



## USER MANUAL – RAN DASHBOARD

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## REFERENCES

Reference	Document / link	Description
[1]		
[2]		
[3]		

## GLOSSARY

Abbreviation	Description
RAN	Radio Access Network
IOT	Internet Of Things
OSS	Operation System Support
BSC	Base Station Controller
RNC	Radio Network Controller
LNS	LoRa Network Server
TKM	Trusted Key Management

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## INTRODUCTION

This user manual is intended for final users and administrators of the RAN Dashboard.

It explains how to connect to the platform and use the interfaces to:

- Read statistics and alarms.
- Communicate with equipment and endpoints.
- Administrate the application data.

This version of the manual is written and usable for the version 2.2 of the RAN Dashboard.

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## 1. Authentication

### 1.1 Log in to access the platform

You can access the dashboard through web browsers. It can be accessed with both HTTP and HTTPS protocols. If you are not logged in, you will see the login screen:



Figure 1 - Login screen

- (1) Fill your username and password.
- (2) Click on the “Login” button. If your credentials are correct, you will be logged into the application. Otherwise, you will get an error message.
- (3) In case you forgot your password, click on the “Forgot password” link to retrieve it.

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## 1.2 Session expired

The time of your session is set and defined by the server. Two minutes before it expires, you will be informed by the following message:



Figure 2 - Session expired message

So, you have to finish and save your current work otherwise you will lose it.

You can logout and reconnect yourself before the end of the current session to reinitiate the expired date. If not, you will be automatically redirected to the login page at the end of the session.

## 1.3 Forgot password



Figure 3 - Forgot password screen

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- (1) To retrieve your password, enter the email set in your account and click “Continue”. You will get an email with a link, allowing you to reset your password.

### 1.4 Reset password



Figure 4 - Reset password screen

- (1) Type your password twice and click “Change password” to reset your password. Once done, you will be logged in the dashboard and your password will be changed.

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## 2. Main menu

 BSC ^
Fleets
Stations
Alarms
 RNC ^
Spectrum
Radio configuration
Modems statistics
 LNS ^
Clusters
Stations
Endpoints
Alarms
 Workflows ^
Templates
Running
Completed

### 2.1 BSC

- Fleet: Consult and analyze the statistics on your fleets.
- Stations: Search and manage your stations.
- Alarms: Consult the last alarms on your fleets.

### 2.2 RNC

- Spectrum: Analyze the radio frequency activity of your modems.
- Radio configuration: Consult the radiopath and channel frequencies of your modems.
- Modem statistics: Consult and analyze the statistics of your modems.

### 2.3 LNS

- Clusters: List your clusters.
- Stations: Consult the stations.
- Endpoints: Search and manage your endpoints.
- Alarms: Consult the last alarms on your clusters.

### 2.4 Workflows

- Templates: List workflow templates and create new one
- Running: List workflows currently in progress
- Completed: List completed workflows

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Administration ^
Customers
Fleets
Stations
Clusters
Endpoints
Users

## 2.5 Administration

- Customers: Manage customers and attach/detach fleets and clusters
- Fleets: Create, update and delete fleets
- Stations: Create and import stations
- Clusters: Create, update and delete clusters
- Endpoints: Create and import endpoints
- Users: Manage users

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### 3. BSC

#### 3.1 Consult and analyze the statistics on your fleets

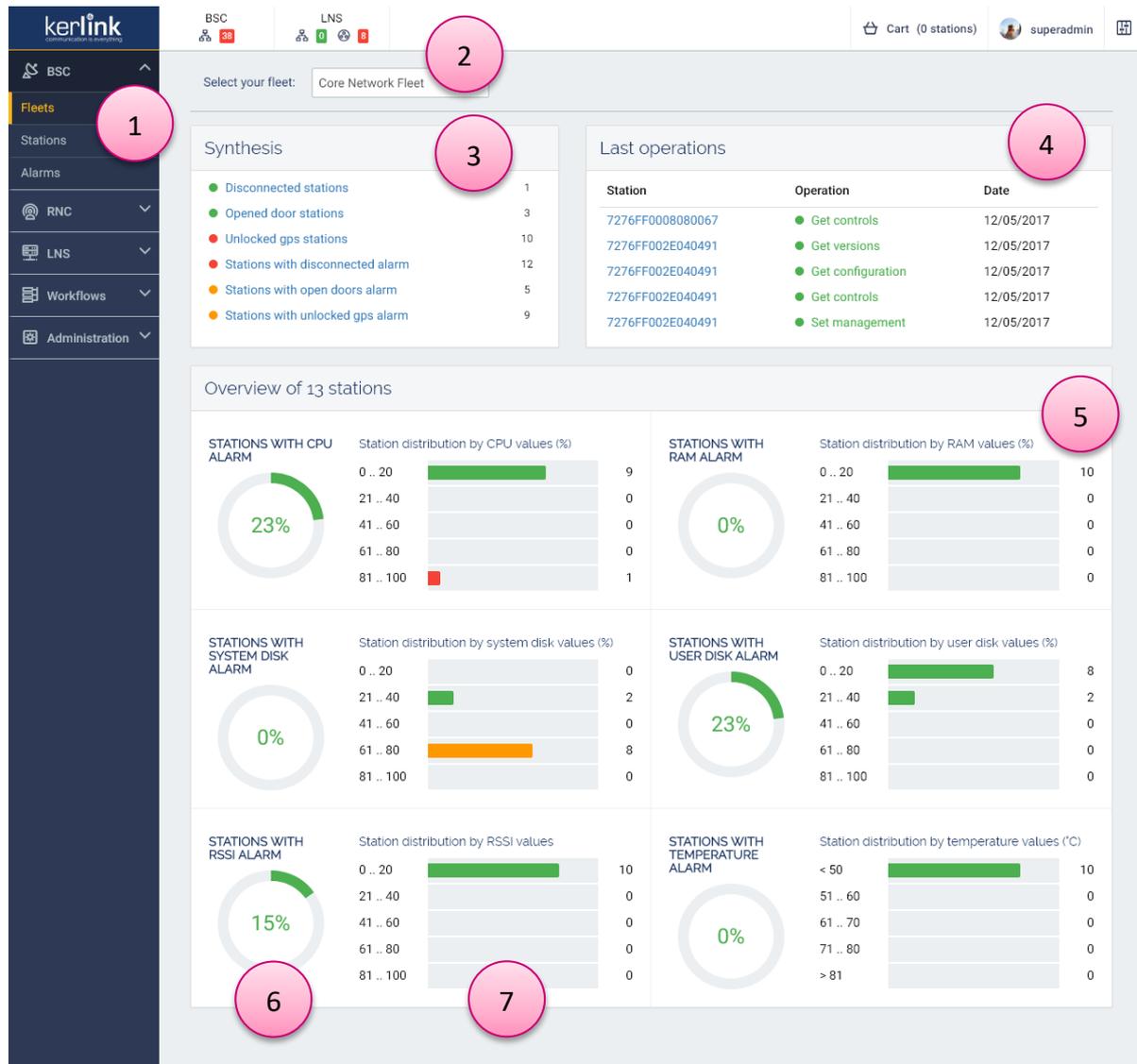


Figure 5 - Fleets overview

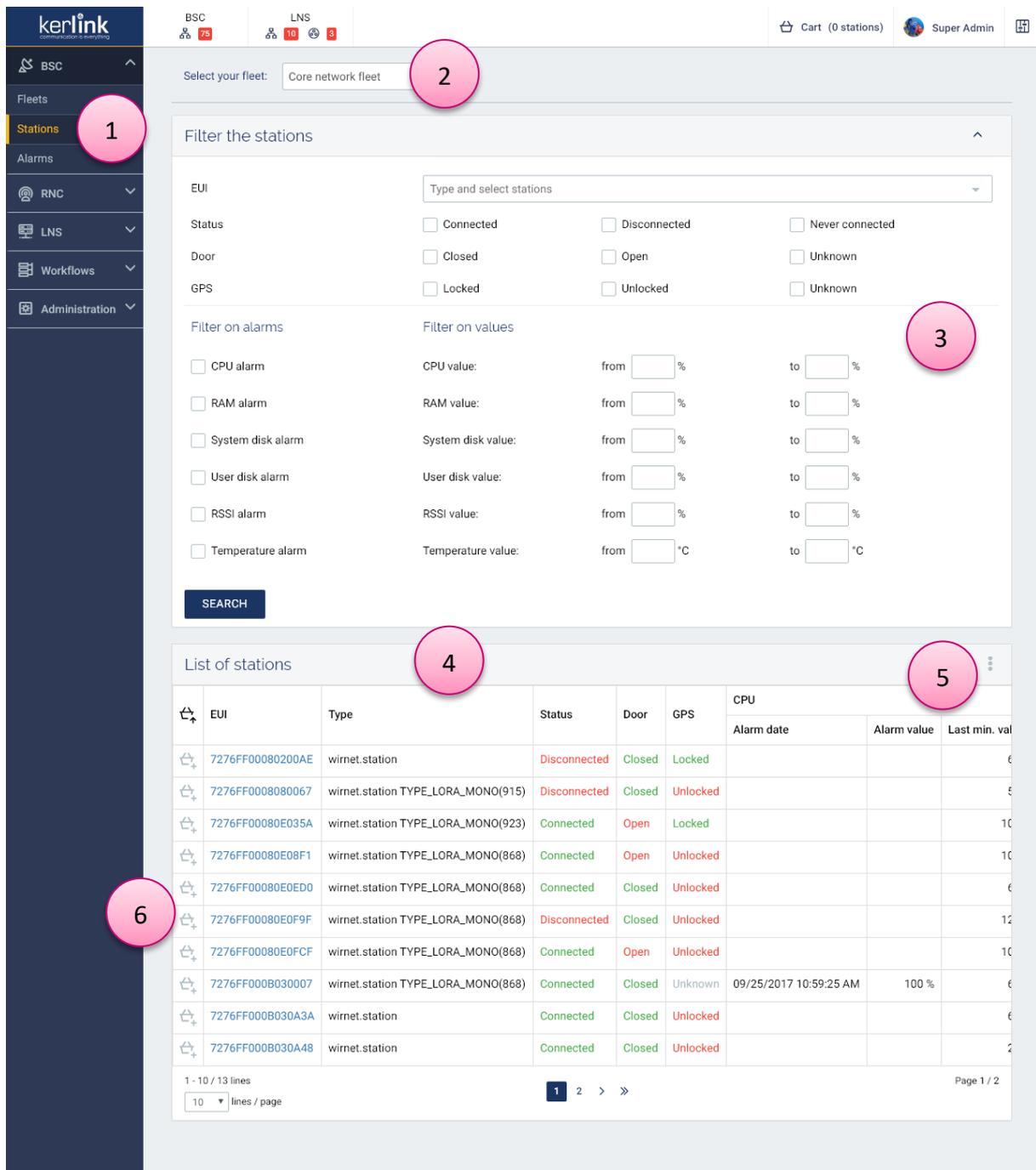
- (1) Click on the “Fleet” button in the main menu to access to an overview of your fleets.
- (2) Select one of your fleets.
- (3) The “Synthesis” panel shows an overview of the stations with alarms on their connection, door or GPS. If you click on it, you will be redirected to the stations page with a preconfigured search form to get the list of stations with this kind of alarm.

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- (4) The “Last operations” panel shows the last operations of the stations in the selected fleet.
- (5) The “Overview” panel shows an overview of alarms and values from stations in the selected fleet.
- (6) Each “donut chart” represents the percentage of stations with an alarm. If you click on it, you will be redirected to the stations page with a preconfigured search form to get the list of stations with this kind of alarm.
- (7) Each “bar chart” represents the distribution of the stations according to their values. If you click on one bar, you will be redirected to the stations page with a preconfigured search form to get the list of stations in this range of values.

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### 3.2 Search and list the stations of your fleets



The screenshot shows the BSC Stations list interface. The left sidebar contains navigation options: BSC, Fleets, Stations (1), Alarms, RNC, LNS, Workflows, and Administration. The main content area has a 'Select your fleet' dropdown set to 'Core network fleet' (2). Below this is a 'Filter the stations' section with checkboxes for EUI, Status (Connected, Disconnected, Never connected), Door (Closed, Open, Unknown), and GPS (Locked, Unlocked, Unknown). There are also filters for alarms (CPU, RAM, System disk, User disk, RSSI, Temperature) and values (CPU, RAM, System disk, User disk, RSSI, Temperature) with range selectors (3). A 'SEARCH' button is located below the filters. The 'List of stations' (4) table (5) displays the following data:

EUI	Type	Status	Door	GPS	CPU		
					Alarm date	Alarm value	Last min. val
7276FF0080200AE	wirnet.station	Disconnected	Closed	Locked			
7276FF008080067	wirnet.station TYPE_LORA_MONO(915)	Disconnected	Closed	Unlocked			
7276FF0080E035A	wirnet.station TYPE_LORA_MONO(923)	Connected	Open	Locked			10
7276FF0080E08F1	wirnet.station TYPE_LORA_MONO(868)	Connected	Open	Unlocked			10
7276FF0080E0ED0	wirnet.station TYPE_LORA_MONO(868)	Connected	Closed	Unlocked			6
7276FF0080E0F9F	wirnet.station TYPE_LORA_MONO(868)	Disconnected	Closed	Unlocked			12
7276FF0080E0FCF	wirnet.station TYPE_LORA_MONO(868)	Connected	Open	Unlocked			10
7276FF008030007	wirnet.station TYPE_LORA_MONO(868)	Connected	Closed	Unknown	09/25/2017 10:59:25 AM	100 %	6
7276FF008030A3A	wirnet.station	Connected	Closed	Unlocked			6
7276FF008030A48	wirnet.station	Connected	Closed	Unlocked			2

At the bottom of the table, there is a pagination control showing '1 - 10 / 13 lines', a dropdown for '10 lines / page', and page navigation buttons (1, 2, >>). The page number 'Page 1 / 2' is also visible.

Figure 6 – BSC Stations list

(1) Click on the BSC "Stations" button to access to the list of stations.

(2) Select a fleet.

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- (3) The filter panel allows you to filter the stations according to several criteria.
- (4) The list panel shows the result of the search. If no filter is set, it shows a list of all stations in the selected fleet.
- (5) You can choose which data of the stations you want to display, and which values of the selected data you want to display. To do that, open the table menu and select “Show / hide columns”. A modal will list all available columns and allows you to select which one you want to show or hide.
- (6) For each station in the list, you can:
  - Add the station to the cart (or remove it).
  - Go to the details page of the station.

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### 3.3 Manage your stations cart

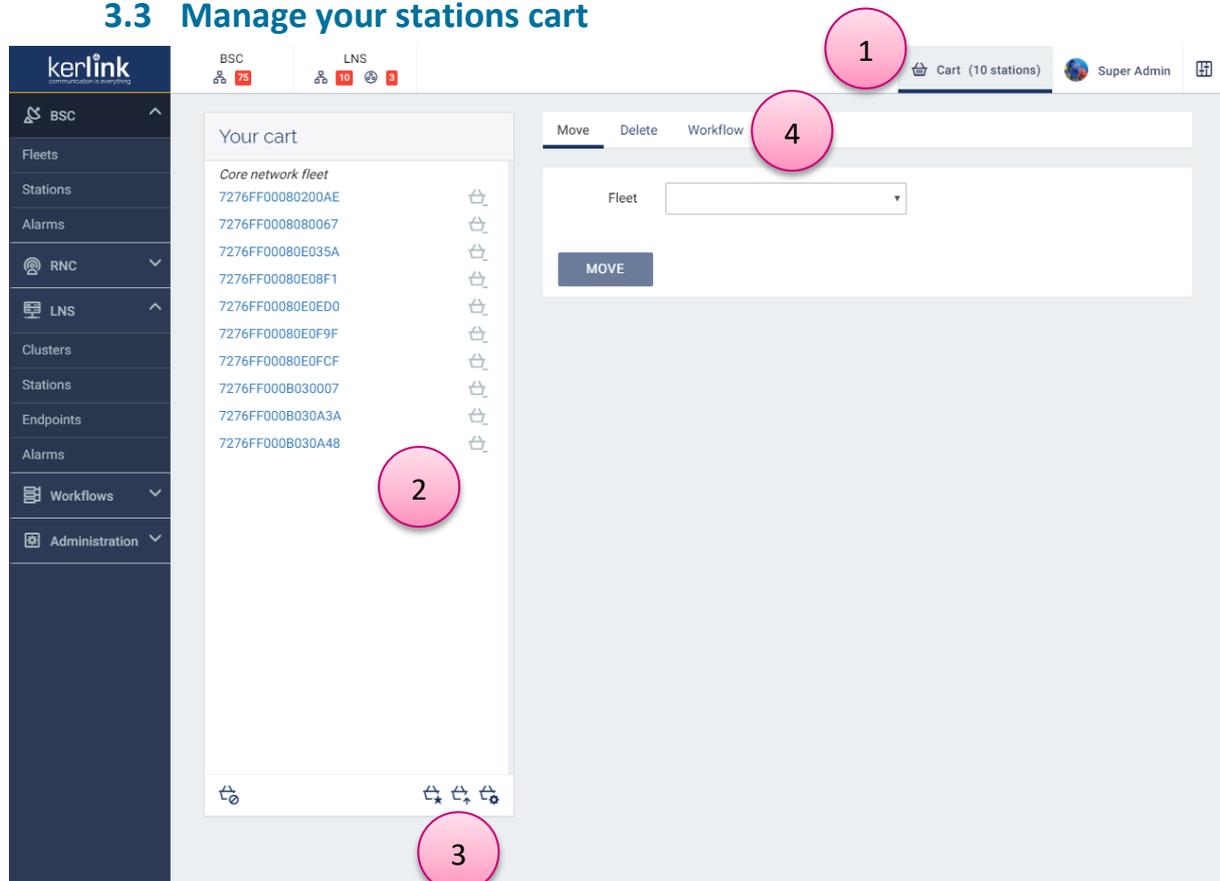


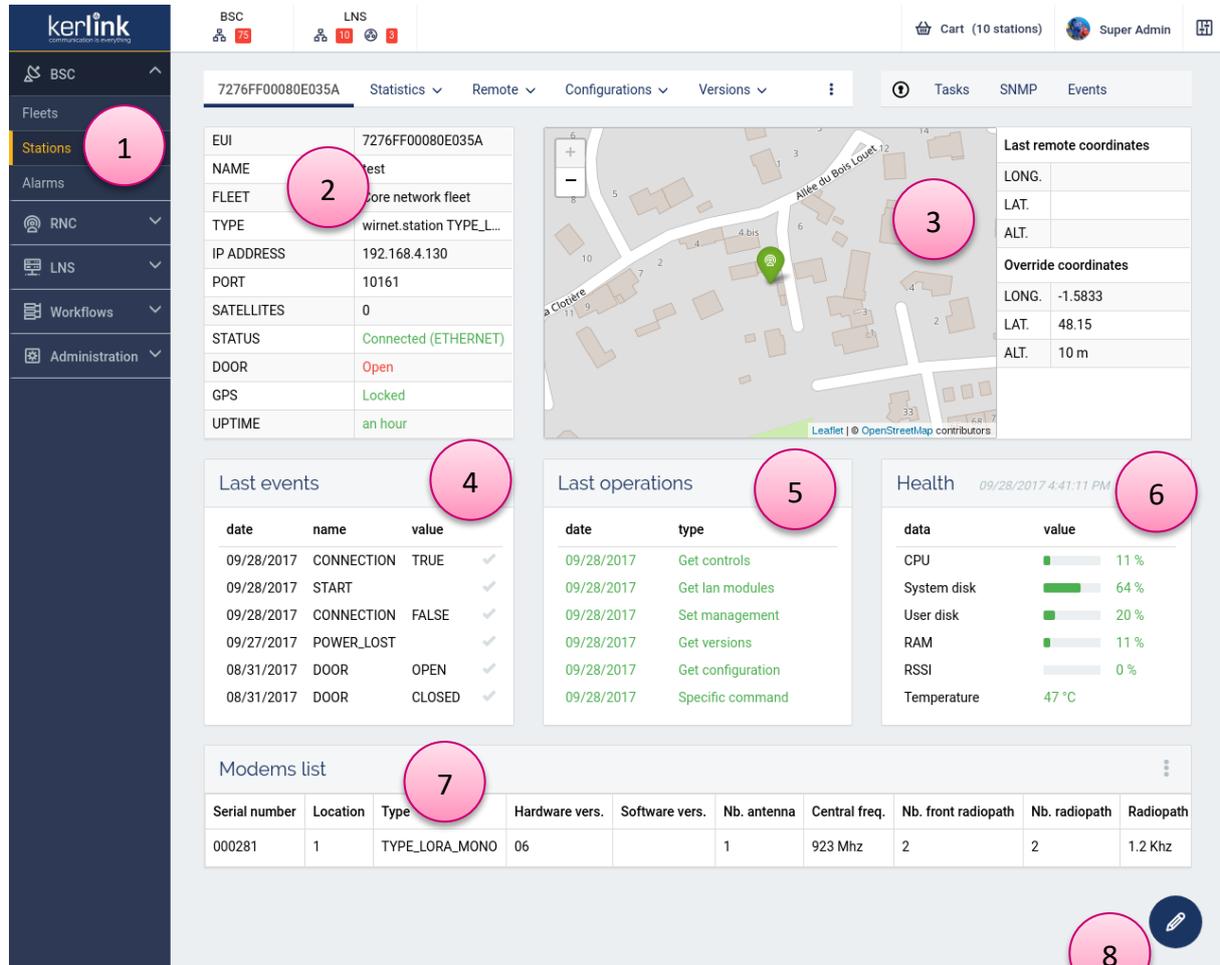
Figure 7 - Stations cart

- (1) Click on the cart button.
- (2) The panel “Your cart” shows the list of stations currently added in your cart. You can remove some stations or empty your cart by clicking on the respective buttons.
- (3) These buttons allow you to respectively save the current cart, load stations of many previous saved carts and manage previous saved carts. These functionalities are described in the paragraph 6 - Cart management.
- (4) The tabs correspond to all the actions you can perform on the stations in your cart.

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### 3.4 Consult and manage the properties of a station

#### 3.4.1 Station attributes



The screenshot displays the 'Station attributes' page for EUI 7276FF00080E035A. The interface is divided into several sections:

- Attributes Table (2):**

EUI	7276FF00080E035A
NAME	test
FLEET	core network fleet
TYPE	wimnet.station TYPE_L...
IP ADDRESS	192.168.4.130
PORT	10161
SATELLITES	0
STATUS	Connected (ETHERNET)
DOOR	Open
GPS	Locked
UPTIME	an hour
- Map (3):** Shows the station location on a map with a green pin.
- Last events (4):**

date	name	value	
09/28/2017	CONNECTION	TRUE	✓
09/28/2017	START		✓
09/28/2017	CONNECTION	FALSE	✓
09/27/2017	POWER_LOST		✓
08/31/2017	DOOR	OPEN	✓
08/31/2017	DOOR	CLOSED	✓
- Last operations (5):**

date	type
09/28/2017	Get controls
09/28/2017	Get lan modules
09/28/2017	Set management
09/28/2017	Get versions
09/28/2017	Get configuration
09/28/2017	Specific command
- Health (6):**

data	value
CPU	11 %
System disk	64 %
User disk	20 %
RAM	11 %
RSSI	0 %
Temperature	47 °C
- Modems list (7):**

Serial number	Location	Type	Hardware vers.	Software vers.	Nb. antenna	Central freq.	Nb. front radiopath	Nb. radiopath	Radiopath
000281	1	TYPE_LORA_MONO	06		1	923 Mhz	2	2	1.2 Khz

Figure 8 – BSC station attributes

- (1) Click on the BSC "Stations" button to access to the list of stations then click on the EUI of the station you want to consult.
- (2) This panel shows the attributes of the station.
- (3) The map shows the position of the station. The first coordinates are retrieved from the station.
- (4) The panel "Last events" lists the last events triggered by the station. You can mark an event as read by clicking on the check button next to the event.
- (5) The panel "Last operations" lists the last operations executed on the station.

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- (6) The panel “Health” lists the current state values of the station.
- (7) The panel “Modems list” lists the modems of the station.
- (8) You can edit or move the station by clicking on the floating button.

### 3.4.2 Station statistics

#### 3.4.2.1 Link status

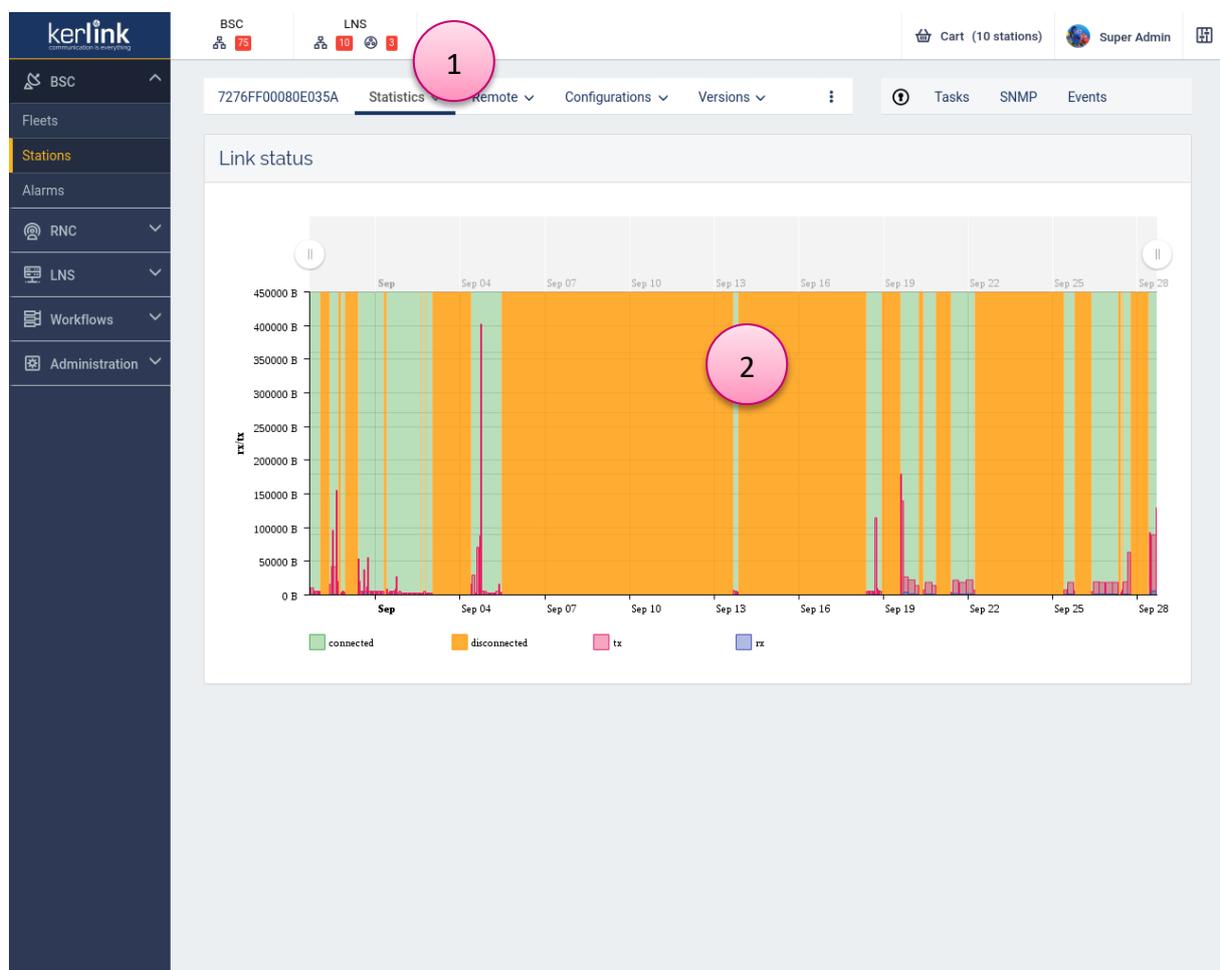


Figure 9 - Station link status

- (1) Access to a station page then click on the “Statistics” menu and select “Link status”.
- (2) The chart displays:
  - The periods when the station was connected and disconnected.
  - The number of bytes received (rx) and sent (tx) to the station.

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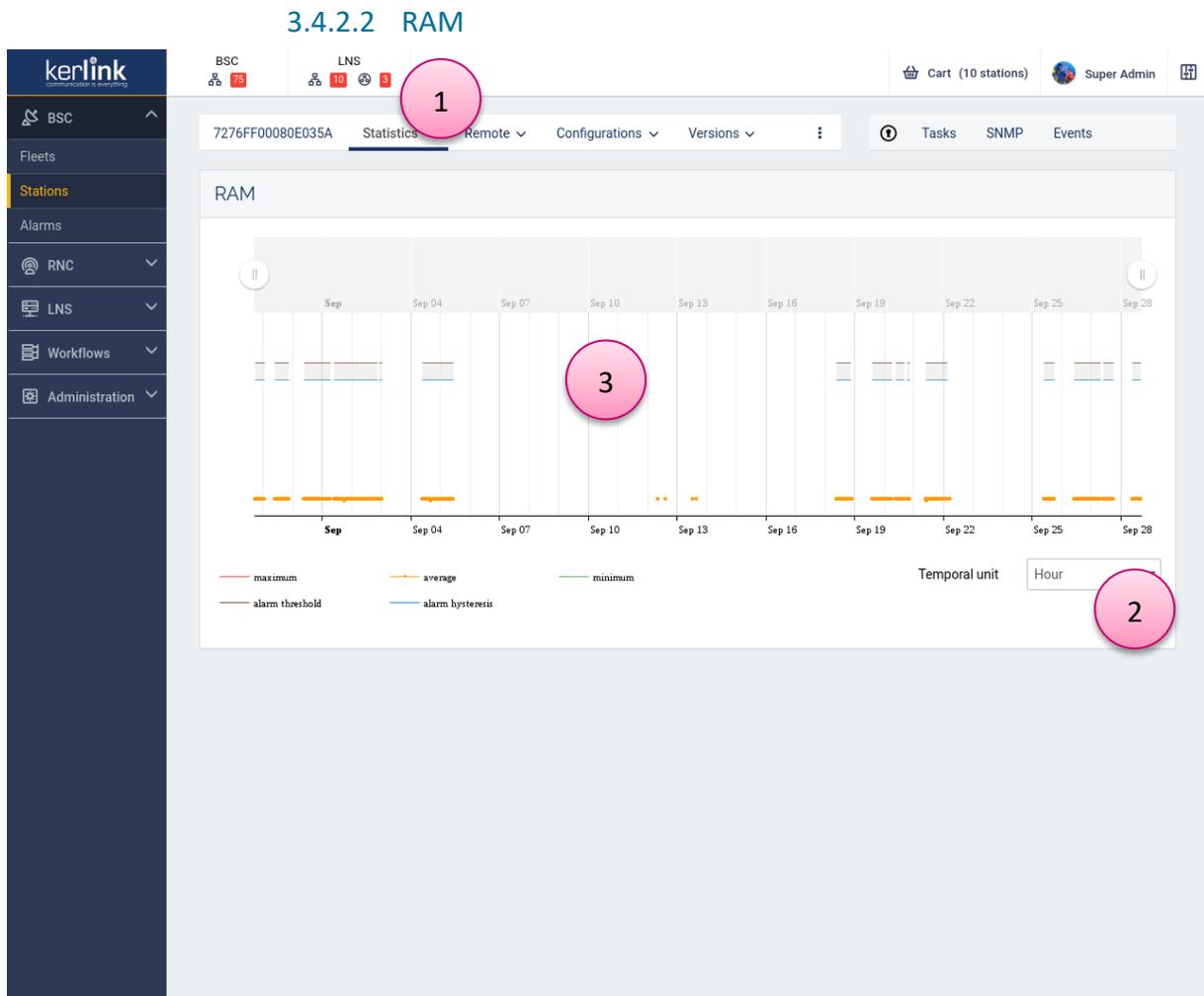


Figure 10 - Station RAM statistics

- (1) Access to a station page then click on the “Statistics” menu and select “RAM”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays:
  - The RAM percent utilization (minimum, average and maximum) by temporal unit.
  - The alarms threshold.
  - The alarms hysteresis.
  - The triggered alarms with their values.

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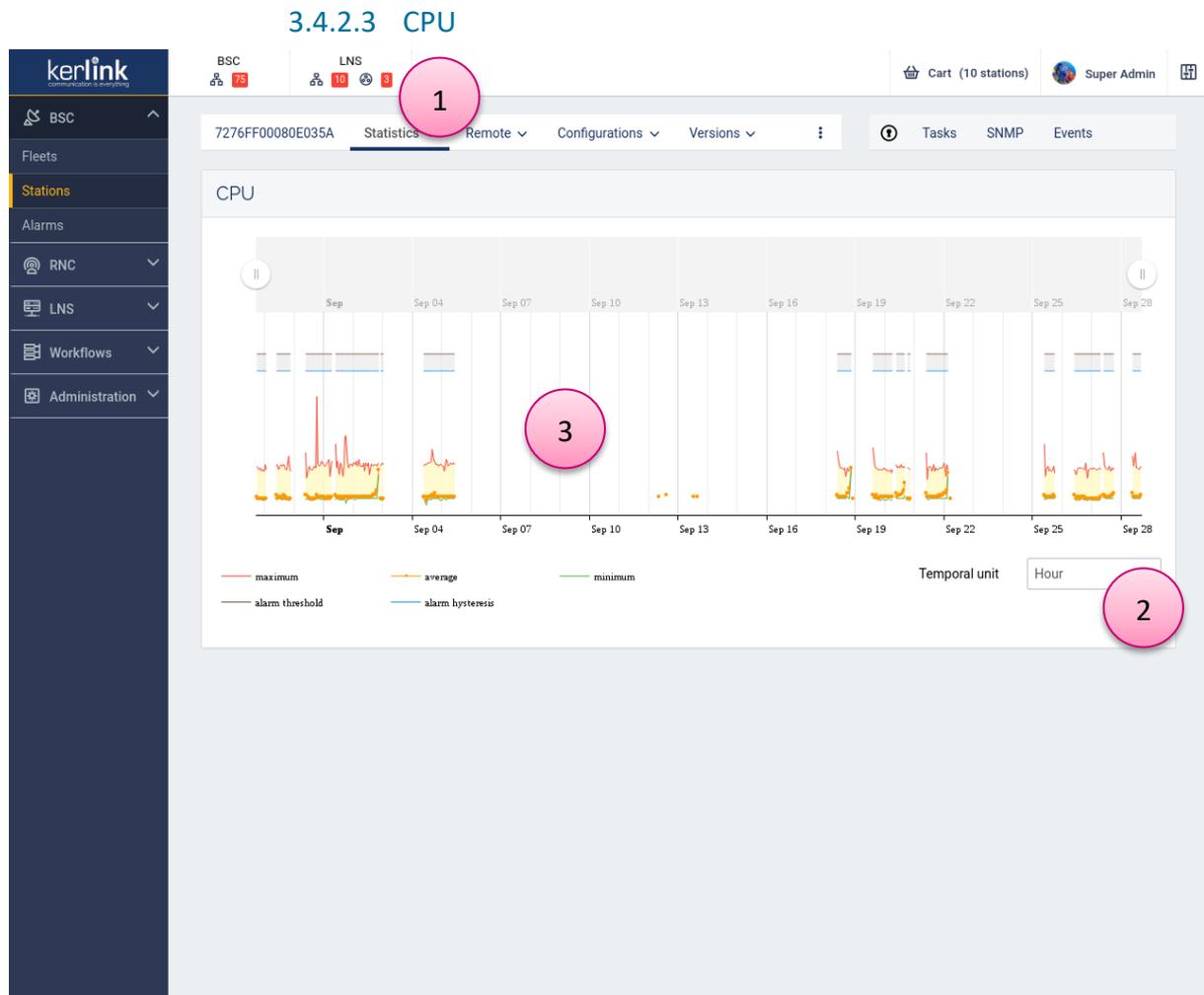


Figure 11 - Station CPU statistics

- (1) Access to a station page then click on the “Statistics” menu and select “CPU”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays:
  - The CPU percent utilization (minimum, average and maximum) by temporal unit.
  - The alarms threshold.
  - The alarms hysteresis.
  - The triggered alarms with their values.

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### 3.4.2.4 System and user disks

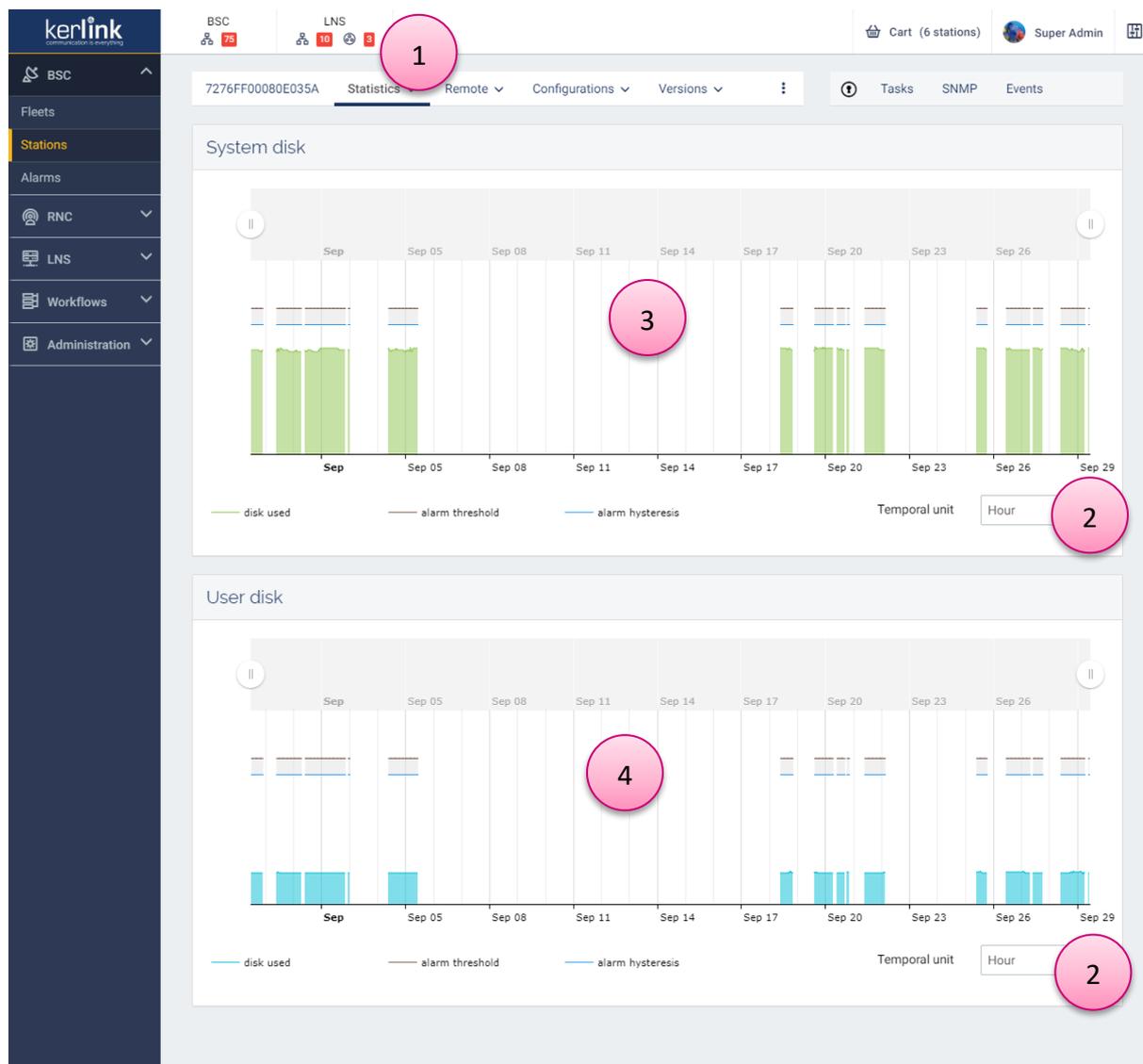


Figure 12 - Station disks statistics

- (1) Access to a station page then click on the “Statistics” menu and select “Disks”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays for system disk (3) and user disk (4):
  - A snapshot (for hour temporal unit) or an average (for other temporal units) of the system disk percent utilization.
  - The alarms threshold.

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- The alarms hysteresis.
- The triggered alarms with their values.

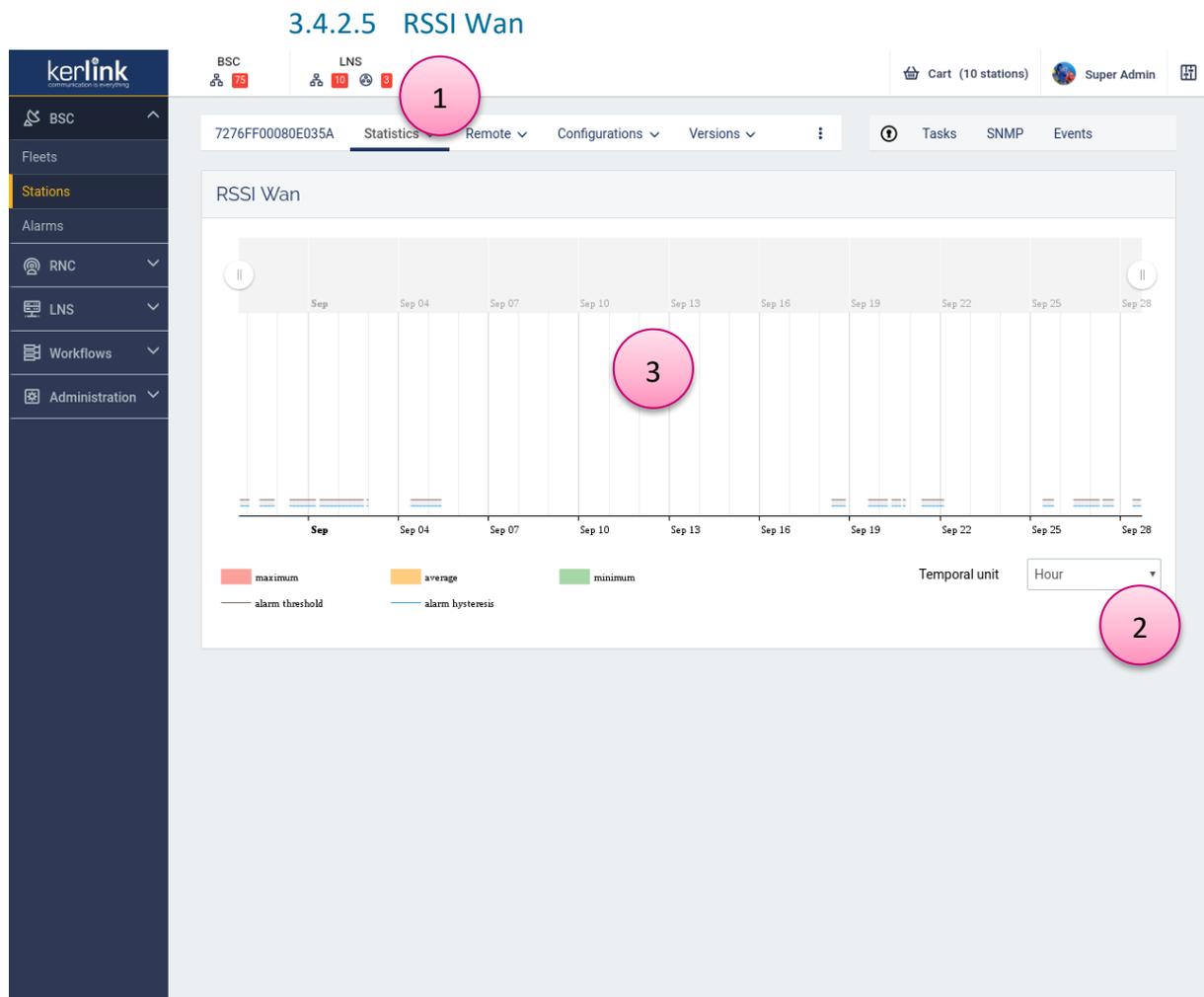


Figure 13 – Station RSSI statistics

- (1) Access to a station page then click on the “Statistics” menu and select “RSSI Wan”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays:
  - The RSSI (minimum, average, maximum) by temporal unit.
  - The alarms threshold.
  - The alarms hysteresis.

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- The triggered alarms with their values.

### 3.4.2.6 Temperature

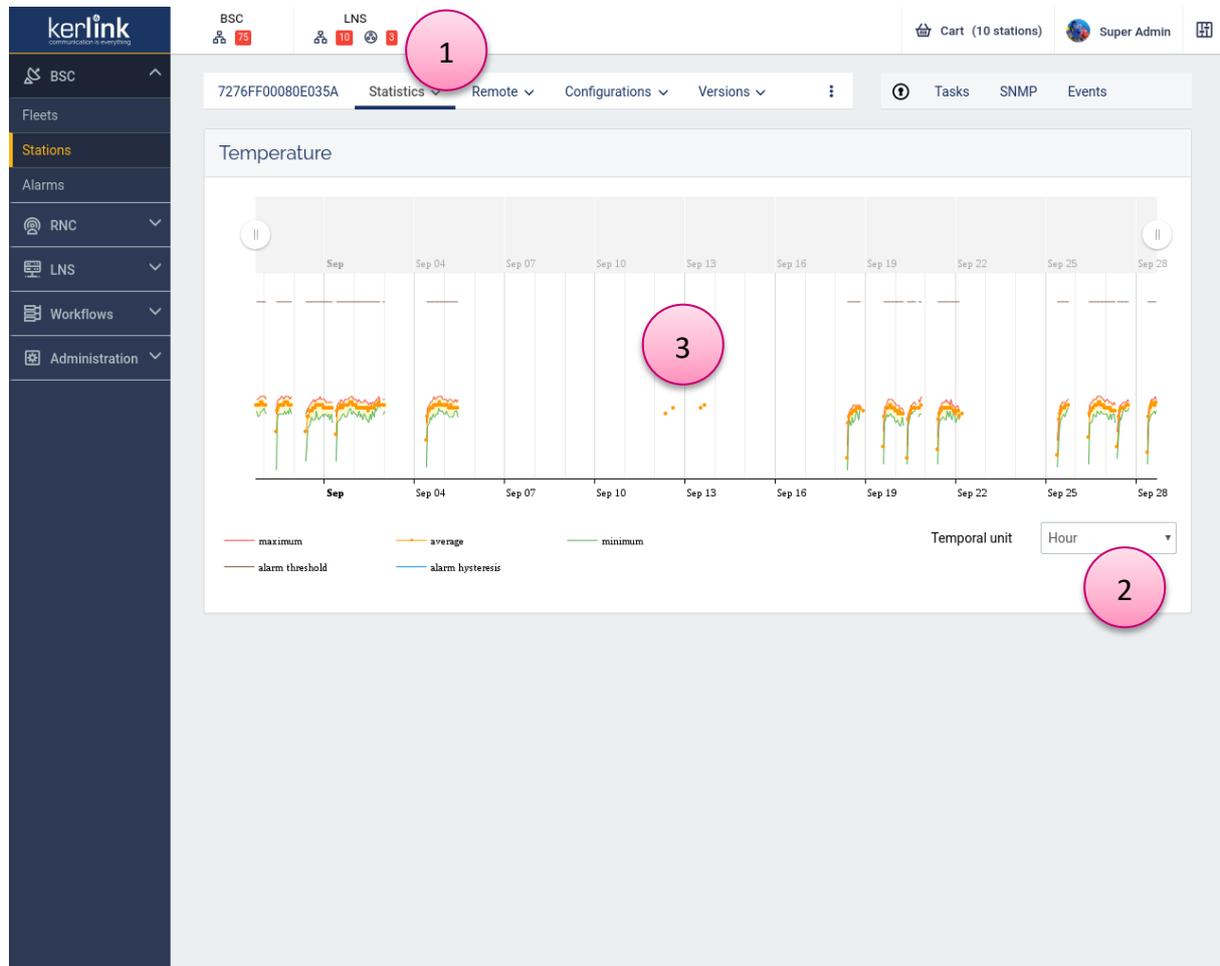


Figure 14 - Station temperature statistics

- (1) Access to a station page then click on the “Statistics” menu and select “Temperature”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays:
  - The temperature (minimum, average, maximum) by temporal unit.
  - The alarms threshold.
  - The alarms hysteresis.
  - The triggered alarms with their values.

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### 3.4.2.7 Power supply voltage and source

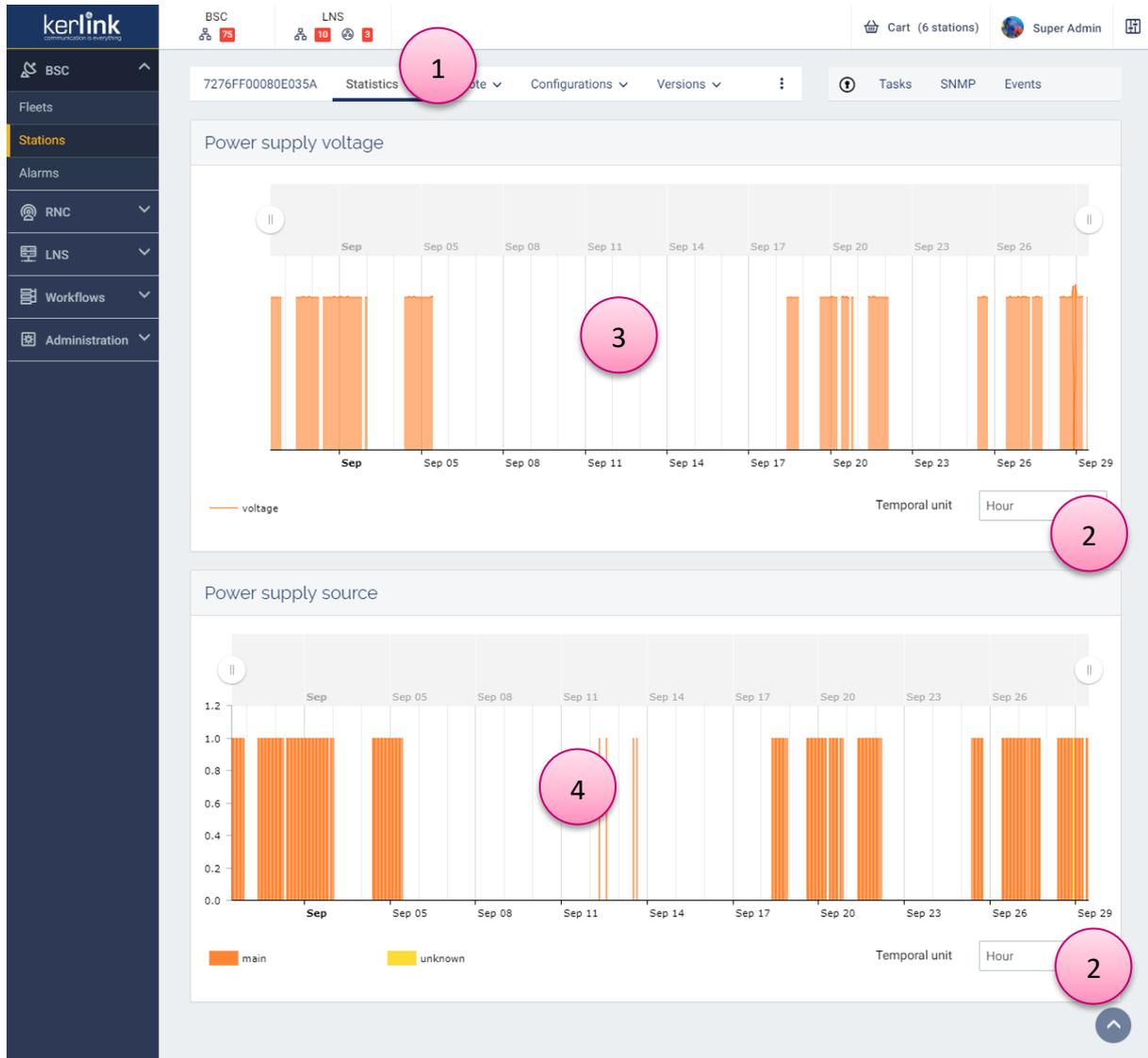


Figure 15 – Station power supply statistics

- (1) Access to a station page then click on the “Statistics” menu and select “Power supply”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays the station power supply in millivolts.
- (4) The chart displays the station power source.

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### 3.4.2.8 Uplink

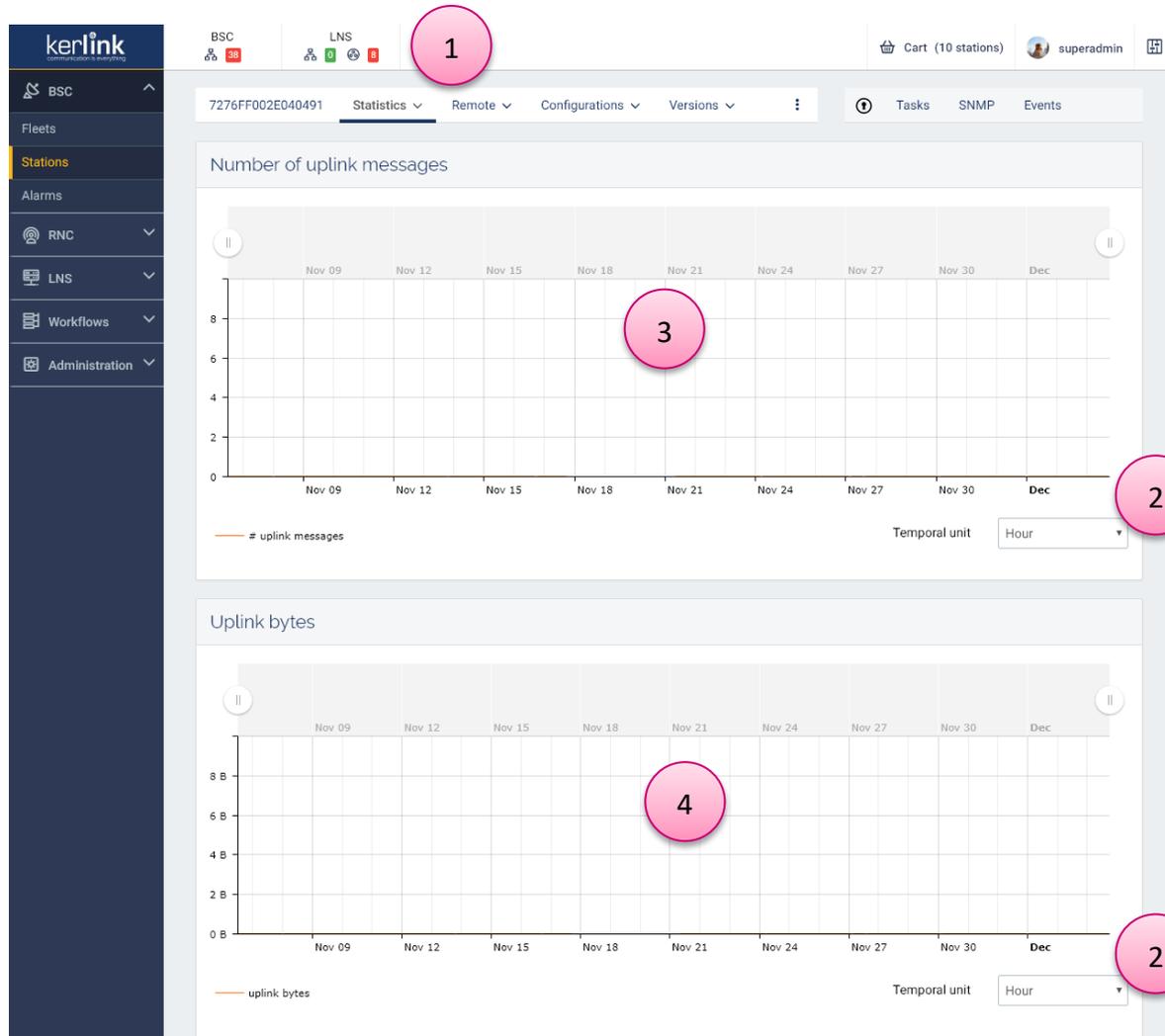


Figure 16 - Station uplink statistics

- (1) Access to a station page then click on the “Statistics” menu and select “Uplink”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays the number of uplink messages.
- (4) The chart displays the size of uplink messages in bytes.

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### 3.4.2.9 Downlink

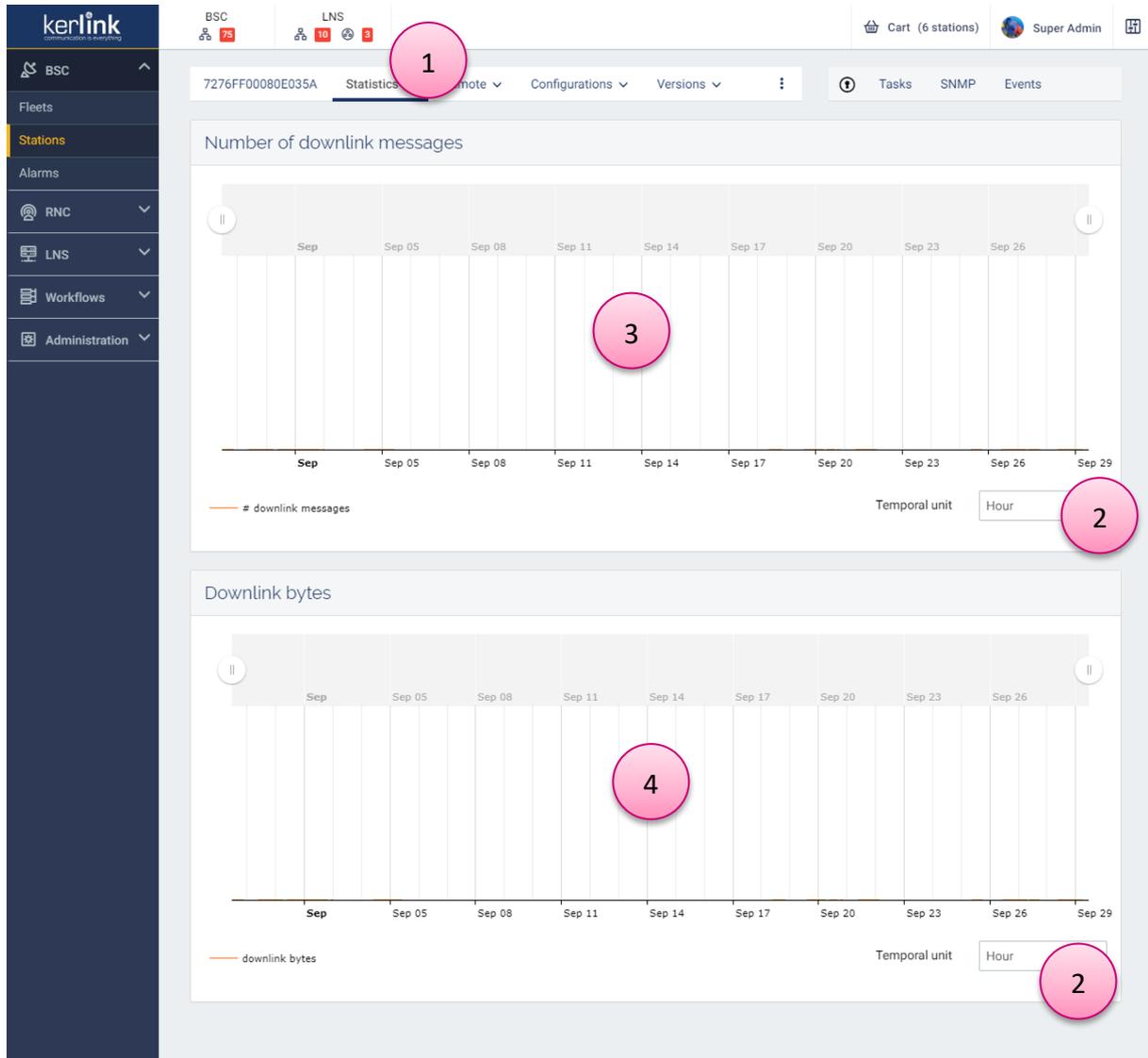


Figure 17 - Station downlink statistics

- (1) Access to a station page then click on the “Statistics” menu and select “Downlink”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays the number of downlink messages.
- (4) The chart displays the size of downlink messages in bytes.

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### 3.4.2.10 Packet forwarder

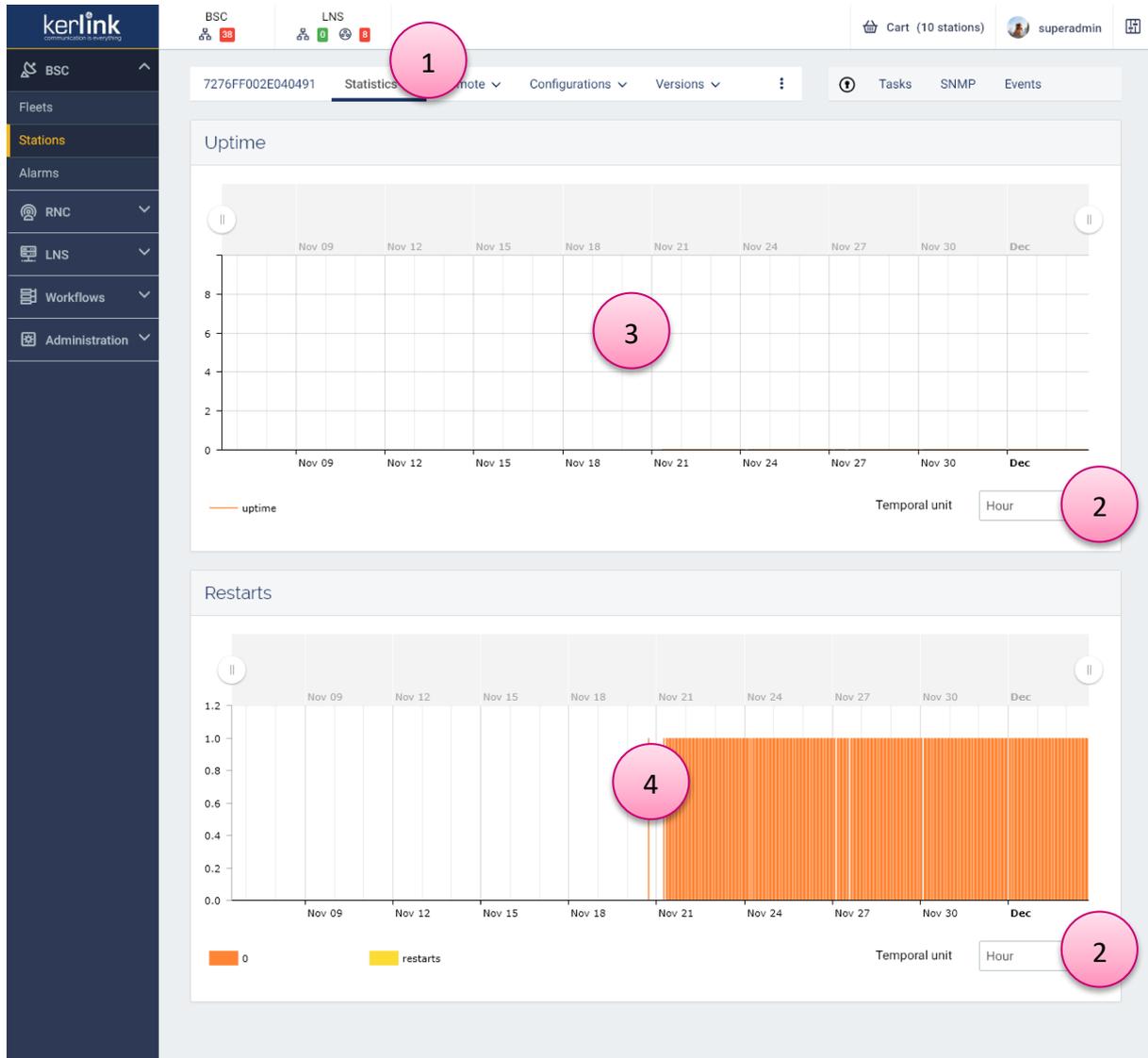


Figure 18 - Station downlink statistics

- (1) Access to a station page then click on the “Statistics” menu and select “Packet forwarder”.
- (2) Set the temporal unit (Hour, Day, Week, Month, Year) you want to use.
- (3) The chart displays the uptime of the packet forwarder.
- (4) The chart displays the number of restarts of the packet forwarder.

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### 3.4.3 Station remote

#### 3.4.3.1 File explorer

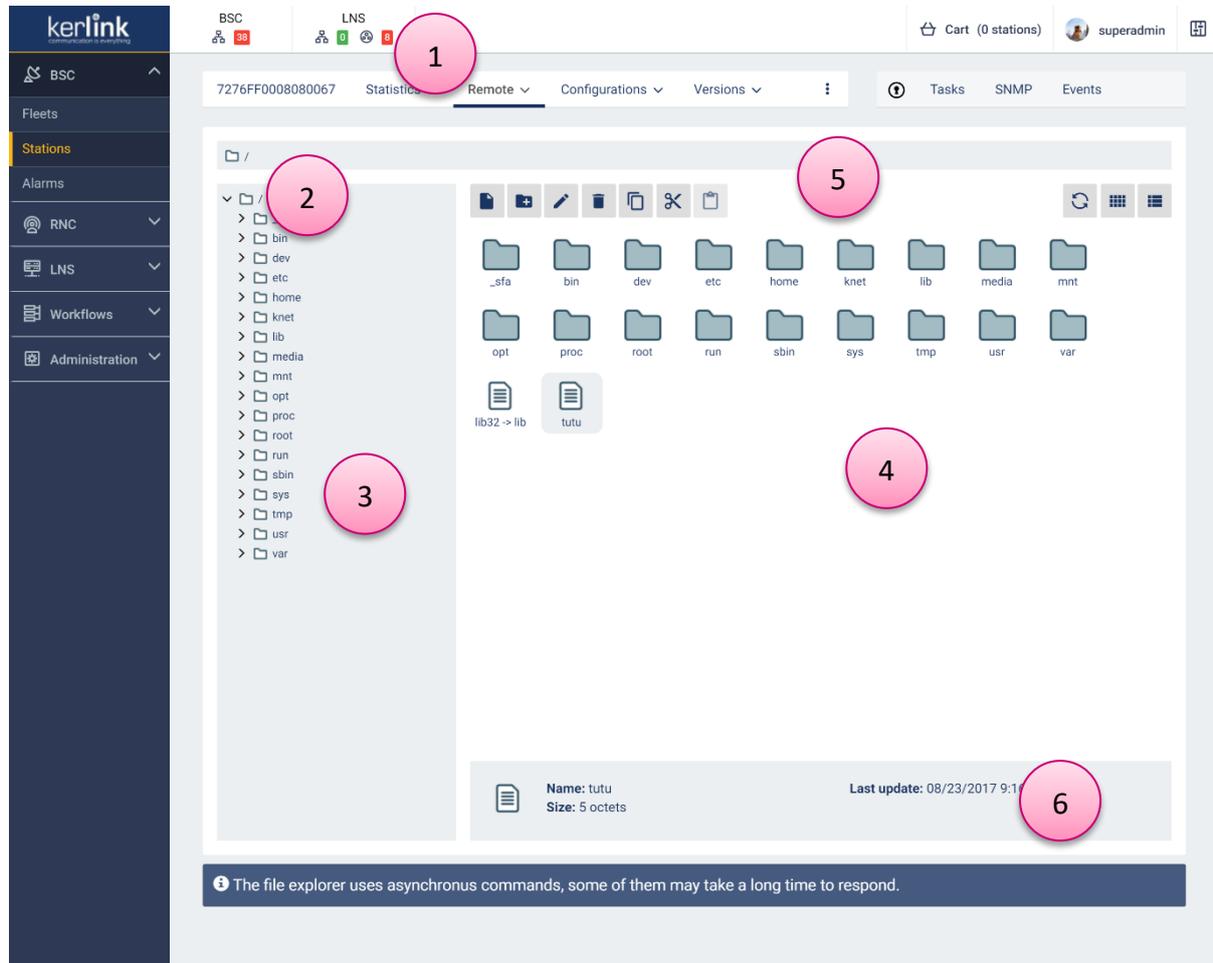


Figure 19 : Station file explorer

- (1) Access to a station page then click on the “Remote” menu and select “File explorer”.
- (2) This panel displays the path of the selected directory. You can click on any directory in order to explore it.
- (3) This panel displays the tree view of directories. You can right click on a directory to execute several actions.
- (4) This panel displays the content (directories and files) of the selected directory. You can right click on elements to execute several actions.
- (5) The toolbar allows you to do several actions like upload a new file, create a new folder, copy/cut/paste elements or change the display of the content panel (4).

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Note: the copy/cut/paste functions are only available for elements from the station itself. You cannot copy/cut an element from your computer to the station.

(6) This panel displays the details of the selected directory or file.

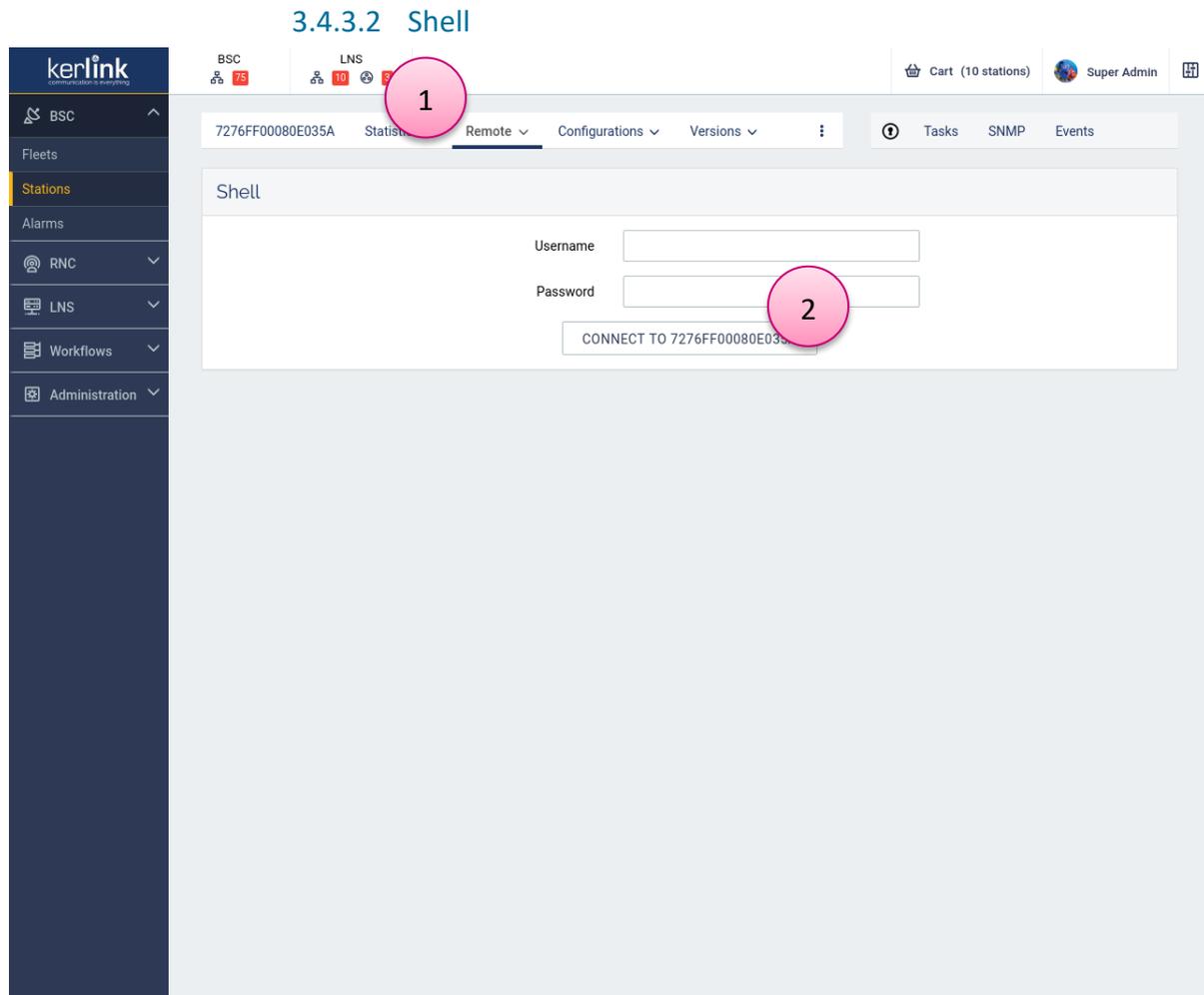


Figure 20 : Station remote shell login

- (1) Access to a station page then click on the “Remote” menu and select “Shell”.
- (2) Fill the SSH username and password then click on the “Connect” button. If your credentials are correct, you will be logged to the station and access to the following console. Otherwise, you will get an error message.

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```

Connecting to 080E08F1...
Connected to 080E08F1
[root@Wirnet_080e08f1 ~]# ls /etc
HOSTNAME          issue                profile.d
crontabs          klk-version          protocols
dropbear          klk_update           rc.d
firstinit         lighttpd             resolv.conf
fstab             logrotate.conf      services
fw_env.config     logrotate.d          shadow
group             mke2fs.conf         shadow-
hostname          mtab                 ssl
hosts            network              sysconfig
ifplugd.action   nsswitch.conf       syslog.conf
inetd.conf       ntp.conf             udev
init.d           os-release           udhcpd.sh
inittab          passwd               udhcpd.conf
inputrc          passwd-              udhcpd.usbnet.conf
iptables_bcc.rules  ppp                  vsftpd
iptables_snmpd.rules  profile              vsftpd.conf
[root@Wirnet_080e08f1 ~]#

```

Figure 21 - Station remote shell console

The console works like a SSH client so you can execute instructions like “vi” or other context needed commands. Moreover, this functionality only works if the station is in the same network than the application server.

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### 3.4.3.3 Command

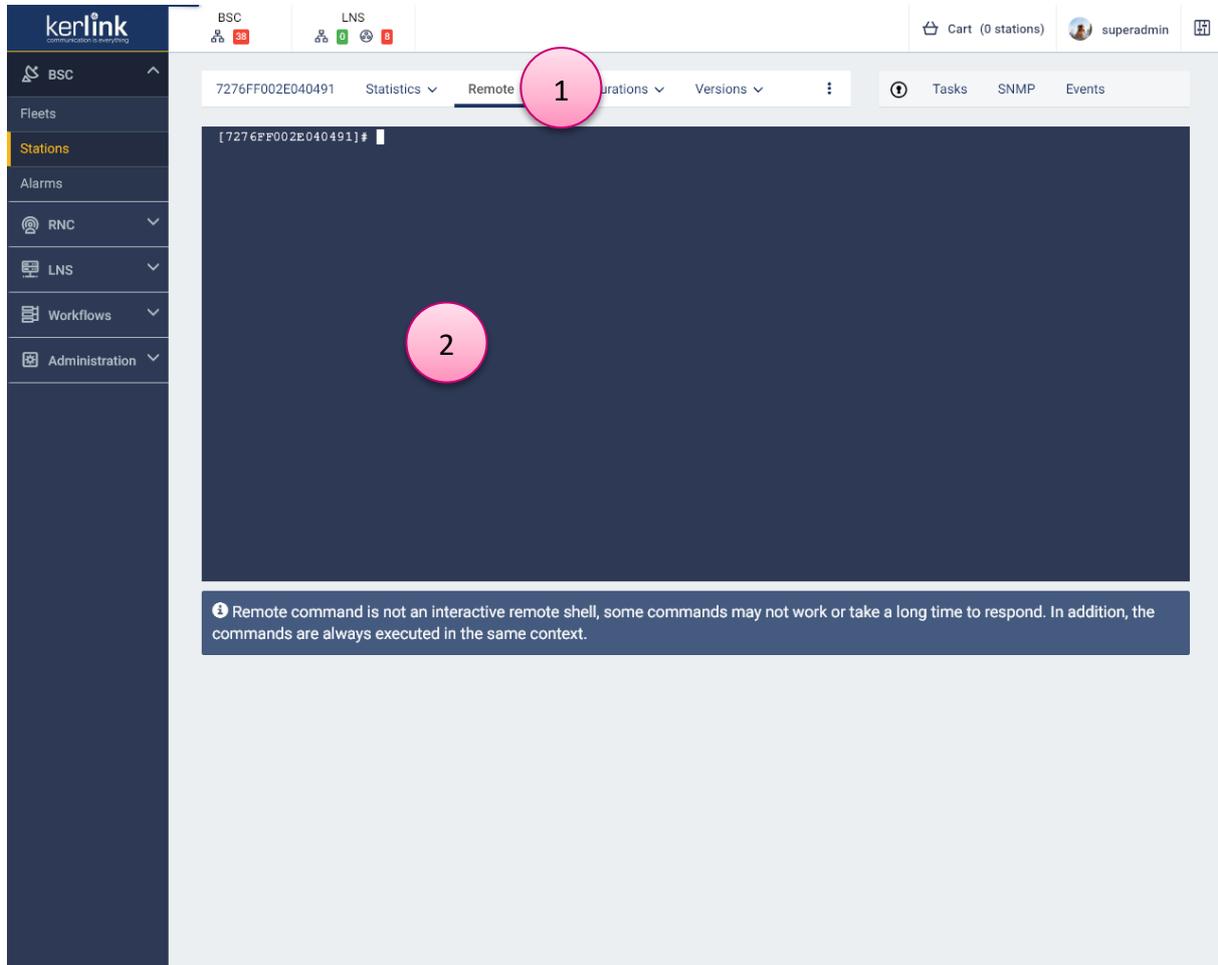


Figure 22 - Station remote command

- (1) Access to a station page then click on the “Remote” menu and select “Command”.
- (2) The console allows you to execute non-interactive and no context needed commands.

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### 3.4.4 Station configurations

#### 3.4.4.1 Supervision

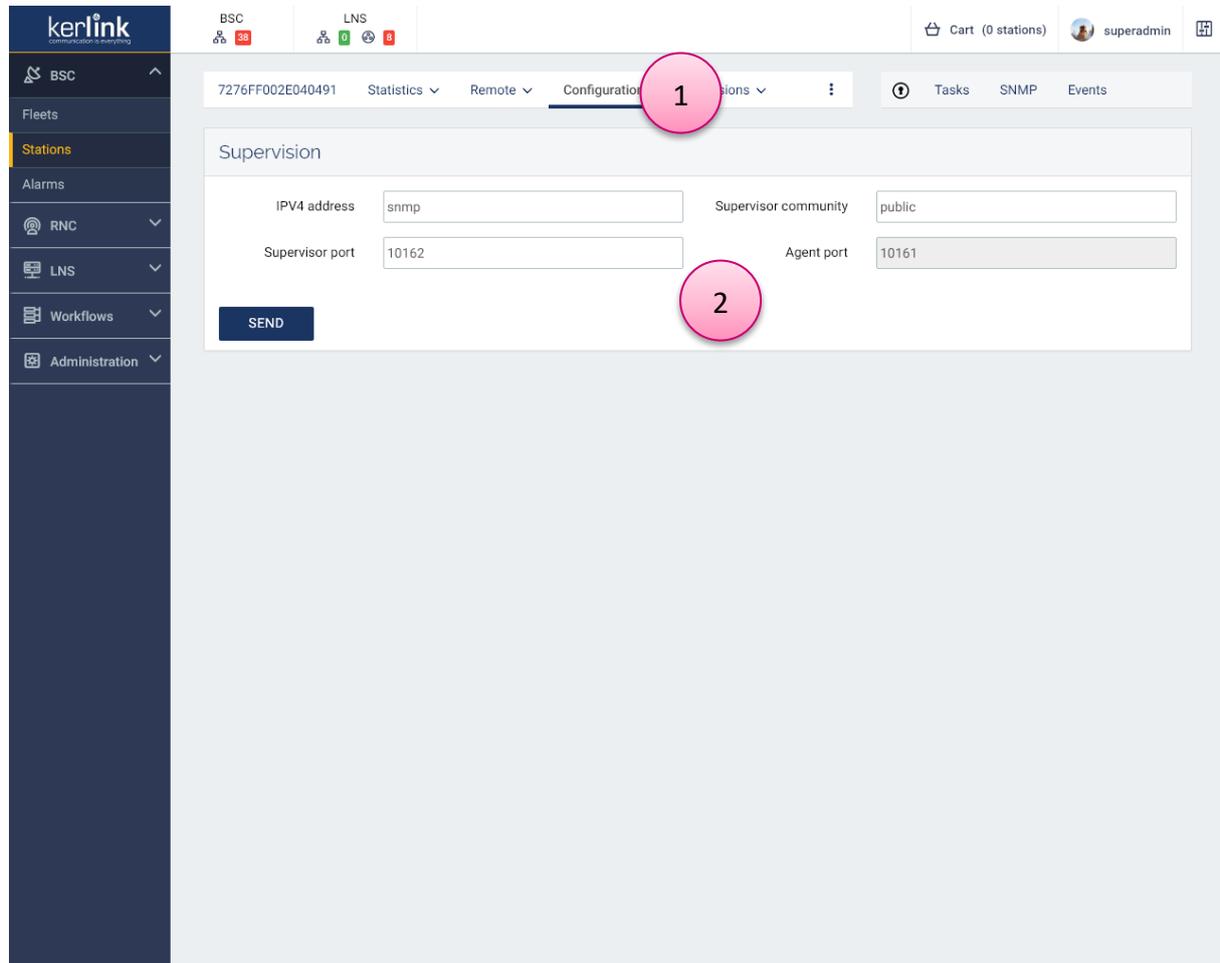


Figure 23 : Station supervision configuration

- (1) Access to a station page then click on the “Configurations” menu and select “Supervision”.
- (2) The “Supervision” panel allows you to configure the destination server of the station events.

Note: An update of the “Supervision” configuration will trigger a restart of the station. So, a message informs you that the station is rebooting and ask you to check that the modifications are well applied after the station is restarted.

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### 3.4.4.2 Alarms

Figure 24 - Station control configuration

(1) Access to a station page then click on the “Configurations” menu and select “Alarms”.

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- (2) The “Control” panel allows you to configure the thresholds and hysteresis for several alarms (CPU, System disk, User disk, Door ...). The current values are displayed next to each property. The colour shows the state of the value according to the threshold and hysteresis.

### 3.4.4.3 System

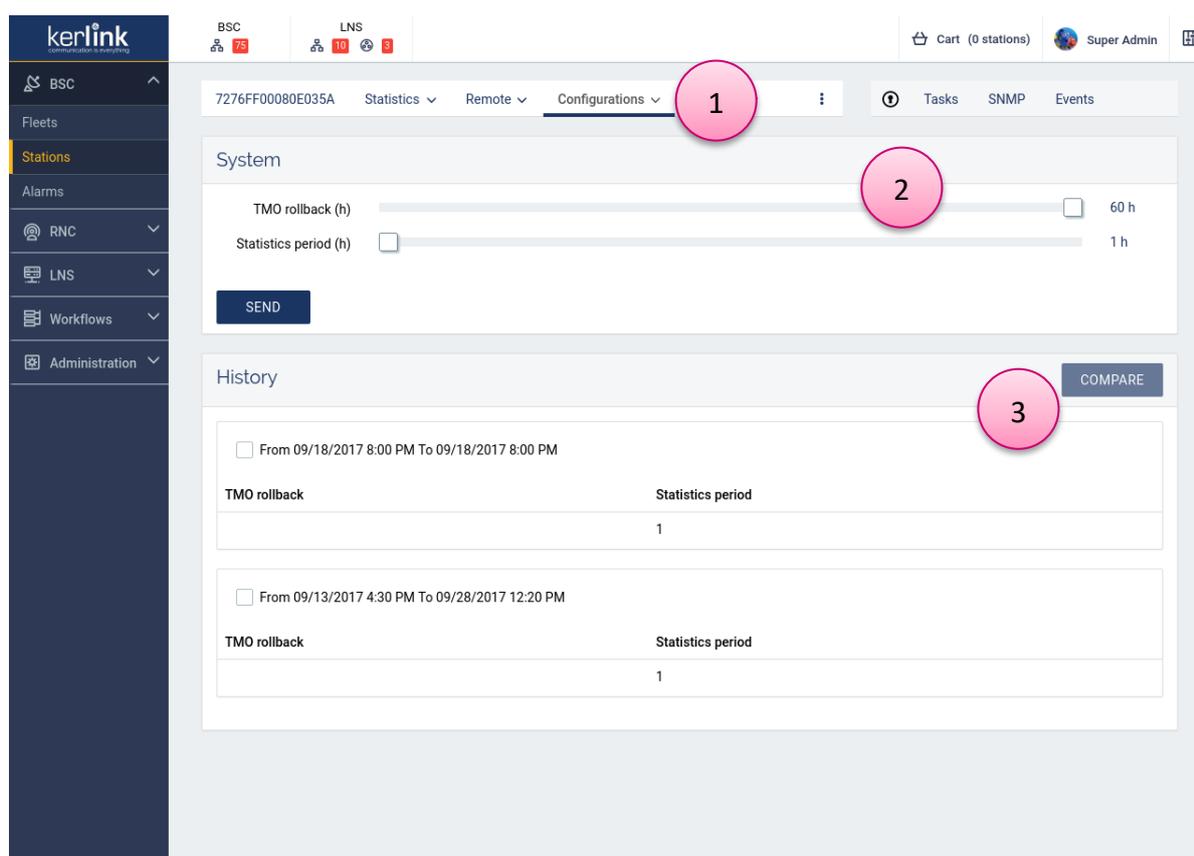


Figure 25 : Station system configuration

- (1) Access to a station page then click on the “Configurations” menu and select “System”.
- (2) The “System” panel allows you to configure the system properties of the station.
- The “TMO rollback” is the number of minutes to rollback after losing WAN connectivity following a configuration.
- (3) The “History” panel displays all the modifications of the properties. You can select many rows and click on the “Compare.” button to view the changes.

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### 3.4.4.4 LAN

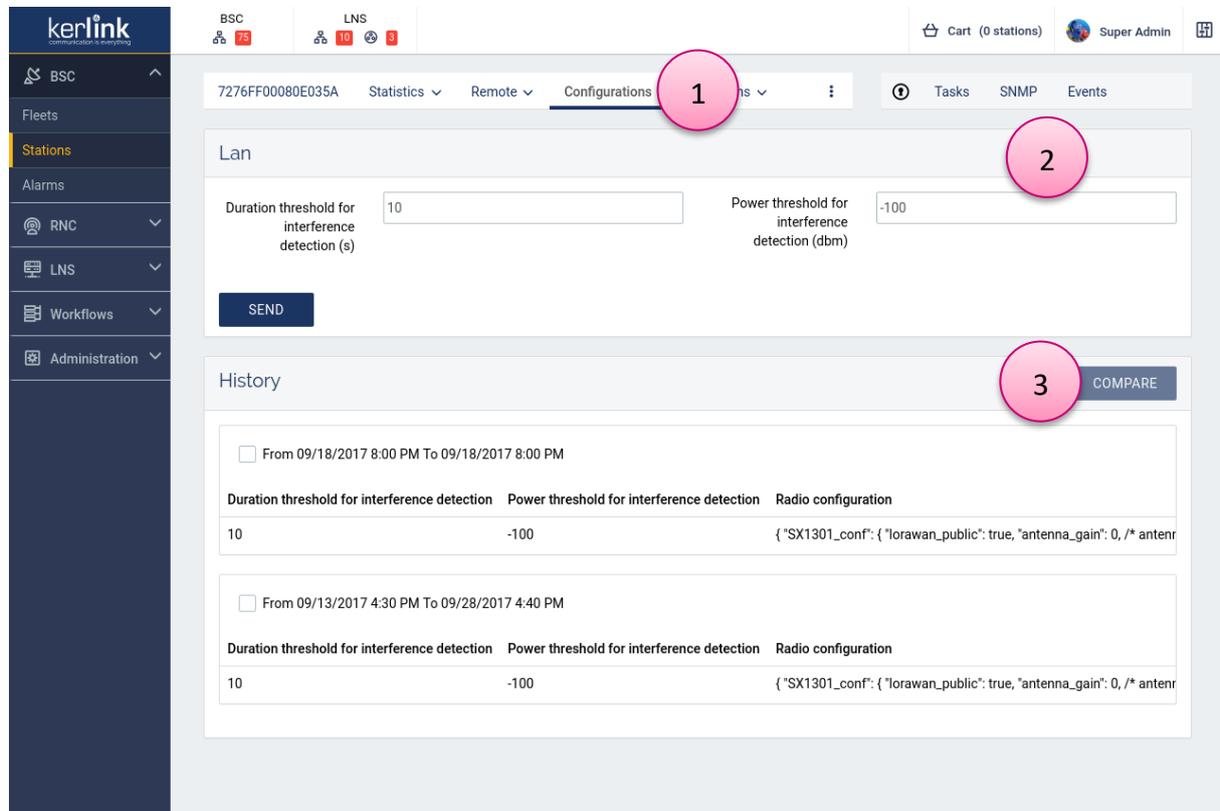


Figure 26 : Station LAN configuration

- (1) Access to a station page then click on the “Configurations” menu and select “Lan”.
- (2) The “Lan” panel allows you to configure the interferences detection properties of the station.
- (3) The “History” panel displays all the modifications of the properties. You can select many rows and click on the “Compare.” button to view the changes.

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### 3.4.4.5 Clock

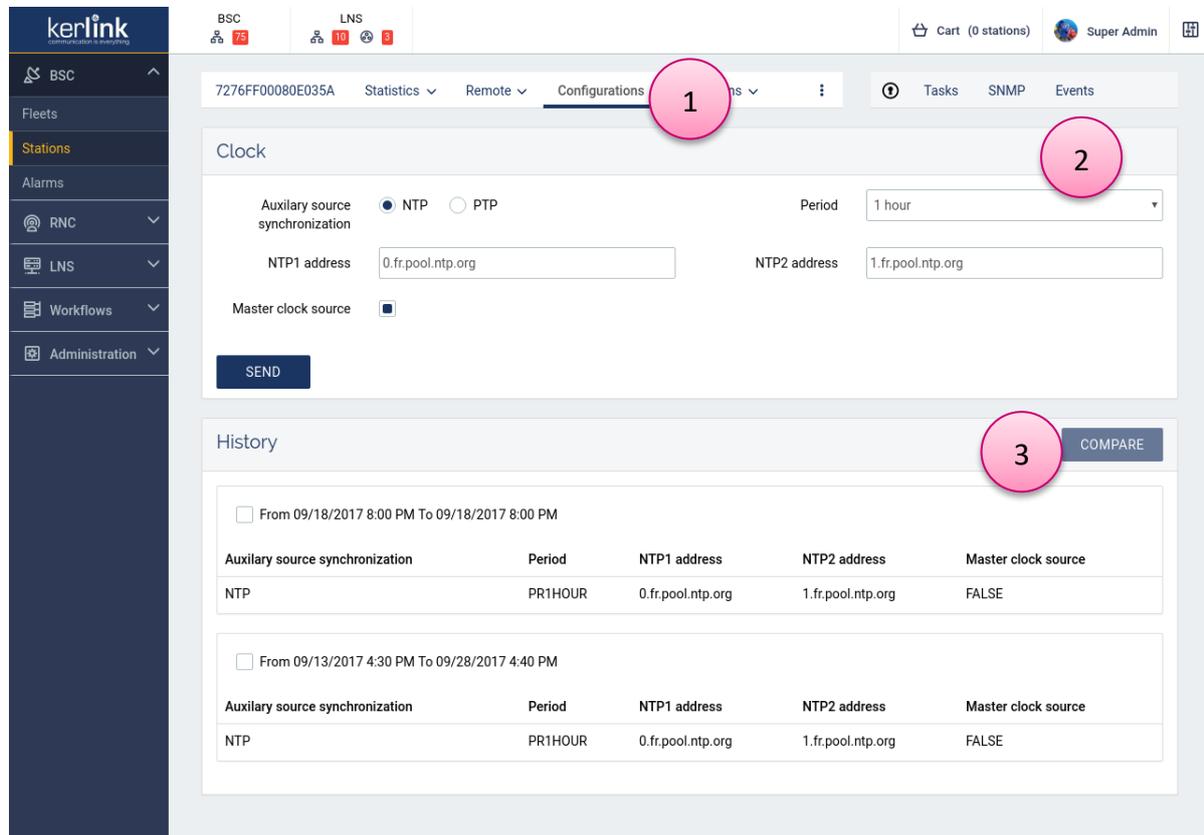
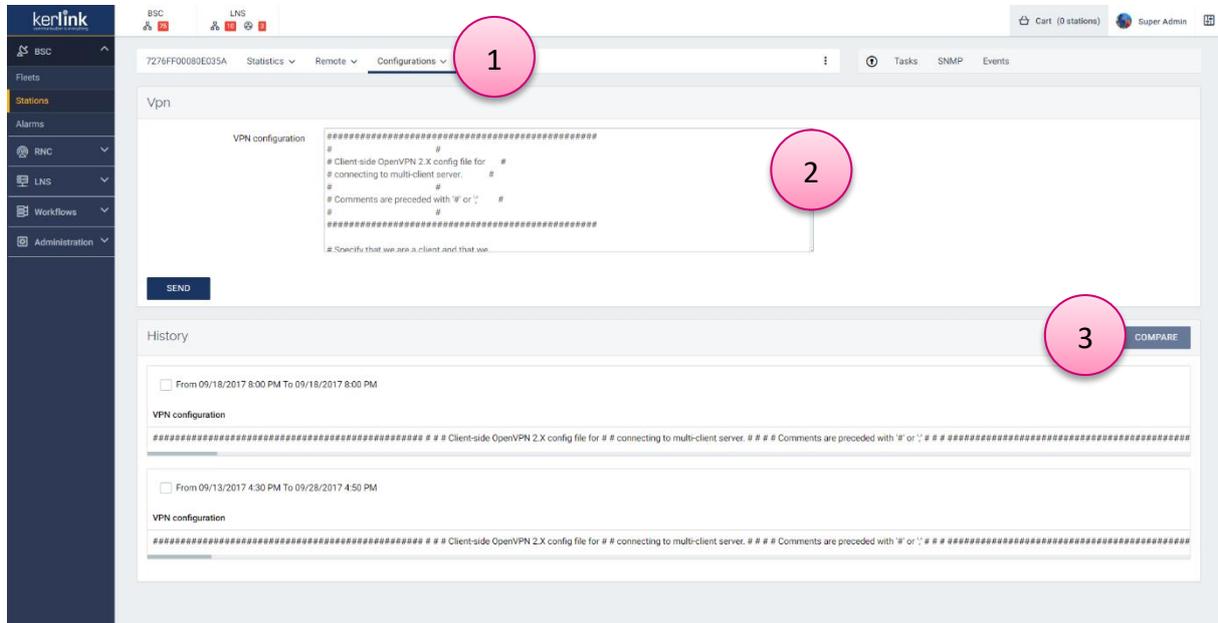


Figure 27 : Station clock configuration

- (1) Access to a station page then click on the “Configurations” menu and select “Clock”.
- (2) The “Clock” panel allows you to configure the clock properties of the station.
- (3) The “History” panel displays all the modifications of the properties. You can select many rows and click on the “Compare.” button to view the changes.

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### 3.4.4.6 VPN



**Figure 28 : Station VPN configuration**

- (1) Access to a station page then click on the “Configurations” menu and select “VPN”.
- (2) The “Vpn” panel allows you to configure the VPN property of the station.
- (3) The “History” panel displays the previous modifications of the property. You can select many rows and click on the “Compare.” button to view the changes.

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### 3.4.4.7 WAN

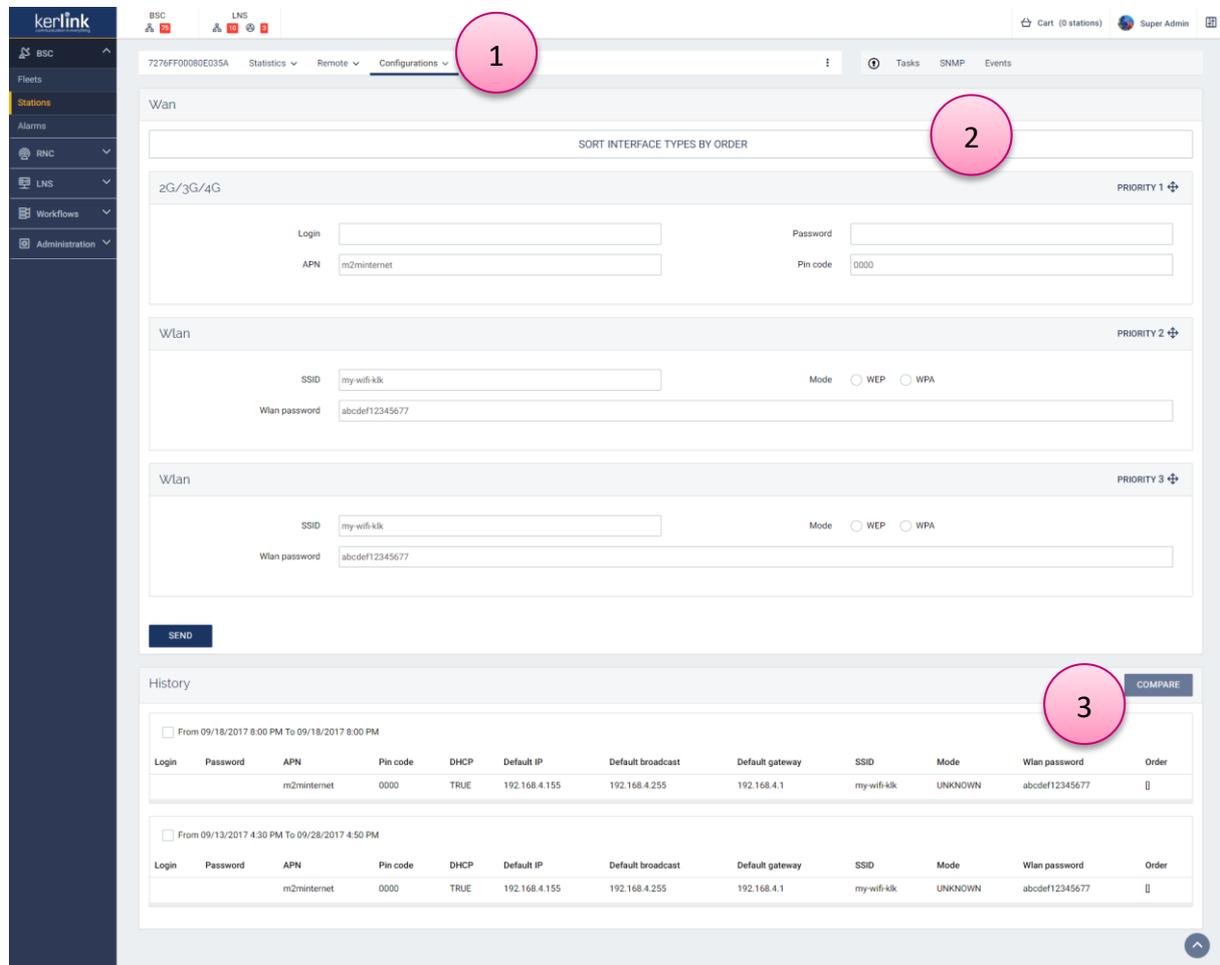


Figure 29 : Station WAN configuration

- (1) Access to a station page then click on the “Configurations” menu and select “Wan”.
- (2) The “Wan” panel allows you to configure the network properties of the station. You can drag and drop each interface to order them by priority.
- (3) The “History” panel displays all the modifications of the properties. You can select many rows and click on the “Compare.” button to view the changes.

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### 3.4.5 Station versions

#### 3.4.5.1 Current version

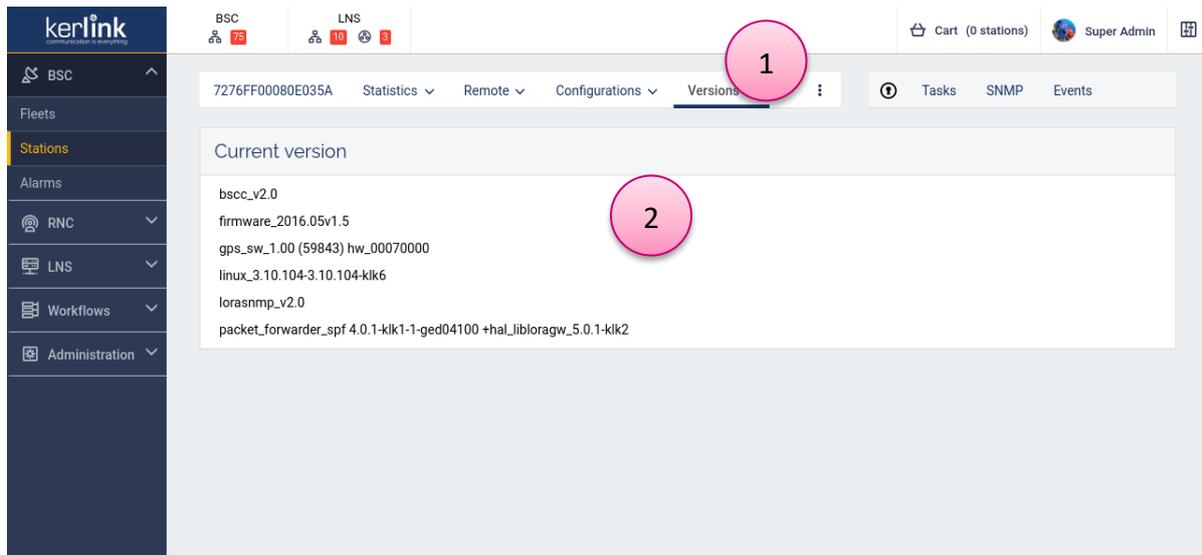


Figure 30 - Station current version

- (1) Access to a station page then click on the “Versions” menu and select “Current version”.
- (2) The “Current version” panel displays the installed version of the software in the station.

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### 3.4.5.2 Version history

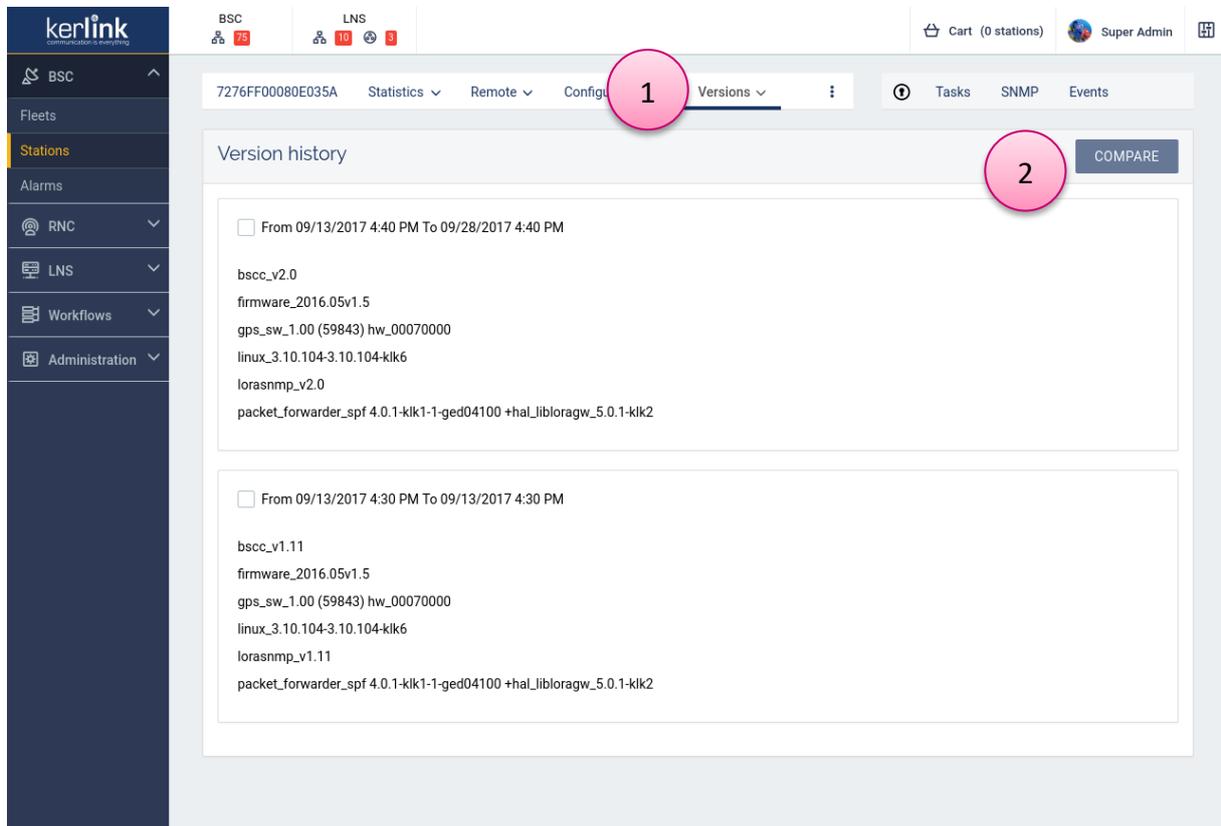


Figure 31 - Station versions history

- (1) Access to a station page then click on the “Versions” menu and select “Version history”.
- (2) The “Version history” panel displays all the versions installed in the station. You can select many rows and click on the “Compare.” button to view the changes.

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### 3.4.5.3 Software update

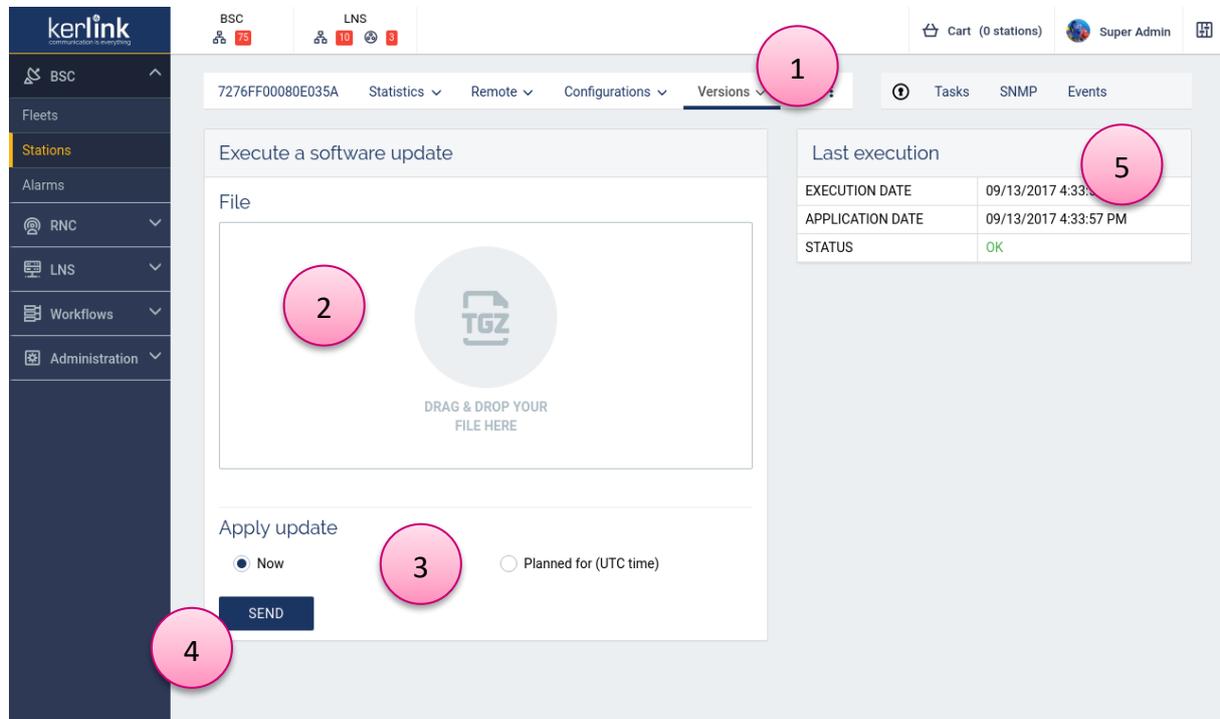


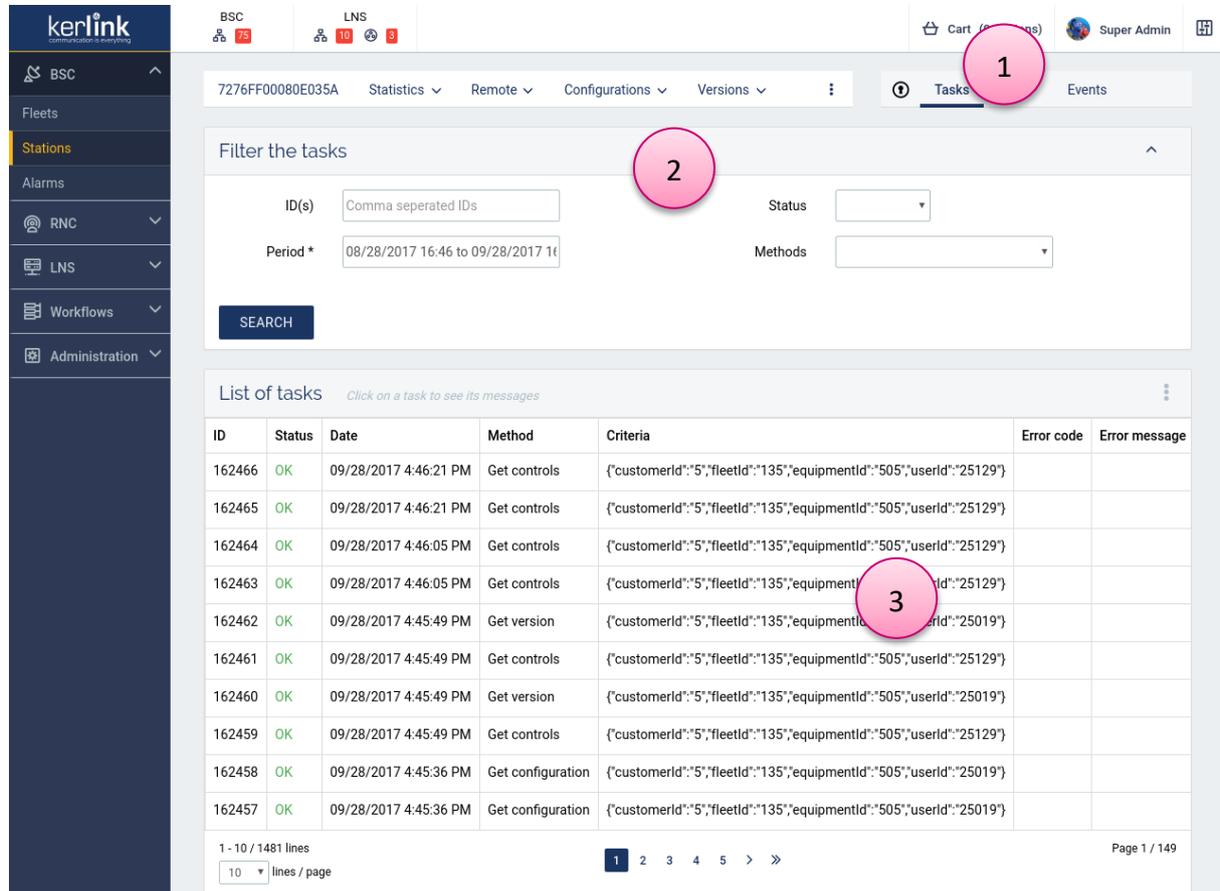
Figure 32 - Station software update

- (1) Access to a station page then click on the “Versions” menu and select “Software update”.
- (2) Click on the panel and choose a TAR.GZ file or drag and drop it from your computer.
- (3) Choose the time you want the station to apply the update.
- (4) Click on the “Send” button. The station will proceed the update asynchronously.
- (5) This panel displays the information of the last update execution task refreshed every 15 minutes. You can also see all the executions on the “Tasks” tab.

### 3.4.6 Station tasks

The tasks tab is an advanced feature. It lists all tasks that were run on the station and allows you to debug issues by checking the tasks status and details: when clicking on a task, you can see all its messages and SNMP logs.

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The screenshot shows the Kerlink RAN Dashboard interface. The 'Tasks' tab is selected, indicated by a red circle with the number 1. The 'Filter the tasks' section contains input fields for 'ID(s)', 'Status', 'Period', and 'Methods', with a 'SEARCH' button below them, highlighted by a red circle with the number 2. The 'List of tasks' table below shows a list of tasks with columns for ID, Status, Date, Method, Criteria, Error code, and Error message. A red circle with the number 3 highlights a task row in the table.

ID	Status	Date	Method	Criteria	Error code	Error message
162466	OK	09/28/2017 4:46:21 PM	Get controls	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25129'}		
162465	OK	09/28/2017 4:46:21 PM	Get controls	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25129'}		
162464	OK	09/28/2017 4:46:05 PM	Get controls	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25129'}		
162463	OK	09/28/2017 4:46:05 PM	Get controls	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25129'}		
162462	OK	09/28/2017 4:45:49 PM	Get version	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25019'}		
162461	OK	09/28/2017 4:45:49 PM	Get controls	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25129'}		
162460	OK	09/28/2017 4:45:49 PM	Get version	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25019'}		
162459	OK	09/28/2017 4:45:49 PM	Get controls	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25129'}		
162458	OK	09/28/2017 4:45:36 PM	Get configuration	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25019'}		
162457	OK	09/28/2017 4:45:36 PM	Get configuration	{'customerId':'5','fleetId':'135','equipmentId':'505','userId':'25019'}		

Figure 33 - Station tasks

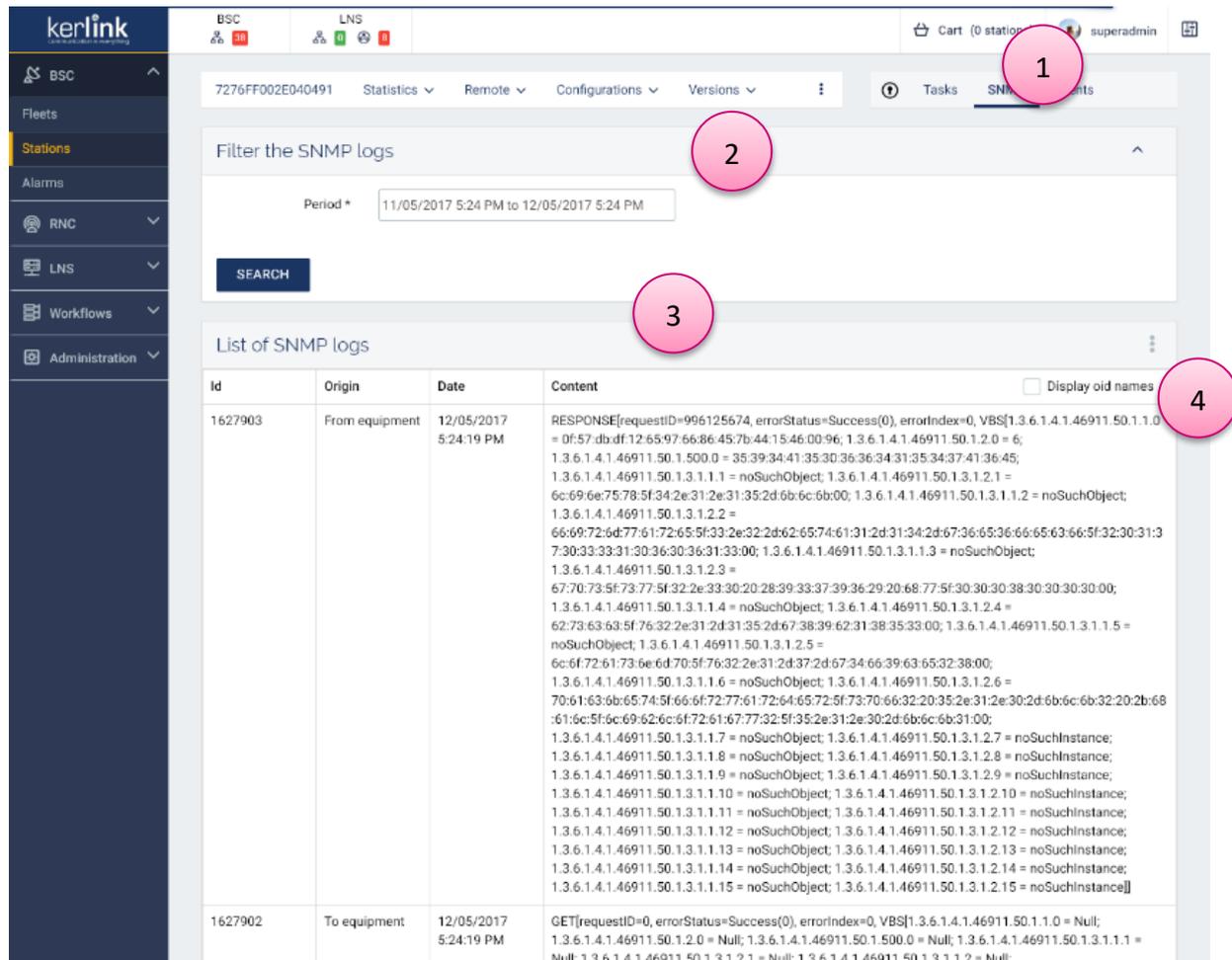
- (1) Access to a station page then click on the “Tasks” tab.
- (2) Select criteria then click on the “Search” button to filter the tasks. Let empty criteria to get all of them.
- (3) The list displays the tasks according to your filters. You can click on a task row to display the task messages and the SNMP logs below the list:

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### 3.4.7 Station SNMP logs

The SNMP tab is an advanced feature. It lists all SNMP requests that were made on the station and allows you to debug issues by checking the requests details.



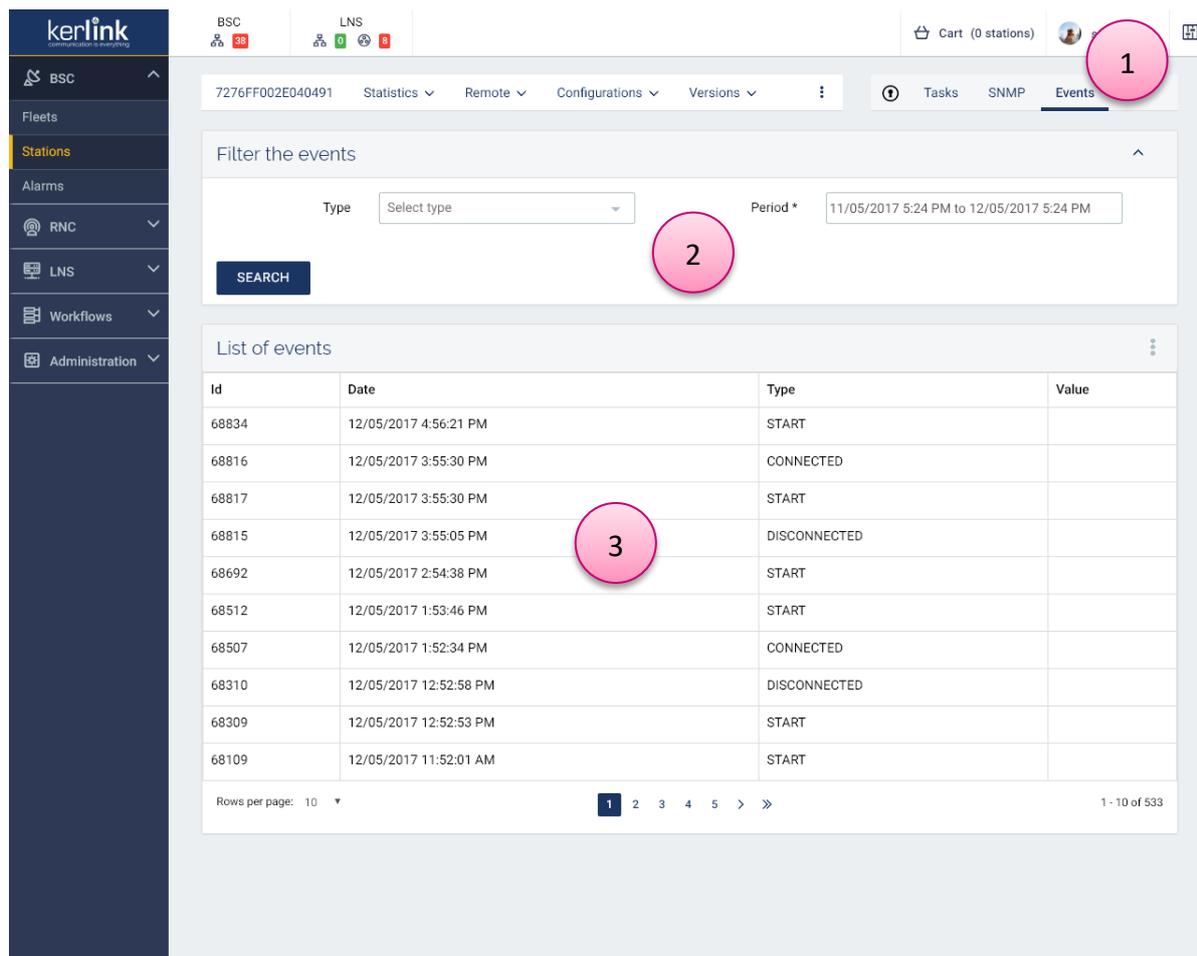
The screenshot shows the 'Station SNMP logs' page in the kerlink dashboard. The interface includes a navigation menu on the left with options like BSC, Fleets, Stations, Alarms, RNC, LNS, Workflows, and Administration. The main content area has a top bar with the station ID '7276FF002E040491' and tabs for 'Statistics', 'Remote', 'Configurations', 'Versions', 'Tasks', and 'SNMP'. Below the tabs is a filter section titled 'Filter the SNMP logs' with a 'Period' dropdown set to '11/05/2017 5:24 PM to 12/05/2017 5:24 PM' and a 'SEARCH' button. Below the filter is a table titled 'List of SNMP logs' with columns for 'Id', 'Origin', 'Date', and 'Content'. The table contains two entries: one with Id '1627903' and Origin 'From equipment', and another with Id '1627902' and Origin 'To equipment'. A checkbox labeled 'Display oid names' is located to the right of the table header.

Figure 35 - Station SNMP logs

- (1) Access to a station page then click on the “SNMP” tab.
- (2) Select criteria then click on the “Search” button to filter the SNMP logs.
- (3) The list displays the SNMP logs according to your filters.
- (4) You can switch to the oid values or the oid names by checking / unchecking this checkbox.

### 3.4.8 Station events

The events tab is an advanced feature. It lists all events that were triggered on the station and allows you to debug issues by checking the events details. Events can be alarms (high CPU value for instance) or simple events (station start, door open/closed...).



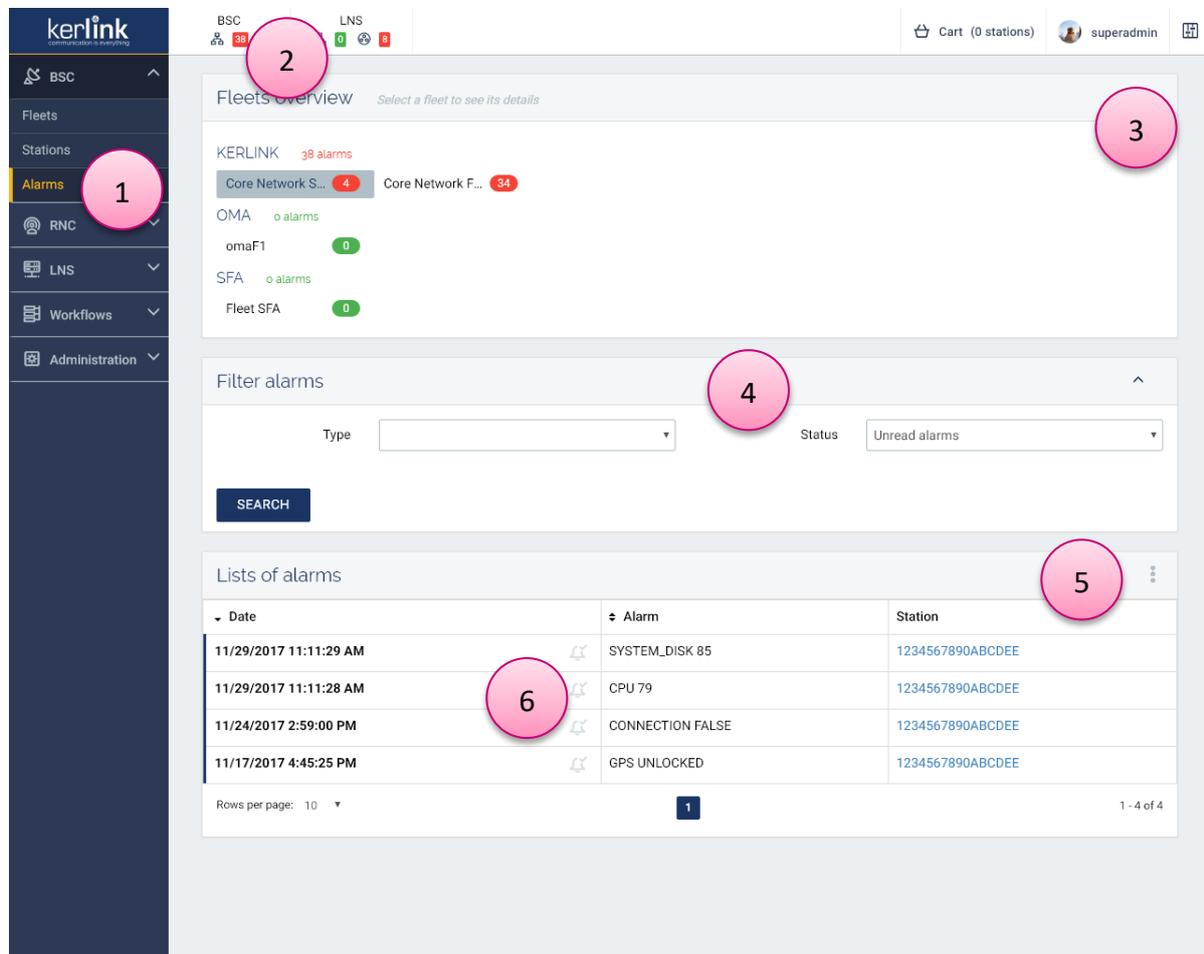
The screenshot shows the Kerlink RAN Dashboard interface. On the left is a dark sidebar with navigation items: BSC, Fleets, Stations (highlighted), Alarms, RNC, LNS, Workflows, and Administration. The main area displays the 'Events' tab for a specific station (ID: 7276FF002E040491). At the top right, there are icons for 'Cart (0 stations)', a user profile, and a help icon. Below the station ID, there are tabs for 'Statistics', 'Remote', 'Configurations', and 'Versions'. The 'Events' tab is active and highlighted with a red circle '1'. Underneath, there is a 'Filter the events' section with a 'Type' dropdown menu (circled '2') and a 'Period' date range selector. A 'SEARCH' button is located below the filter. The 'List of events' table below shows a list of events with columns for Id, Date, Type, and Value. A red circle '3' highlights a row with Id 68815, Date 12/05/2017 3:55:05 PM, and Type DISCONNECTED. At the bottom of the table, there is a pagination control showing 'Rows per page: 10' and a page indicator '1' out of 533.

Figure 36 - Station events

- (1) Access to a station page then click on the “Events” tab.
- (2) Select criteria then click on the “Search” button to filter the events.
- (3) The list displays the events according to your filters.

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### 3.5 Consult the last alarms of your fleets



The screenshot shows the Kerlink RAN Dashboard interface. The sidebar on the left contains navigation options: BSC, Fleets, Stations, Alarms (highlighted with a red circle 1), RNC, LNS, Workflows, and Administration. The top navigation bar shows 'BSC' (with a red circle 2) and 'LNS' buttons, along with a 'Cart (0 stations)' and a user profile 'superadmin'. The main content area is divided into three sections: 'Fleets overview' (with a red circle 3) showing a list of fleets and their alarm counts; 'Filter alarms' (with a red circle 4) containing a search bar and a 'SEARCH' button; and 'Lists of alarms' (with a red circle 5) displaying a table of recent alarms. A red circle 6 highlights a specific alarm row in the table.

Date	Alarm	Station
11/29/2017 11:11:29 AM	SYSTEM_DISK 85	1234567890ABCDEE
11/29/2017 11:11:28 AM	CPU 79	1234567890ABCDEE
11/24/2017 2:59:00 PM	CONNECTION FALSE	1234567890ABCDEE
11/17/2017 4:45:25 PM	GPS UNLOCKED	1234567890ABCDEE

Figure 37 - BSC alarms

- (1) Click on the “Alarms” button to navigate to the BSC alarms screen.
- (2) The “BSC” button is a shortcut to the same screen. It displays the number of BSC alarms of all fleets.
- (3) The “Fleets overview” panel lists all the fleets with their number of alarms. To see the details of a fleet, click on it.  
  
A super admin will see all fleets of all customers. Other roles will only see the fleets of their customer.
- (4) Select criteria then click on the “Search” button to filter the alarms.
- (5) The “Details” panel lists all alarms of the selected fleet.

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(6) You can click on the “read” button to mark an alarm as read.

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## 4. RNC

### 4.1 Analyze the radio frequency activity of your modems

#### 4.1.1 Request a radio frequency activity analysis of your modem

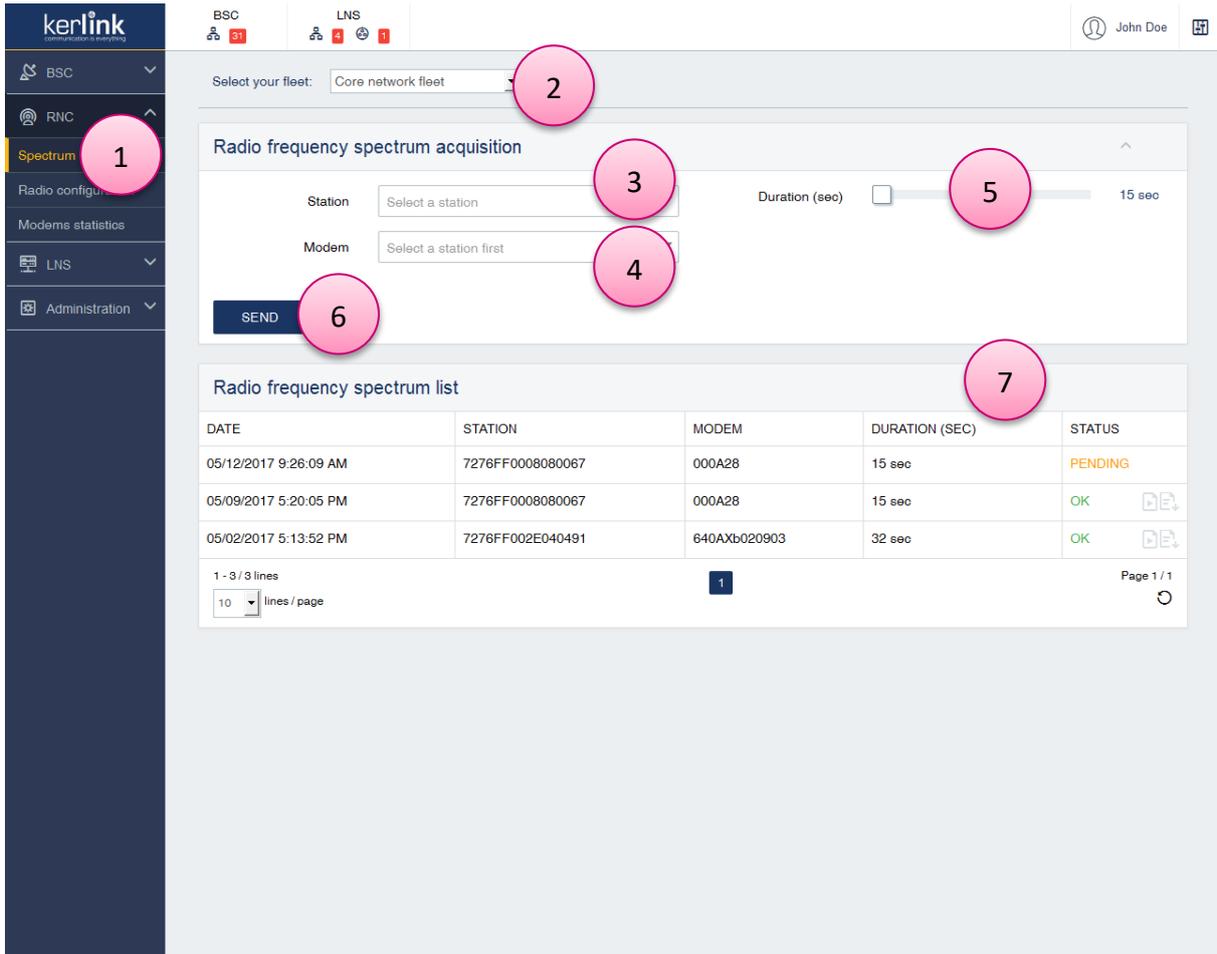


Figure 38 - Spectrum analysis acquisition

- (1) Click on the “Spectrum” button to access to the radio frequency analysis page.
- (2) Select a fleet.
- (3) Select a station.
- (4) Select a modem.
- (5) Select the duration of the analysis.
- (6) Click on the “Send” button.

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(7) The “list” panel displays all requests. When a spectrum succeed (status is “OK”), two buttons appear next to it:

- Play: Visualize the spectrum with the 3D viewer.
- Download: Download the spectrum as a text file.

#### 4.1.2 Consult the results of a radio frequency activity analysis of your modem

In order to visualize a spectrum with the 3D viewer, click on the “Play” button next to the “OK” status of a request in the panel “Radio frequency spectrum list”.

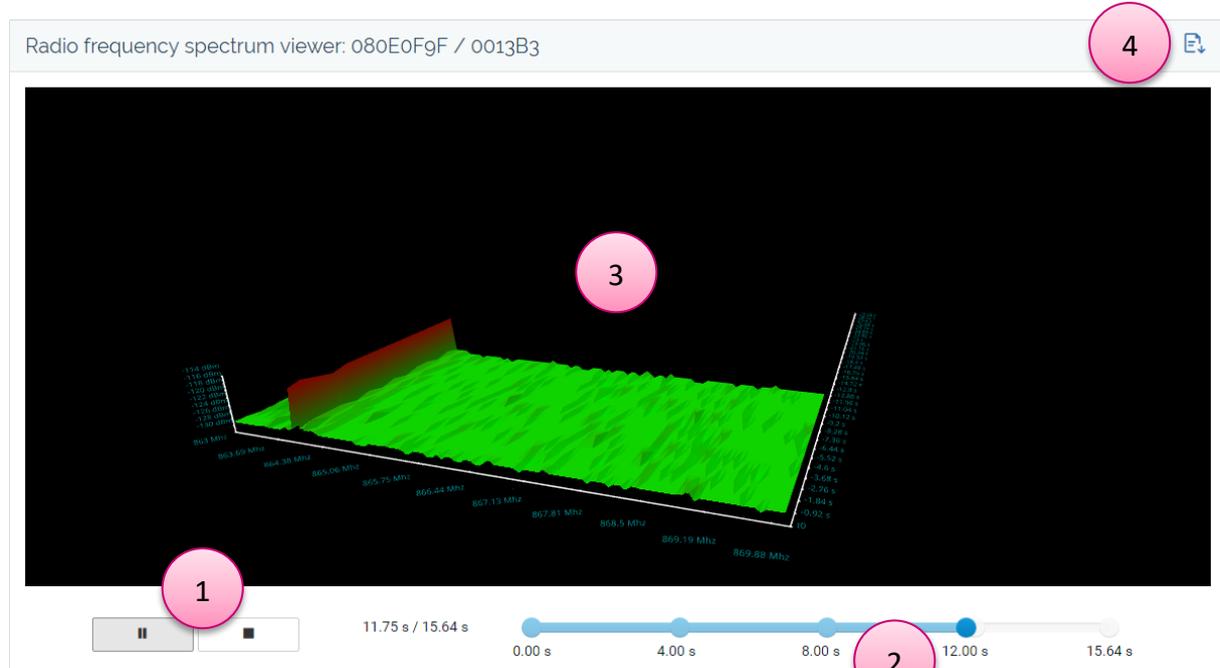


Figure 39 - Spectrum analysis viewer

- (1) Click on the “Play/Pause” button to start/pause the animation. Click on the “Stop” button to stop and reset the animation to the beginning.
- (2) The time bar shows the progress of the animation. You can reach a specific moment by clicking or moving the cursor.
- (3) You can zoom and change the position of the camera by scrolling or clicking and moving the mouse. On pause mode, you can highlight a point on the spectrum to display its values on a tooltip.
- (4) Click on the “Download” button to download the spectrum as a text file.

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## 4.2 Configure the radiopath and channel frequencies of your modems

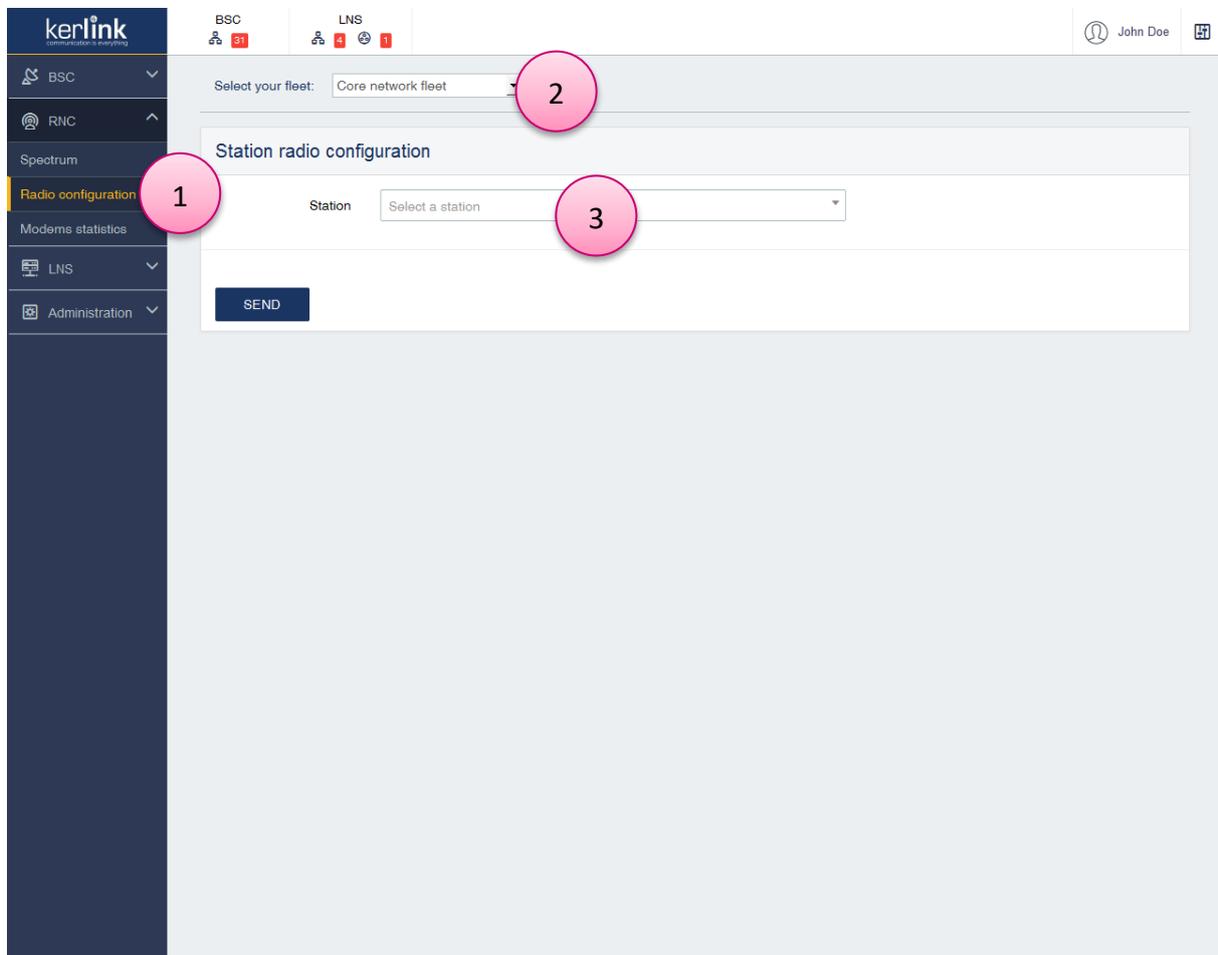


Figure 40 - Station selection for radiofrequency configuration

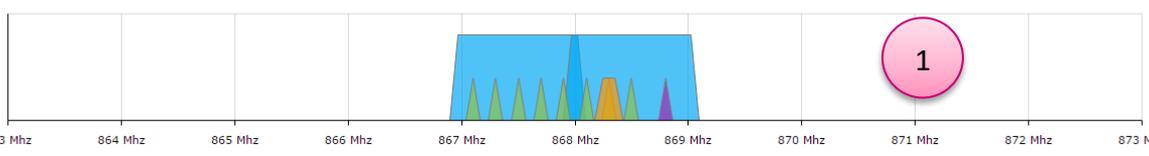
- (1) Click on the “Radio configuration” button.
- (2) Select a fleet.
- (3) Select a station. After that, the radiofrequency configuration appears below.

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Station radio configuration

STATION: 7276FF00080E08F1 (wirnet.station TYPE\_LORA\_MONO(868))

Modem 1



Modem 1

FREQUENCY INTERVAL	NB RADIOPATH	RADIOPATH WIDTH	RADIOPATH INTERVAL	NB MUSF	NB MOSF	NB FSK	NB FLORA
863 Mhz - 873 Mhz	2	1.2 Mhz	866.9 Mhz - 868.1 Mhz 867.9 Mhz - 869.1 Mhz	8	1	1	0

Channels

NAME	EFFECTIVE	SPREAD FACTOR	FREQUENCY INTERVAL	BANDWIDTH	DATARATE
chan_multiSF_0	<input type="checkbox"/>	Multi SF	868.0375 MHz - 868.1 MHz - 868.1625 MHz	125 KHz	
chan_multiSF_1	<input type="checkbox"/>	Multi SF	868.2375 MHz - 868.3 MHz - 868.3625 MHz	125 KHz	
chan_multiSF_2	<input type="checkbox"/>	Multi SF	868.4375 MHz - 868.5 MHz - 868.5625 MHz	125 KHz	
chan_multiSF_3	<input type="checkbox"/>	Multi SF	867.0375 MHz - 867.1 MHz - 867.1625 MHz	125 KHz	
chan_multiSF_4	<input type="checkbox"/>	Multi SF	867.2375 MHz - 867.3 MHz - 867.3625 MHz	125 KHz	
chan_multiSF_5	<input type="checkbox"/>	Multi SF	867.4375 MHz - 867.5 MHz - 867.5625 MHz	125 KHz	
chan_multiSF_6	<input type="checkbox"/>	Multi SF	867.6375 MHz - 867.7 MHz - 867.7625 MHz	125 KHz	
chan_multiSF_7	<input type="checkbox"/>	Multi SF	867.8375 MHz - 867.9 MHz - 867.9625 MHz	125 KHz	
chan_Lora_std	<input type="checkbox"/>	7	868.175 MHz - 868.3 MHz - 868.425 MHz	250 KHz	
chan_FSK	<input type="checkbox"/>		868.7375 MHz - 868.8 MHz - 868.8625 MHz	125 KHz	50 Kbps

Raw

SEND

Figure 41 - Radiofrequency configuration

- (1) The chart displays the radio paths and channels (only for configuration formats supported by the application). It is a read-only visualization.
- (2) Form edition of the radio paths and channels frequencies (only for configuration formats supported by the application). The values are checked with the following rules:
  - The radio path interval frequencies are included into the range interval frequency.

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- The effective channels interval frequencies are included into at least one of the radio path interval frequency.

(3) Text “raw” area contains the radiofrequency configuration as raw string.

(4) Click on the “Send” button to apply the new radiofrequency configuration.

### 4.3 Consult and analyze the statistics on your modems

#### 4.3.1 Request a statistics chart

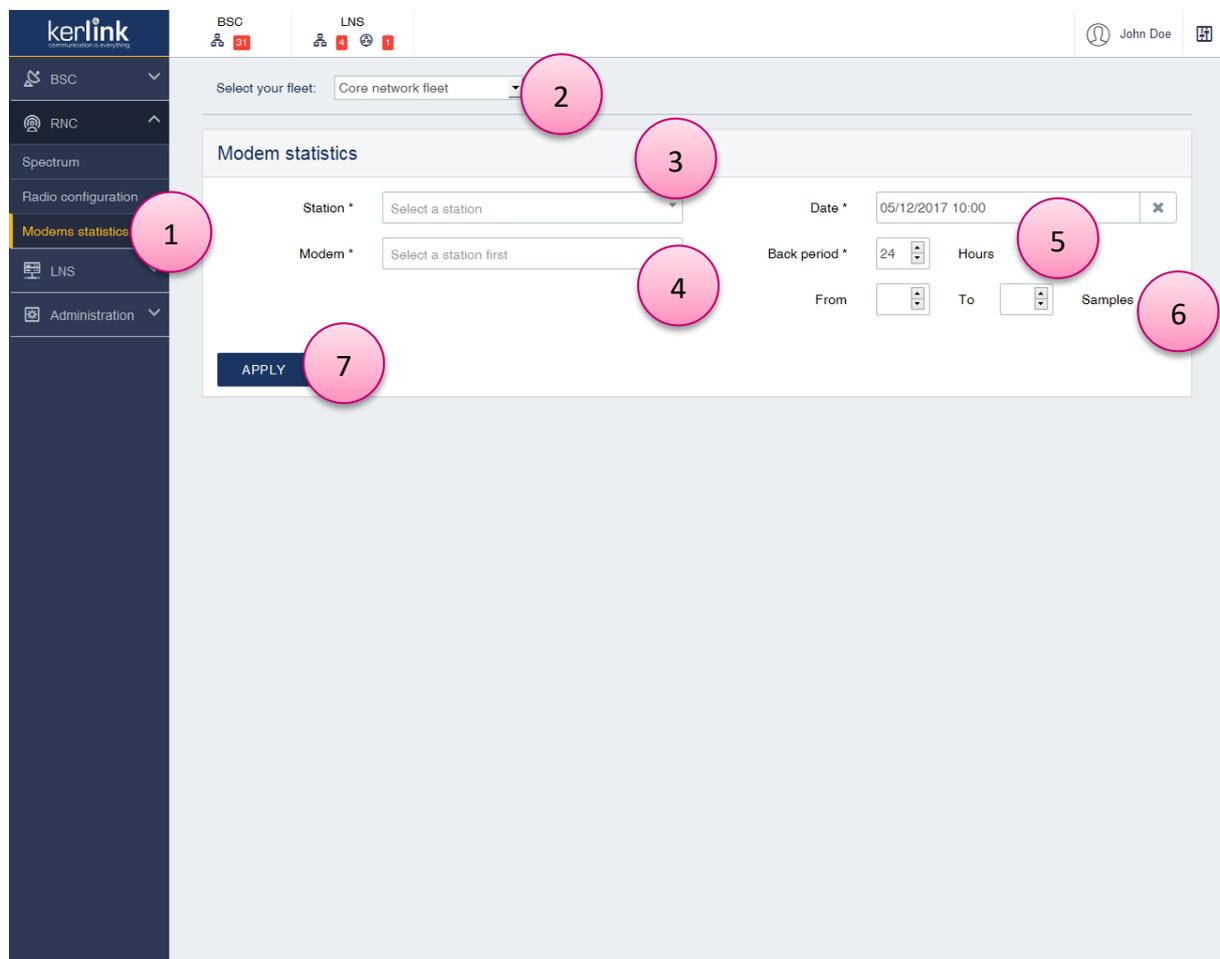


Figure 42 - Modem selection for statistics display

- (1) Click on the “Modems statistics” button.
- (2) Select a fleet.
- (3) Select a station.

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- (4) Select a modem.
- (5) Set the date and the back-hour period.
- (6) Set the filter of samples number by frequency.
- (7) Click on the “Apply” button to see statistics. The 3D chart statistics appears below.

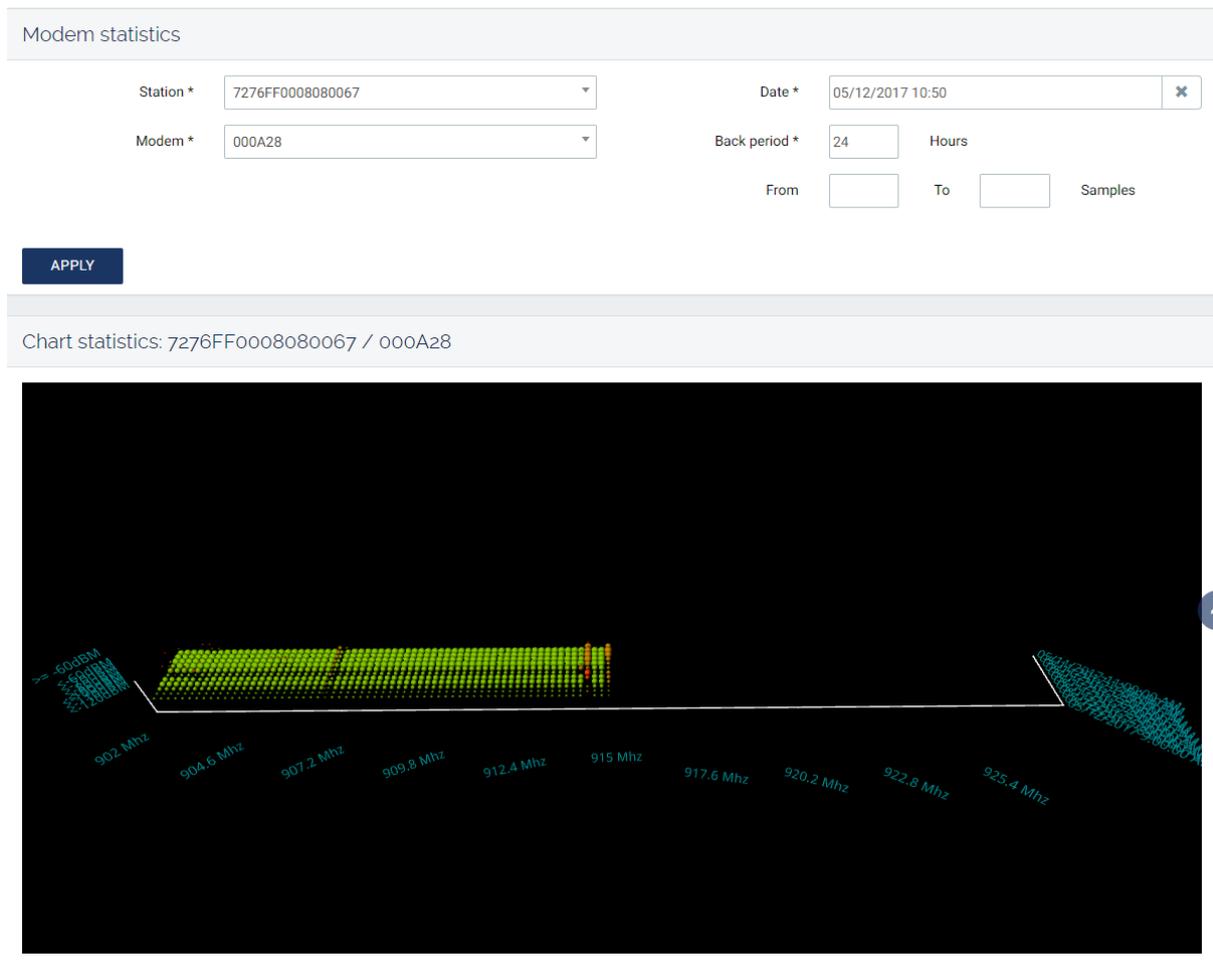


Figure 43 : Modem statistics

You can zoom and change the position of the camera by scrolling or clicking and moving the mouse. You can hover over a sphere to display the details in a tooltip.

#### 4.3.2 Read the statistics chart

The chart shows a scan result of the modem RSSI. The radio frequencies are sampled and grouped on three axes:

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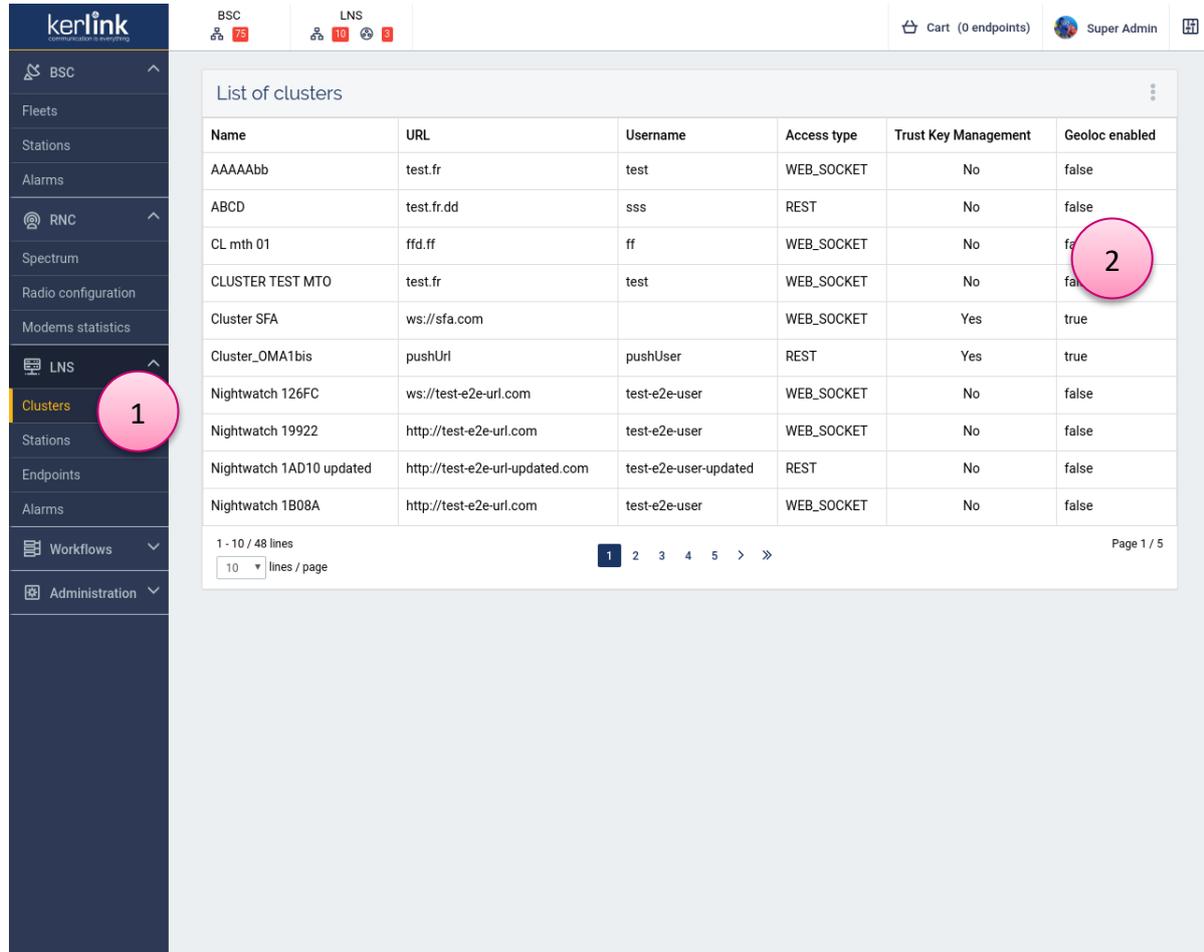
- Frequency (X axis)
- RSSI range (Y axis with color: green < -120 dBm to red >= -60 dBm)
- Hour (Z axis)

The size of the spheres is proportional to the sample count.

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## 5. LNS

### 5.1 List your clusters



The screenshot shows the Kerlink RAN Dashboard interface. On the left sidebar, the 'Clusters' button is highlighted with a pink circle containing the number '1'. The main content area displays a table titled 'List of clusters' with the following data:

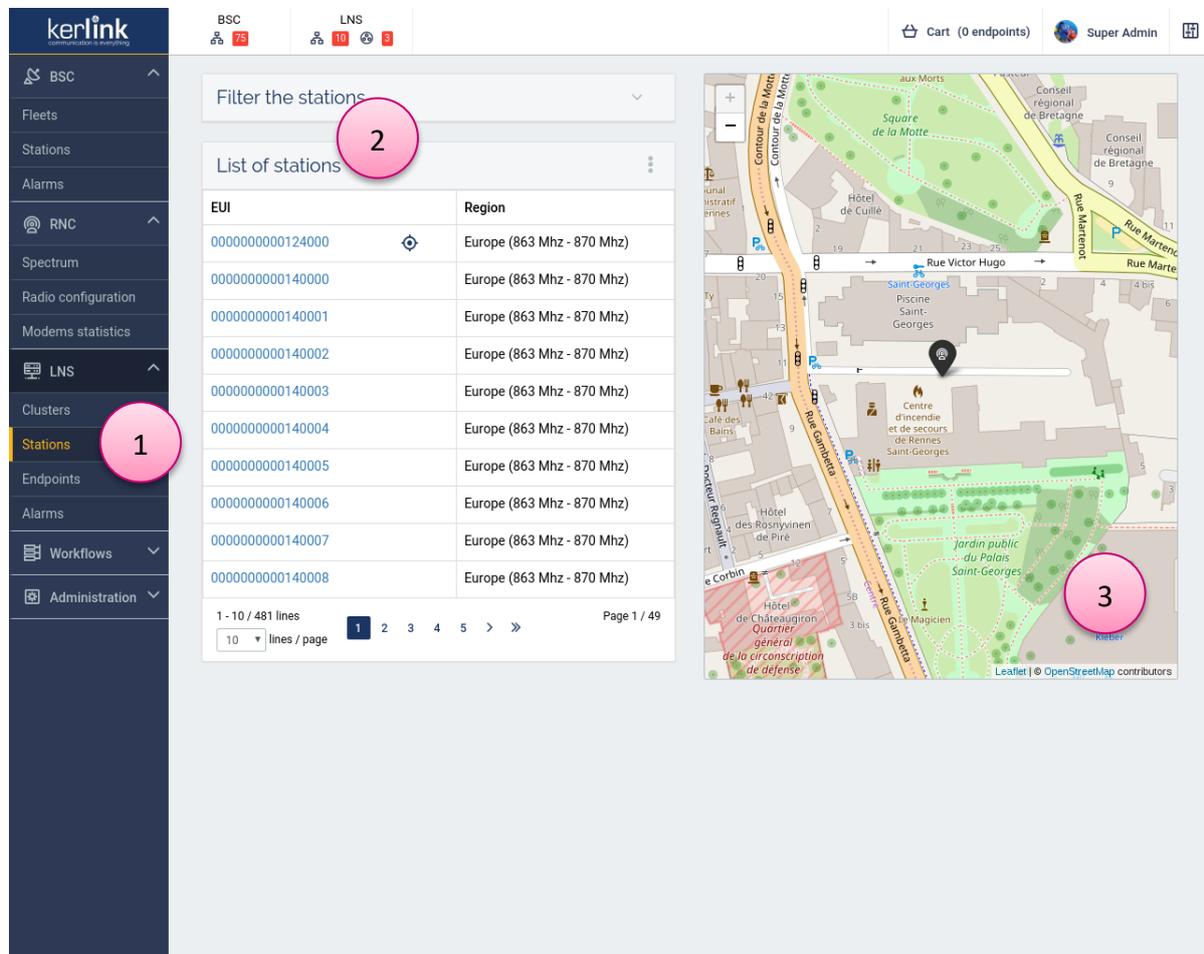
Name	URL	Username	Access type	Trust Key Management	Geoloc enabled
AAAAAbb	test.fr	test	WEB_SOCKET	No	false
ABCD	test.fr.dd	sss	REST	No	false
CL.mth 01	ffd.ff	ff	WEB_SOCKET	No	false
CLUSTER TEST MTO	test.fr	test	WEB_SOCKET	No	false
Cluster SFA	ws://sfa.com		WEB_SOCKET	Yes	true
Cluster_OMA1bis	pushUrl	pushUser	REST	Yes	true
Nightwatch 126FC	ws://test-e2e-url.com	test-e2e-user	WEB_SOCKET	No	false
Nightwatch 19922	http://test-e2e-url.com	test-e2e-user	WEB_SOCKET	No	false
Nightwatch 1AD10 updated	http://test-e2e-url-updated.com	test-e2e-user-updated	REST	No	false
Nightwatch 1B08A	http://test-e2e-url.com	test-e2e-user	WEB_SOCKET	No	false

At the bottom of the table, there is a pagination control showing '1 - 10 / 48 lines' and a dropdown menu set to '10 lines / page'. The page number 'Page 1 / 5' is also visible.

Figure 44 - Clusters list

- (1) Click on the “Clusters” button.
- (2) List of your clusters.

## 5.2 List the stations



The screenshot displays the 'LNS Stations' page in the kerlink dashboard. The left sidebar shows the 'Stations' button highlighted with a pink circle labeled '1'. The main content area features a 'Filter the stations' panel (circled '2') and a table of stations. The table has two columns: 'EUI' and 'Region'. The 'Region' column for all entries is 'Europe (863 Mhz - 870 Mhz)'. Below the table is a pagination control showing '1 - 10 / 481 lines' and 'Page 1 / 49'. To the right of the table is a map view showing the geographical locations of the stations, with a pink circle labeled '3' highlighting a specific station marker.

Figure 45 - LNS stations list

- (1) Click on the LNS “Stations” button.
- (2) List of the stations (your stations or public stations). You can click on the ID of a station to access to its details page. You can filter the station with the “Filter stations” panel.
- (3) Map of the stations positions. You can click on the marker of a station to see its ID and click on it to access its details page.

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### 5.3 Consult the properties of a station

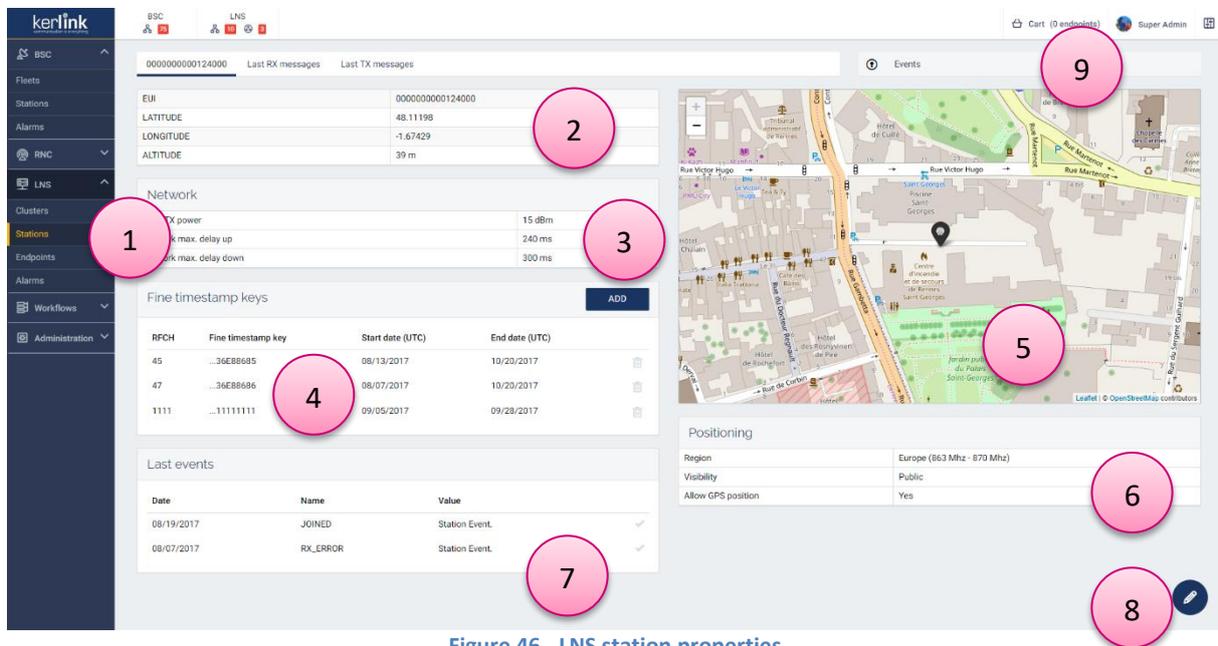
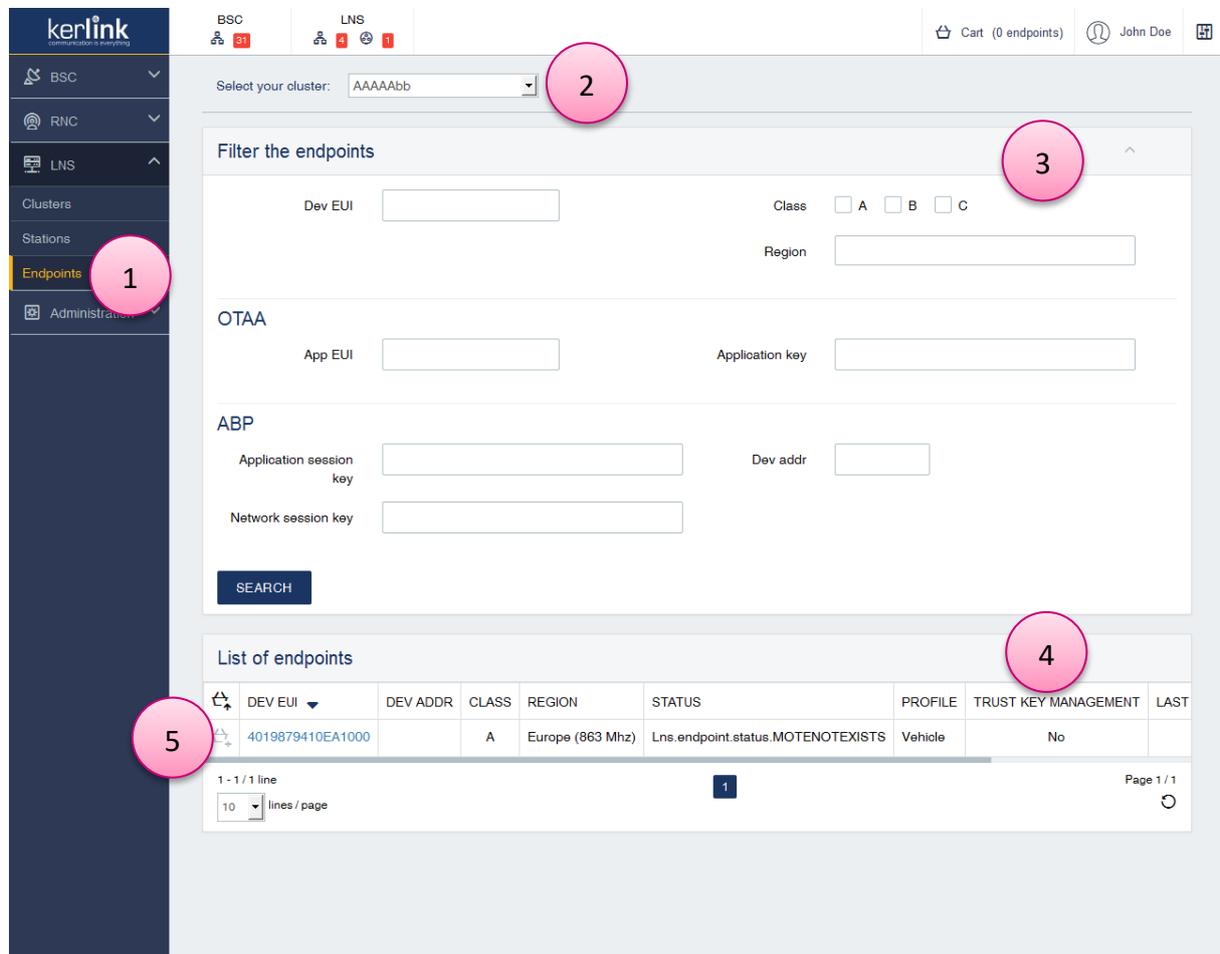


Figure 46 - LNS station properties

- (1) Click on the LNS “Stations” button then click on the ID of a station.
- (2) Attributes of the station.
- (3) Network properties of the station.
- (4) AES keys of the station.
- (5) Position of the station.
- (6) Positioning properties of the station.
- (7) Last events of the station.
- (8) The floating button allows you to edit some properties of the station
- (9) The top menu bar allows you to see last RX messages, last TX messages and events of the station.

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## 5.4 Search and list the endpoints of your clusters



The screenshot shows the 'Endpoints' page in the Kerlink RAN Dashboard. The sidebar on the left has the 'Endpoints' button highlighted with a red circle labeled '1'. The main content area has a 'Select your cluster' dropdown menu with 'AAAAAbb' selected, circled with a red circle labeled '2'. Below this is a 'Filter the endpoints' section with various input fields for 'Dev EUI', 'Class' (A, B, C), 'Region', 'App EUI', 'Application key', 'Application session key', 'Dev addr', and 'Network session key', circled with a red circle labeled '3'. A 'SEARCH' button is located below the filters. The 'List of endpoints' section contains a table with one row of data, circled with a red circle labeled '4'. The table has columns: DEV EUI, DEV ADDR, CLASS, REGION, STATUS, PROFILE, TRUST KEY MANAGEMENT, and LAST. The first row shows '4019879410EA1000', 'A', 'Europe (863 Mhz)', and 'Lns.endpoint.status.MOTENOTEXISTS'. Below the table is a pagination control showing '1 - 1 / 1 line' and '10 lines / page', circled with a red circle labeled '5'. The top right of the dashboard shows 'Cart (0 endpoints)' and the user name 'John Doe'.

Figure 47 - Endpoints list

- (1) Click on the “Endpoints” button.
- (2) Select a cluster.
- (3) The filter panel allows you to filter the endpoints according to several criteria.
- (4) The list panel shows the result of the search. If no filter is set, it shows a list of all endpoints in the selected cluster.
- (5) For each endpoint in the list, you can:
  - Add the endpoint to the cart (or remove it).
  - Go to the details page of the endpoint.

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## 5.5 Manage your endpoints cart

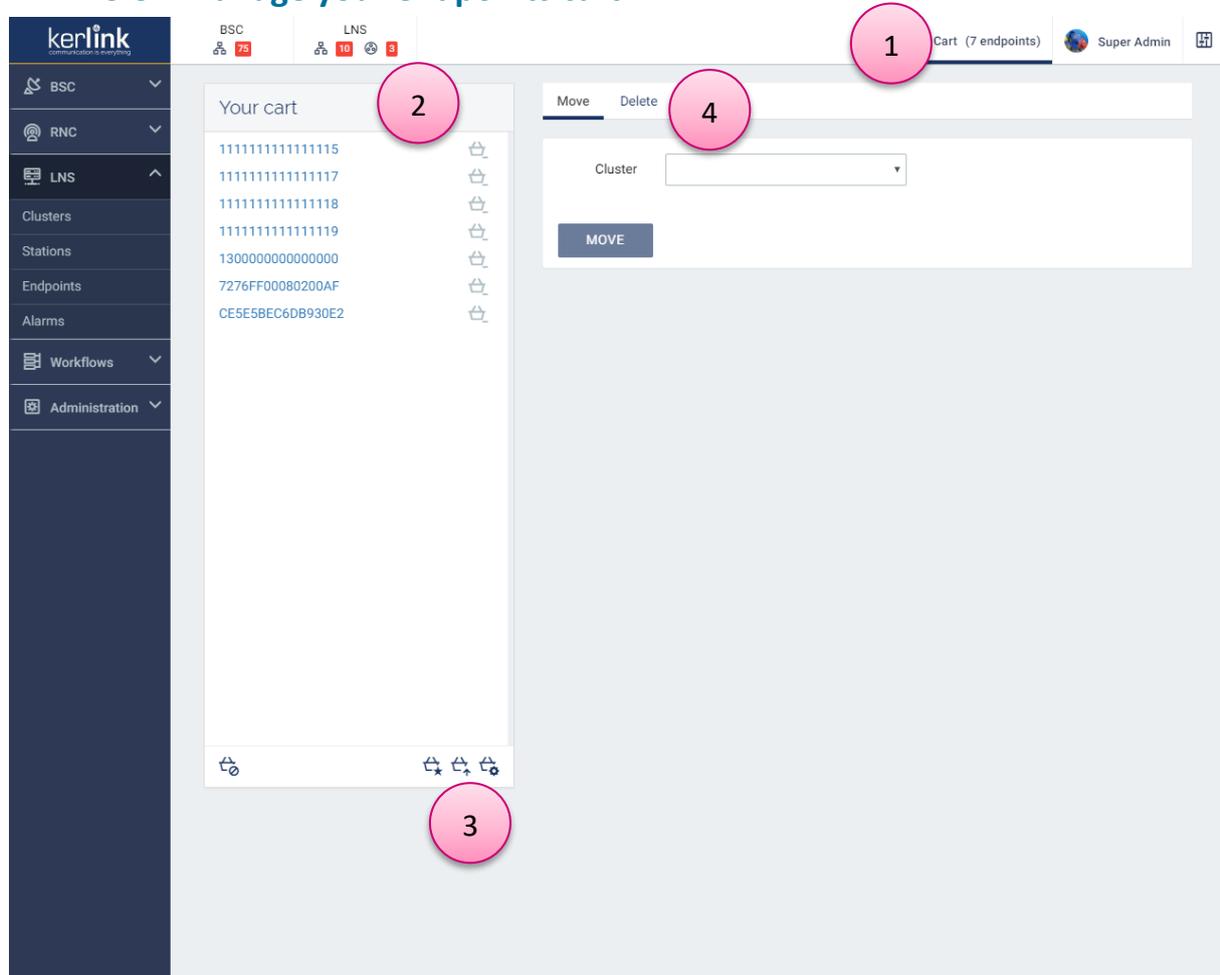


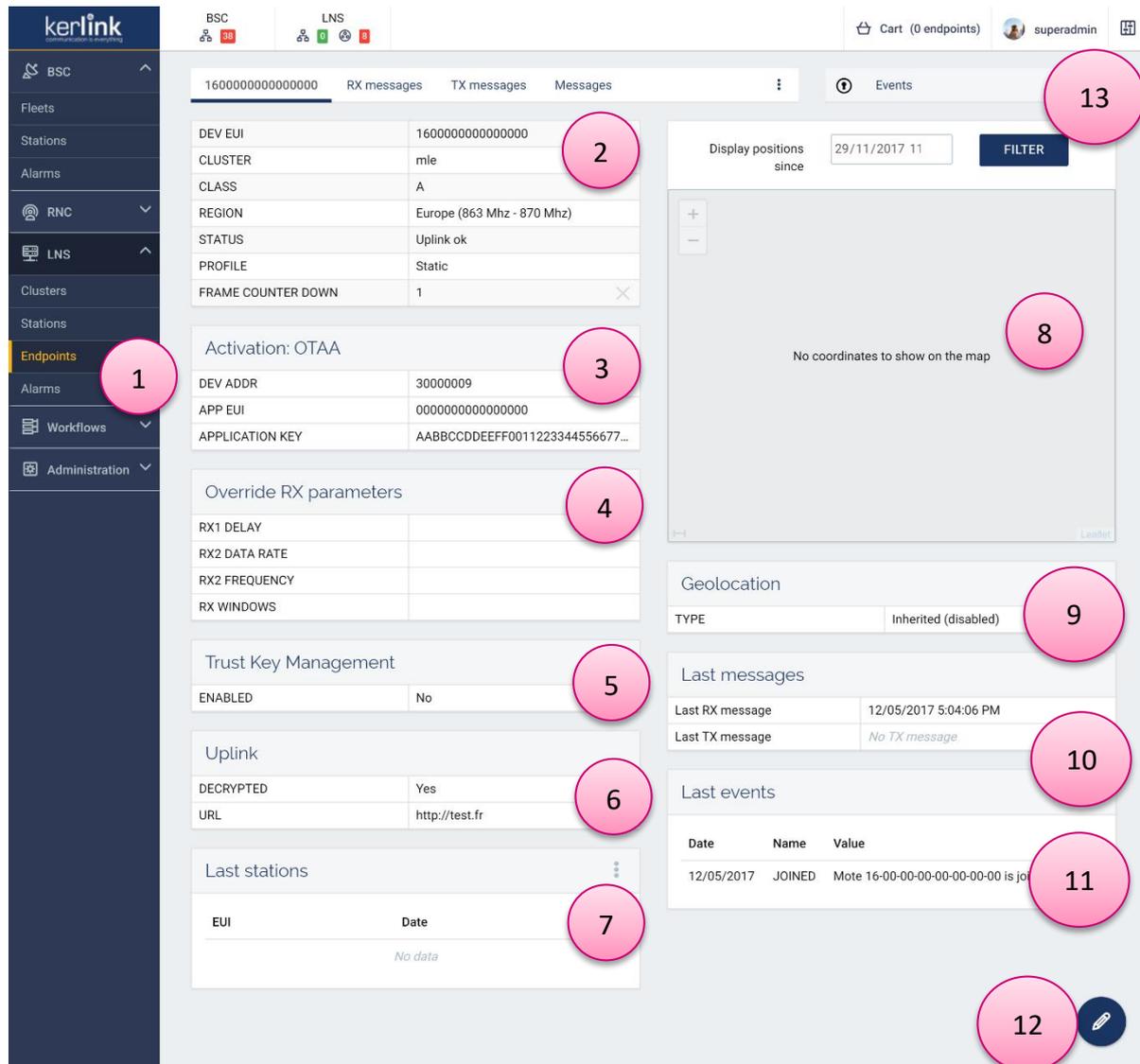
Figure 48 - Endpoints cart

- (1) Click on the cart button.
- (2) The panel “Your cart” shows the list of endpoints currently added in your cart. You can remove some endpoints or empty your cart by clicking on the respective buttons.
- (3) These buttons allow you to respectively save the current cart, load endpoints of many previous saved carts and manage previous saved carts. These functionalities are described in the paragraph 6 - Cart management.
- (4) The tabs correspond to all the actions you can perform on the endpoints of your cart.

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## 5.6 Consult the properties of an endpoint

### 5.6.1 Endpoint attributes



The screenshot displays the 'Endpoint attributes' page in the Kerlink RAN Dashboard. The interface is divided into several sections:

- Left Sidebar (1):** Contains navigation options like BSC, Fleets, Stations, Alarms, RNC, LNS, Clusters, Stations, Endpoints, Alarms, Workflows, and Administration.
- Top Bar:** Shows BSC and LNS status, a cart with 0 endpoints, and the user 'superadmin'.
- Endpoint Information:** A table showing attributes for DEV EUI 1600000000000000, including CLUSTER (mle), CLASS (A), REGION (Europe), STATUS (Uplink ok), PROFILE (Static), and FRAME COUNTER DOWN (1).
- Activation: OTAA (3):** A section for activation parameters with fields for DEV ADDR (30000009), APP EUI (0000000000000000), and APPLICATION KEY (AABBCDDDEEFF0011223344556677...).
- Override RX parameters (4):** A table for configuring RX parameters like RX1 DELAY, RX2 DATA RATE, RX2 FREQUENCY, and RX WINDOWS.
- Trust Key Management (5):** A section with an ENABLED checkbox set to 'No'.
- Uplink (6):** A section with DECRYPTED set to 'Yes' and a URL field containing 'http://test.fr'.
- Last stations (7):** A table with columns for EUI and Date, currently showing 'No data'.
- Map (8):** A map area with the text 'No coordinates to show on the map'.
- Geolocation (9):** A section with a TYPE dropdown set to 'Inherited (disabled)'.
- Last messages (10):** A section showing the last RX message (12/05/2017 5:04:06 PM) and the last TX message (No TX message).
- Last events (11):** A table with columns for Date, Name, and Value, showing an event on 12/05/2017 named 'JOINED' with value 'Mote 16-00-00-00-00-00-00-00 is jo'.
- Events (13):** A button to view event details.
- Edit (12):** A pencil icon button to edit the endpoint.

Figure 49 - Endpoint attributes

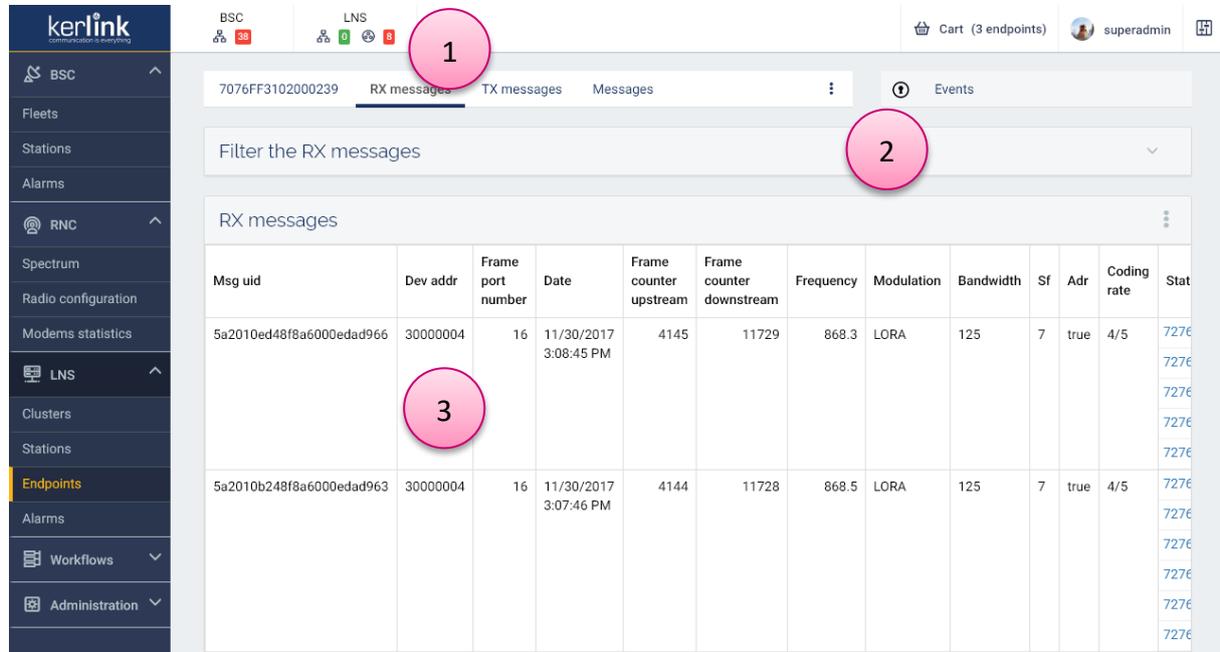
- (1) Click on the "Endpoints" button to access to the list of endpoints then click on the dev EUI of the endpoint you want to consult.
- (2) This panel shows the attributes of the endpoint. You can reset the frame counter down by clicking on the reset button.
- (3) The panel "Activation" lists the activation parameters of the endpoint (OTAA or ABP).

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- (4) The panel “Override RX parameters” lists the override RX parameters of the endpoint.
- (5) The panel “TKM” lists the trust key management parameters of the endpoint cluster. These values are set when creating the endpoint (see paragraph 8.5).
- (6) The panel “Uplink” lists the push parameters of the endpoint cluster.
- (7) The panel “Last stations” shows the last stations the endpoint has communicated with.
- (8) The map displays the positions of the endpoint and the positions of the stations who has communicated with it after the “Start date” value.
- (9) The panel “Geolocation” displays the geolocation properties of the endpoint.
- (10) The panel “Last messages” displays the last RX and TX messages of the endpoint.
- (11) The panel “Last events” displays the last events of the endpoint.
- (12) Click on the floating button to edit the endpoint.
- (13) The top menu bar allows you to see last RX messages, last TX messages and events of the endpoint.

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### 5.6.2 RX messages



The screenshot shows the 'RX messages' view for endpoint 7076FF3102000239. The table below represents the data shown in the 'RX messages' section:

Msg uid	Dev addr	Frame port number	Date	Frame counter upstream	Frame counter downstream	Frequency	Modulation	Bandwidth	Sf	Adr	Coding rate	Stat
5a2010ed48f8a6000edad966	30000004	16	11/30/2017 3:08:45 PM	4145	11729	868.3	LORA	125	7	true	4/5	727€
5a2010b248f8a6000edad963	30000004	16	11/30/2017 3:07:46 PM	4144	11728	868.5	LORA	125	7	true	4/5	727€

Figure 50 - Endpoint RX messages

- (1) Access to an endpoint page then click on the “RX messages” tab.
- (2) The filter panel allows you to filter the list of RX messages.
- (3) The panel “RX messages” list the messages sent by the endpoint and received by the stations. You can click on a message row to display its details.

### 5.6.3 TX messages

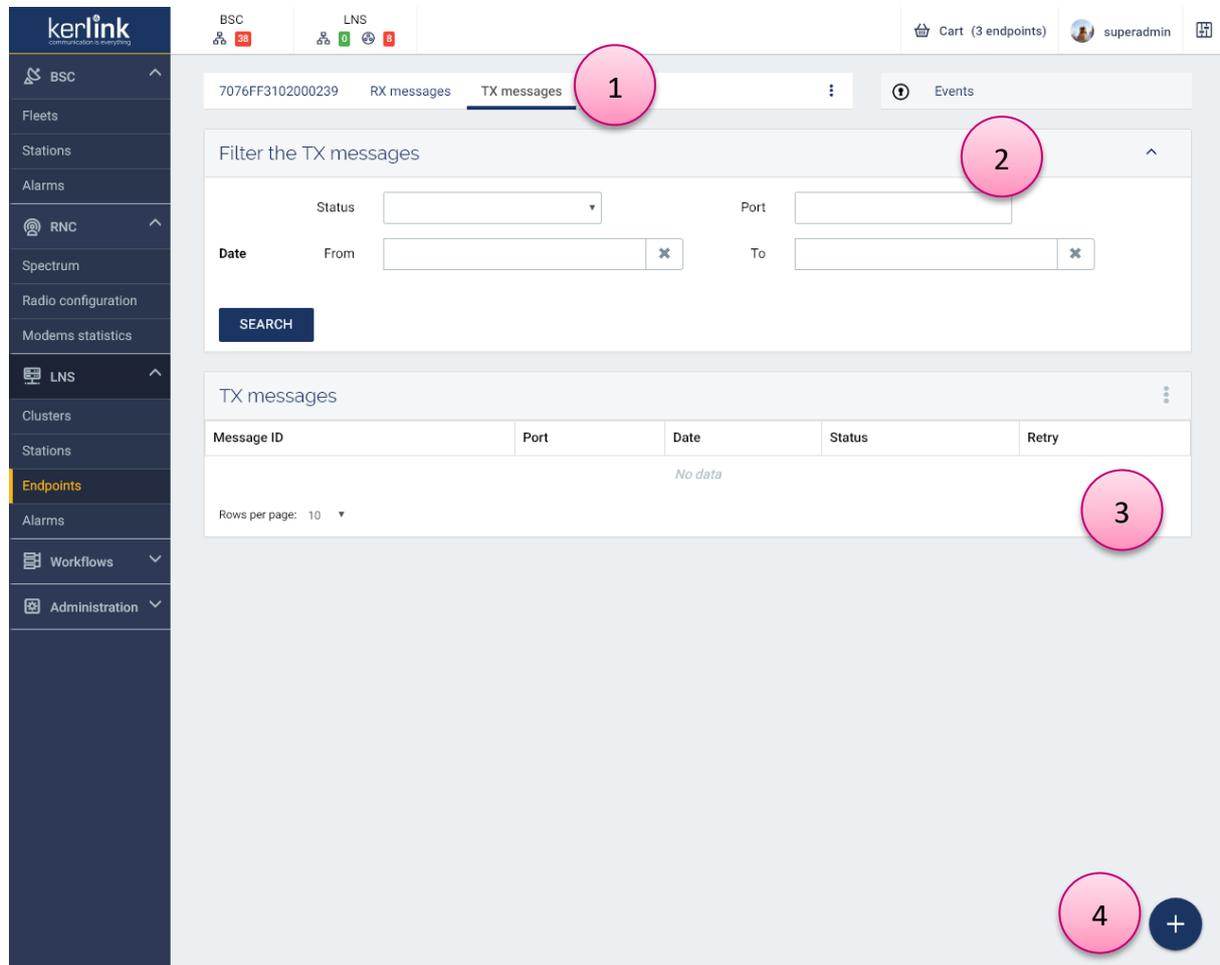


Figure 51 – Endpoint TX messages

- (1) Access to an endpoint page then click on the “TX messages” tab.
- (2) The filter panel allows you to filter the list of TX messages.
- (3) The panel “TX messages” lists the messages received by the endpoint. You can click on a message row to display its details in a popup.
- (4) The floating button allows you to send a message to the endpoint.

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### 5.6.4 Messages

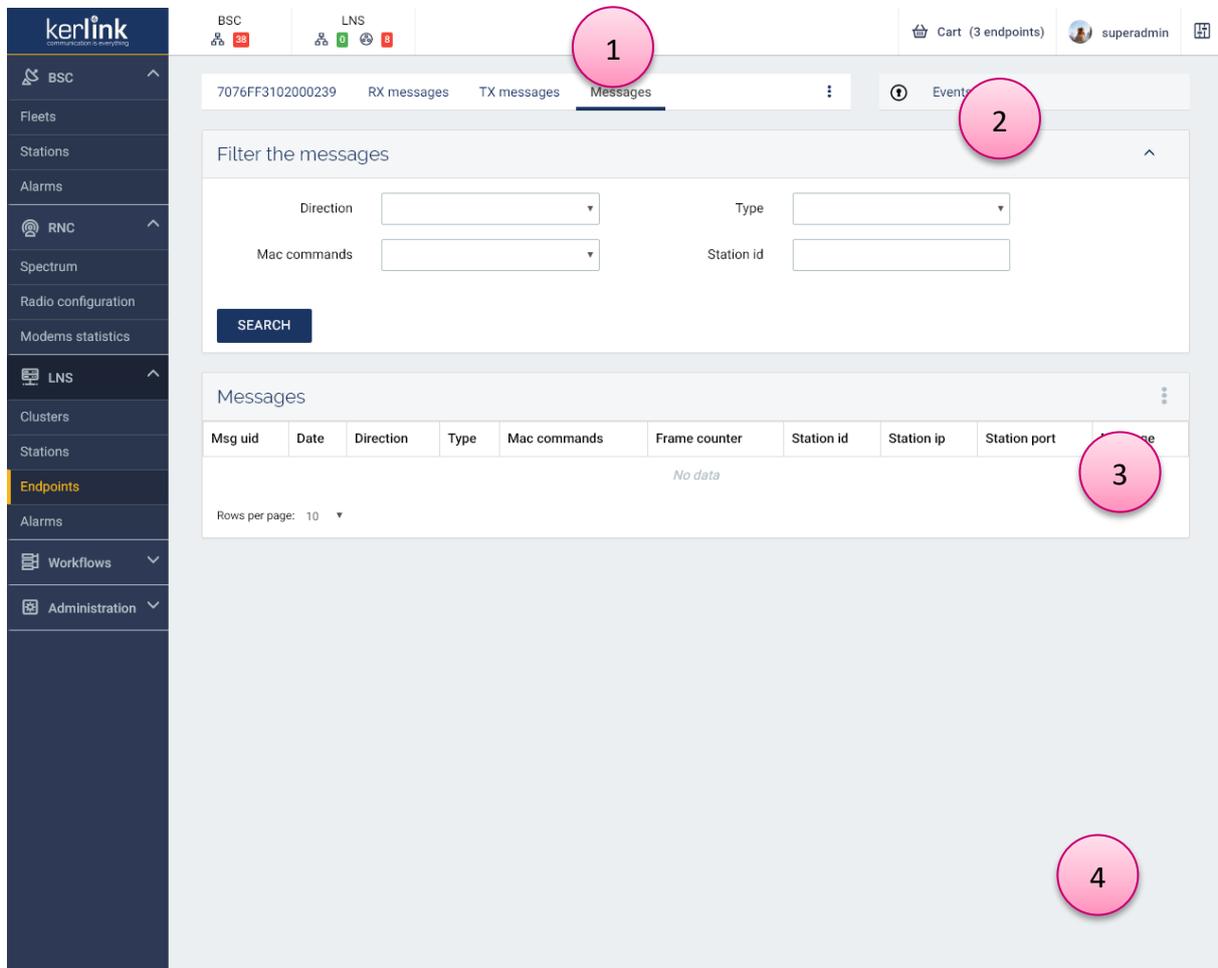
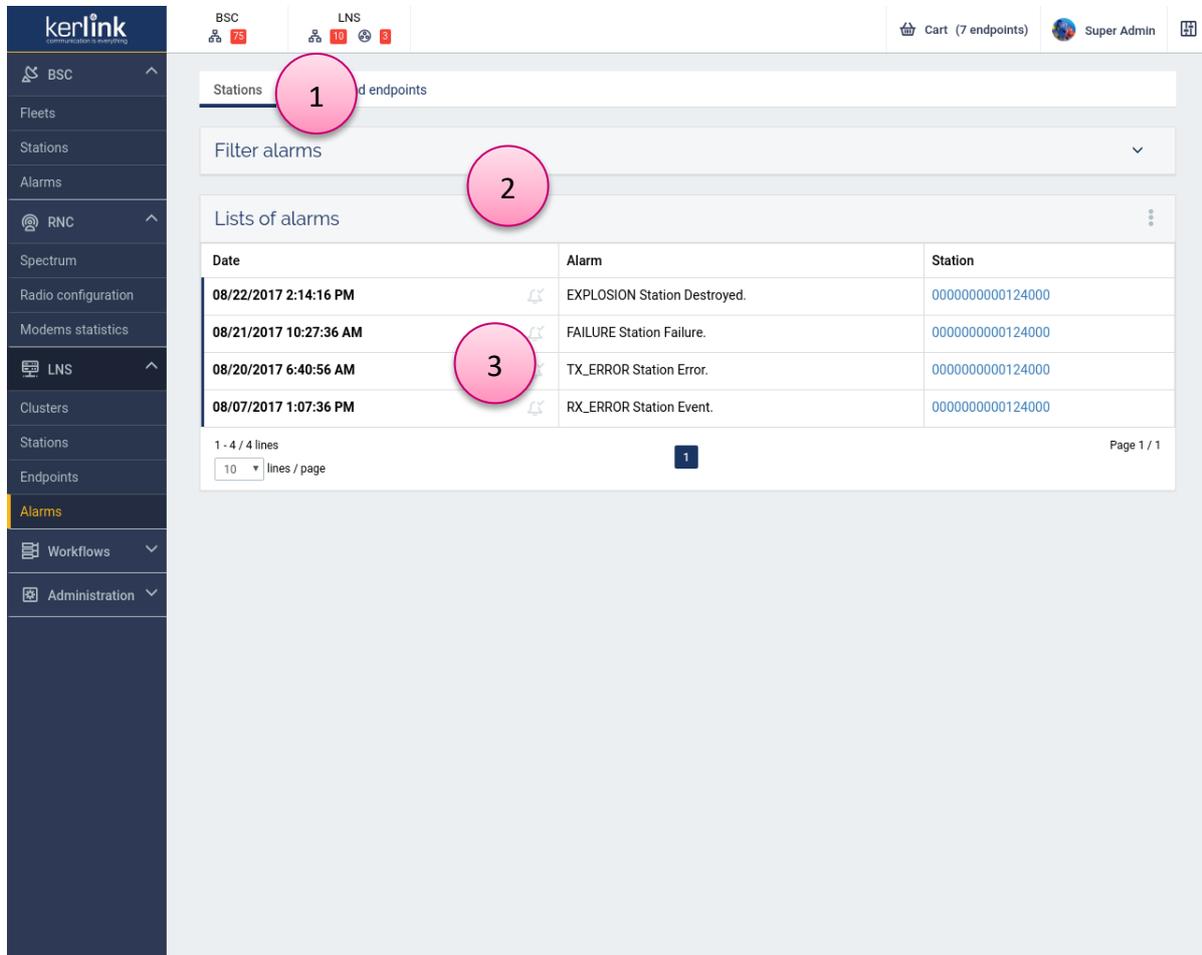


Figure 52 – Endpoint messages

- (1) Access to an endpoint page then click on the “Messages” tab.
- (2) The filter panel allows you to filter the list of messages.
- (3) The panel “Messages” lists the messages received by the endpoint. You can click on a message row to display its details in a popup.

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## 5.7 Consult the last alarms of your stations



The screenshot shows the Kerlink RAN Dashboard interface. The sidebar on the left contains navigation items: BSC, Fleets, Stations, Alarms, RNC, Spectrum, Radio configuration, Modems statistics, LNS, Clusters, Stations, Endpoints, Alarms (highlighted), Workflows, and Administration. The top navigation bar shows 'BSC' (75) and 'LNS' (10) tabs, along with a 'Cart (7 endpoints)' and 'Super Admin' user profile. The main content area displays 'Stations' and 'd endpoints' tabs. A 'Filter alarms' panel is visible. Below it, a table titled 'Lists of alarms' shows the following data:

Date	Alarm	Station
08/22/2017 2:14:16 PM	EXPLOSION Station Destroyed.	000000000124000
08/21/2017 10:27:36 AM	FAILURE Station Failure.	000000000124000
08/20/2017 6:40:56 AM	TX_ERROR Station Error.	000000000124000
08/07/2017 1:07:36 PM	RX_ERROR Station Event.	000000000124000

At the bottom of the table, there is a pagination control showing '1 - 4 / 4 lines' and a dropdown for '10 lines / page'. A '1' button is also visible at the bottom right of the table area.

Figure 53 – Last alarms of LNS stations

- (1) Click on the “Alarms” button to navigate to the LNS station alarms screen.
- (2) The list displays the LNS station alarms. You can filter on a specific alarm type with the “Filter alarms” panel.
- (3) You can click on the “read” button to mark an alarm as read.

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## 5.8 Consult the last alarms of your endpoints

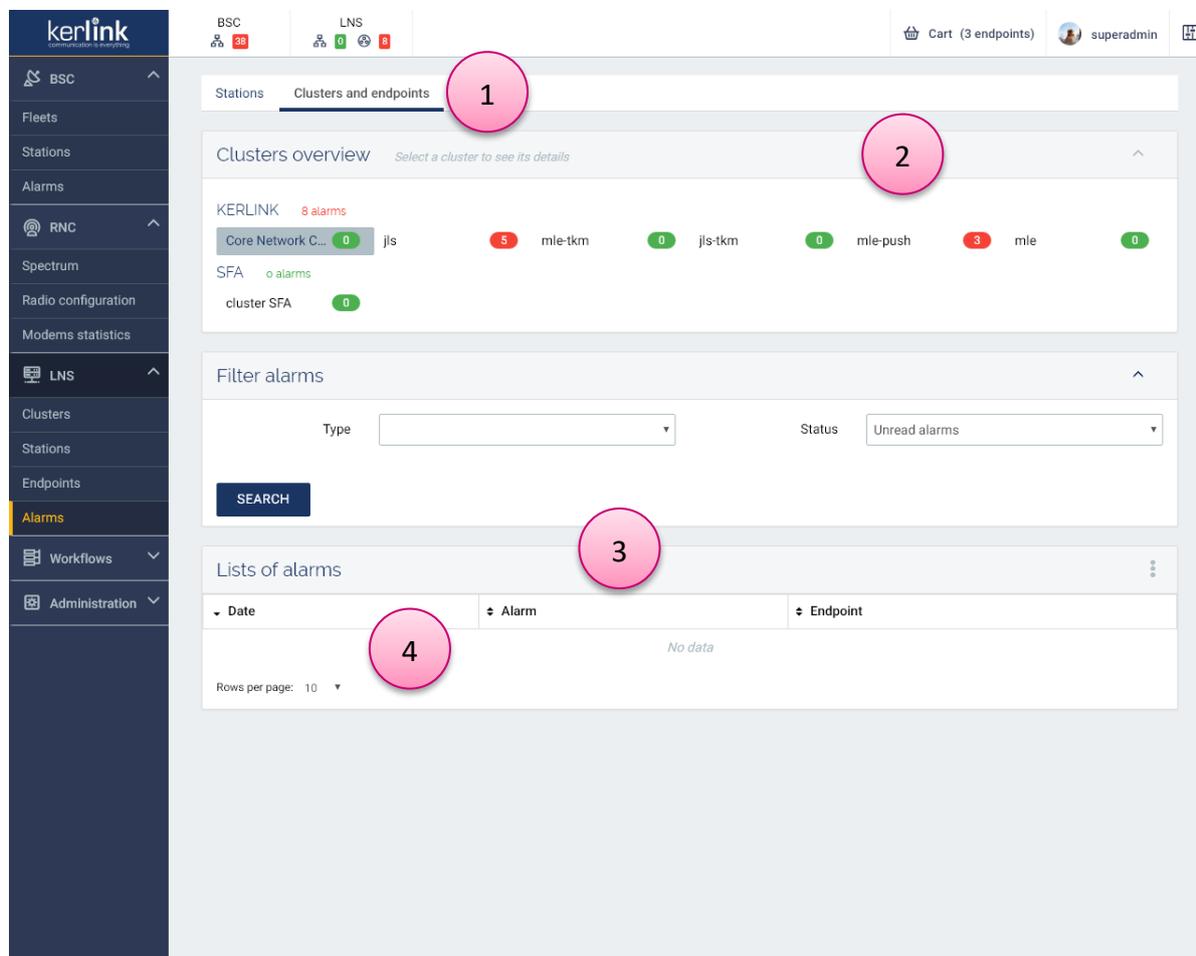


Figure 54 - Last alarms of endpoints

- (1) Click on the “Alarms” button to navigate to the LNS endpoint alarms screen.
- (2) The “Clusters overview” panel lists all the clusters with their number of alarms. To see the details of a cluster, click on it.  
  
A super admin will see all clusters of all customers. Other roles will only see the clusters of their customer.
- (3) Select criteria then click on the “Search” button to filter the alarms.
- (4) The “Details” panel lists all the endpoints of the selected cluster with their current alarms.
- (5) You can click on the “read” button to mark an alarm as read.

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## 6. Cart management

### 6.1 Save your cart

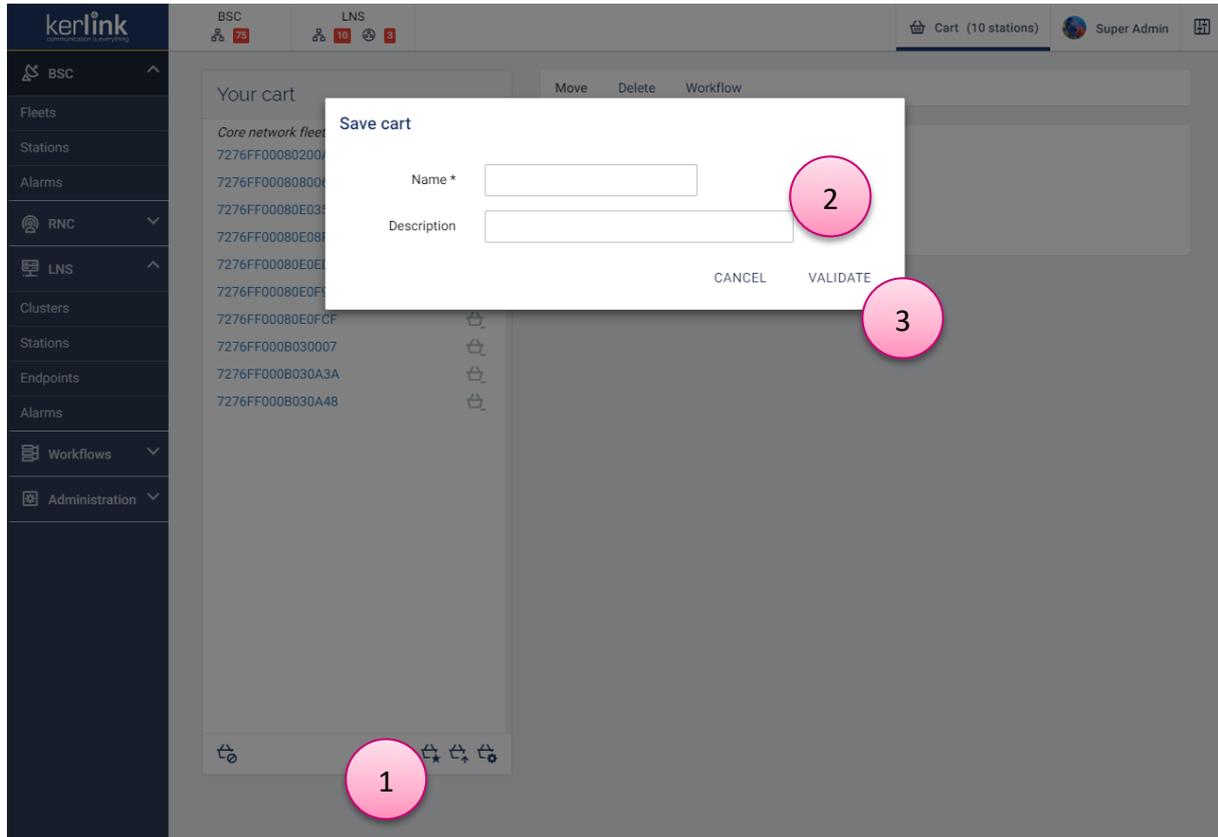


Figure 55 - Save cart

- (1) Click on the “Save” button. A modal appears.
- (2) Enter a name and optionally a description.
- (3) Click on the “Validate” button to save your cart. The modal disappears and your cart is saved.

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## 6.2 Load the content of your carts

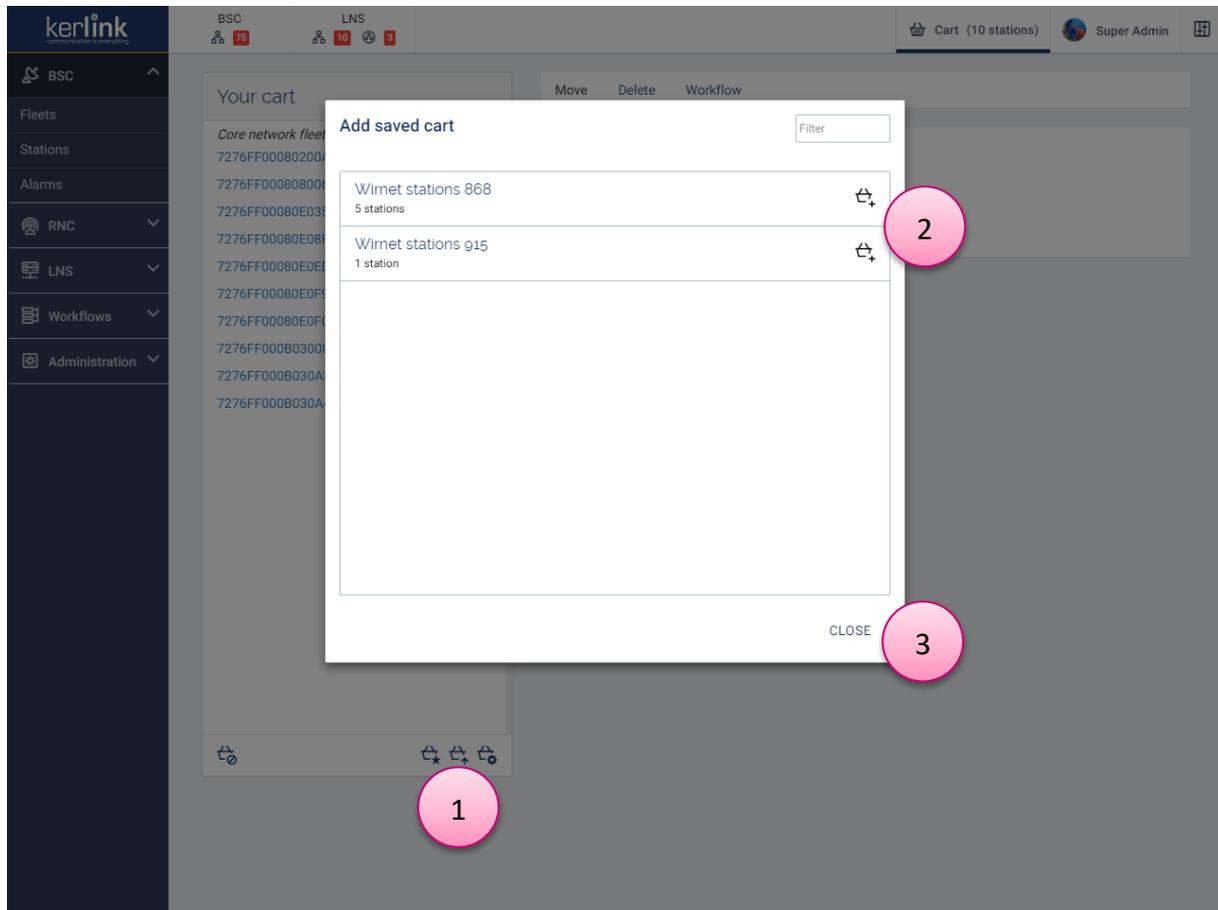
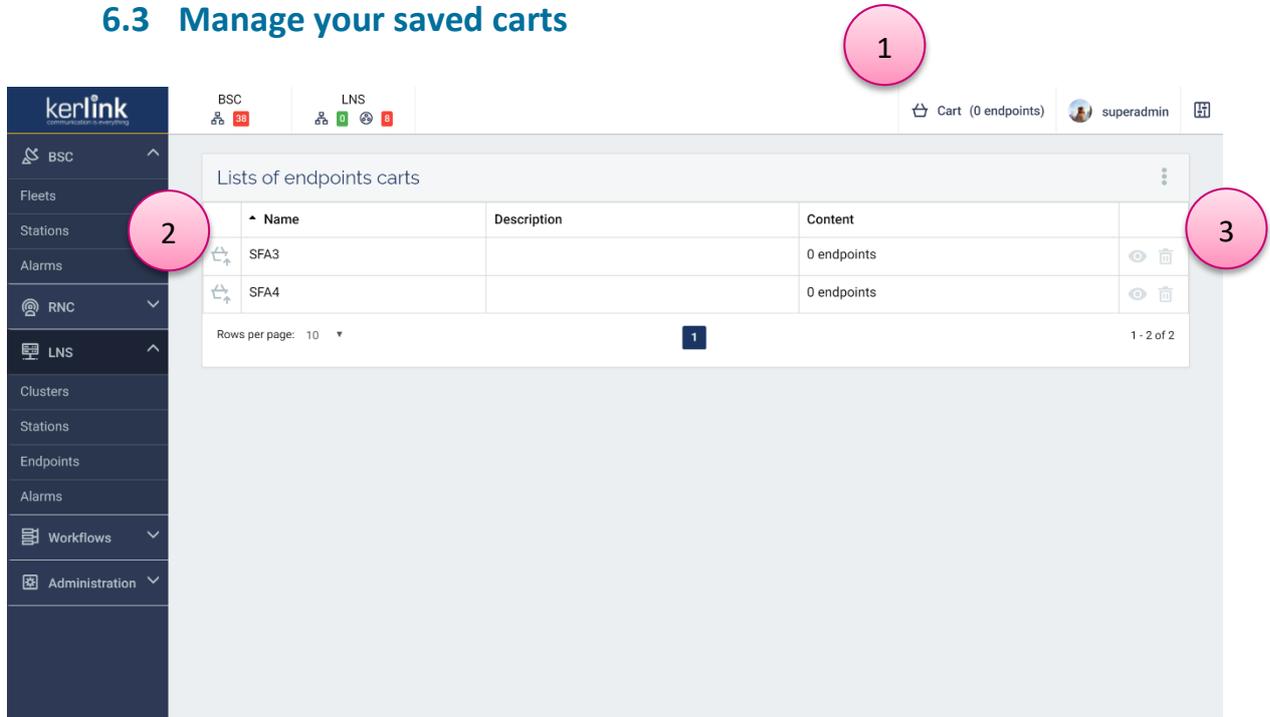


Figure 56 - Load content of carts

- (1) Click on the “Load” button. A modal appears with your previous saved carts.
- (2) Click on the “Add” button of the saved carts you want to load the content. The content is added to your cart.
- (3) Click on the “Close” button. The modal disappears.

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### 6.3 Manage your saved carts



The screenshot shows the 'Lists of endpoints carts' management interface. The table contains the following data:

Name	Description	Content	Actions
SFA3		0 endpoints	view, delete
SFA4		0 endpoints	view, delete

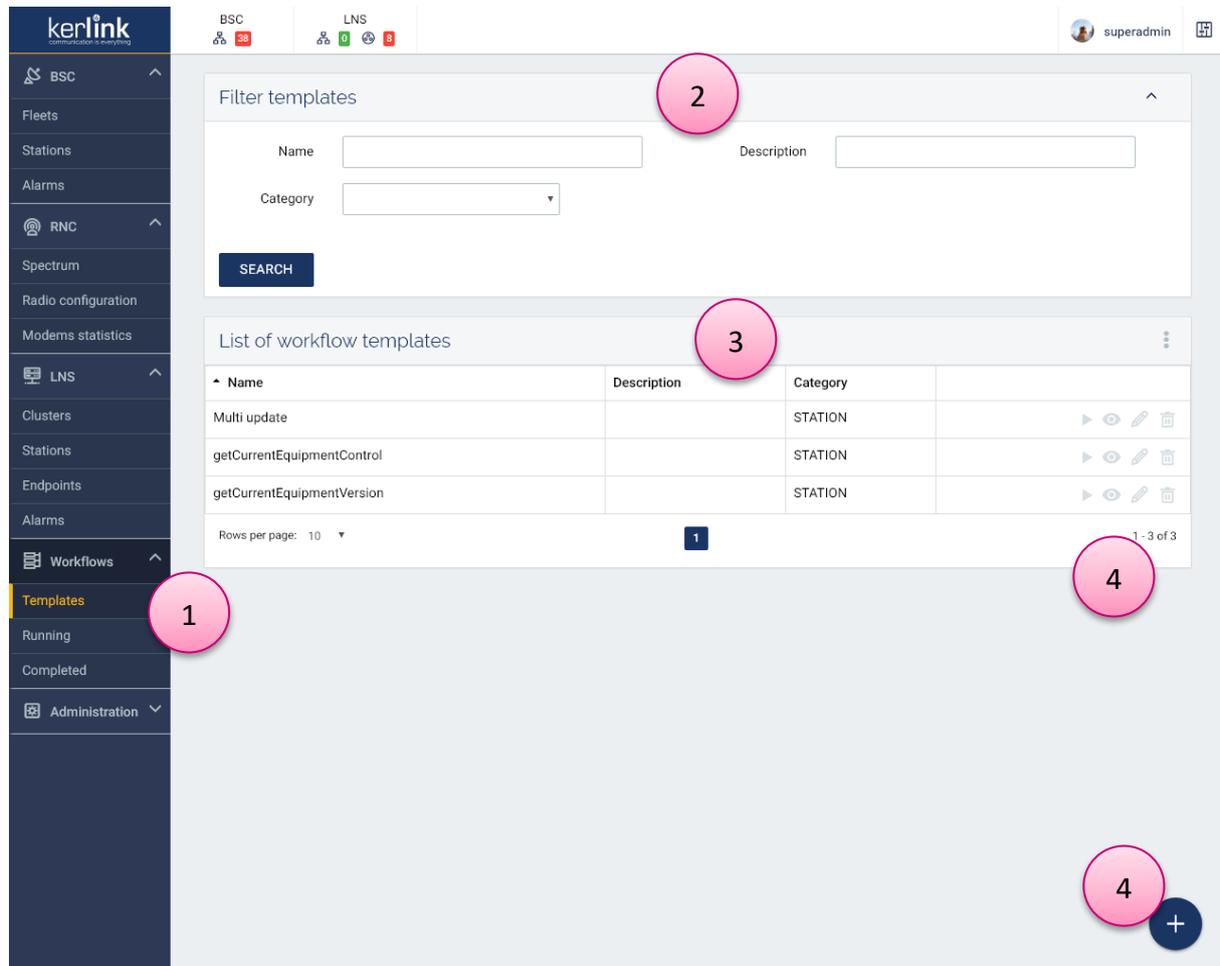
Additional interface elements include a sidebar menu with 'LNS' selected, a top navigation bar with 'BSC' and 'LNS' tabs, and a user profile dropdown showing 'superadmin'.

Figure 57 - Saved carts management

- (1) Click on the “Cart” button and then click on the “Manage” button at the bottom of your cart list. The saved carts management page is loading.
- (2) Click on the “Add” button of the saved carts you want to add. The content is added to your cart.
- (3) Click on the “view” button to see the details of the saved cart. Click on the “delete” button to delete a saved cart.

## 7. Workflow

### 7.1 List workflow templates



The screenshot shows the 'List workflow templates' page in the Kerlink RAN Dashboard. The interface includes a sidebar menu with 'Templates' highlighted under the 'Workflows' section (1). The main content area features a search filter section (2) with input fields for Name, Description, and Category, and a 'SEARCH' button. Below the filter is a table titled 'List of workflow templates' (3) with columns for Name, Description, and Category. The table lists three templates: 'Multi update', 'getCurrentEquipmentControl', and 'getCurrentEquipmentVersion'. Below the table is a pagination control (1) showing 'Rows per page: 10' and '1 - 3 of 3'. A floating button (4) with a plus sign is located at the bottom right of the table area.

Figure 58 - List workflow templates

- (1) Click the "Template" item in the "Workflows" menu
- (2) Set filters and click on search to filter the templates
- (3) List workflows templates
- (4) The buttons allow you to execute, see, edit or delete a template
- (5) The floating button allows you to create a new template

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## 7.2 Create a workflow template

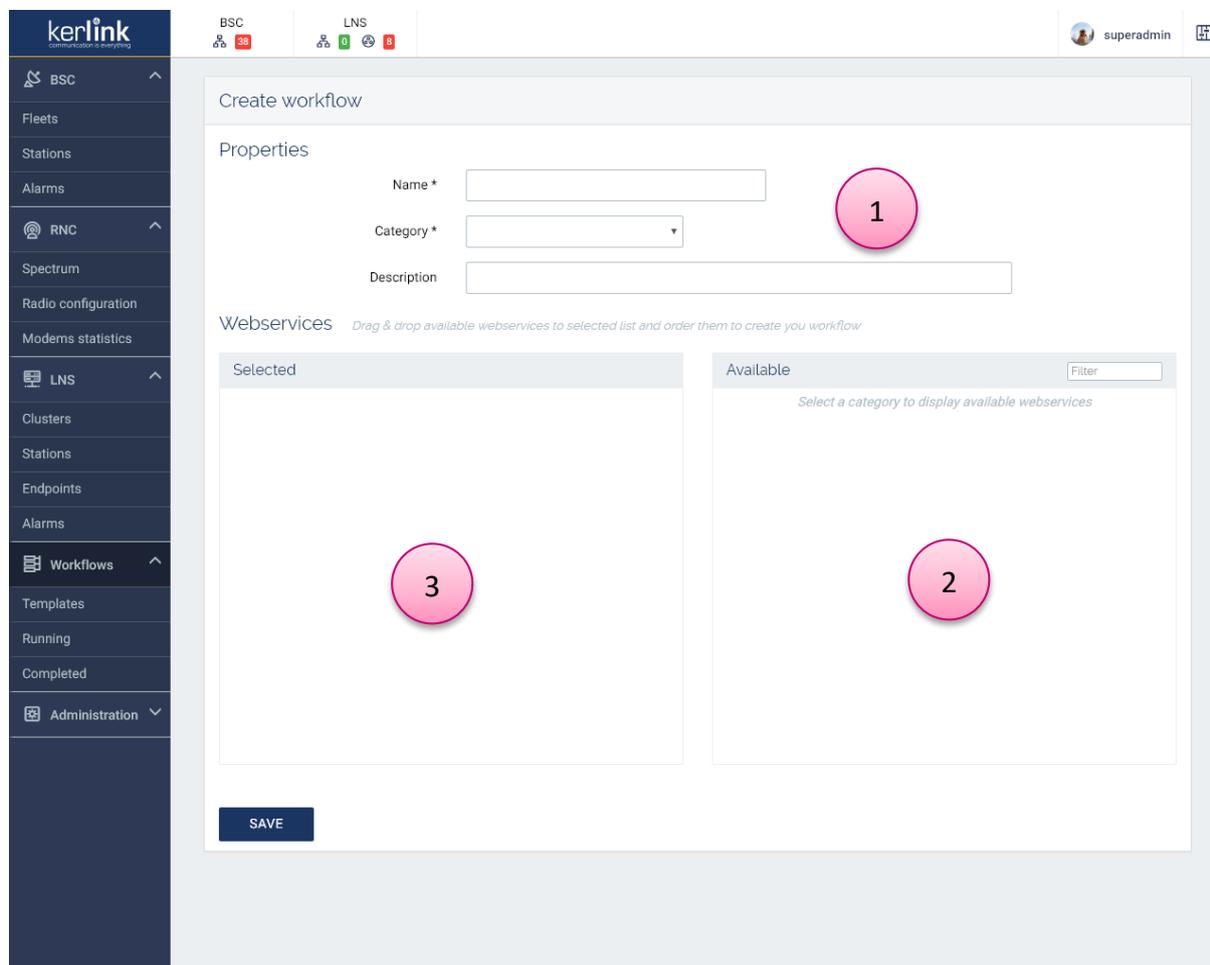


Figure 59 - Import workflow template

- (1) The properties of the template, including the category (Station or Endpoint) which defines the list of available webservices.
- (2) The list of available webservices that can be added to the template.
- (3) Drag & drop a webservice from (2) to (3) to add a webservice to the template. Then, in the selected list (3), you can drag & drop webservices to order them.

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### 7.3 Execute a workflow

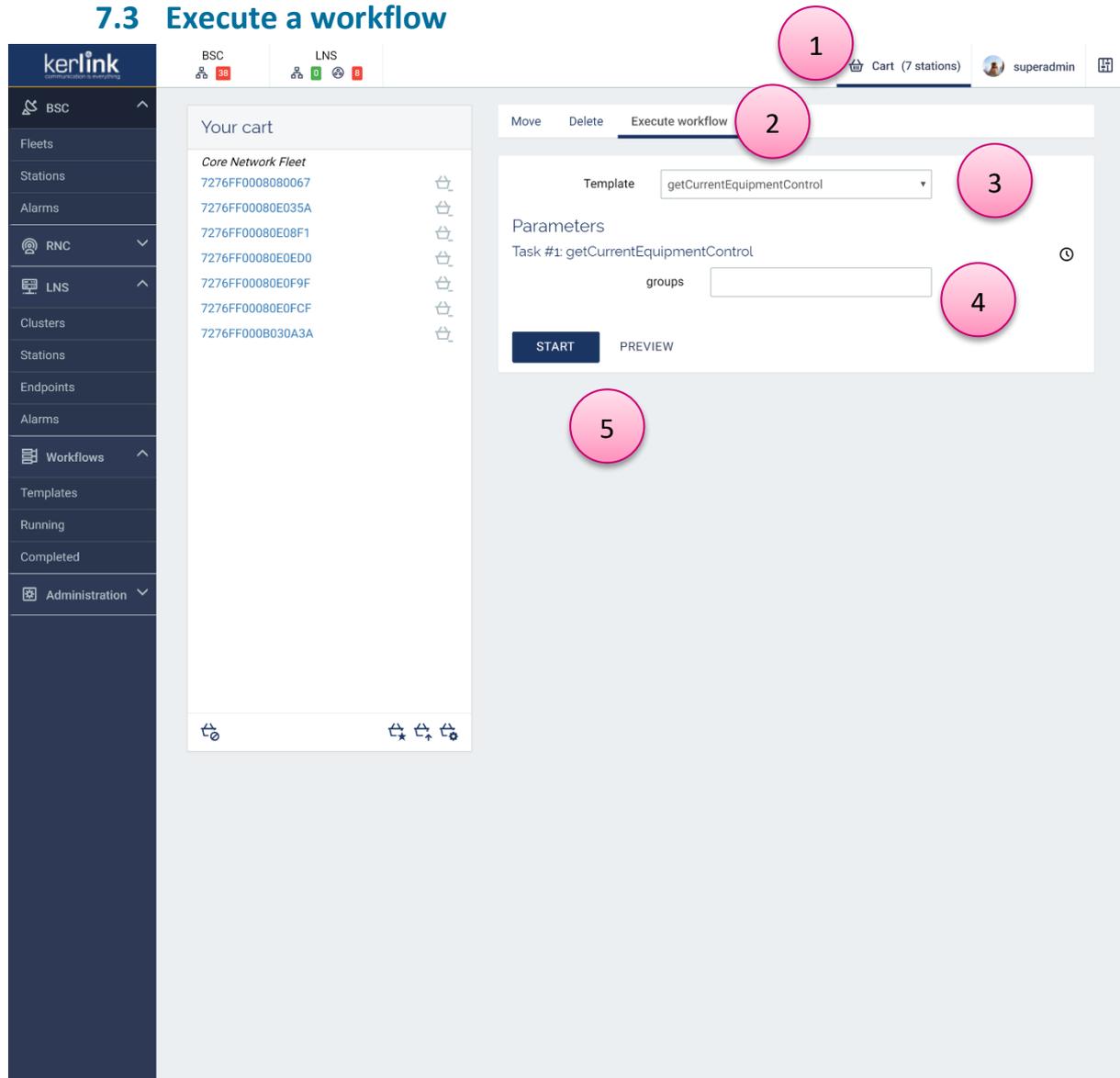


Figure 60 – Execute a workflow

- (1) Click on the “Cart” button.
- (2) Click on the “Workflow” tab.
- (3) Select a template workflow.
- (4) Enter the parameters of the workflow.
- (5) The buttons allow you to:

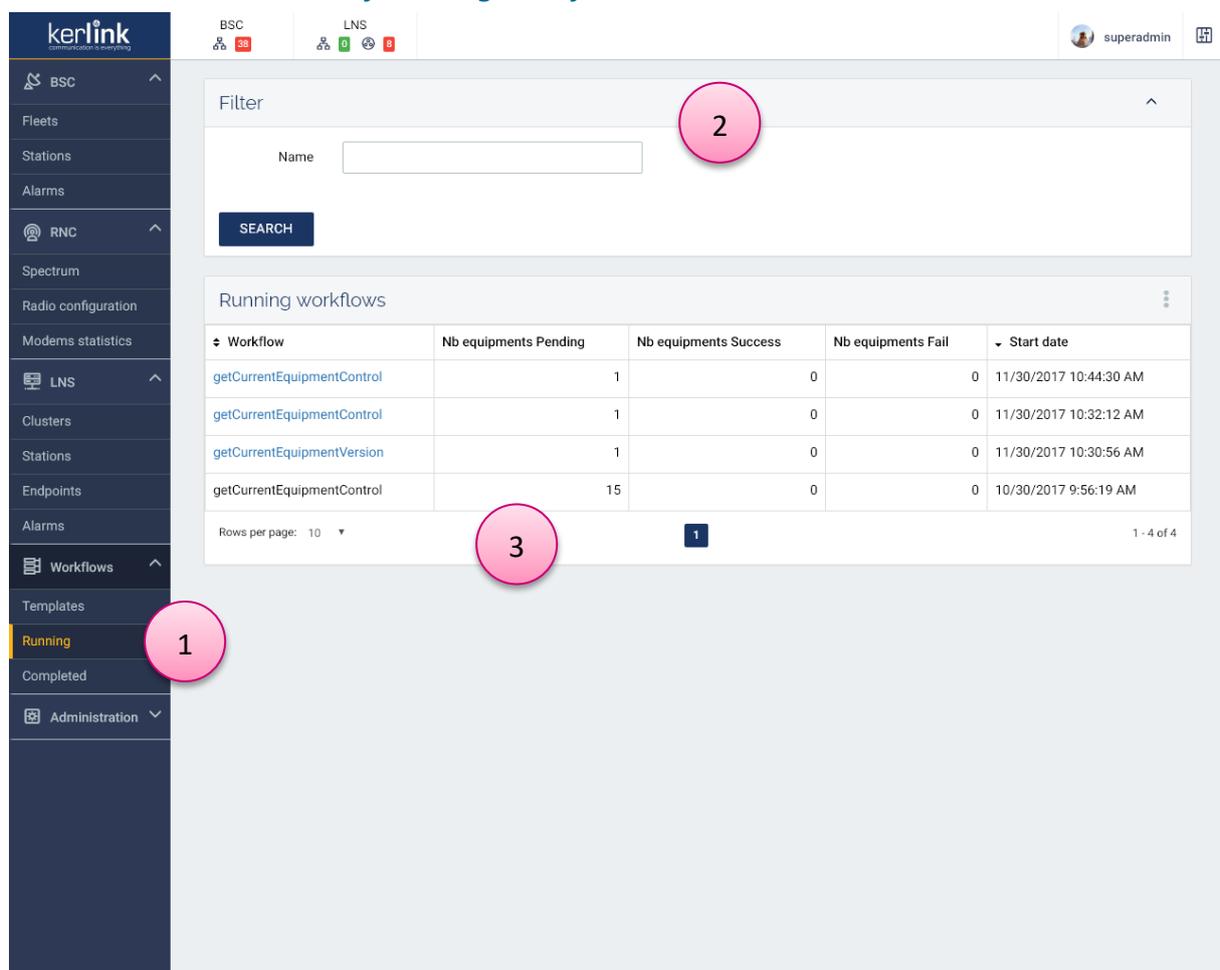
- start a workflow

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- preview the selected workflow
- go to the workflow progress page (this button is only visible when the workflow is started)

## 7.4 Running workflows

### 7.4.1 List of running workflows



The screenshot shows the Kerlink RAN Dashboard interface. On the left is a dark sidebar menu with the 'Workflows' section expanded, and the 'Running' item highlighted. At the top right, the user 'superadmin' is logged in. The main area features a search filter for workflow names and a table of running workflows. The table has columns for Workflow, Pending, Success, Fail, and Start date. The table lists four workflows, all of which are 'getCurrentEquipmentControl' with varying start dates and pending counts.

Workflow	Nb equipments Pending	Nb equipments Success	Nb equipments Fail	Start date
getCurrentEquipmentControl	1	0	0	11/30/2017 10:44:30 AM
getCurrentEquipmentControl	1	0	0	11/30/2017 10:32:12 AM
getCurrentEquipmentVersion	1	0	0	11/30/2017 10:30:56 AM
getCurrentEquipmentControl	15	0	0	10/30/2017 9:56:19 AM

Figure 61 - Running workflows list

- (1) Click on the “Running” item in the “Workflows” menu.
- (2) Set the filters and click on search to filter workflows list.
- (3) The panel lists the currently processing workflows.

Clicking on a workflow name will display the details of the execution.

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### 7.4.2 Details of a running workflow execution

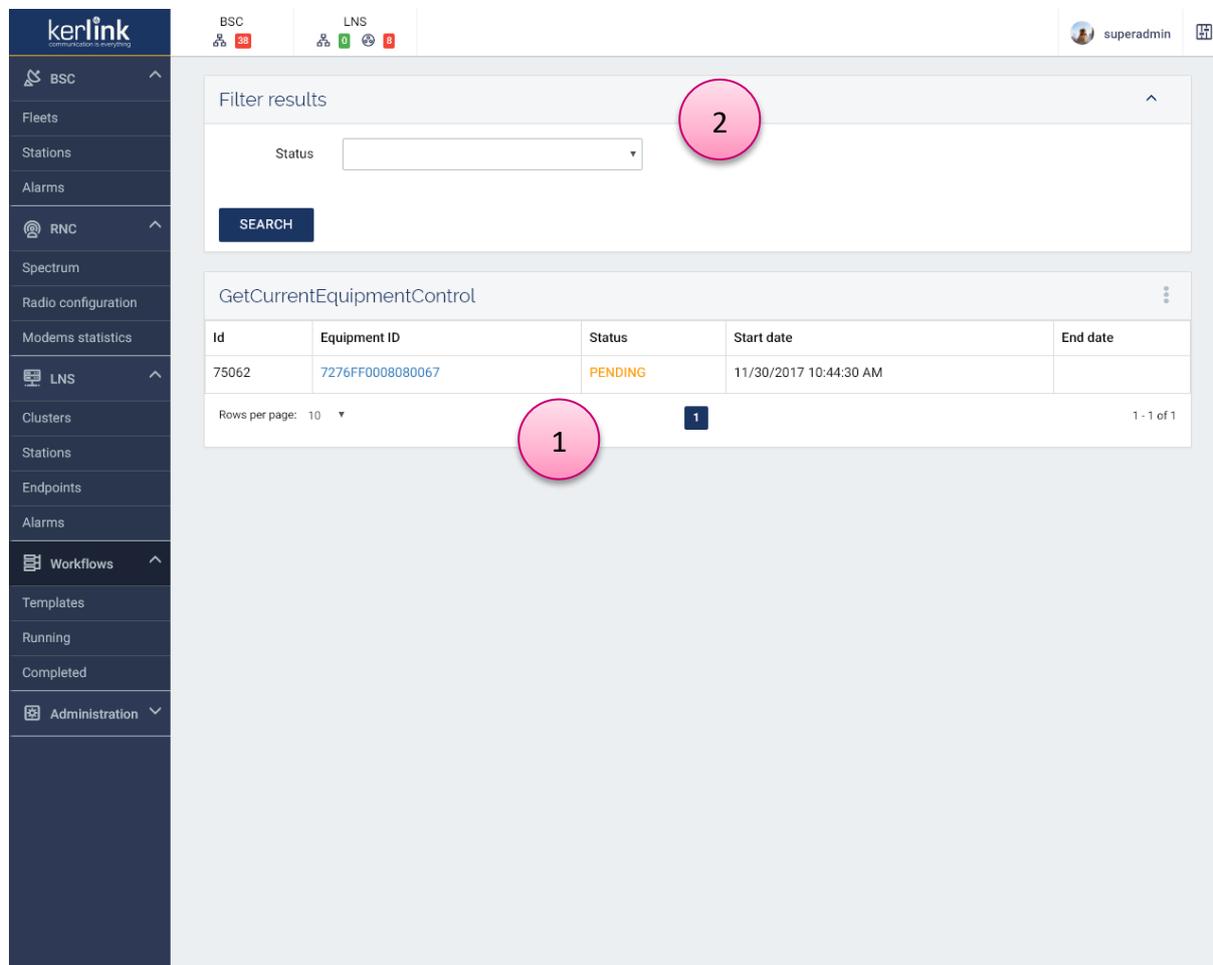


Figure 62 – Details of a running workflows

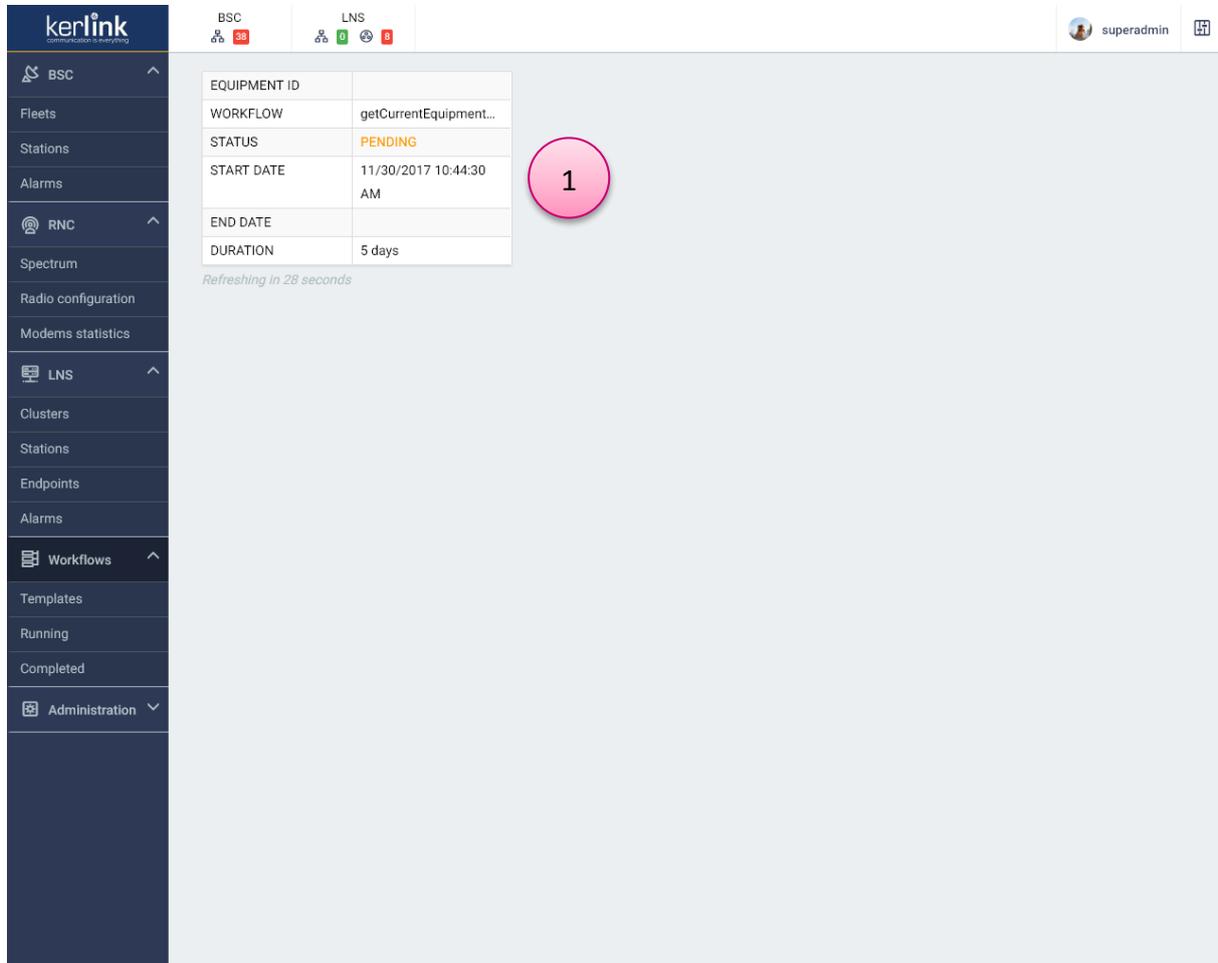
- (1) The list shows all equipment on which the workflow has been executed and displays its status, start date and end date.

A workflow is considered as running if there is at least on equipment in PENDING status.

Clicking on an equipment ID will display the details of the execution for this equipment.

- (2) Set the filters and click on search to filter the equipment list.

### 7.4.3 Details of a running workflow execution for a specific equipment



The screenshot shows the Kerlink RAN Dashboard interface. On the left is a navigation menu with categories: BSC, RNC, LNS, Workflows, and Administration. The main content area displays details for a workflow execution. At the top, there are tabs for BSC and LNS. The workflow details are shown in a table:

EQUIPMENT ID	
WORKFLOW	getCurrentEquipment...
STATUS	PENDING
START DATE	11/30/2017 10:44:30 AM
END DATE	
DURATION	5 days

Below the table, it says "Refreshing in 28 seconds". A red circle with the number 1 is overlaid on the "STATUS" field.

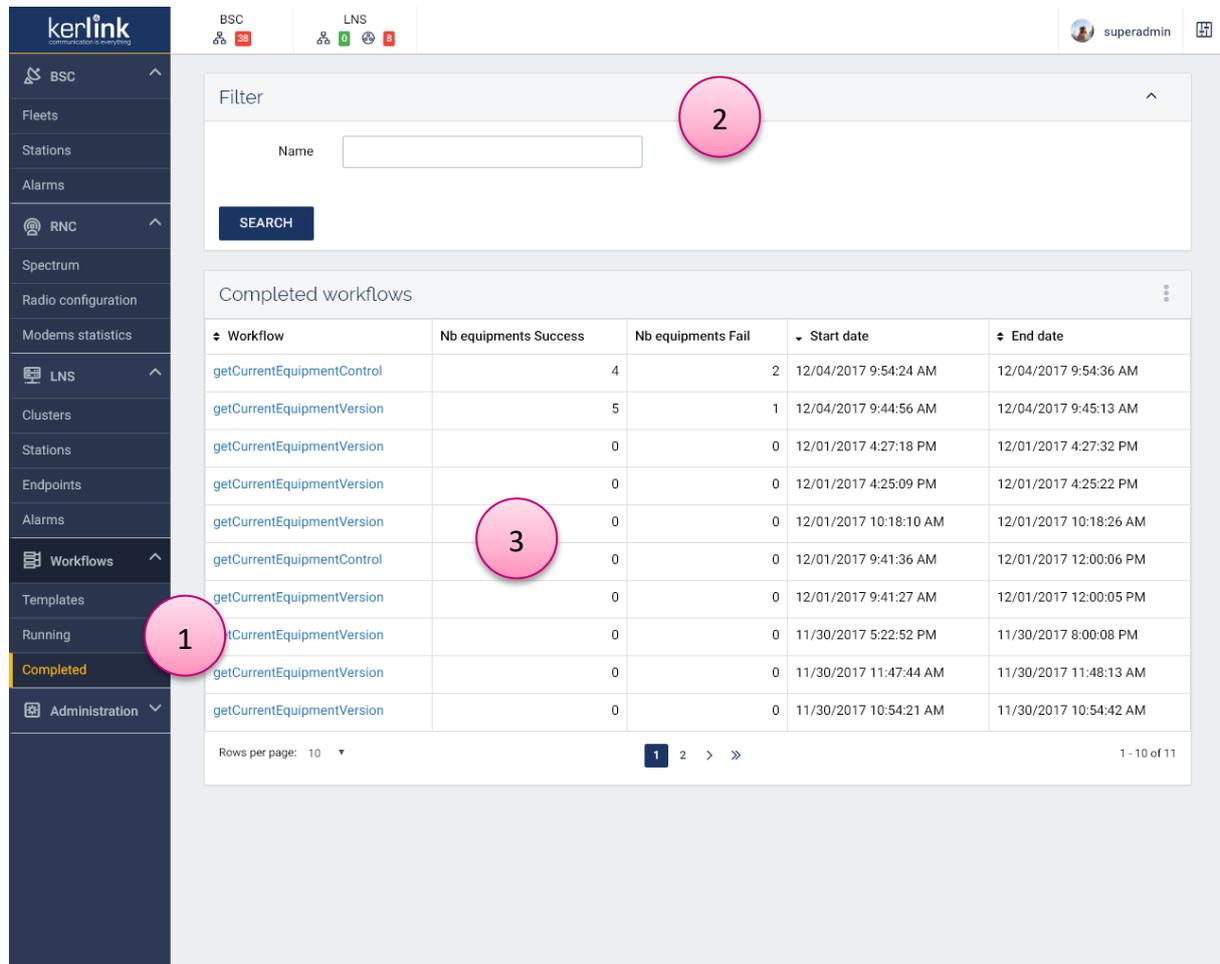
Figure 63 – Details of a running workflows for an equipment

- (1) When in PENDING status, the details page shows only some attributes of the execution. The page is automatically refreshed every 30 seconds.

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## 7.5 Completed workflows

### 7.5.1 List of completed workflows



The screenshot shows the 'Completed workflows' section of the Kerlink RAN Dashboard. The sidebar menu on the left has 'Completed' highlighted under the 'Workflows' category. The main area features a search filter with a 'Name' input field and a 'SEARCH' button. Below the filter is a table titled 'Completed workflows' with the following columns: Workflow, Nb equipments Success, Nb equipments Fail, Start date, and End date. The table contains 10 rows of data. A pagination bar at the bottom indicates 'Rows per page: 10' and '1 - 10 of 11'.

Workflow	Nb equipments Success	Nb equipments Fail	Start date	End date
<a href="#">getCurrentEquipmentControl</a>	4	2	12/04/2017 9:54:24 AM	12/04/2017 9:54:36 AM
<a href="#">getCurrentEquipmentVersion</a>	5	1	12/04/2017 9:44:56 AM	12/04/2017 9:45:13 AM
<a href="#">getCurrentEquipmentVersion</a>	0	0	12/01/2017 4:27:18 PM	12/01/2017 4:27:32 PM
<a href="#">getCurrentEquipmentVersion</a>	0	0	12/01/2017 4:25:09 PM	12/01/2017 4:25:22 PM
<a href="#">getCurrentEquipmentVersion</a>	0	0	12/01/2017 10:18:10 AM	12/01/2017 10:18:26 AM
<a href="#">getCurrentEquipmentControl</a>	0	0	12/01/2017 9:41:36 AM	12/01/2017 12:00:06 PM
<a href="#">getCurrentEquipmentVersion</a>	0	0	12/01/2017 9:41:27 AM	12/01/2017 12:00:05 PM
<a href="#">getCurrentEquipmentVersion</a>	0	0	11/30/2017 5:22:52 PM	11/30/2017 8:00:08 PM
<a href="#">getCurrentEquipmentVersion</a>	0	0	11/30/2017 11:47:44 AM	11/30/2017 11:48:13 AM
<a href="#">getCurrentEquipmentVersion</a>	0	0	11/30/2017 10:54:21 AM	11/30/2017 10:54:42 AM

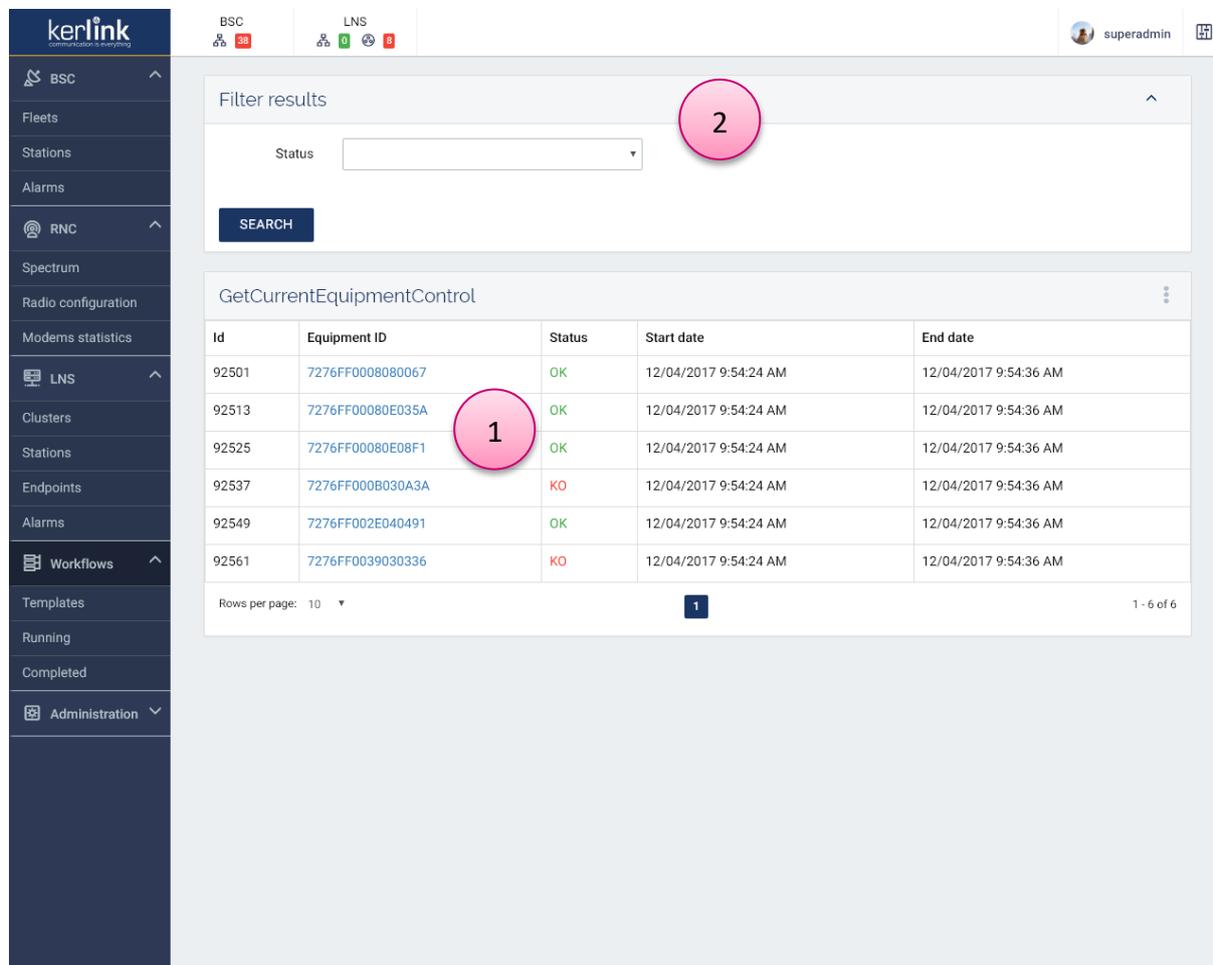
Figure 64 - Completed workflows list

- (1) Click on the "Completed" item in the "Workflows" menu.
- (2) Set the filters and click on search to filter workflows list.
- (3) The panel lists the completed workflows.

Clicking on a workflow name will display the details of the execution.

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### 7.5.2 Details of a completed workflow execution



Id	Equipment ID	Status	Start date	End date
92501	7276FF0008080067	OK	12/04/2017 9:54:24 AM	12/04/2017 9:54:36 AM
92513	7276FF00080E035A	OK	12/04/2017 9:54:24 AM	12/04/2017 9:54:36 AM
92525	7276FF00080E08F1	OK	12/04/2017 9:54:24 AM	12/04/2017 9:54:36 AM
92537	7276FF000B030A3A	KO	12/04/2017 9:54:24 AM	12/04/2017 9:54:36 AM
92549	7276FF002E040491	OK	12/04/2017 9:54:24 AM	12/04/2017 9:54:36 AM
92561	7276FF0039030336	KO	12/04/2017 9:54:24 AM	12/04/2017 9:54:36 AM

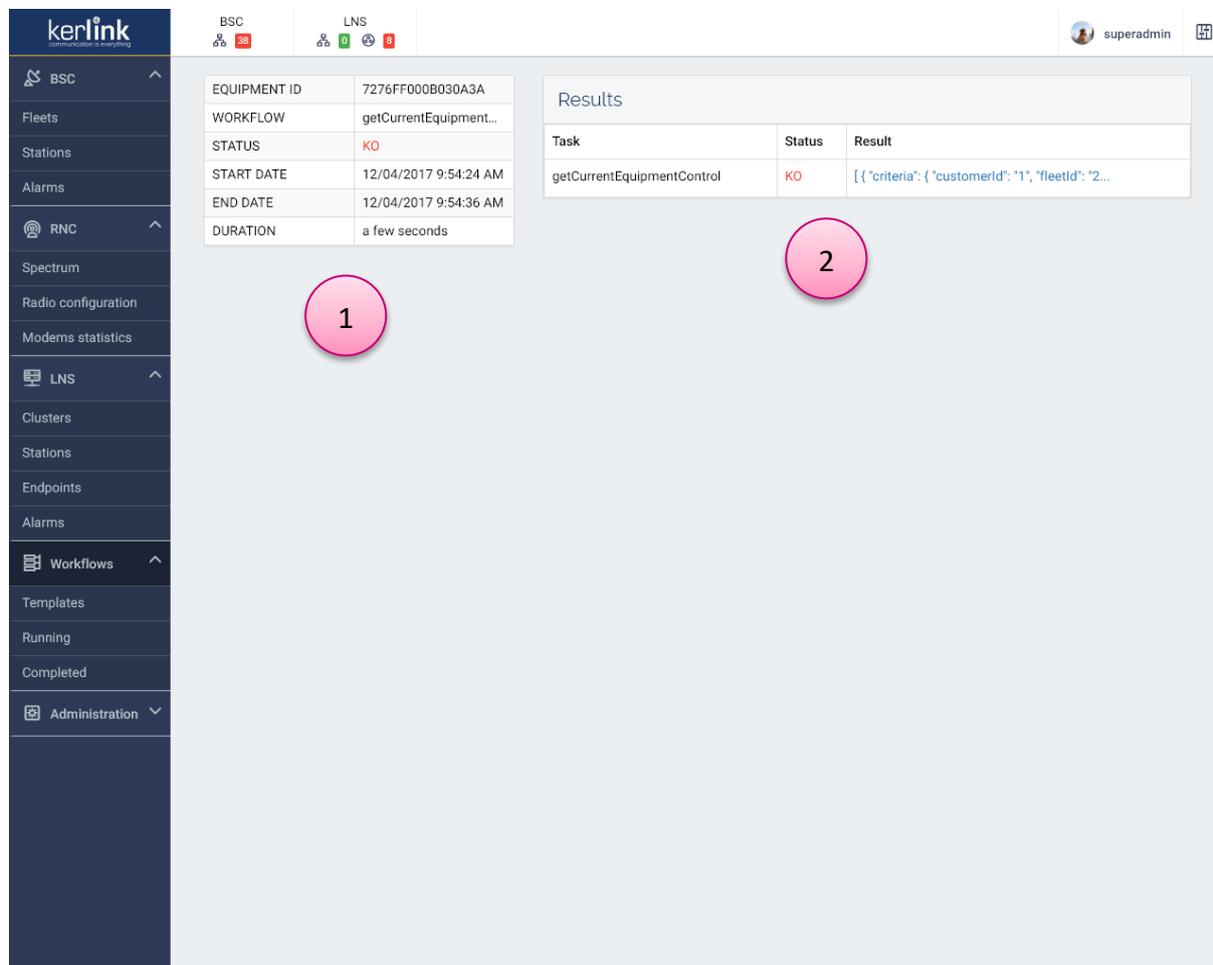
Figure 65 – Details of a running workflows

(1) The list shows all equipment on which the workflow has been executed and displays its status, start date and end date.

Clicking on an equipment ID will display the details of the execution for this equipment.

(2) Set the filters and click on search to filter the equipment list.

### 7.5.3 Details of a completed workflow execution for a specific equipment



The screenshot shows the Kerlink RAN Dashboard interface. The sidebar menu on the left includes sections for BSC, RNC, LNS, Workflows, and Administration. The main content area is divided into two sections: 'Attributes' and 'Results'. The 'Attributes' section contains a table with the following data:

EQUIPMENT ID	7276FF000B030A3A
WORKFLOW	getCurrentEquipment...
STATUS	KO
START DATE	12/04/2017 9:54:24 AM
END DATE	12/04/2017 9:54:36 AM
DURATION	a few seconds

The 'Results' section contains a table with the following data:

Task	Status	Result
getCurrentEquipmentControl	KO	[{"criteria": {"customerId": "1", "fleetId": "2..."

Callout box 1 points to the 'Attributes' table, and callout box 2 points to the 'Results' table.

Figure 66 – Details of a completed workflows for an equipment

- (1) When in completed, the details page shows all attributes of the execution.
- (2) The “Results” table lists all webservices of the workflow:
  - Its status of execution
  - Its result. Clicking on a result will open a modal with the detailed result.

## 8. Administration

### 8.1 Manage customers

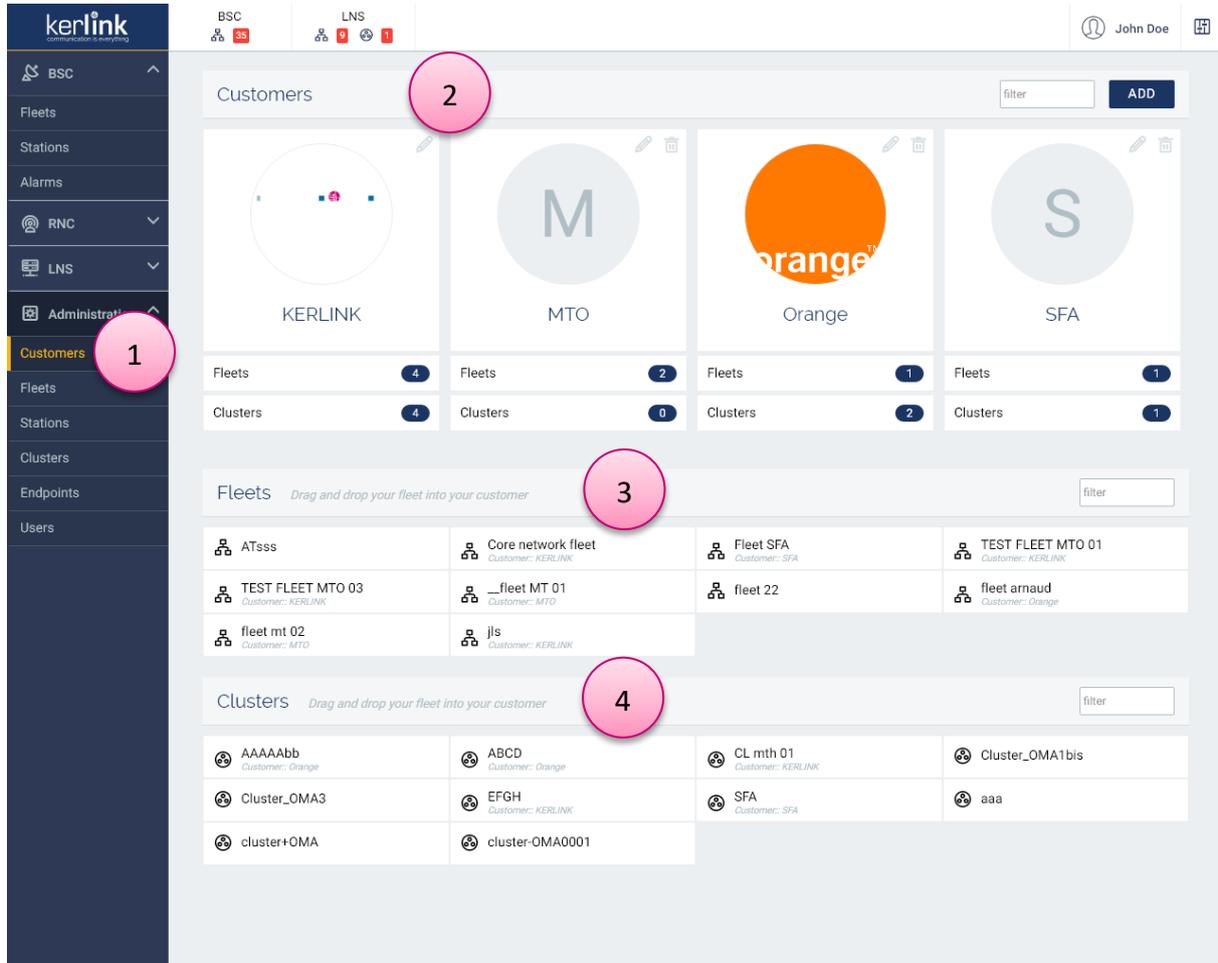


Figure 67 - Customers management

- (1) Click on the “Customers” button to access to the customers management page.
- (2) The “Customers” panel allows you to add, edit and remove a customer. It also lists the fleets and clusters attached to each customer. You can detach a fleet / cluster by clicking on the “trash” button next to it.
- (3) The panel “Fleets” lists all the fleets of the application. You can drag and drop a fleet from this panel to the customer you want to attach it.
- (4) The panel “Clusters” lists all the clusters of the application. You can drag and drop a cluster from this panel to the customer you want to attach it.

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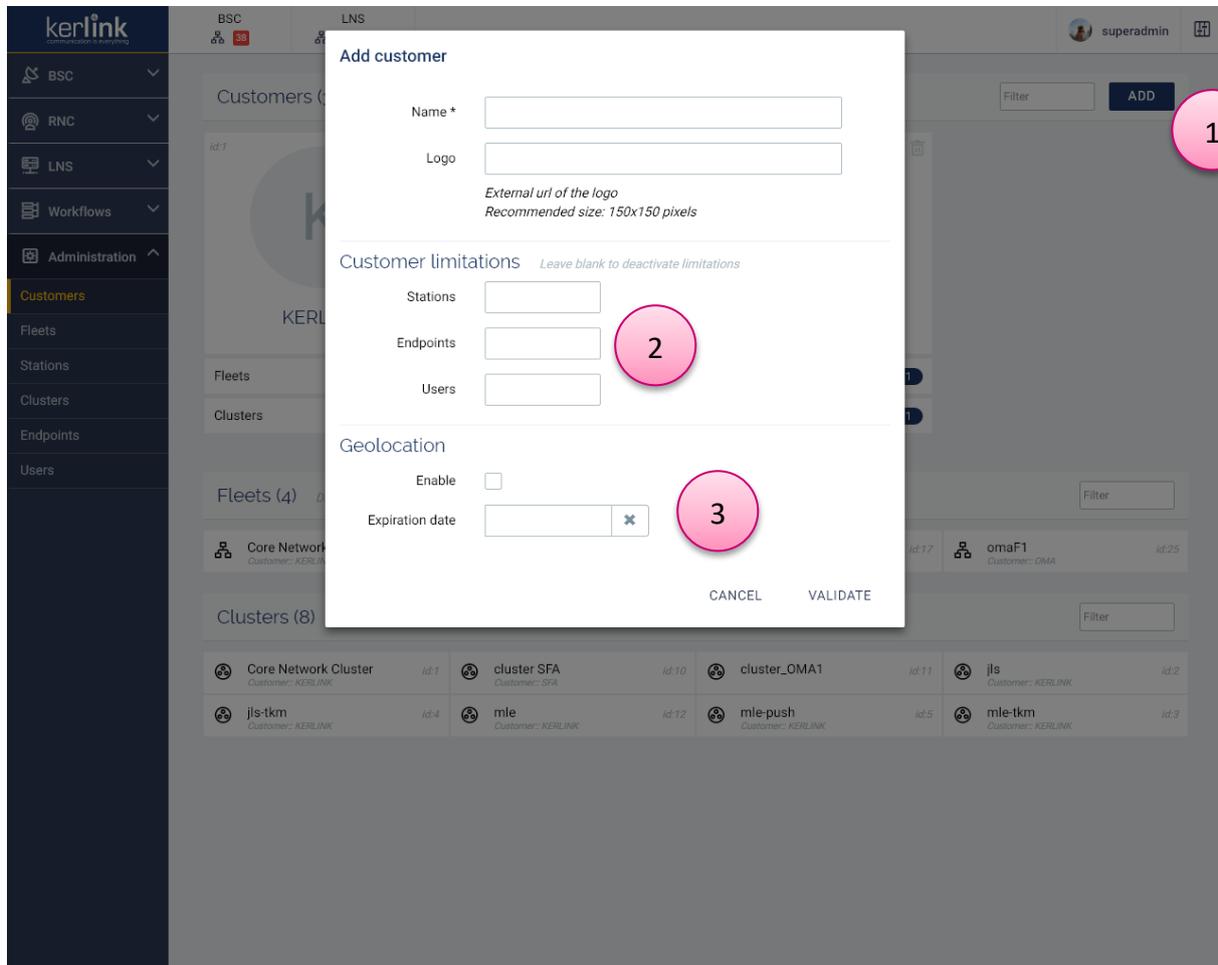


Figure 68 - Customer form

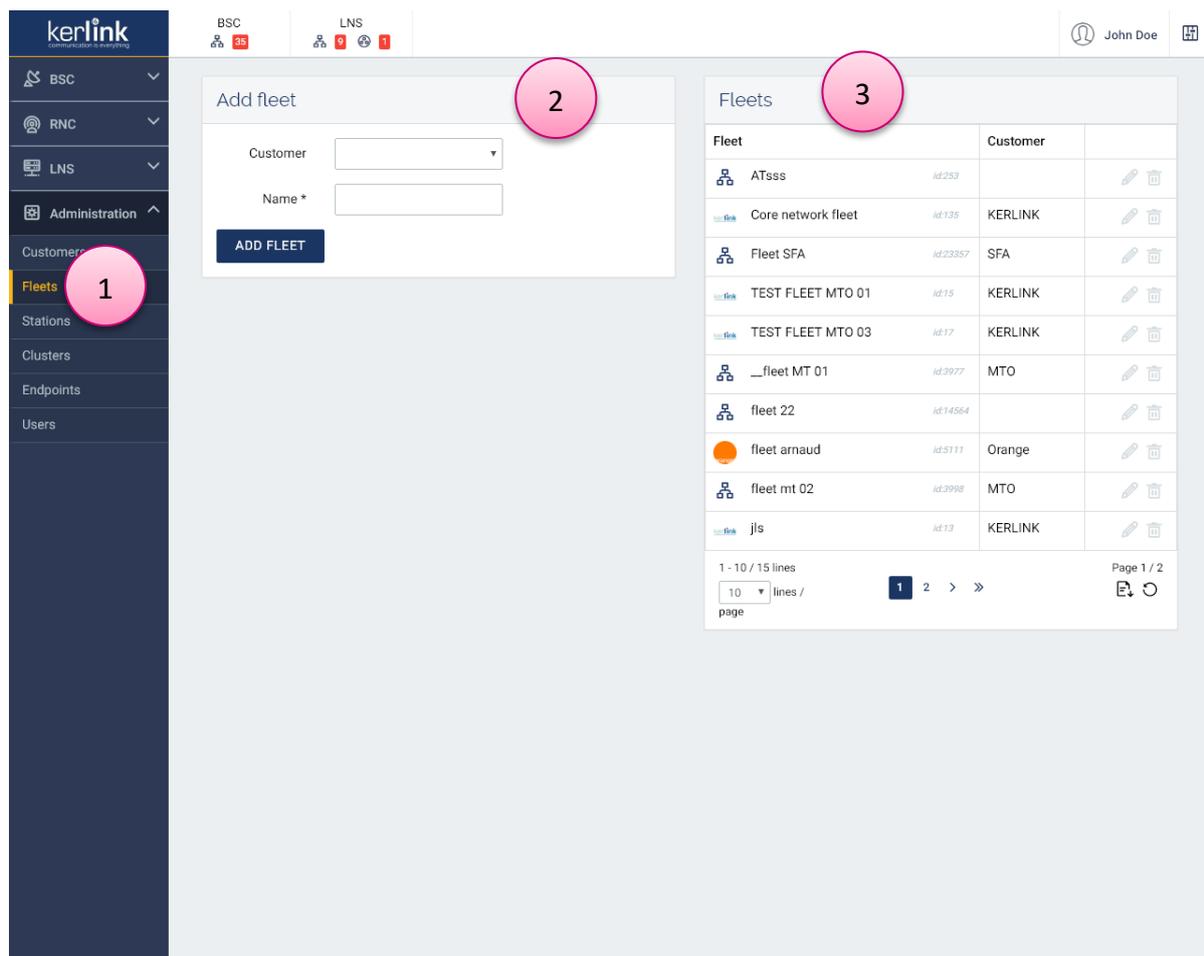
- (1) Click on the “add” button or the “edit” button of a customer. The form appears as a popup.
- (2) Customer limitations.
  - Stations: Number of stations the customer can manage.
  - Endpoints: Number of endpoints the customer can manage.
  - Users: Number of users the customer can have.
- (3) Activate or deactivate geolocation for a customer. An expiration date can also be set to deactivate geolocation at a specific date.

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## 8.2 Manage fleets

Fleets are a logical way to group stations. You can choose to group them by position, type or whatever you want.

It will allow you to have an overview of a group of station in the fleet screen (see paragraph 3.1)



The screenshot shows the Kerlink RAN Dashboard interface. On the left is a dark sidebar with navigation options: BSC, RNC, LNS, Administration, Customers, **Fleets** (highlighted with a red circle 1), Stations, Clusters, Endpoints, and Users. The main content area is divided into two panels. The left panel, titled 'Add fleet' (highlighted with a red circle 2), contains a form with a 'Customer' dropdown menu, a 'Name \*' text input field, and an 'ADD FLEET' button. The right panel, titled 'Fleets' (highlighted with a red circle 3), displays a table of fleet information. The table has columns for 'Fleet', 'Customer', and actions (edit and delete). The table lists several fleets, including 'ATsss', 'Core network fleet', 'Fleet SFA', 'TEST FLEET MTO 01', 'TEST FLEET MTO 03', 'fleet MT 01', 'fleet 22', 'fleet arnaud', 'fleet mt 02', and 'jls'. At the bottom of the table, there is a pagination control showing '1 - 10 / 15 lines' and 'Page 1 / 2'.

Figure 69 – Fleets management

- (1) Click on the “Fleets” button to access to the fleets management page.
- (2) The “Add fleet” panel allows you to add a new fleet.
- (3) The “Fleets” panel lists all your fleets and allows you to rename or delete a fleet by using the respective buttons.

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### 8.3 Manage stations

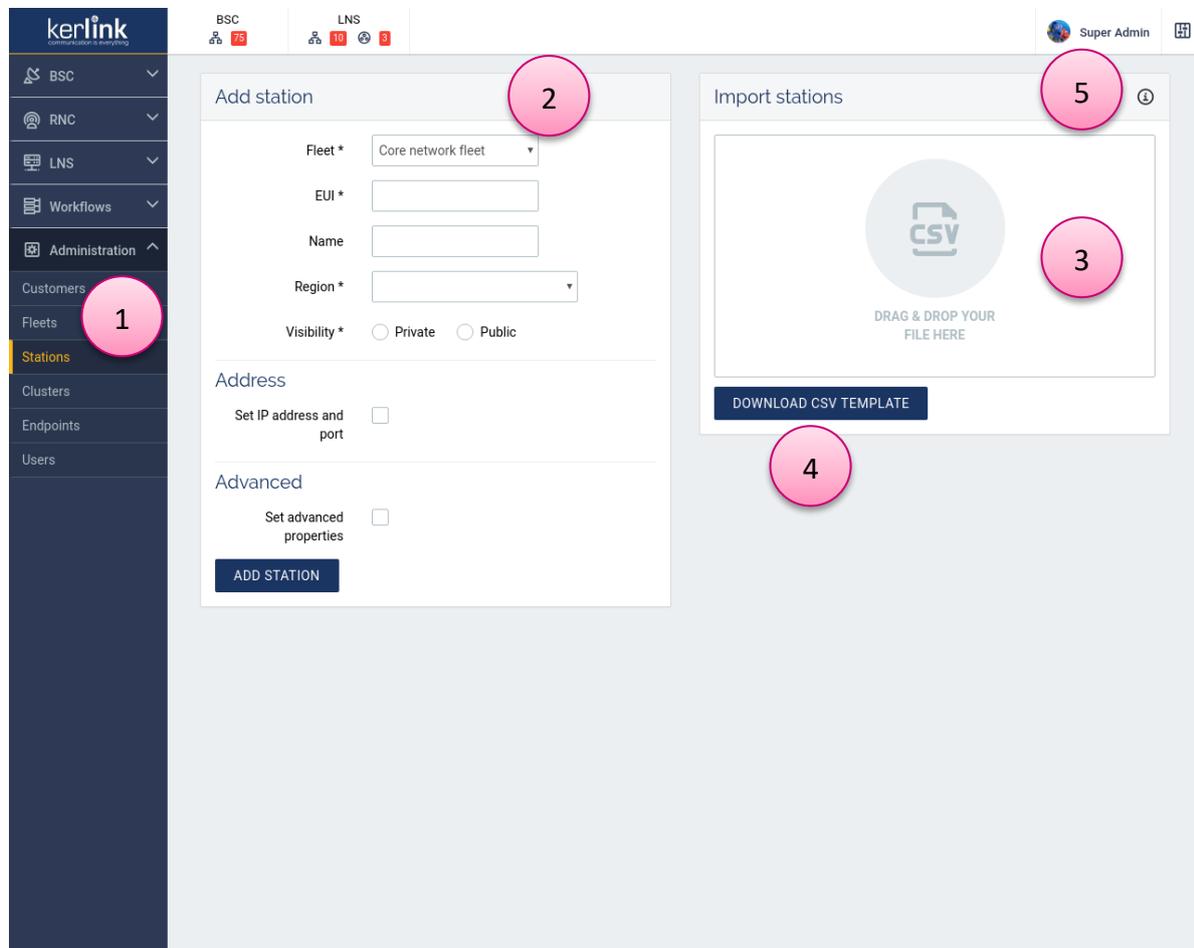


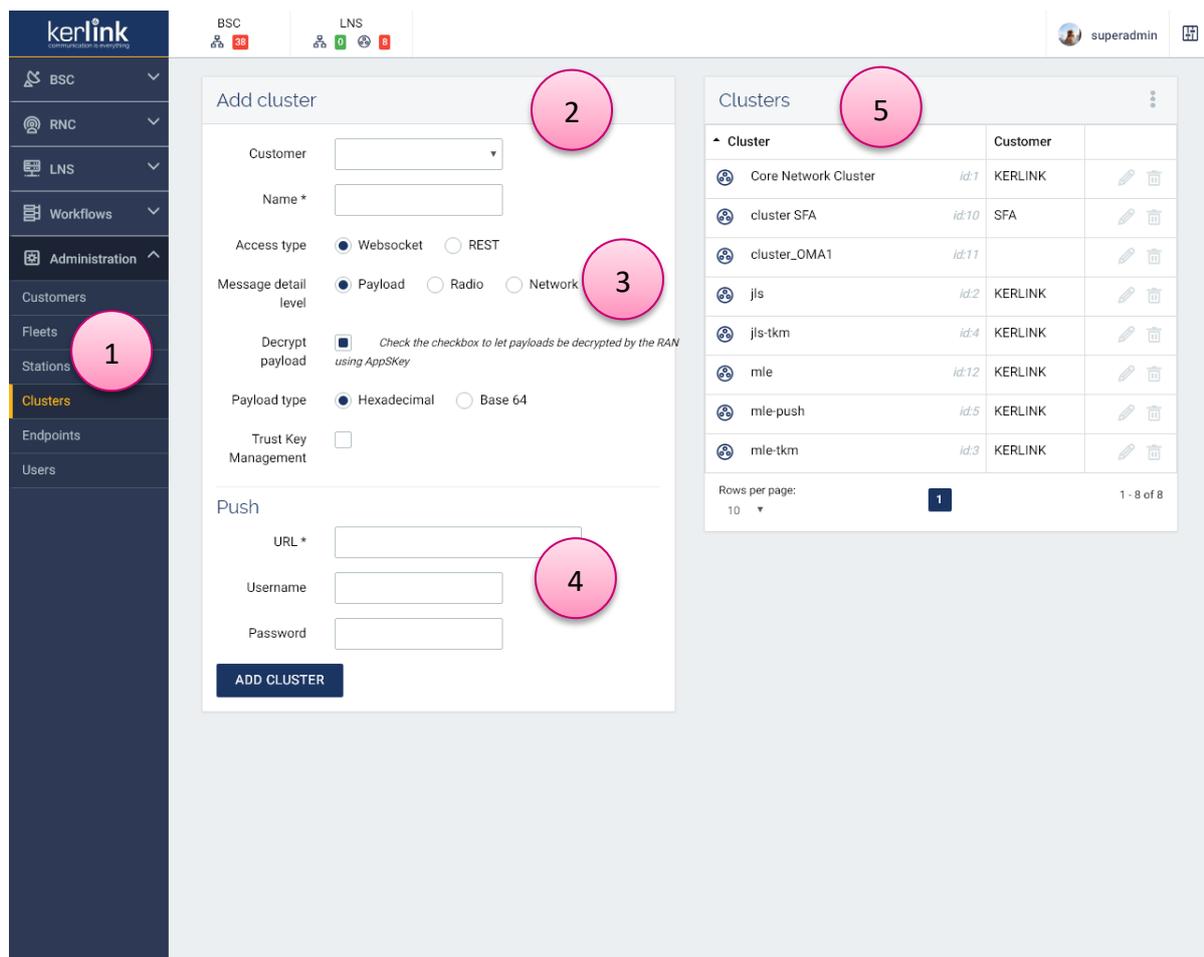
Figure 70 – Stations management

- (1) Click on the “Stations” button to access to the stations management page.
- (2) The “Add station” panel allows you to create a new station.
- (3) The “Import stations” panel allows you to import a CSV file containing multiple station definitions.
- (4) The “Download” button will download a CSV template with the correct columns to fill to import multiple stations.
- (5) The “Info” button will display a modal with the details of all properties needed in the CSV file.

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## 8.4 Manage clusters

Clusters are a logical way to group endpoints. You can choose to group them by position, type or whatever you want.



The screenshot displays the 'Clusters' management interface. On the left, a sidebar contains navigation items, with 'Clusters' highlighted and circled with a '1'. The main area is split into two panels. The left panel, titled 'Add cluster' (circled with a '2'), contains form fields for 'Customer', 'Name \*', 'Access type' (Websocket/REST), 'Message detail level' (Payload/Radio/Network, circled with a '3'), 'Decrypt payload', 'Payload type' (Hexadecimal/Base 64), and 'Trust Key Management'. Below this is a 'Push' section with 'URL \*', 'Username', and 'Password' fields, and an 'ADD CLUSTER' button (circled with a '4'). The right panel, titled 'Clusters' (circled with a '5'), shows a table of existing clusters with columns for Cluster, id, and Customer. The table lists clusters like 'Core Network Cluster', 'cluster SFA', 'cluster\_OMA1', 'jls', 'jls-tkm', 'mle', 'mle-push', and 'mle-tkm'. At the bottom of the table, there is a 'Rows per page' dropdown set to '10' (circled with a '1') and a '1 - 8 of 8' indicator.

Figure 71 - Clusters management

- (1) Click on the “Clusters” button to access to the clusters management page.
- (2) The “Add cluster” panel allows you to add a new cluster.
- (3) The “Message detail level” attribute defines which properties are returned by the endpoints of the cluster.
  - Payload: “userData” property only.

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Example of "userData"

```
{
  "fPort": 10,
  "payload": "d3d3LnNlbXRlY2guY29tAAAAABA",
  "maxRetry": 0,
  "ttl": 1.4071897396579e+14
}
```

- Radio: "userData" and "moteTx" properties.

Example of "moteTx"

```
{
  "freq": 864.6,
  "modu": "LORA",
  "datr": "SF9BW125",
  "codr": "4\5",
  "adr": true
}
```

- Network: "userData", "moteTx" and "gwRx".

Example of "gwRx"

```
[
  {
    "eui": "124000",
    "ant": 0,
    "tmms": 1479455937000,
    "chan": 0,
    "rfch": 0,
    "rssic": -10,
    "lsnr": 10,
    "foff": 0,
    "rfbsb": 78,
    "rs2s1": 67
  }
]
```

- (4) While editing an existing and attached cluster to a customer, the URL to get unsent RX messages is displayed here.
- (5) The "Clusters" panel lists all your clusters and allows you to edit or delete a cluster by using the respective buttons.

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## 8.5 Manage endpoints

### 8.5.1 Create or import endpoints

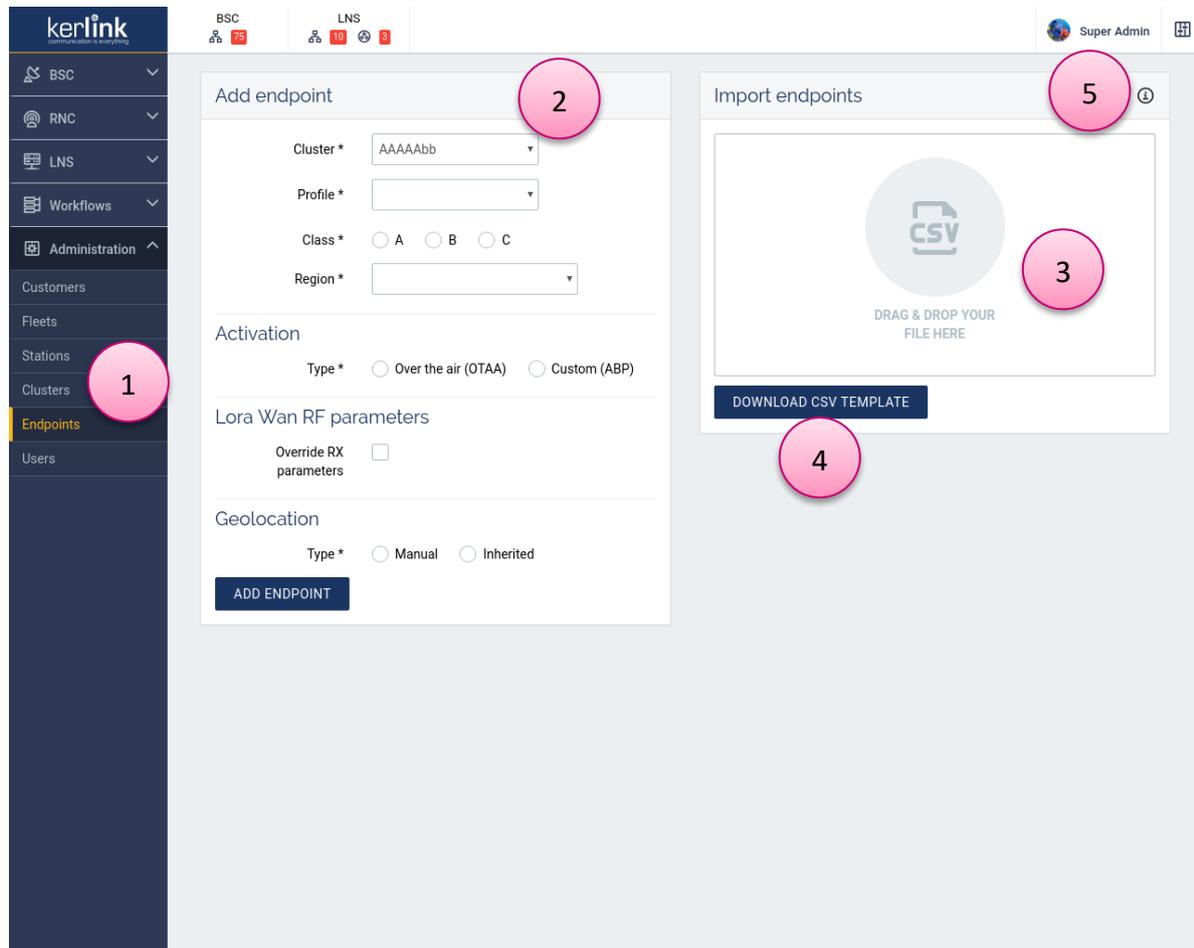


Figure 72 - Endpoints management

- (1) Click on the “Endpoints” button to access to the endpoints management page.
- (2) The “Add endpoint” panel allows you to create a new endpoint.
- (3) The “Import endpoints” panel allows you to import a CSV file containing multiple endpoint definitions.
- (4) The “Download” button will download a CSV template with the correct columns to fill to import multiple endpoints.
- (5) The “Info” button will display a modal with the details of all properties needed in the CSV file.

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### 8.5.2 Overriding RX parameters

When creating a new endpoint, you can choose to override RX parameters:

Lora RF parameters

**1** OVERRIDE RX PARAMETERS

RX1 DELAY

RX2 SPREADING FACTOR

RX2 FREQUENCY  **2**

RX WINDOWS  RX1  RX2  AUTO

Figure 73 - Overriding RX parameters

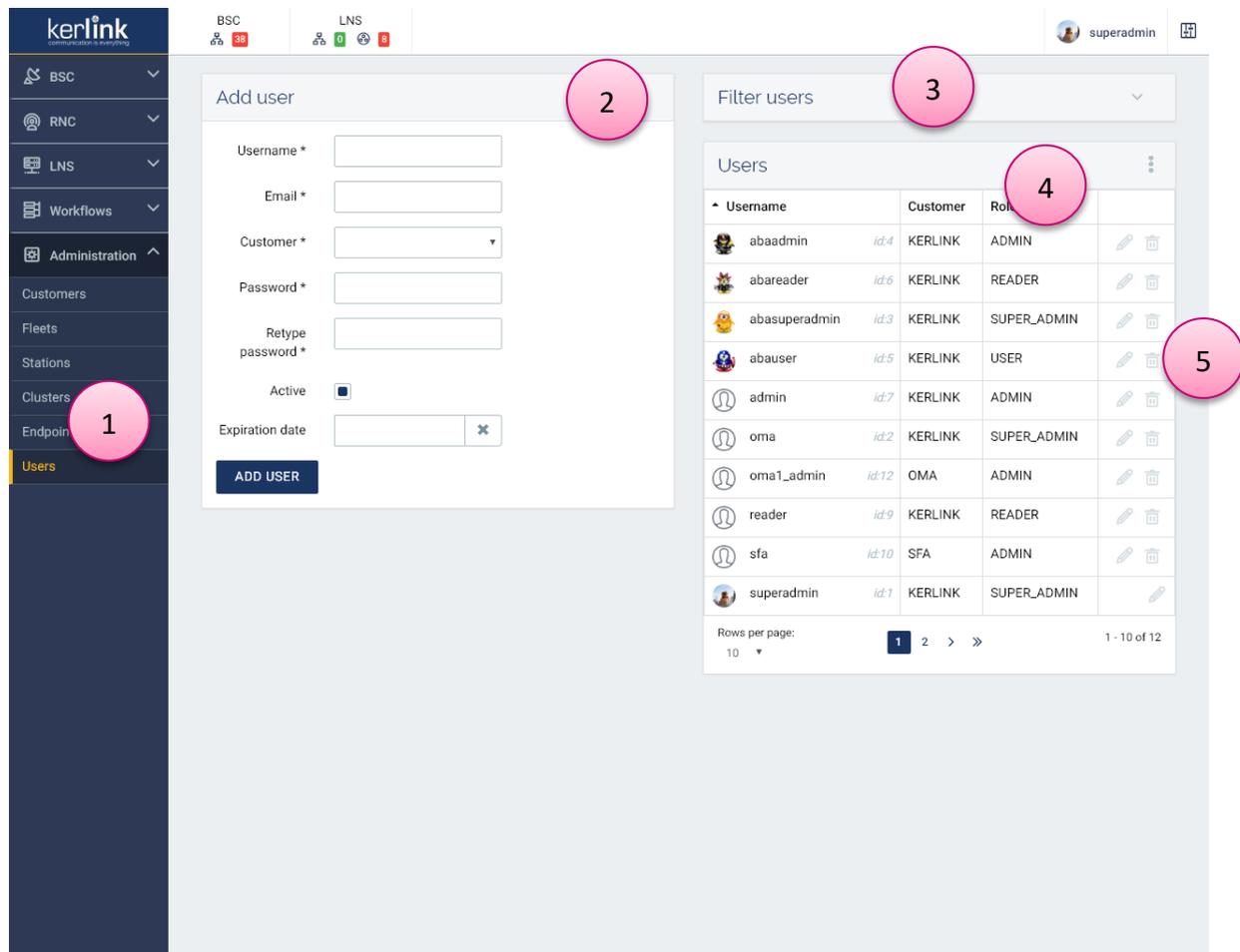
(1) Check the “Override RX parameters” checkbox. It will allow you to set specific parameters for an endpoint instead of using the default ones described in the LoRaWAN Specification.

(2) Parameters are:

- RX1 delay: the delay in seconds before the opening of the RX1 receive window.
- RX2 spreading factor: the spreading factor of the RX2 receive window.
- RX2 frequency: the frequency in Hertz of the RX2 receive window.
- RX WINDOWS: the receive window to use (default = auto). Auto allows to use RX1 or RX2 receive windows.

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## 8.6 Manage users



The screenshot shows the 'Manage users' interface. On the left, a sidebar contains navigation options: BSC, RNC, LNS, Workflows, Administration, Customers, Fleets, Stations, Clusters, Endpoints, and Users (1). The main area is split into two panels. The left panel (2) is the 'Add user' form, which includes fields for Username, Email, Customer, Password, Retype password, an Active checkbox, and an Expiration date field, along with an 'ADD USER' button. The right panel (3) is the 'Filter users' section, which contains a table of existing users (4). The table has columns for Username, Customer, Role, and actions (5). The users listed are: abadmin (ADMIN), abareader (READER), abasuperadmin (SUPER\_ADMIN), abauser (USER), admin (ADMIN), oma (SUPER\_ADMIN), oma1\_admin (ADMIN), reader (READER), sfa (ADMIN), and superadmin (SUPER\_ADMIN). A pagination bar at the bottom indicates '1 - 10 of 12' users.

Figure 74 – Users management

- (1) Click on the “Users” button to access to the users management page.
- (2) The “Add user” allows you to create a new user.
- (3) Use the “Filter” panel to search for users with specific filters.
- (4) The “Users” panel lists all the existing users.
- (5) For each user, you can access to his profile page (see paragraph 9.1), to edit his information clicking on the “edit” button and to delete the user by clicking on the “trash” button.

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## 9. User profile

### 9.1 Update your profile

The screenshot shows the 'User profile' update interface. On the left is a navigation menu with options: BSC, RNC, LNS, Workflows, and Administration. The main content area is titled 'User profile' and contains several sections:

- User profile:** Username (superadmin, with a note 'Username can't be modified'), First name, Last name, and Customer (KERLINK).
- Contact information:** Email (support@kerlink.fr) and Phone.
- Profile picture:** Picture url (http://lorempicsum.com/up/150/150/5) and a preview of a dog's photo. A note indicates 'External url of the picture' and 'Recommended size: 150x150 pixels'.
- Account:** Role (SUPER\_ADMIN), Password, and Retype password.

At the bottom left, there is a blue button labeled 'UPDATE PROFILE'. A red circle with the number '1' highlights the user name 'superadmin' in the top right corner of the dashboard. A red circle with the number '2' highlights the 'UPDATE PROFILE' button.

Figure 75 - Profile update

- (1) The profile button allows you to access to your profile.
- (2) You can change your information and click the “Update profile” button to save the modifications.

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## 10. Settings

### 10.1 Dashboard

Figure 76 - Settings dashboard

- (1) Click on the “Application settings” menu to access to the settings page.
- (2) Alarms thresholds: Green, orange and red colors applied on fleet percentage ranges.
- (3) Distribution ranges: Ranges and colors applied on the fleet statistics overview.
- (4) Refresh frequency: Interval in seconds the count of alarms is updated.

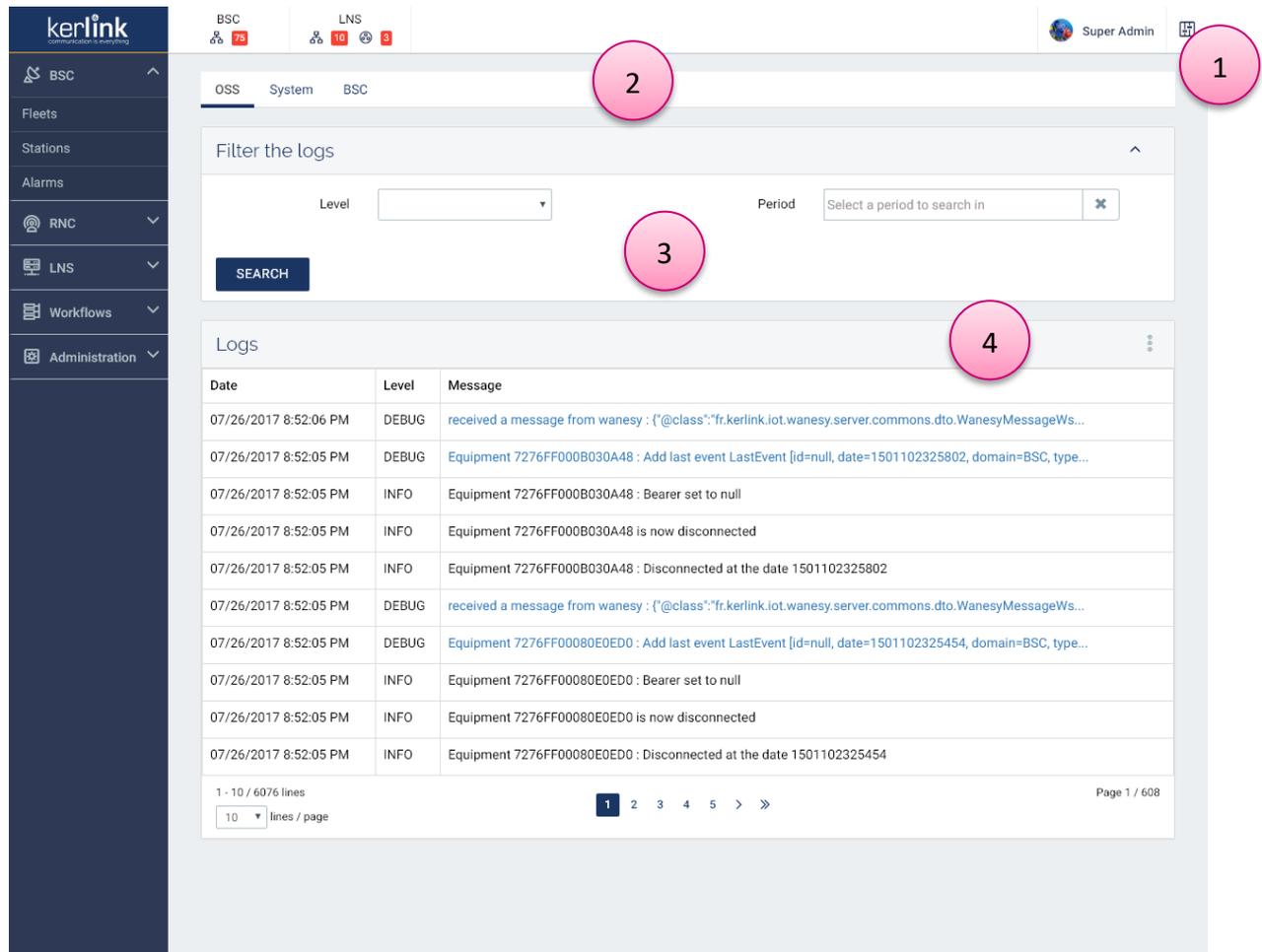
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- (5) Health refresh frequency: Interval in seconds the station “health” is updated.
- (6) Activate remote shell: Activate or deactivate the remote shell functionality.
- (7) Tile server for Leaflet: Map Tile Server to display map layer with the Leaflet library.  
Logs

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## 11. Logs

### 11.1 Application logs



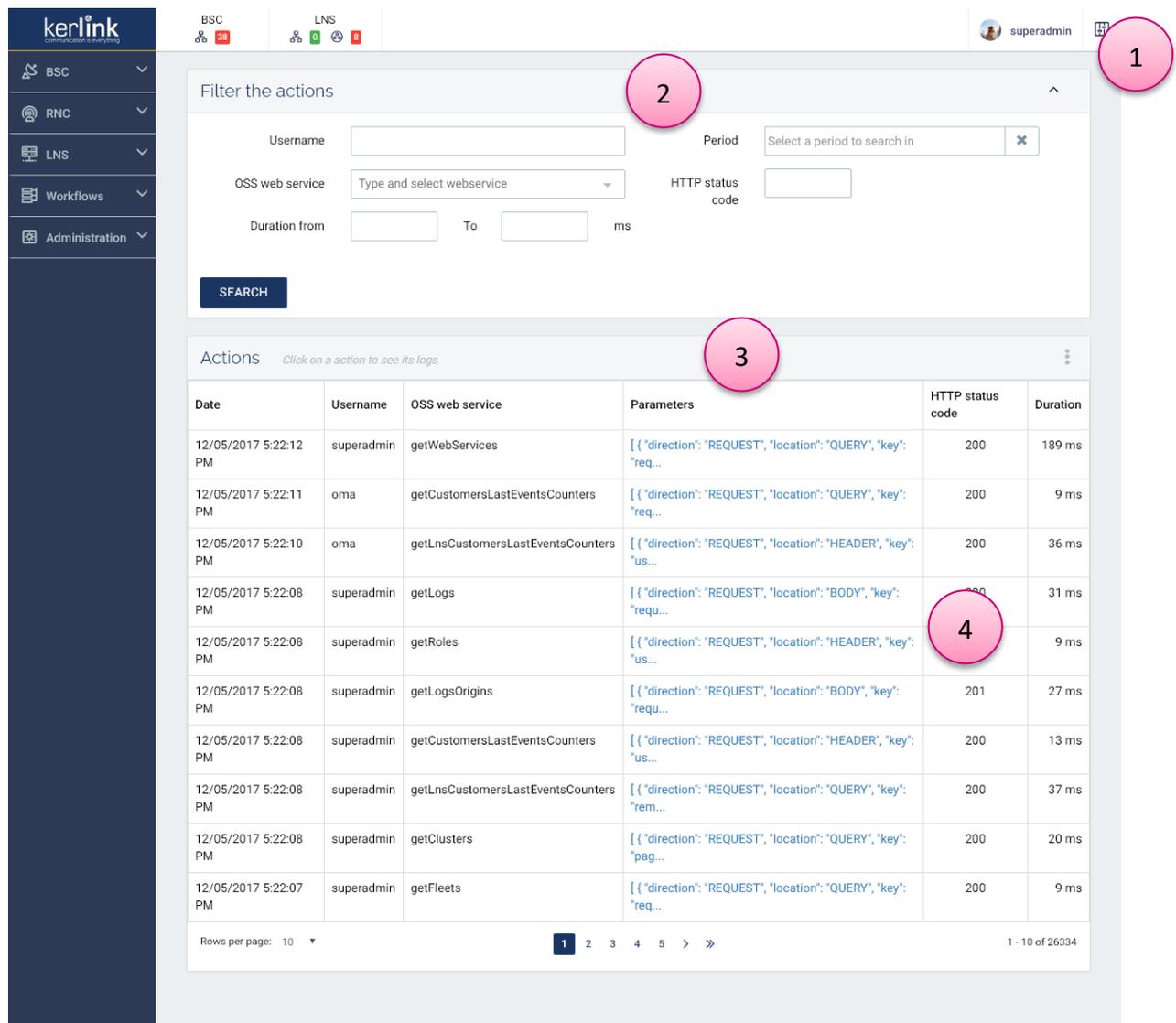
The screenshot shows the 'Application logs' page in the Kerlink RAN Dashboard. The interface includes a sidebar menu with options like BSC, Fleets, Stations, Alarms, RNC, LNS, Workflows, and Administration. The main content area has tabs for 'OSS', 'System', and 'BSC'. A search filter is present with a 'Level' dropdown and a 'Period' selector. Below the filter is a table of logs with columns for Date, Level, and Message. The table contains several log entries with timestamps and messages related to equipment events and disconnections. At the bottom, there is a pagination control showing '1 - 10 / 6076 lines' and a 'Page 1 / 608' indicator.

Figure 77 - Application logs

- (1) Click on the “Application logs” menu to access to the page.
- (2) The tabs list the applications which logs are available.
- (3) Filters on logs properties.
- (4) The selected application logs. A click on some message cell will show a modal with log details.

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## 11.2 Activity logs



The screenshot shows the 'Activity logs' interface. At the top left is the kerlink logo and navigation menu (BSC, RNC, LNS, Workflows, Administration). The main area has a search filter section (2) with fields for Username, OSS web service, Duration, and HTTP status code. Below is a table of actions (3) with columns: Date, Username, OSS web service, Parameters, HTTP status code (4), and Duration. The table lists various web service calls from 12/05/2017 5:22:07 PM to 5:22:12 PM. A pagination bar at the bottom shows 'Rows per page: 10' and '1 - 10 of 26334'.

Figure 78 - Users actions logs

- (1) Click on the “Activity logs” menu to access to the actions page.
- (2) Filters on actions properties.
- (3) The list of the web service called by the dashboard. A click on parameters cell will show a modal with parameters details.
- (4) The column “HTTP status code” is the status code of the HTTP request. Most common codes are:

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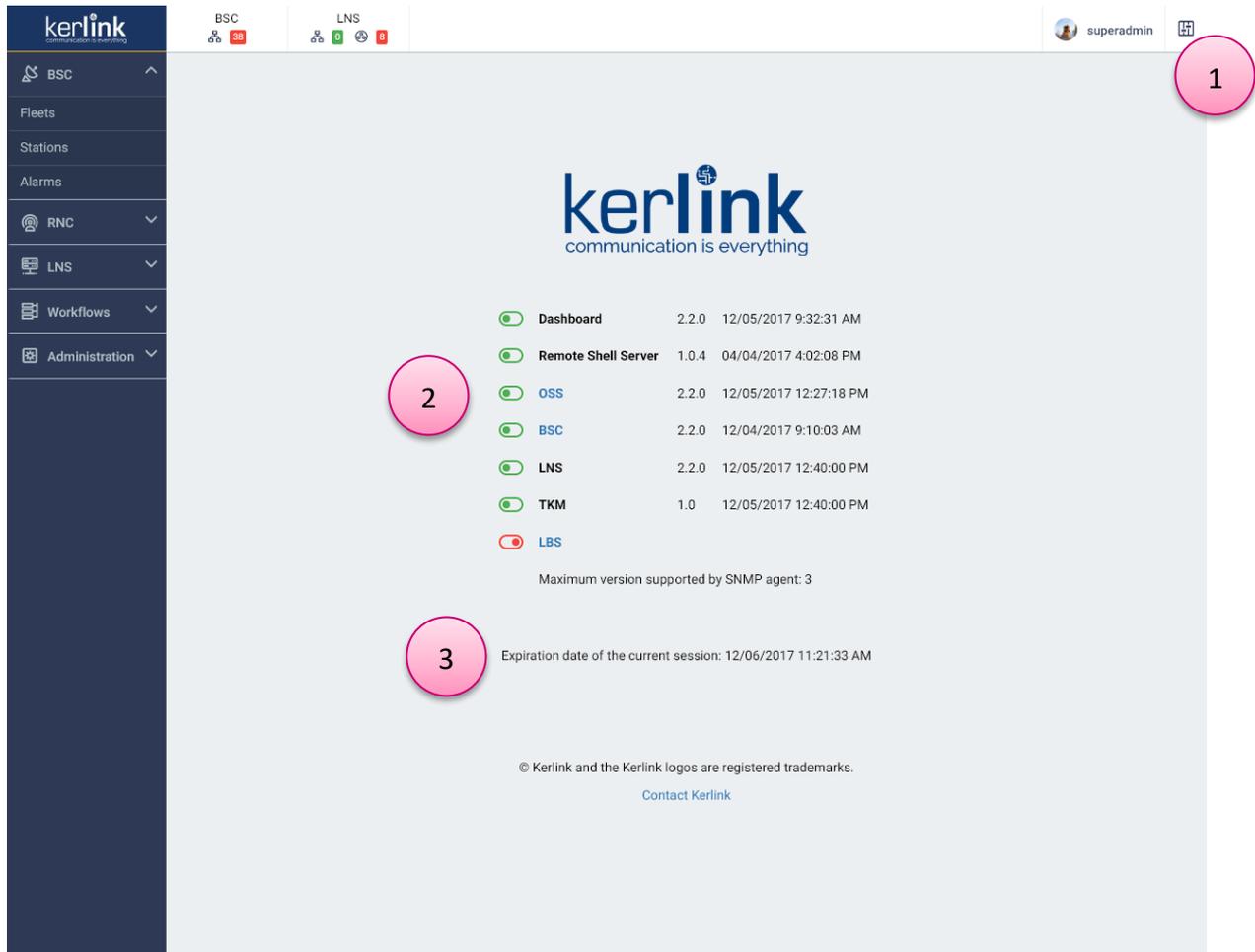
- 200: OK
- 301 and 302: Redirection
- 401: User not authenticated
- 403: Not allowed
- 404: Not found
- 500 and 503: Server error

A full list of HTTP status code can be found in [Wikipedia](#).

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## 12. About

### 12.1 Check services statuses



Service	Status	Version	Build Date
Dashboard	Green	2.2.0	12/05/2017 9:32:31 AM
Remote Shell Server	Green	1.0.4	04/04/2017 4:02:08 PM
OSS	Green	2.2.0	12/05/2017 12:27:18 PM
BSC	Green	2.2.0	12/04/2017 9:10:03 AM
LNS	Green	2.2.0	12/05/2017 12:40:00 PM
TKM	Green	1.0	12/05/2017 12:40:00 PM
LBS	Red		

Maximum version supported by SNMP agent: 3

Expiration date of the current session: 12/06/2017 11:21:33 AM

Figure 79 - About page

- (1) Click on the “About” menu to access to the about page.
- (2) The page list the status of all services with their version number and, if available, their build date.  
  
A super admin can access to some services metrics by clicking on the service name.
- (3) The expiration date of the current session.

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## 13. Documentations

### 13.1 Access the documentation in the dashboard



Figure 80 - Documentations page

- (1) Click on the “Documentations” menu to access to the documentations page.
- (2) The tabs list the available documentations. Click on a tab to display the PDF file.
- (3) The PDF will be displayed in an iframe.

**Pre-requisite for IE11:** Microsoft Internet Explorer 11 does not have an internal PDF reader unlike Chrome, Firefox and Microsoft Edge. To be able to display a PDF file, the user must have an external PDF reader with an Internet Explorer plugin.

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## 14. Annex 1: Supported browsers

Due to technical limitations, only recent browsers are officially supported. Older browsers may run the application but experiences random issues.

Browser	Minimum version
Microsoft Internet Explorer	11
Microsoft Edge	12
Mozilla Firefox	49
Google Chrome	49

Figure 81 - Supported browsers

## 15. Annex 2: Roles tables

### 15.1 BSC

	Reader	User	Admin	Super admin
<b>Fleet</b>				
Consult fleets overview	✓	✓	✓	✓
<b>Stations</b>				
Search and list stations	✓	✓	✓	✓
<b>Station</b>				
Consult station overview	✓	✓	✓	✓
Delete station	•	•	✓	✓
Rename station	•	✓	✓	✓
Move station	•	✓	✓	✓
Set station geolocation	•	✓	✓	✓
Mark station events as read	✓	✓	✓	✓
Consult station statistics	✓	✓	✓	✓
Access station file explorer	•	•	✓	✓
Access station through SSH	•	•	✓	✓
Access station through remote commands	•	•	✓	✓
Configure station	•	•	✓	✓
Consult station versions	•	•	✓	✓
List station tasks	•	•	✓	✓
List station SNMP logs	•	•	✓	✓
List station events	•	•	✓	✓
<b>Cart</b>				
Manage station cart	✓	✓	✓	✓
<b>Alarms</b>				
Consult fleet alarms	✓	✓	✓	✓

Figure 82 – BSC roles table

### 15.2 RNC

	Reader	User	Admin	Super admin
<b>Spectrum</b>				
Analyze radio frequency	•	✓	✓	✓
<b>Radio configuration</b>				
Configure radiopath	•	✓	✓	✓

<b>Modem configuration</b>				
Analyze modem statistics	✓	✓	✓	✓

Figure 83 - RNC roles table

### 15.3 LNS

	Reader	User	Admin	Super admin
<b>Clusters</b>				
List your clusters	✓	✓	✓	✓
<b>Stations</b>				
List stations	✓	✓	✓	✓
<b>Station</b>				
Consult station overview	✓	✓	✓	✓
Consult network properties	✓	✓	✓	✓
Set network properties	•	•	✓	✓
Consult station AES keys	•	•	✓	✓
Add station AES key	•	•	✓	✓
Remove station AES key	•	•	✓	✓
Consult positioning properties	✓	✓	✓	✓
Set positioning properties	•	•	✓	✓
List RX and TX messages	✓	✓	✓	✓
List events	✓	✓	✓	✓
<b>Endpoints</b>				
List endpoints	✓	✓	✓	✓
<b>Endpoint</b>				
Consult endpoint overview	✓	✓	✓	✓
Reset frame counter down	•	✓	✓	✓
Move endpoint	•	✓	✓	✓
Set endpoint geolocation	•	✓	✓	✓
List messages	✓	✓	✓	✓
List events	✓	✓	✓	✓
Send TX messages	✓	✓	✓	✓
Delete endpoint	•	•	✓	✓
<b>Cart</b>				
Manage endpoint cart	✓	✓	✓	✓
<b>Alarms</b>				
Consult station alarms	✓	✓	✓	✓

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Consult cluster alarms	✓	✓	✓	✓
------------------------	---	---	---	---

Figure 84 - LNS roles table

## 15.1 Workflows

	Reader	User	Admin	Super admin
Create a new workflow	•	•	✓	✓
Execute a workflow on a cart	•	✓	✓	✓
Consult running workflows	•	✓	✓	✓
Consult completed workflows	•	✓	✓	✓
Consult workflows results	•	✓	✓	✓

Figure 85 - Administration roles table

## 15.1 Administration

	Reader	User	Admin	Super admin
Manage customers	•	•	•	✓
Manage fleets	•	•	✓	✓
Manage stations	•	•	✓	✓
Manage clusters	•	•	✓	✓
Manage endpoints	•	•	✓	✓
Manage users	•	•	✓	✓

Figure 86 - Administration roles table

## 15.2 Settings

	Reader	User	Admin	Super admin
Update alarm settings	•	•	•	✓
Update fleet settings	•	•	•	✓
Update station settings	•	•	•	✓

Figure 87 - Settings roles table

## 15.3 Logs

	Reader	User	Admin	Super admin
Consult application logs	•	•	•	✓
Consult activity logs	•	•	•	✓

Figure 88 - Logs roles table

## 15.4 Profile

	Reader	User	Admin	Super admin
--	--------	------	-------	-------------

Update your profile	✓	✓	✓	✓
Update another profile	•	•	✓	✓

Figure 89 - Profile roles table

## 15.5 About and documentation

	Reader	User	Admin	Super admin
Check services statuses	✓	✓	✓	✓
Consult documentations	✓	✓	✓	✓

Figure 90 - About roles table

## 16. Annex 3: FAQ

### 16.1 How do I move a station from a fleet to another fleet?

You can move a station from a fleet to another fleet from:

- (1) **The BSC cart:** add one or more stations to the cart, click on the cart icon and then use the move action to move your stations (see paragraph 3.3)
- (2) **The station overview page:** go on the main page of the station you want to move and click on the floating button to edit the station. Select another fleet to move the station (see paragraph 3.4.1)

### 16.2 How can I put a station in two fleets?

You cannot. Stations can only be in one fleet.

### 16.3 How can I put an endpoint in two clusters?

You cannot. Endpoint can only be in one cluster.

### 16.4 How can I deactivate a user or set an expiration date to a user's account?

You must have at least the role Admin to access to the user profile page you want to manage. But you can only deactivate or set an expiration date to a user who has a lowest role than yours. Of course, you cannot update the limitations of your own account.

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