



Nexans Switches Frequently Asked Questions VIII

Automatic provisioning of FTTO switches via Zero Touch Configuration

Version 2 EN

The goal of this document is to provide a simple and practical description of the different parameters “Zero Touch Configuration” parameters. All the parameters related to NEXMAN and the Controller are described in the documentation "NEXMAN manual", available on our support portal.

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1. Introduction

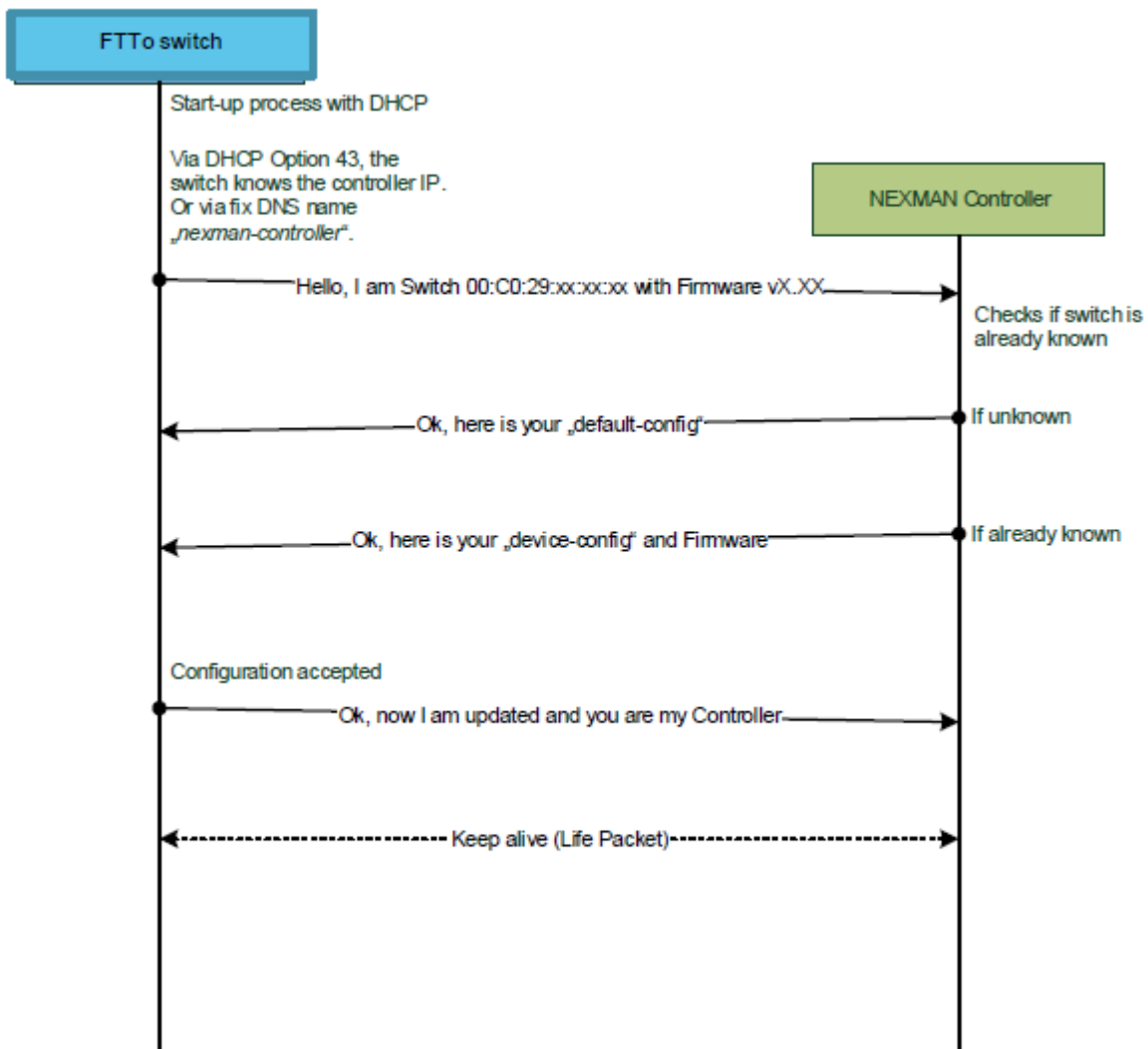
1.1. Presentation

Definition of the Zero Touch Configuration

Once connected to a network segment, the Nexans switch will automatically contact its Controller to be updated, receive a configuration and be added to the database.

The Zero Touch Configuration is a feature allowing once configured :

- Adding new switches in the database and in a dedicated device-list
- The firmware update (Upgrade or Downgrade).
- Import of configurations on new switches (default or predefined configurations).
- Sending log messages, also by email.



1.2. Requierements

To be configured via Zero Touch Configuration, switches must meet certain requirements:

- The switch must be on firmware version 6.0 or higher.
- The switches must start with the factory settings.
- Zero Touch Configuration is only available with the Client-Controller version of NEXMAN..
- A DHCP or DNS pre-configuration is required..

2. Pre-configuration of switches via DHCP

2.1. Functioning

At startup, the FTTO switch checks to see if Zero Touch Configuration is enabled. If it is, the switch contacts the Controller to get new configurations and firmware. To do this, the switch needs to know the Controller's IP address, which it can retrieve in three different ways:

- Via Nexan specific DHCP option 43 (if DHCP is enabled)
- Via the DNS server using DHCP options 6 and 15 (if DHCP is enabled)
- Via the controller's static IP address manually configured in the switch

Important :

For simplicity reasons, only the first and most common of these options will be described below. All the other options are described in the documentation "Switch Management Manual" chapter "7.3 Zero Touch Configuration".

2.2. Get the controller's IP address via the DHCP option 43

To get the controller's IP address from a DHCP server, DHCP must be enabled, and on the DHCP server, option 43 must be configured as "vendor-encapsulated-option" in the following Nexans-specific text format:

```
0x01 <text length> "NEXANS_cip_<IPv4/IPv6 address>"
```

Where 0x01 is the code for the "Controller IP Address" suboption, and <text length> is the length of the following text field without a NULL terminator. For some DHCP servers, the text length is automatically calculated by the length of the following text field and does not need to be explicitly declared.

Syntax examples:

```
0119"NEXANS_cip_192.168.201.92"
```

```
0118"NEXANS_cip_192.168.0.224"
```

Example of configuration in a DHCP server configuration file:

```
OPTION_43=0119"NEXANS_cip_192.168.201.92"
```

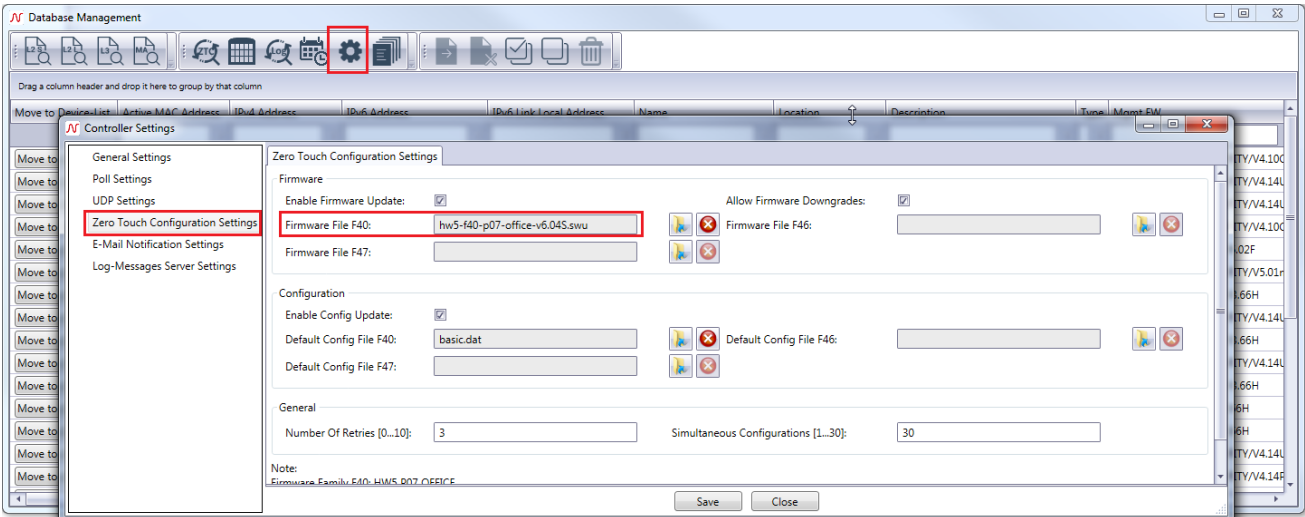
or

```
OPTION_43=01194e4558414e535f6369705f3139322e3136382e3230312e3932
```

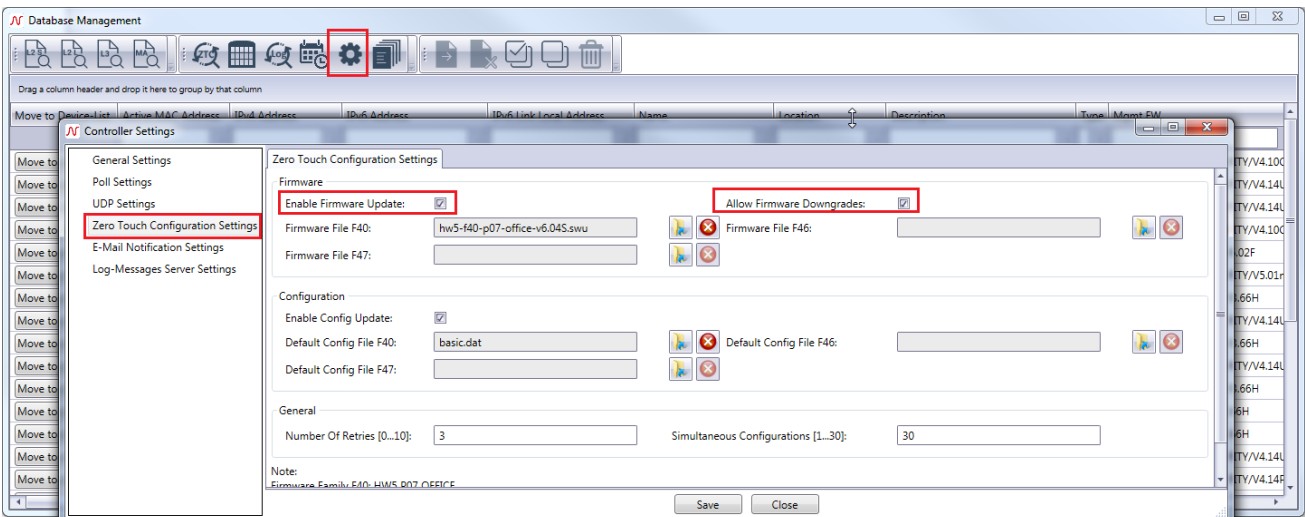
3. Firmware setting

Switches provisioned via Zero Touch Configuration can be automatically updated to a predefined firmware version if required. This can be a newer version or an older version than the one on the newly added switch.

The new firmware version can be selected in the Zero Touch Configuration settings. For an FTTO switch, the firmware must be loaded in the "Firmware file f40:" field.



- To enable the firmware update, the "Enable Firmware Update:" option must be checked. When this option is checked, the Controller will automatically update the switch's firmware version if the current one is older. If this option is not checked, the update will simply be ignored.
- The "Allow Firmware Downgrade" option will define, in case the firmware version of the switch is higher than the selected one, if the switch should still be downgraded with this version or not.

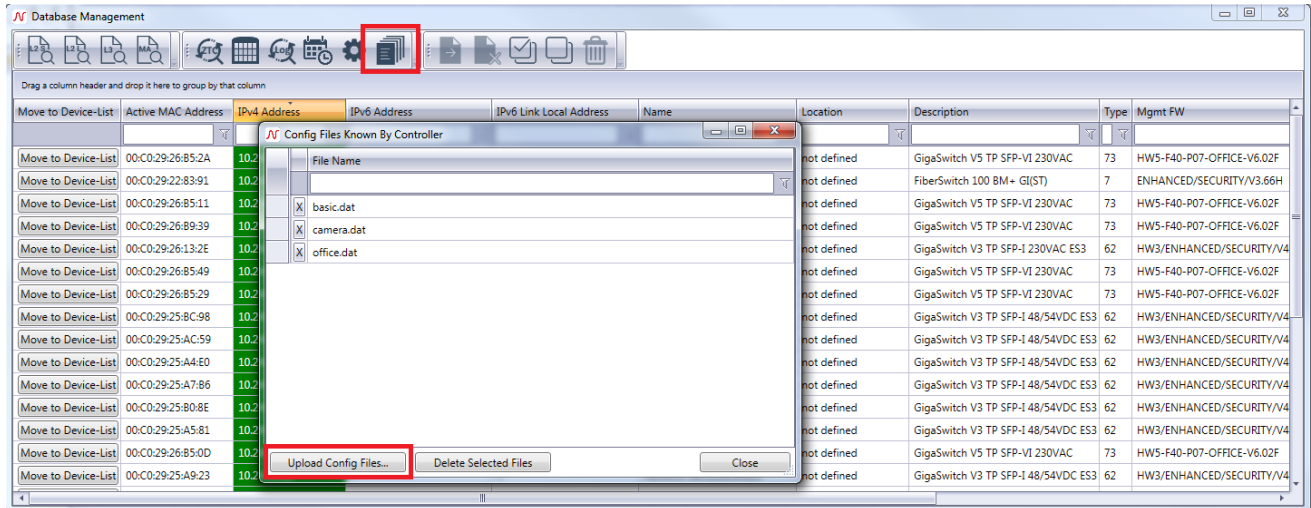


4. Configuration settings

4.1. Predefined Configuration

4.1.1. Import configurations to the Controller

Before the configurations can be assigned to the switches, they must be imported to the Controller. This can be done in the "Config files on Server" section of the Database Management menu.



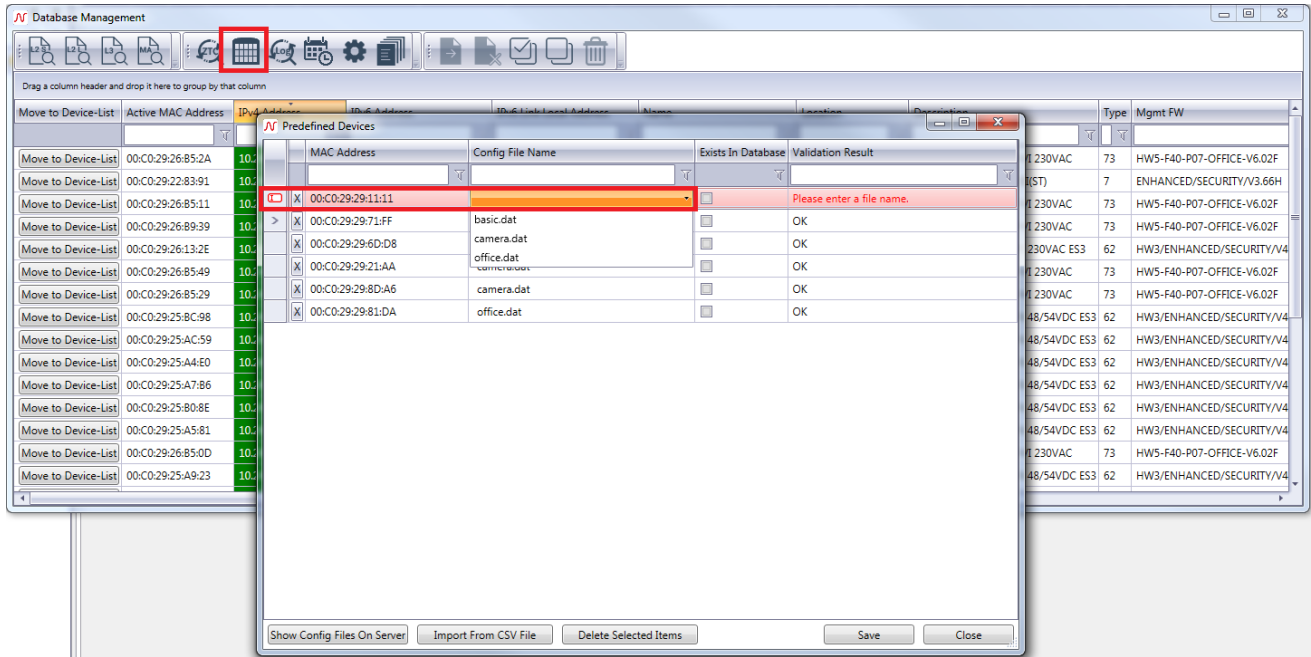
4.1.2. Adding predefined configurations

Once the configurations have been imported, it is then possible to associate them with the MAC addresses of the switches that will be provisioned via ZTC. This is done in the "Predefined Devices" section of the "Database Management" menu.

These MAC addresses can be entered manually, or automatically via a CSV file.

Manually

It is possible to simply add MAC addresses to the list, and then associate them with one of the configurations available in the database via a drop-down menu.



Automatically

The predefined MAC addresses can be entered automatically, using a .csv file filled in beforehand. This file must be composed of two columns:

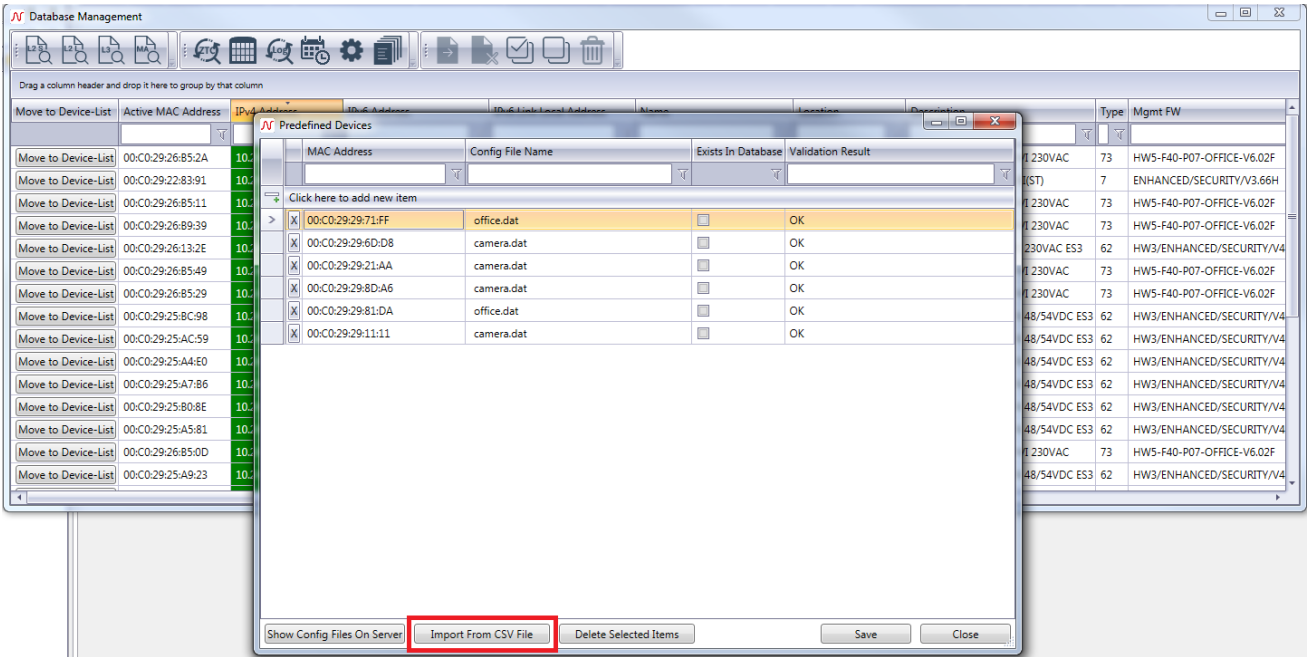
- A column containing the MAC address of the switches.
- A second column containing the name of the configuration to be assigned to the switch.

This file should not contain any column names, or any information other than those listed above.

Example :

	A	B	C
1	00:C0:29:29:71:FF	office.dat	
2	00:C0:29:29:6D:D8	camera.dat	
3	00:C0:29:29:21:AA	camera.dat	
4	00:C0:29:29:8D:A6	camera.dat	
5	00:C0:29:29:81:DA	office.dat	

This file can be imported using the "Import From CSV File" option.

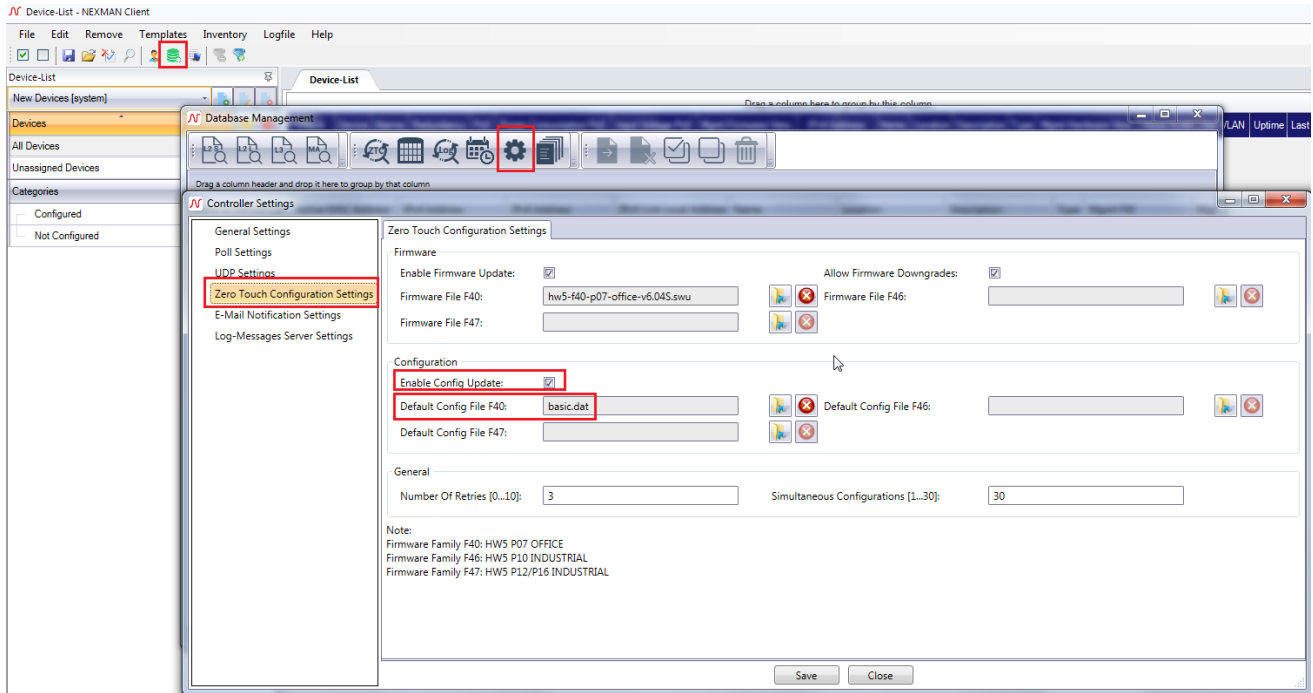


4.2. Default Configuration

It is also possible to configure a default configuration, which will be assigned to switches added via ZTC, whose MAC address is not entered in the predefined configuration database.

This configuration must be entered in the "Database Management" -> "Controller Settings" -> "Zero Touch Configuration Settings" menu.

For an FTTO switch, the configuration must be entered in the "Default Config file F40" field. To activate the configuration import, the "Enable Config Update" option must be checked. If this option is not checked, new switches added via Zero Touch configuration will not receive a configuration.



4.3. Configuration of static IP parameters and naming via CSV

It is possible to assign static IP parameters as well as naming parameters to the switches according to their MAC address.

These parameters are independent for each switch, so you don't have to create your own configuration for each switch.

These parameters must be entered in two files in .csv format (one for the IP parameters, and one for the naming parameters). They must be placed on the Controller, and their access path must be filled in the parameters of the master-configs imported on the switches when adding them in Zero Touch Configuration.

4.3.1. IP settings via CSV file

It is possible in a first file to define IP addresses for the switches according to their MAC address. These parameters must be entered in a simple .csv file containing 4 columns:

- MAC address
- IP address
- Subnet mask
- Gateway

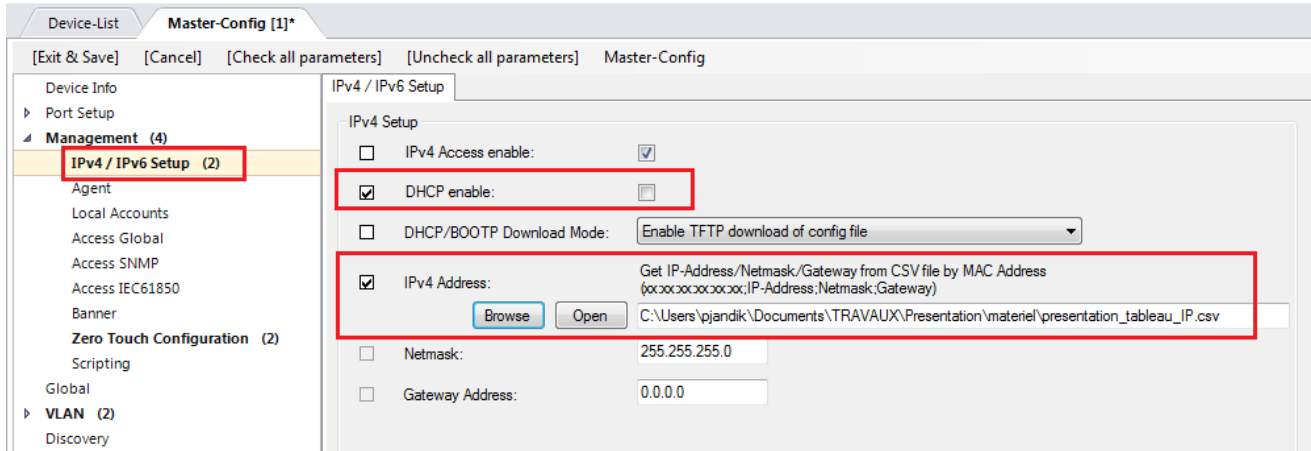
This file should not contain any other information, or column headers.

Example :

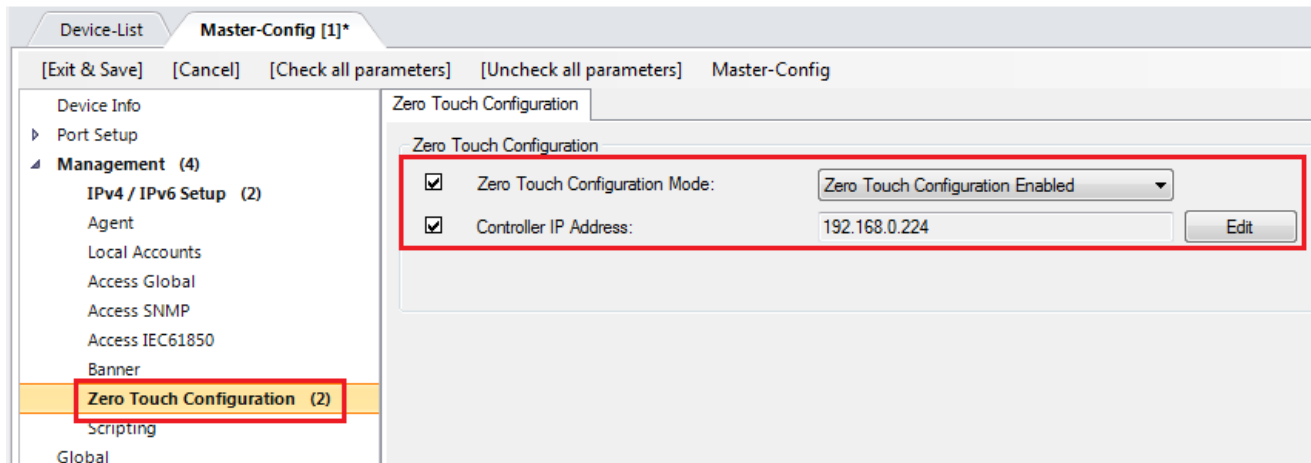
	A	B	C	D	E
1	00:C0:29:29:71:FF	192.168.0.80	255.255.255.0	192.168.0.254	
2	00:C0:29:29:6D:D8	192.168.0.90	255.255.255.0	192.168.0.254	
3	00:C0:29:29:21:AA	192.168.0.91	255.255.255.0	192.168.0.254	
4	00:C0:29:29:8D:A6	192.168.0.92	255.255.255.0	192.168.0.254	
5	00:C0:29:29:81:DA	192.168.0.93	255.255.255.0	192.168.0.254	

The file can then be selected directly in the master-config settings, in the "IPv4 / IPv6 Setup -> IPv4 Address" parameter.

At the same time the "DHCP enable" parameter must be disabled, so that the switch loses its assigned address and takes on its new static IP address.



Finally, the IP address of the Controller must be added in the "Zero Touch Configuration" section.



This option allows the switch to contact the Controller once its IP address has been changed. This allows the Controller to automatically update the switch with its new IP address.

4.3.2. Name setting via CSV file

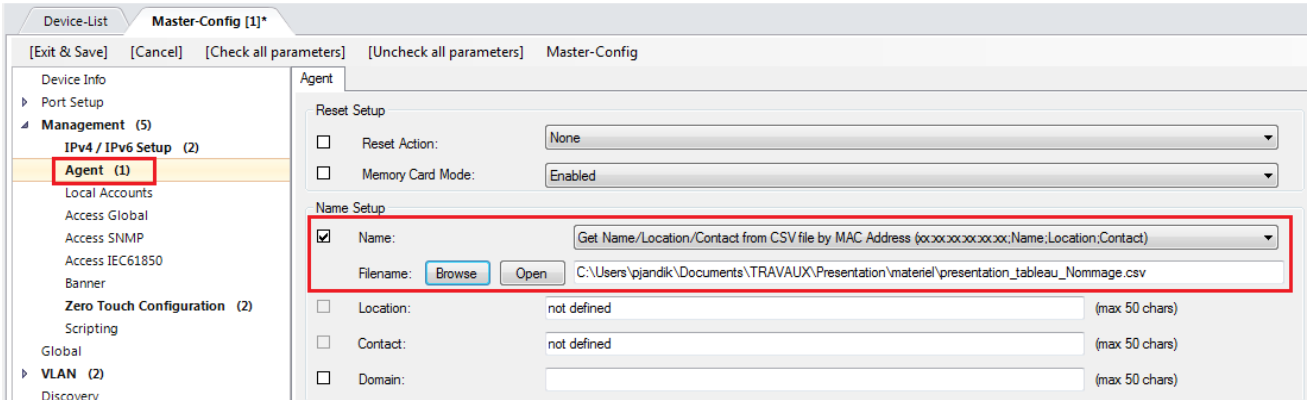
In the same way, it is possible to configure different naming information parameters via a CSV file. Different parameters are available. In this example, the CSV file is composed of 4 columns:

- MAC address
- Name
- Location
- Contact

Example :

	A	B	C	D
1	00:C0:29:29:71:FF	MS_01_01_01	Etage_1_Bureau_1	support@nexans.com
2	00:C0:29:29:6D:D8	MS_01_01_02	Etage_1_Bureau_2	support@nexans.com
3	00:C0:29:29:21:AA	MS_01_01_03	Etage_1_Bureau_3	support@nexans.com
4	00:C0:29:29:8D:A6	MS_01_01_04	Etage_1_Bureau_4	support@nexans.com
5	00:C0:29:29:81:DA	MS_01_01_05	Etage_1_Bureau_5	support@nexans.com

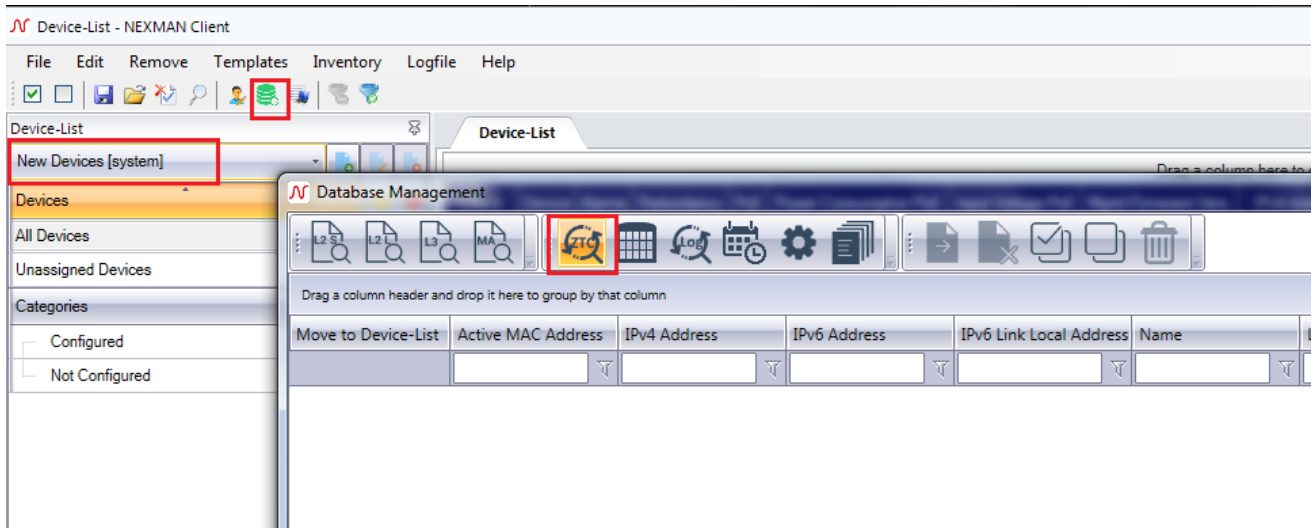
The file can then be selected directly in the master-config parameters, in the "Agent -> Name" parameter. Different file configurations are available in case for example you want to use only one naming parameter.



5. Starting the Zero-Touch Configuration

The Zero Touch Configuration is only active when the Controller is in listening mode. This means that if listening mode is not enabled, the switches can be preconfigured with the Controller's IP address, and attempt to contact the Controller, but they will not be supported by the Controller. This will allow you to choose when the switch provisioning should take place.

The listening mode must be activated with the "ZTC" button in the "Database Management" menu.



Once supported, the switches will be configured with the preconfigured settings, and added to the database, as well as to the "New Devices [system]" Device-List, which is a list dedicated to new switches added via ZTC. They can then be assigned to other device lists via the database.

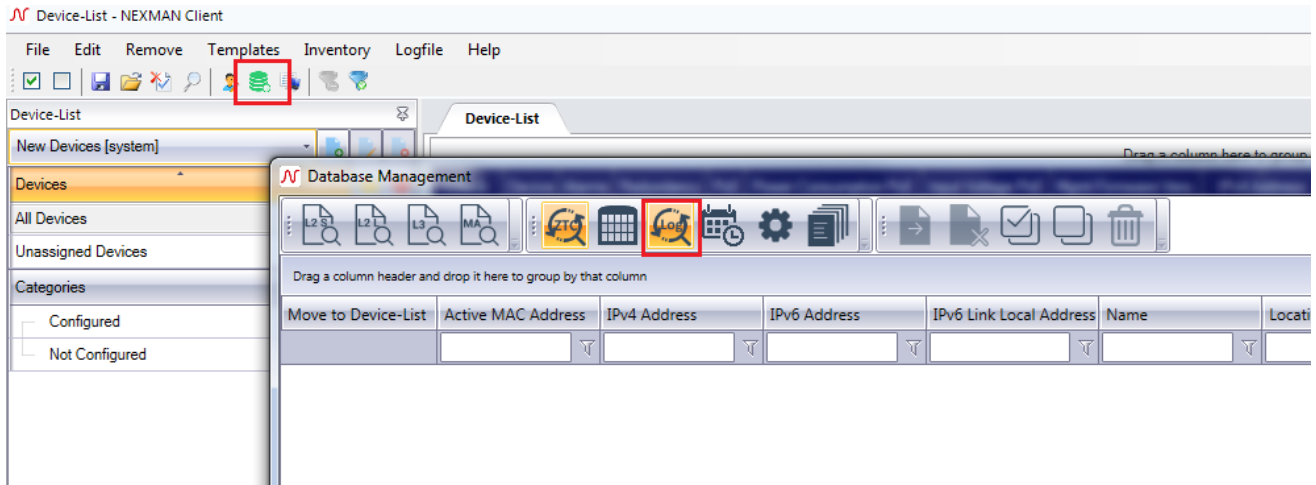
6. Logs configuration

6.1. Activating logs

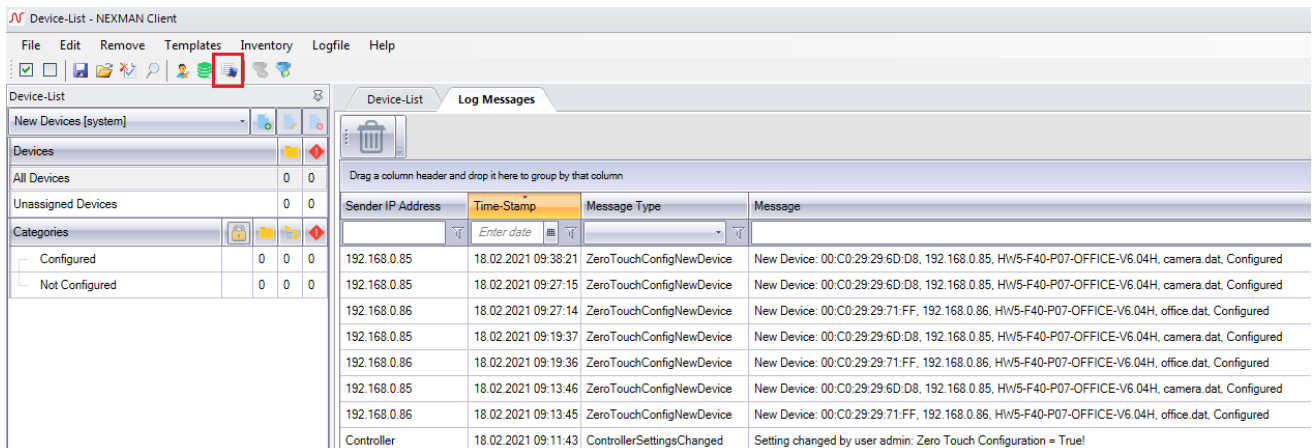
The controller can receive different types of logs and store them in the database. These different messages can be received and stored:

- SYSLOG messages
- SNMP Trap messages
- Zero Touch Configuration notifications
- Controller notifications

To enable listening for SYSLOG and SNMP Trap messages, click "Start Log-Messages Listening" in the Database Management menu. Messages sent by the Controller itself, such as Zero Touch Configuration notifications or Controller notifications, will be stored in any case.



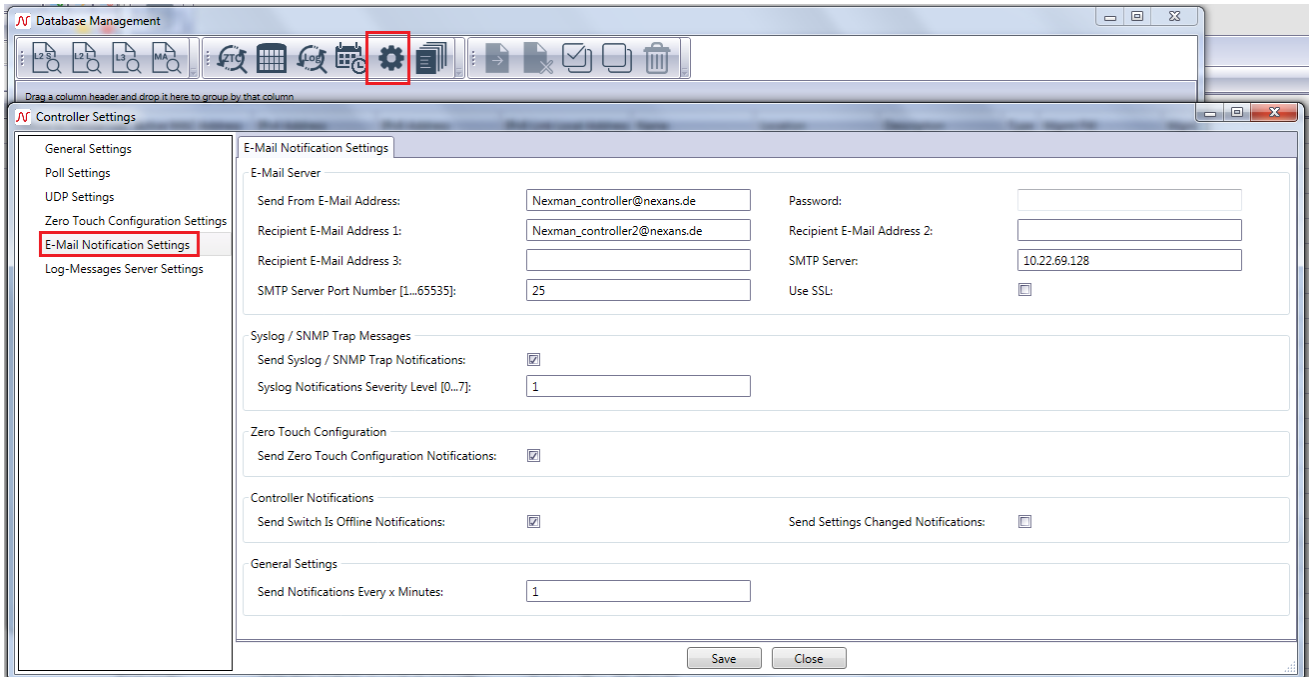
To display the log viewing tab, select the "Show/Hide log messages" button.



6.2. Setting of log emails

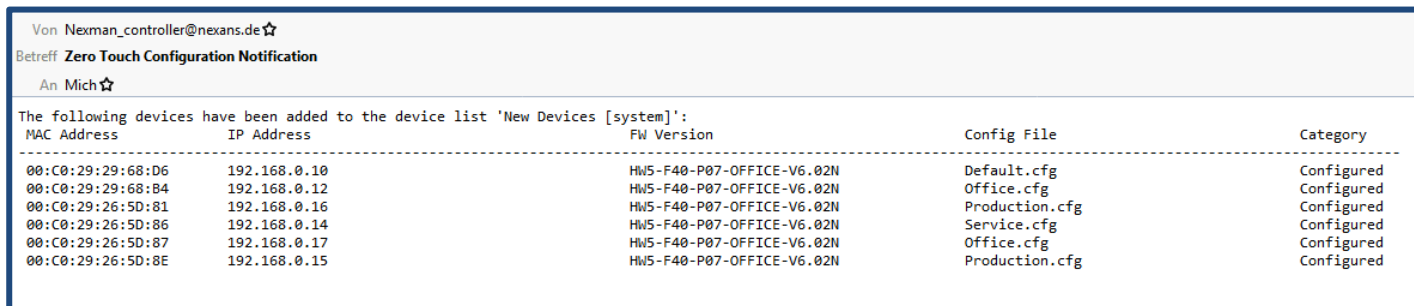
The various messages received by the Controller can be transmitted by email via an SMTP server. This includes all the message types described in the previous point.

The different types of emails that can be sent can be configured in "Controller Settings -> E-Mail Notifications Settings".



This can for example allow emailing of information about added switches via ZTC.

If enabled, the controller will, after some time, send an email containing information about which switches have been updated, configured and added to the database since the last notification. It also shows the current firmware version, the configuration file used and the category the device has been moved to. The email will look like this:

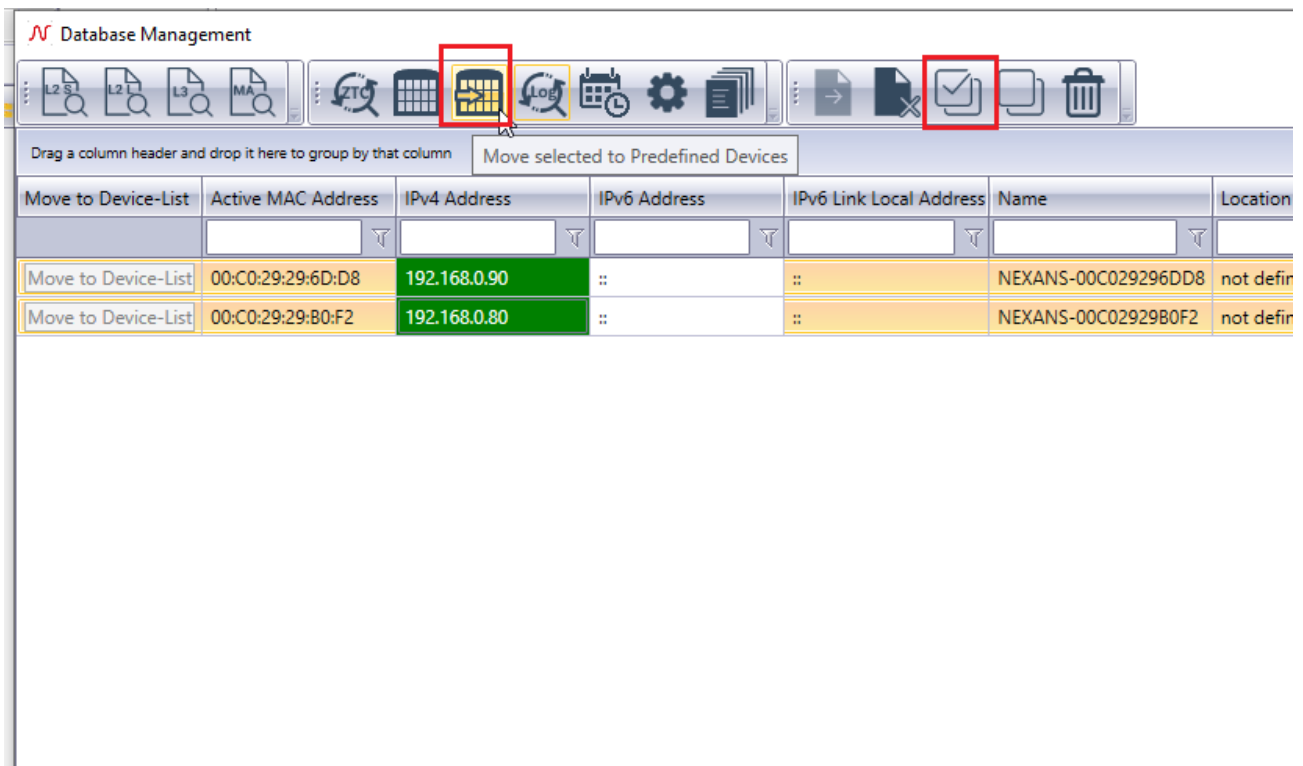


7. Configuration saving and replacement of switches

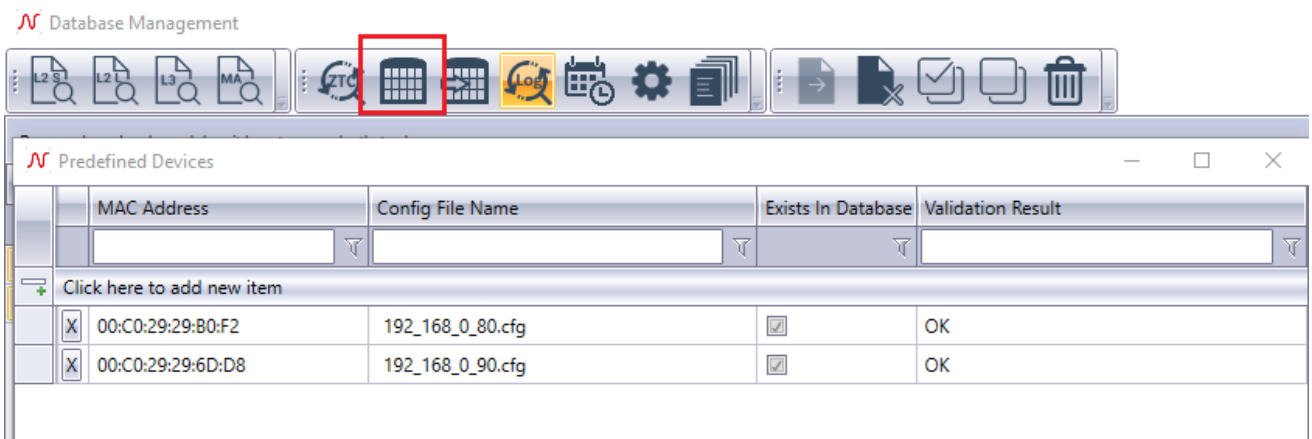
In order to quickly replace a switch via, NEXMAN offers to save switches configuration on the pre-defined list. This will allow then a quick and easy replacement of a switch.

7.1. Saving Configurations to predefined Devices

Select the switches in the NEXMAN database, and select “Move selected to Predefined Devices”. Configs will be saved on the predefined configs.

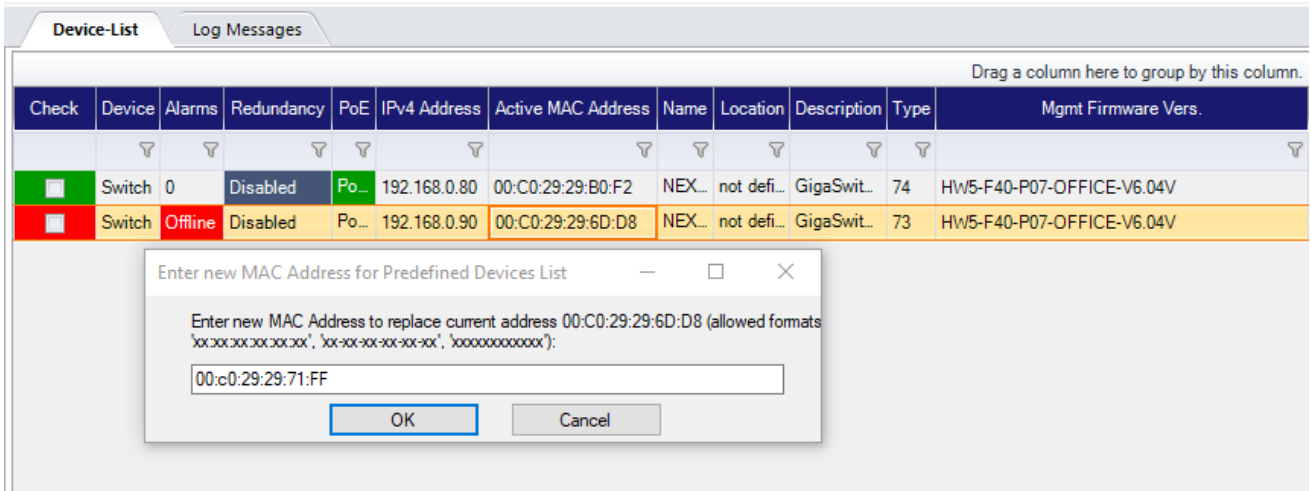


Configuration of each switch is saved and configured in the predefined configuration list.

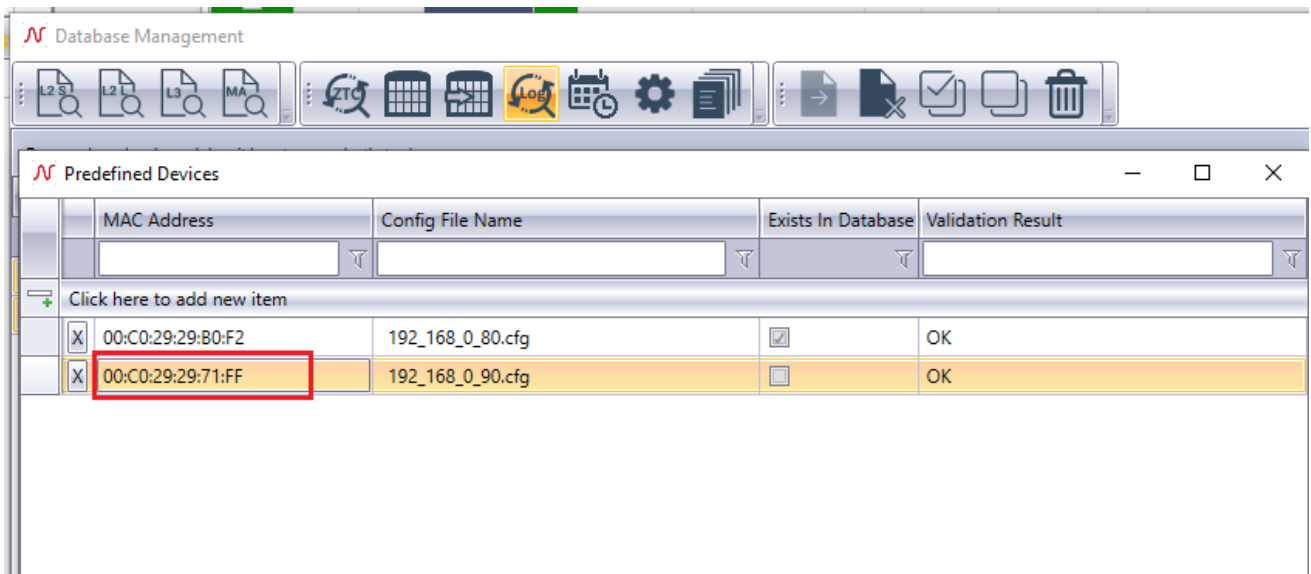


7.2. Replace a device

In case of replacement of a switch, the MAC address of the old switch can be replaced on the predefined configuration lists, directly from the device-list.



In case of replacement of a switch, the MAC address of the old switch can be replaced on the predefined configuration lists, directly from the device-list.



The MAC of the switch is now replaced on the predefined configuration list.

After running Zero Touch Configuration, the new switch will take the place of the old one.

Device-List											
Drag a column here to group by this column.											
Check	Device	Alarms	Redundancy	PoE	IPv4 Address	Active MAC Address	Name	Location	Description	Type	Mgmt Firmware Vers.
<input checked="" type="checkbox"/>	Switch 0	Disabled	Powered	192.168.0.80	00:C0:29:29:B0:F2	NEXANS-00C02929B0F2	not defined	GigaSwitch V5 SFP-2VI 54VDC	74	HW5-F40-P07-OFFICE-V6.04V	
<input checked="" type="checkbox"/>	Switch 0	Disabled	Powered	192.168.0.90	00:C0:29:29:71:FF	NEXANS-00C029296DD8	not defined	GigaSwitch V5 TP SFP-VI 54VDC	73	HW5-F40-P07-OFFICE-V6.04V	

Action of the Controller can be followed on the log.

Device-List				Log Messages			
Drag a column header and drop it here to group by that column							
Time-Stamp	Sender IP Address	Message Type	Message				
<i>Enter date</i>							
08.07.2021 11:41:46	192.168.0.81	ZeroTouchConfigNewDevice	New Device: 00:C0:29:29:71:FF, 192.168.0.81, HW5-F40-P07-OFFICE-V6.04V, 192_168_0_90.cfg, Configured				
08.07.2021 11:36:26	192.168.0.81	ZeroTouchConfigStartingFirmwareUpdate	Starting Firmware Update of Device 00:C0:29:29:71:FF, 192.168.0.81 to HW5-F40-P07-OFFICE-v6.04V...				

8. Troubleshooting

8.1. Configuration option 43

Configuration of option 43 of the DHCP depends of the type of DHCP used, and can varied a lot. Therefore we advise you to check on your DHCP configuration how to

Example of configuration for Windows DHCP:

IP address of the controller :

192.168.7.121

Parameter of the option 43 :

01184e4558414e535f6369705f3139322e3136382e372e313231

Example of Configuration for DHCP Server:

OPTION_43=0119"NEXANS_cip_192.168.201.92"

or

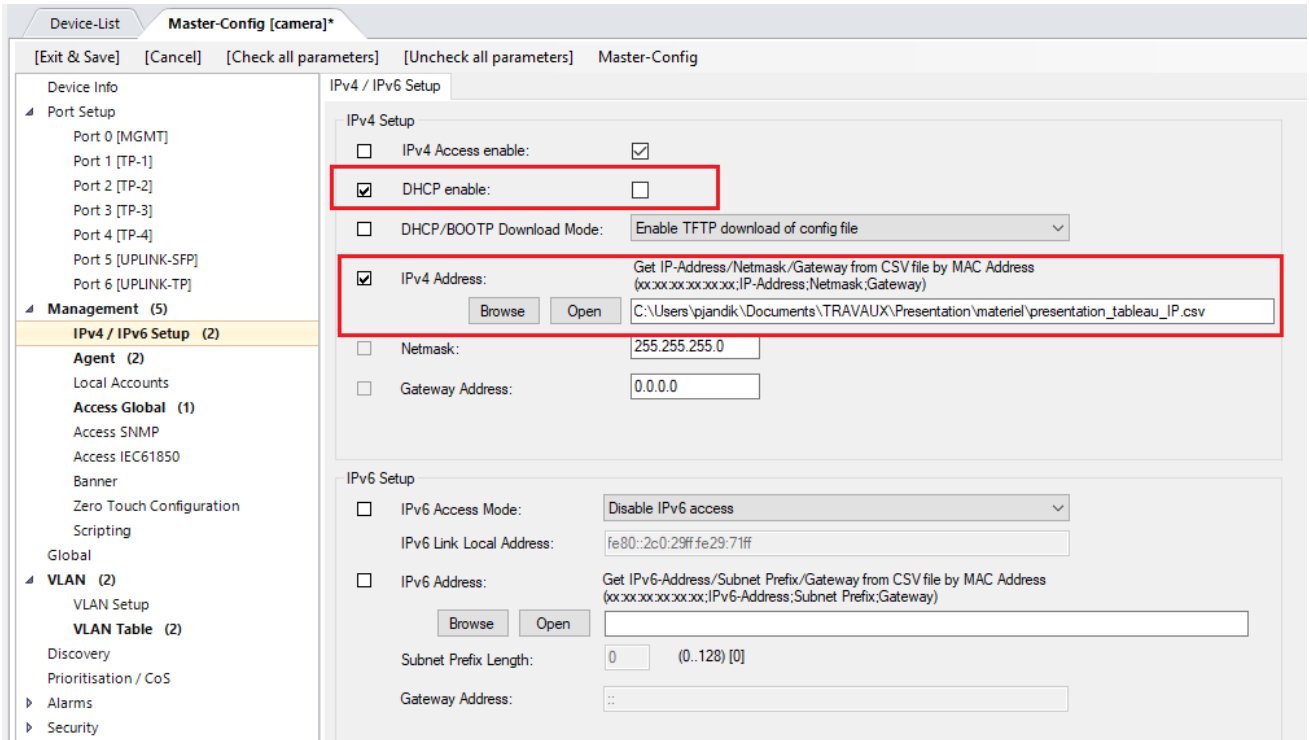
OPTION_43=01194e4558414e535f6369705f3139322e3136382e3230312e3932

8.2. IP parameters Master Config configuration

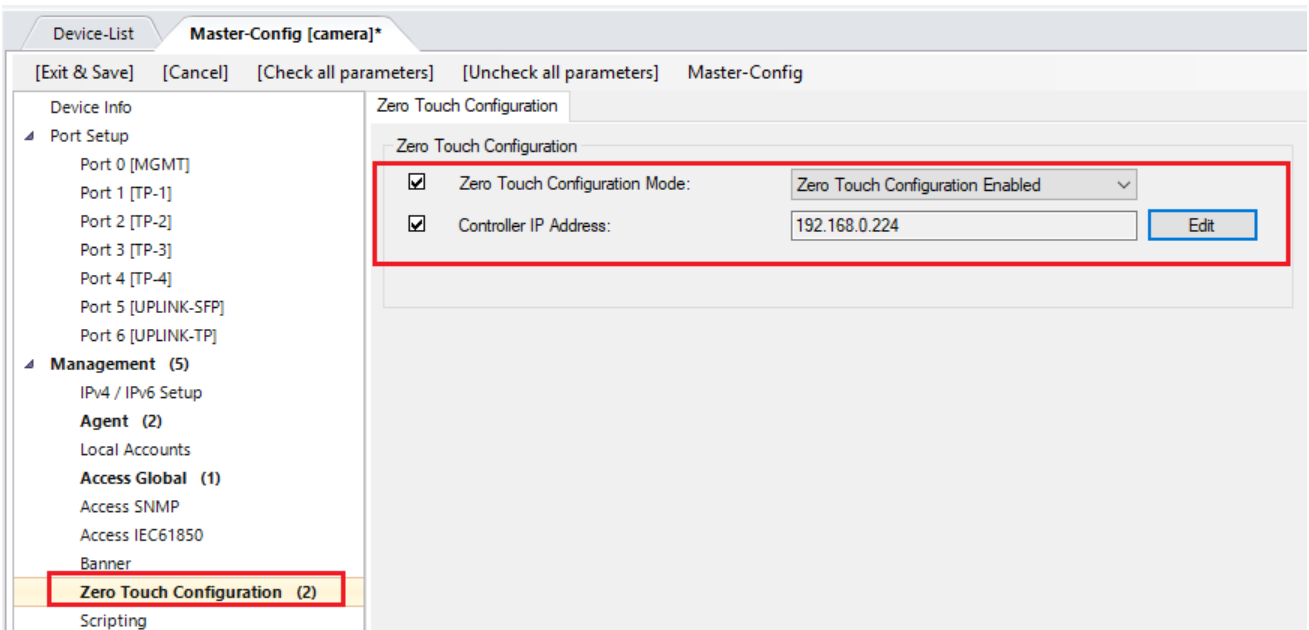
Different issues can be caused by a wrong master-config creation.

8.2.1. Static IP configuration

In case of static parameters configured from a CSV list, DHCP should be disabled too.



As controller IP address is transmitted to the switch via DHCP, when DHCP is disabled, they are automatically removed. Zero Touch Configuration should be configured in static, in order for the switch to contact the controller with it's new IP address.



8.2.2. DHCP IP configuration

In case DHCP parameters should be kept by switches, DHCP enable parameter only should be selected.

