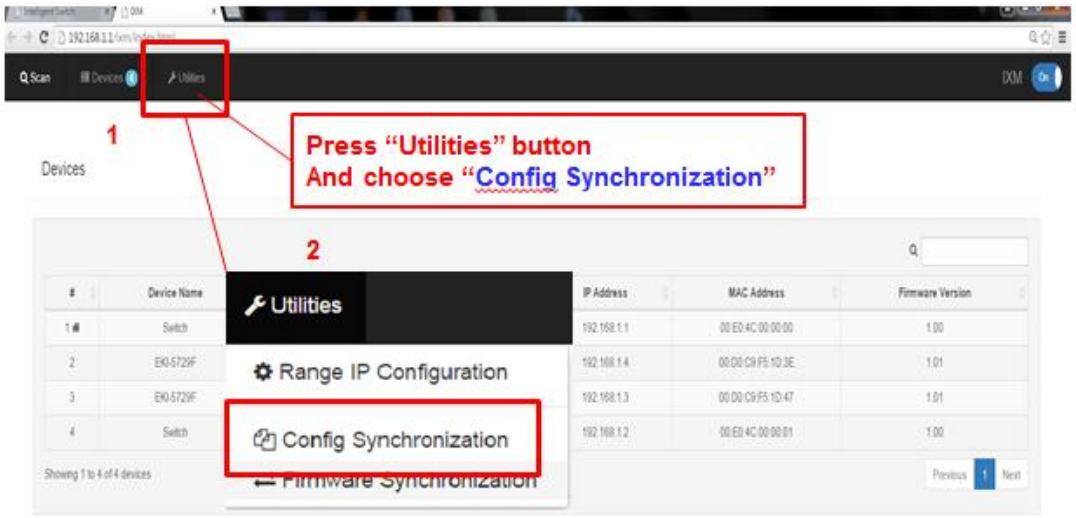


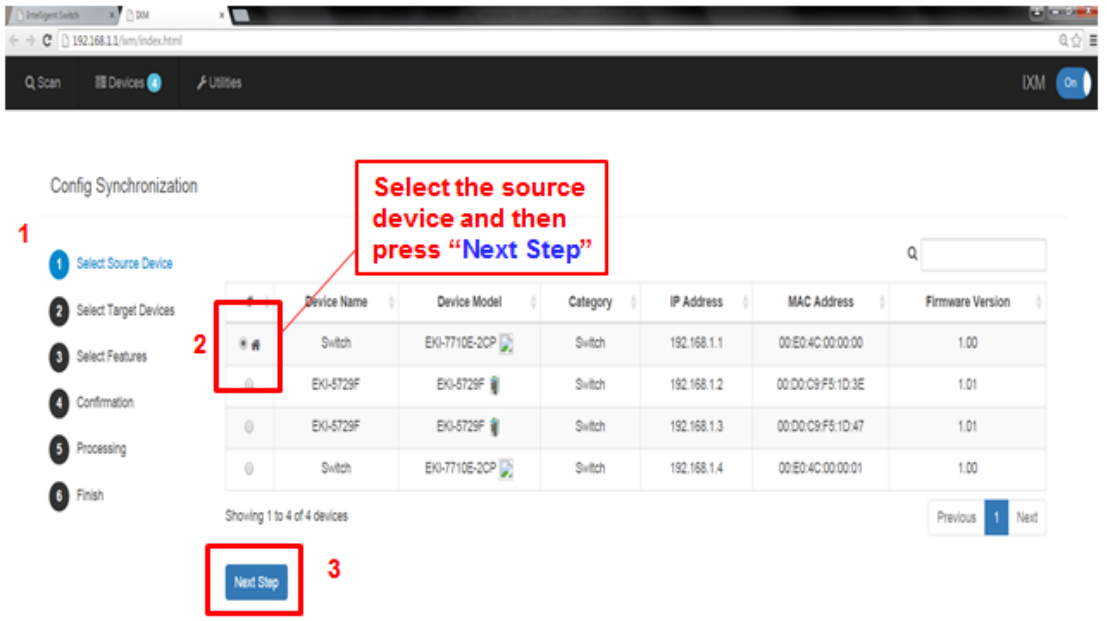
Now, all the IP address of the switches have been automatically assigned.

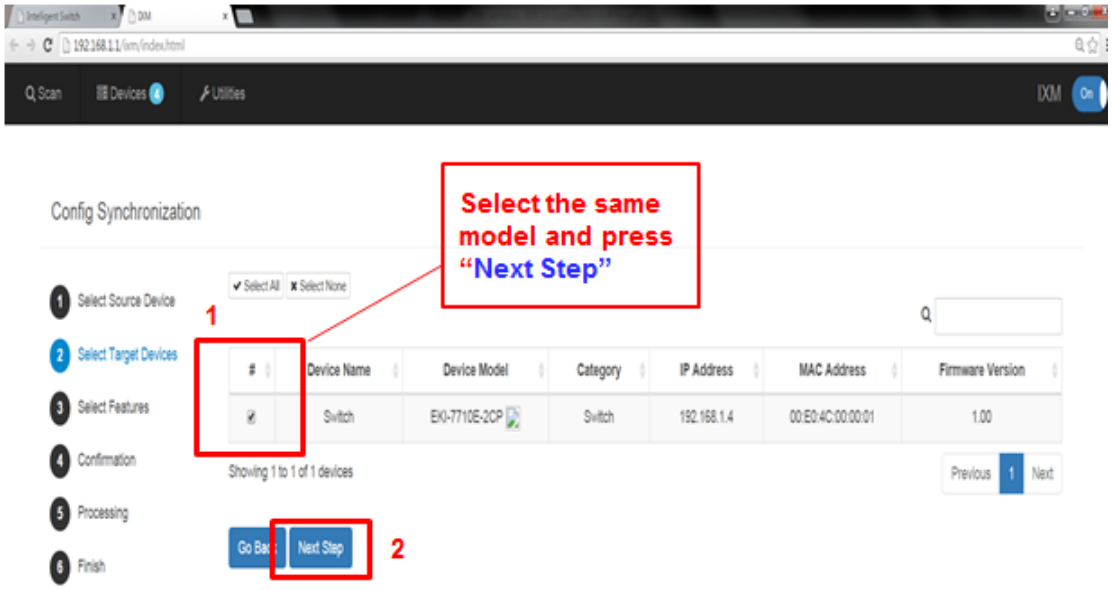


B. Mass and Flexible restore configuration file

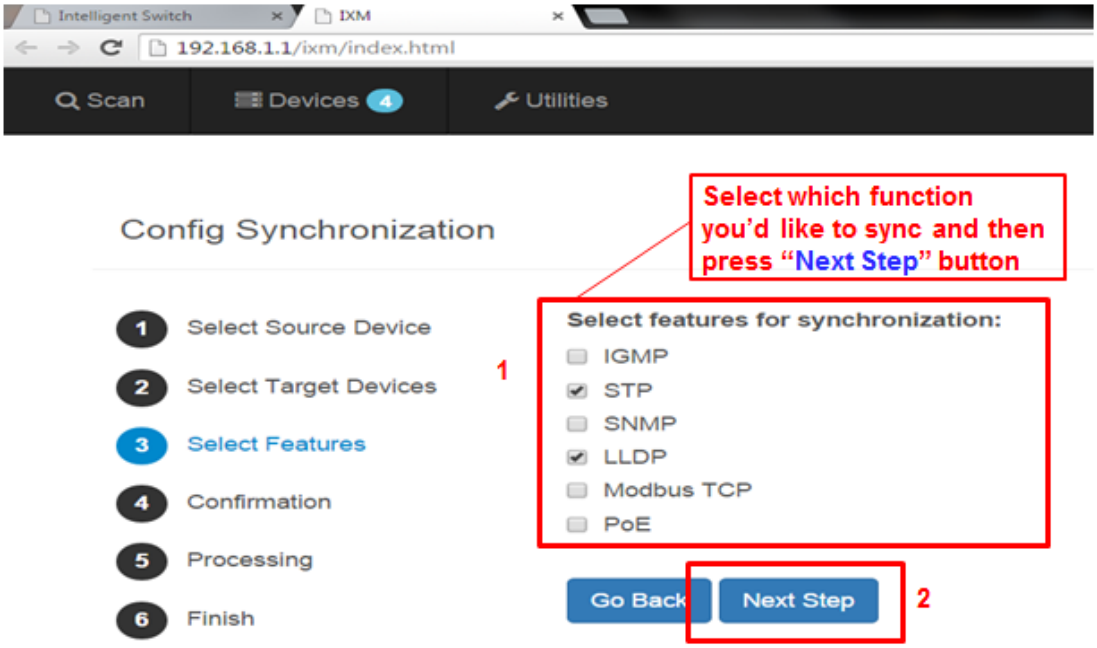
The **Config Synchronization** function supports a one to many deployment of configuration files to the switch at the same time. The feature greatly reduces the speed of network deployment. Users just need to select one of the source devices, and follow the wizard's step. All the switches will return to the specific software function you selected.

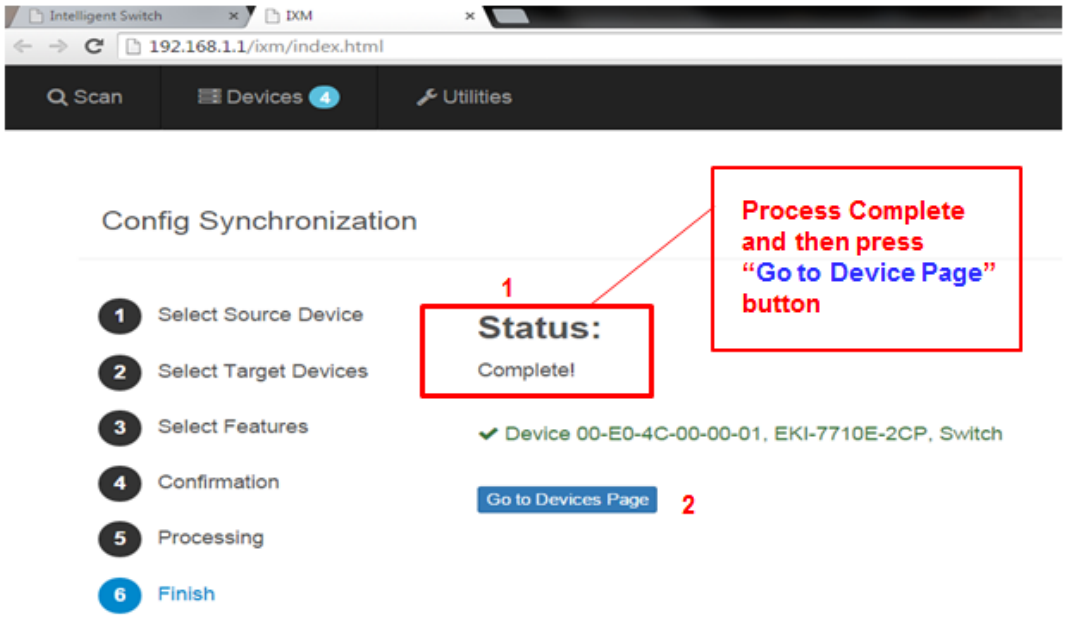




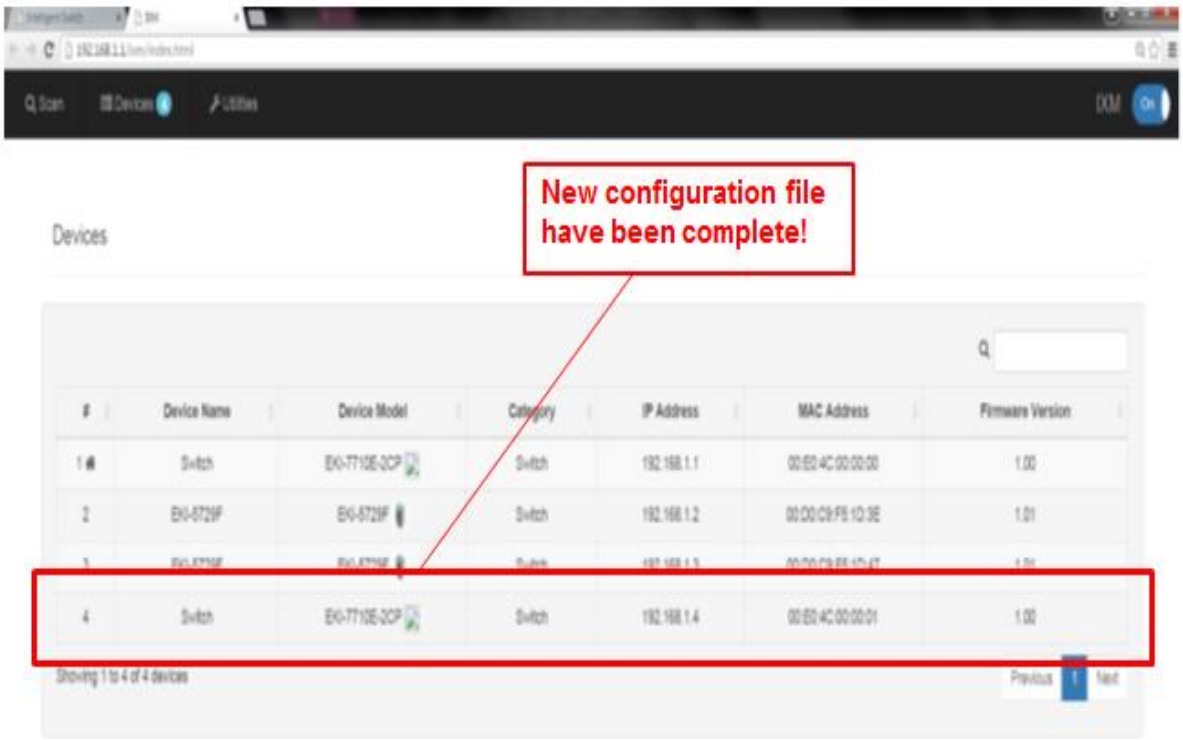


In this step, you can select the functions to be restored to other switches.


Intelligent Switch
IXM
192.168.1.1/ixm/index.html
Scan
Devices 4
Utilities
Config Synchronization
Select which function you'd like to sync and then press "Next Step" button
1 Select Source Device
2 Select Target Devices
3 Select Features
4 Confirmation
5 Processing
6 Finish
Select features for synchronization:
IGMP
STP
SNMP
LLDP
Modbus TCP
PoE
1
Go Back
Next Step
2

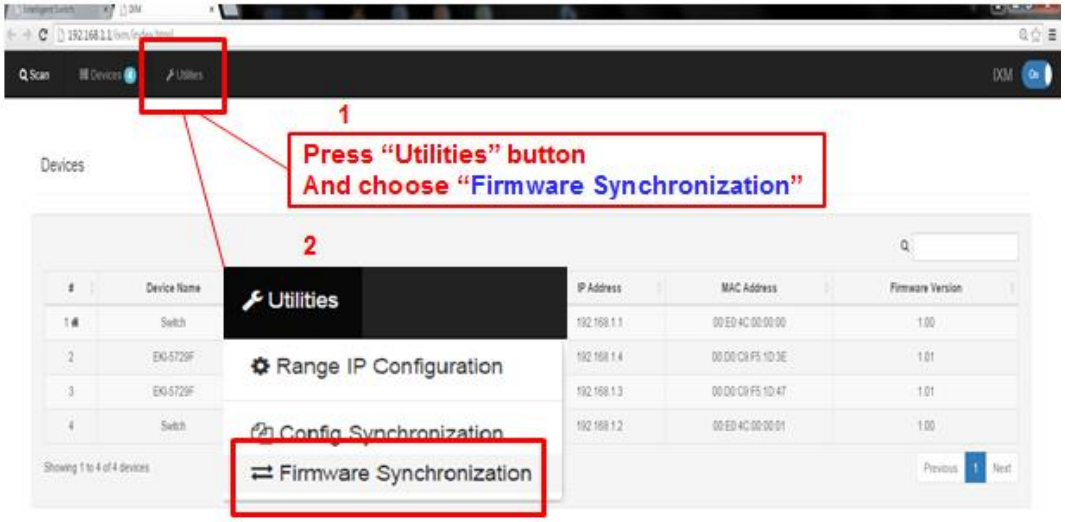

Intelligent Switch
IXM
192.168.1.1/ixm/index.html
Scan
Devices 4
Utilities
Config Synchronization
Process Complete and then press "Go to Device Page" button
1 Select Source Device
2 Select Target Devices
3 Select Features
4 Confirmation
5 Processing
6 Finish
1
Status:
Complete!
Device 00-E0-4C-00-00-01, EKI-7710E-2CP, Switch
Go to Devices Page
2

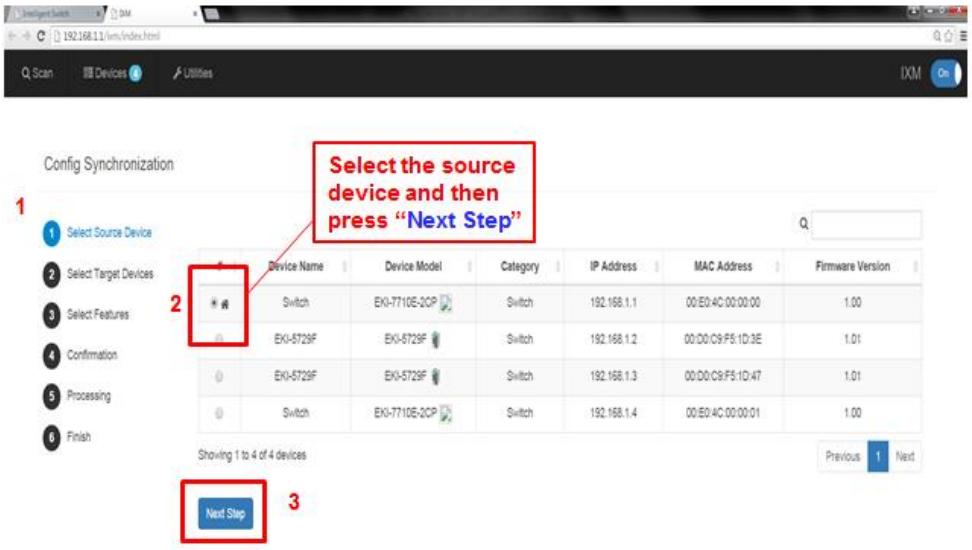
Now, the new configuration has been made to the new switches.

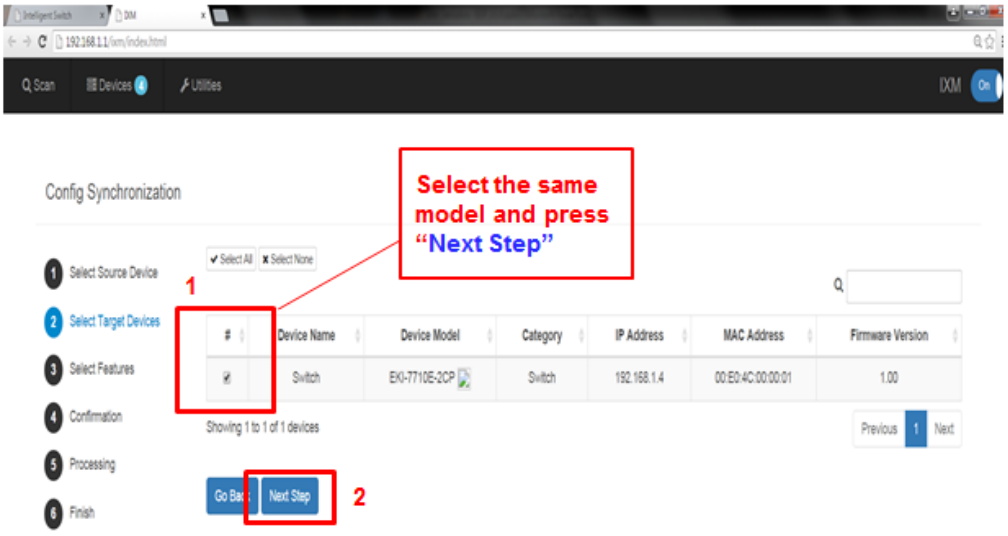


C. Mass upgrade firmware

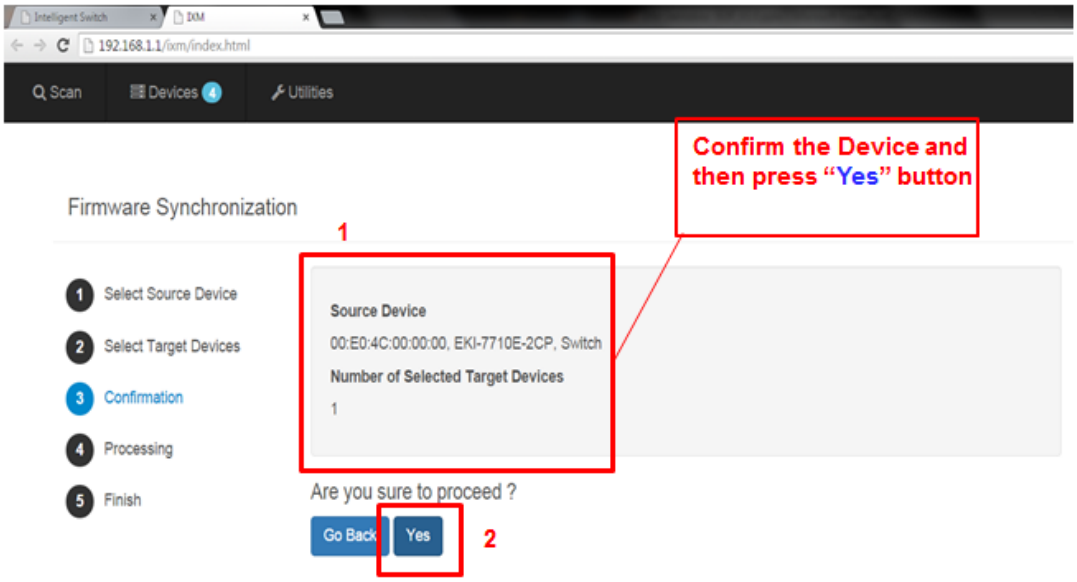
The **Firmware Synchronization** function is another useful tool. If you have a large number of switches and need to upgrade firmware, this function can help you upgrade new firmware to all of the switches at the same time thereby greatly reducing the time of network maintenance. Just select one of the source devices, and follow the wizard steps. All the switches will upgrade their firmware at the same time.

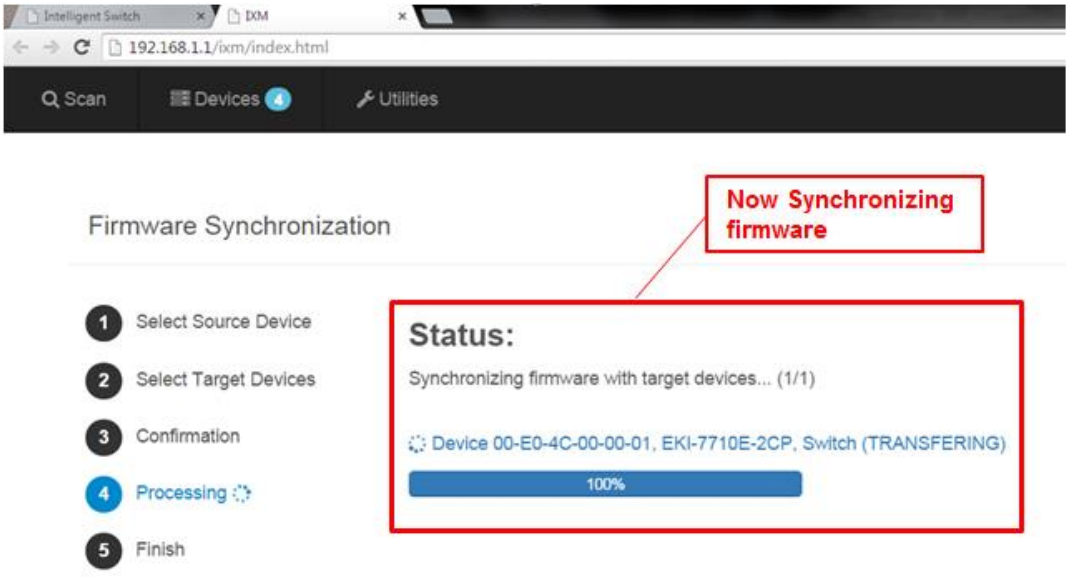




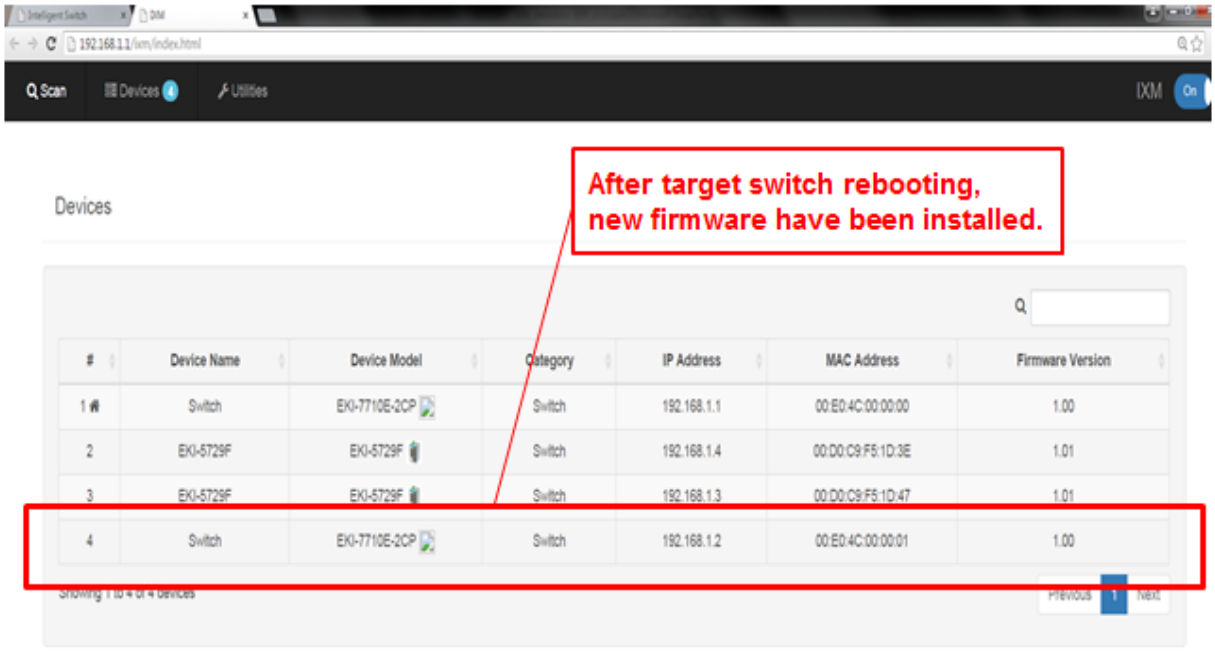


Press the "**YES**" button to confirm the steps.





Now all the models have been upgraded to the same firmware version thereby saving both time and potential complications.



Communication with NMS software via SNMP

EKI-7700 switches support SNMP (Simple Network Management Protocol) allowing NMS (Network Management System/Station) software such as SNMPc, WebAccess NMS and OpenNMS to monitor the device status ie device and port status monitoring, configuration and even events notification.

This allows IT engineers to better monitor and control the network making troubleshooting easier when something goes wrong on the network.

In an industrial environment such as manufacturing, nothing is more important than keeping the network, which is formed by thousands of sensor devices, running. SNMP is widely used to monitor the network device status and an NMS is able to provide an intuitive network topology with a real time device status similar to the example topology shown below.

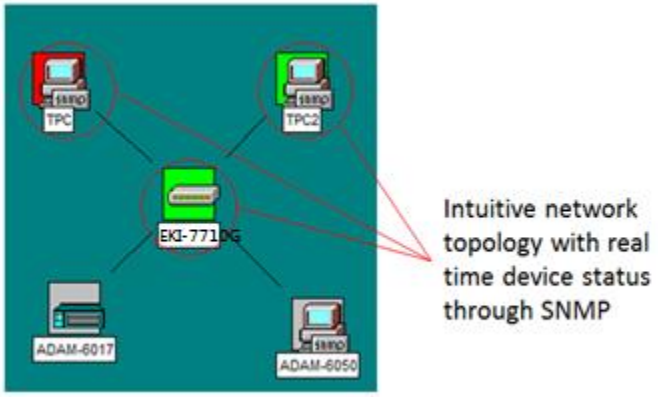


Figure 10. Network Management System using SNMPc

For information that is not supported by a standard SNMP MIB library, Advantech provides a private MIB file which gives NMS software the method of obtaining this information. To add a private MIB into your NMS software, the Advantech private MIB file needs to be compiled into the library. As well as device monitoring, the EKI-7700 series of switches allow IT staff to control or perform certain configuration through SNMP. The setting of the device location, device IP mode, device IP, device net-mask, default gateway and read/write community name can be configured directly through the NMS software.

For statistical port information, EKI-7700 switches provide statistical information including count on transmit and received unicast, multicast and broadcast packet for each individual Ethernet port.

EKI-7700 switches support SNMP traps which will automatically notify the SNMP server when events such as power1 or power2 fail, port link-down/up, cold start and warm start occur. This information allows IT engineers to be notified of a network status change, not just on the EKI-7700 switch, but also on the devices connected to it, imminently and act quickly. In the figure below, it shows the trap message example in the SNMPc.

▪	Normal	09/29/2014	18:25:14	ProViewSW	Interface 1 Link Up Trap
▪	Minor	09/29/2014	18:25:51	ProViewSW	Interface 4 Link Down Trap
▪	Normal	09/30/2014	09:38:24	ProViewSW	Device Responding to Poll
▪	Normal	09/30/2014	09:38:47	ProViewSW	Interface 2 Link Up Trap
▪	Normal	09/30/2014	09:39:15	TPC(192.168.253.1	Device Responding to Poll
▪	Normal	09/30/2014	09:40:10	TPC(192.168.253.1	Device Responding to Poll

POE model support IEEE802.3at

PoE (Power over Ethernet) provides the power to a device through the RJ45 cable therefore reducing the amount of wiring and power supplies required. This is ideal for CCTV cameras which are frequenctly placed in difficult locations.

Advantech's industrial PoE EKI-7700 series switches are specifically designed to meet the IEEE 802.3at standard. When installation of network devices such as IP phones, IP surveillance cameras, Wireless access points, EKI-7700 PoE industrial series switches are the first choice.

Supports Advantech X-ring and X-ring Pro technology

Advantech's EKI-7700 managed Industrial Ethernet Switches allow users to quickly and cost effectively expand their industrial network. X-Ring technology offers the fastest recovery time (< 20 ms) to increase the reliability and speed of network infrastructures. Advantech Industrial Ethernet Switches are an ideal solution for easily managing applications centrally or locally.

Supports IPv4/IPv6

The new EKI-7700 series switches support IPv4/IPv6 . Advantech has released many IPv6-ready industrial Ethernet switches to meet the emerging requirements of IPv6 networking and have officially passed the IPv6 Ready Logo Program ensuring they are ready for use in pure IPv4 or IPv6 backbones, or mixed IPv4-IPv6 industrial network environments.

In order to make it easier to upgrade and integrate existing network infrastructures in the future, Advantech industrial managed Ethernet switches follow a dual-stack transition structure for both IPv4 and IPv6 network applications. Advantech EKI-7700 series switches can automatically allocate an IPv6 IP address in line with the latest generation of IP configuration.

Conclusion

IXM chiefly benefits administrators who perform network installation and maintenance. It does more than a utility and a little less than an NMS, but the main advantage is that it's embedded in the switches firmware, allows upgrades at any time, and is independent from operating systems or physical server devices. Advantech is about to release a series of Managed Ethernet Switches embedded with this cutting edge technology- IXM.