LIGHTING SOLUTIONS

Blu2Light

Instruction manual Blu2Light LiNA Server

LiNA Connect

Programming of local Blu2Light System

LiNA Server

Programming and operating of Blu2Light LiNA Server

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1 GENERAL INFORMATION

Thank you for choosing the Blu2Light system from Vossloh-Schwabe. Before putting the product into operation, please read these operating instructions to familiarize yourself with the functions of the system.

Any person responsible for the installation, commissioning, operation, maintenance, and repair of the system must:

- be suitably qualified and
- strictly observe the provisions of these operating instructions.

1.1 SAFETY INSTRUCTIONS

1.1.1 OVERVIEW

Before connecting the Blu2Light Server unit, observe the following safety instructions to protect yourself, your environment, and the Server unit from damage.

1.1.2 FIRES AND ELECTRIC SHOCKS

Overloaded sockets, extension cables and multiple socket outlets can lead to fires and electric shocks.

- Avoid the use of multiple socket outlets and extension cables.
- Do not connect several extension cables or multiple socket strips with each other.

1.1.3 OVERHEATING

Heat build-up can cause the Server unit to overheat. This can lead to damage to the Server unit!

- Ensure that there is sufficient air circulation around the Server unit.
- Make sure that the ventilation openings on the housing of the Server unit housing are always unobstructed.
- Do not place the server unit in environments warmer than 35°C.
- Do not cover any device inside of the Server unit housing.

1.1.4 DAMAGE TO HEAT-SENSITIVE SURFACES

The back of the Server unit heats up during normal operation. This heat development can cause damage to heat-sensitive surfaces.

- Do not place the Server unit on heat-sensitive surfaces.

1.1.5 PROTECTION AGAINST THUNDERSTORM AND LIGHTNING DAMAGE

During thunderstorms, over voltages can cause faults in the electricity and network. This can damage connected electrical devices.

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- Do not install the Server unit during thunderstorms.
- If possible, disconnect the Server unit from the power supply and the network connection during thunderstorms.

1.1.6 MOISTURE, LIQUIDS AND VAPORS

Moisture, liquids and vapours that get into the Server unit housing can cause electric shocks or short circuits.

- Only use the Server unit indoors.
- Do not allow any liquids to enter the Server unit housing.
- Protect the Server unit from vapours and moisture.

1.1.7 IMPROPER CLEANING

Improper cleaning with harsh cleaning agents, solvents or dripping wet cloths can cause damage to the Server unit.

1.1.8 IMPROPER OPENING AND REPAIRS

Improper opening and improper repairs can be dangerous for users of the device.

- Do not open the housing of the Server unit if you are not suitably qualified.
- If you need to repair the Server unit, return it to a service partner or contact the service team of Vossloh-Schwabe Deutschland GmbH.

1.1.9 INTERNET SECURITY

Protect your Server unit and your local network from unauthorized access.

1.1.10 RADIO INTERFERENCE AND INTERFERENCE

Radio interference can be generated by any device that emits electromagnetic signals. Due to the large number of devices that transmit and receive radio waves, interference can be caused by overlapping radio waves.

- Do not use the Server unit in places where the use of radio devices is prohibited.
- Follow - especially in hospitals, outpatient health centres, medical practices and other medical facilities - the instructions and directions of authorized persons to switch off radio devices to avoid interference with sensitive medical equipment.
- Consult your doctor or the manufacturer of your medical device (pacemaker, hearing aid, implant with electronic control, etc.) to ensure that it functions without interference when using the Server unit.
- If necessary, maintain the minimum distance of 15 cm recommended by medical device manufacturers to avoid interference with your medical device.

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1.1.11 POTENTIALLY EXPLOSIVE ENVIRONMENTS

Under unfavourable circumstances, radio waves can cause fire or explosions in the vicinity of potentially explosive atmospheres.

- Do not install and operate your Server unit near potentially explosive atmospheres, flammable gases, areas where the air contains chemicals or particles such as grain, dust or metal powder, or near blasting sites.

1.2 LEGAL NOTICE

Trademarks

- The Vossloh-Schwabe and Blu2Light logos are trademarks of Vossloh-Schwabe Deutschland GmbH.
- Other products and company names mentioned in this manual may be trademarks of other companies.

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1.3 DOWNLOADING THE APPS

Beide Apps sind als iOS- und Android-Version in den jeweiligen App-Stores erhältlich.

	LINA Touch	LINA Connect
Download on the App Store		
GET IT ON Google Play		

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2 BLU2LIGHT LINA SERVER INSTALLATION NOTES

Vossloh-Schwabe will provide our Lina-Server Software as 3 Docker images together with a docker compose file and some Linux bash scripts for install / update etc.

These are packed in 2 Zip files. One for fresh install and one for update an existing instance.
The file for a fresh install, is named ‚linaserver-install-<platform>-<version>.zip'.
And the other file, as update package for manual or automatic install,
is named ‚*linaserver-update-<platform>-<version>.zip*'.

The platform information specifies the host platform of the server hardware. Installation and update packages are available for the following platforms:

- aarch64 (arm64) for Raspberry Pi 4/5 and RevolutionPi Connect 5 with min. 2 GB RAM.
- x86_64 (amd64) for Intel/AMD-based servers with Debian 12 OS or higher.

2.1 INSTALLATION ON RASPBERRY PI

1. Download the latest version of "Raspberry Pi OS" or "Raspberry Pi OS lite" (64 Bit) on a microSD card. We recommend the usage of "Raspberry PI OS lite" as it uses less resources in memory and performance. The instructions therefore and all required downloads can be found here:

   https://www.raspberrypi.com/software/.
   Tip: Use the "Raspberry Pi Imager v2" for writing the image to your microSD card, as it will provide you the possibility to set hostname, time zone, keyboard layout, username / password, SSH or WIFI.

   Please keep in mind, that during the installation process we need a connection to the internet.

2. Log into the Raspberry Pi OS console via SSH, Putty, or locally with a connected keyboard and monitor. Choose one of the following installation methods:

Method 1 (recommended):

Use the following two commands to download and install the LiNA-Server package.

```
'wget https://software-blu2light.com/current/setup_linaserver.sh'
'bash setup_linaserver.sh'
```

Method 2: If using "Raspberry Pi OS" with a graphical interface, open the Terminal application and enter the above noted commands there.

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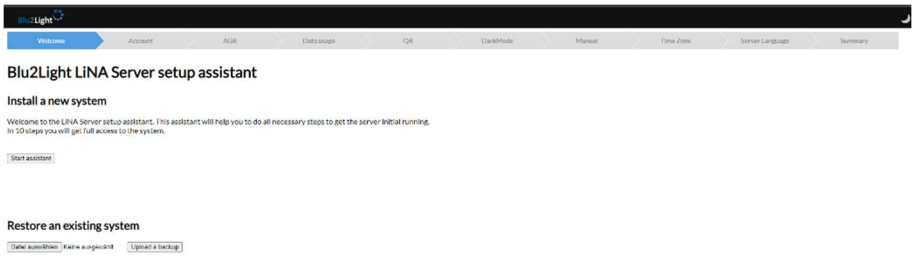
Method 3: Use a USB drive.

Method 4: Use other file transfer methods, such as Samba or SCP.

During the initial installation, you will be asked to confirm the setup and define the server's time zone for proper timer operation in Lina-Server. The setup script also updates all Raspbian OS packages and installs necessary ones like Docker.

3. If your host system has 2 GB of RAM or more, the installation script will ask if you want to install Grafana. Make your selection, and the installation will continue.

4. After the setup has finished, the script shows you the URL for the Lina-Server Web-Interface. You can access it by entering your server's IP address or hostname in a browser like 'http://<ip-address>/' or 'http://<hostname>.<your domain>/' or 'http://<hostname>.local/'.



5. Follow the Lina-Server assistant to create admin user / password and general server settings or use your backup file of a previous installation to restore.

2.2 UPDATE LINA-SERVER ON RASPBERRY PI

Important: Your server requires internet access to install the update!

1. Automatic update installation (to update an existing Blu2Light server). Recommended!
   The update can be done directly from Lina-Server Web Interface.
   Important: Your server requires internet access to the VS Software Blu2Light page!
   This will take several minutes. Please be patient!

2. Manual update installation (to update an existing Blu2Light server).
   The update package (linaserver-update-aarch64-Vx.x.x.zip) can be downloaded from Vossloh-Schwabe Blu2Light homepage via browser with this URL:
   https://software-blu2light.com/current/linaserver-update-aarch64-Vx.x.x.zip
   Copy zip file into 'linaserver' folder and unzip with

   'unzip -o linaserver-update-aarch64-Vx.x.x.zip'.

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After the extraction process is complete, execute the following command to initiate the update process:

```
'bash vs_lina_update.sh'
```

2.3 INSTALLATION ON INTEL / AMD BASED SERVER WITH DEBIAN OS

1. Log into the existing Debian OS console via ssh, Putty or use local the console with connected keyboard / monitor.

   Check the following steps before starting installation:

   - Check if 'wget' package for the download is already installed. If not, install it with the command 'sudo apt install wget'!
   - Check if you have installed a firewall on the server host. If yes, add a firewall rule for Incoming TCP & UDP traffic on port 31461 (is used for Gateway / Server communication)!

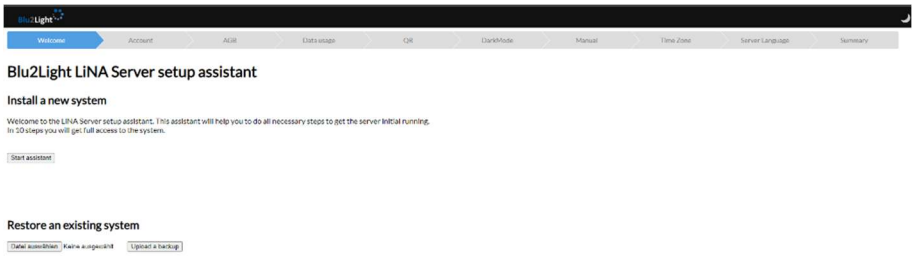
   Use the following two commands for starting download and install of LiNA-Server package. Internet access of the server during install process is necessary!

   ```
   'wget https://software-blu2light.com/current/setup_linaserver.sh'
   'bash setup_linaserver.sh'
   ```

   During the initial installation, you will be asked to confirm the setup and define the server's time zone for proper timer operation in Lina-Server. The setup script also updates all Debian OS packages and installs necessary ones like Docker.

2. If your host system has 2 GB of RAM or more, the installation script will ask if you want to install Grafana. Make your selection, and the installation will continue.

3. After the setup has finished, the script shows you the URL for the Lina-Server Web-Interface. You can access it by entering your server's IP address or hostname in a browser like 'http://<ip-address>/' or 'http://<hostname>.<yourdomain>/'.



4. Follow the Lina-Server assistant to create admin user / password and general server settings or use your backup file of a previous installation to restore.
5.

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2.4 UPDATE LINA-SERVER ON INTEL / AMD BASED SERVER WITH DEBIAN OS

Important: Your server requires internet access to install the update!

1. Automatic update installation (to update an existing Blu2Light server). Recommended!
   The update can be performed directly from the Lina-Server Web Interface.
   Important: Your server requires internet access to the VS Software Blu2Light page!
   This update process will take several minutes. Please be patient!

2. Manual update installation (to update an existing Blu2Light server).
   The update package (linaserver-update-x86_64-Vx.x.x.zip) can be downloaded from the Vossloh-Schwabe Blu2Light Homepage via browser using the following URL:
   https://software-blu2light.com/current/linaserver-update-x86_64-Vx.x.x.zip
   Please copy the zip file into the 'linaserver' folder and extract it using the command:

   ```
   'unzip -o linaserver-update-x86_64-Vx.x.x.zip'.
   ```

   After the extraction process is complete, execute the following command to initiate the update process:

   ```
   'bash vs_lina_update.sh'
   ```

3 BLU2LIGHT LINA SERVER SETUP ASSISTANT

The wizard for the initial setup of the Blu2Light LiNA Server starts when you open the user interface for the first time. The wizard will help you to enter your data. Make sure that all your Blu2Light nodes are supplied with power.

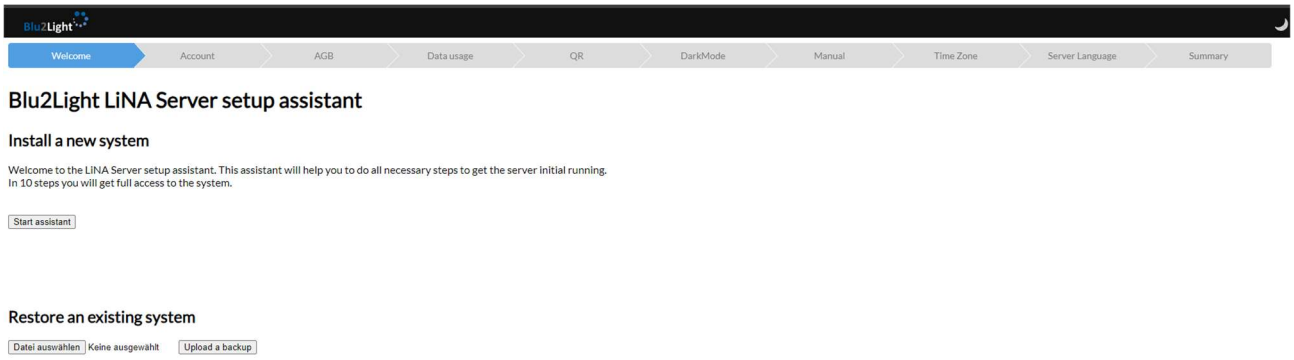

Figure 1: Start page of the initial setup wizard

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Press the button “Start assistant” to start the server setup. Follow the wizard's instructions or use the option to restore an existing system.

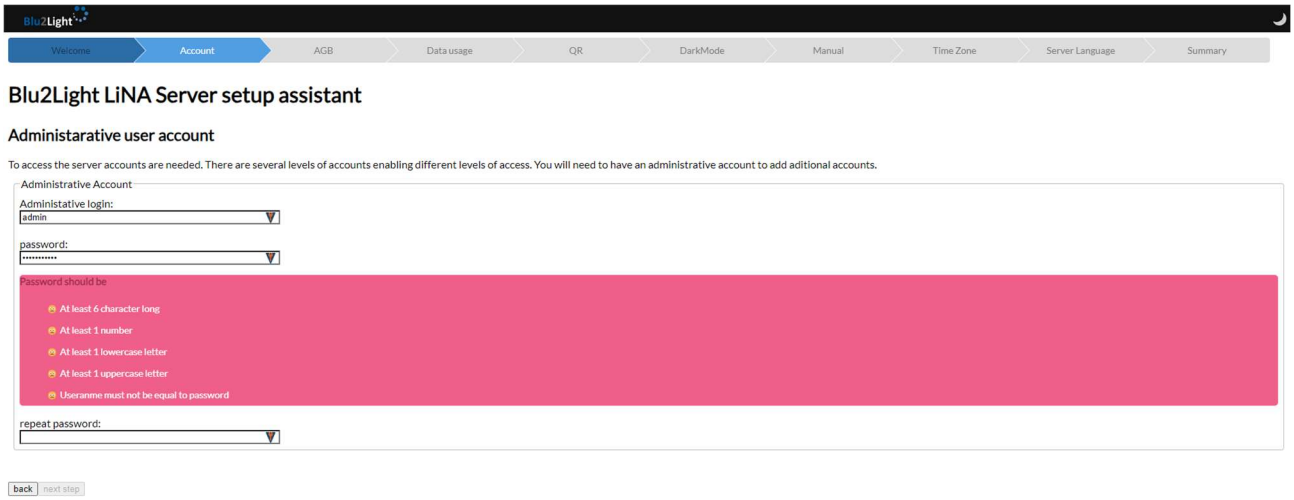

Figure 2: Creating an administrator account

First create an administrator account with which you can add further accounts with different access rights. After you have assigned an administrator name and password, press the “next step” button.

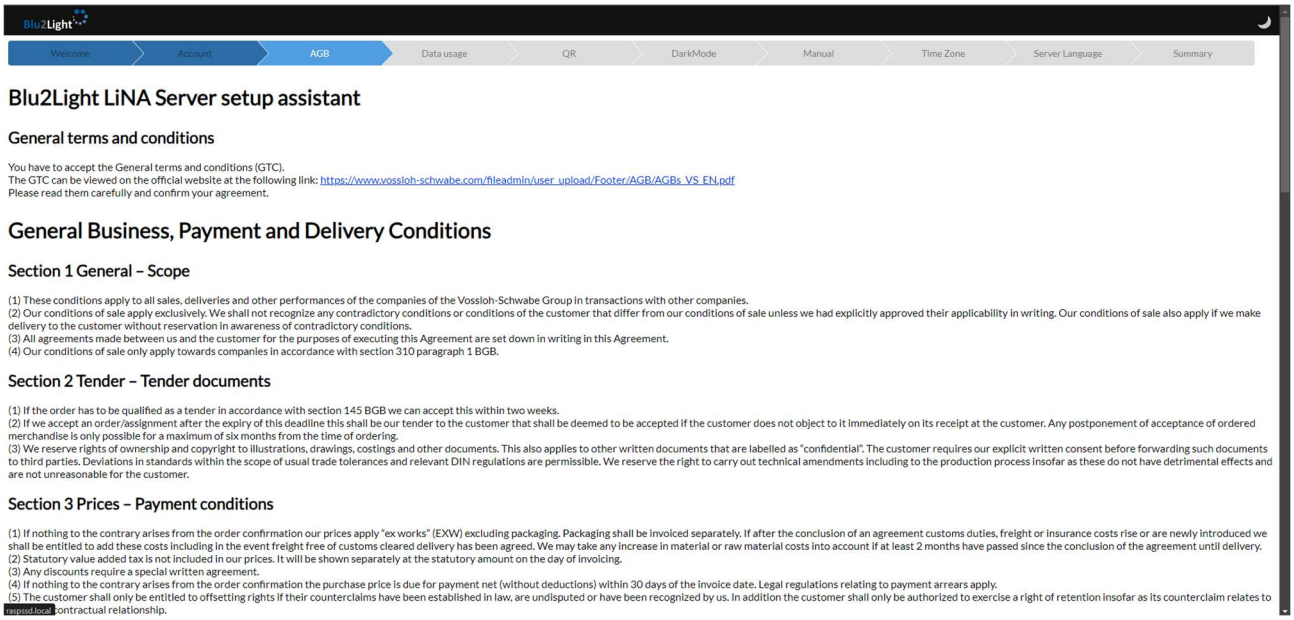

Figure 3: Terms of conditions

The next page takes you to the General Terms and Conditions (GTC), which can be viewed on the official website at the following link: https://www.vossloh-schwabe.com/fileadmin/user_upload/Footer/AGB/AGBs_VS_EN.pdf
Please read it carefully and confirm your agreement by clicking on the box “I have read and accept the GTC”. Press the “next step” button to continue.

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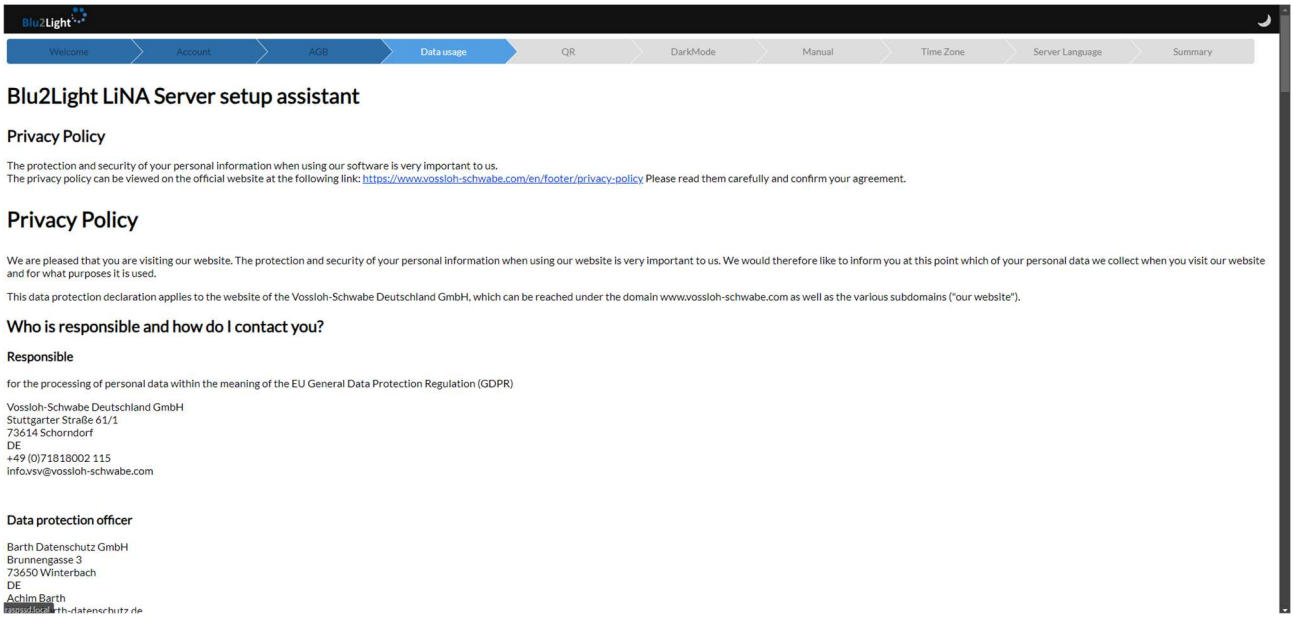

Figure 4: Privacy policy

The next page takes you to the Privacy policy, which can be viewed on the official website at the following link: https://www.vossloh-schwabe.com/en/footer/privacy-policy

Please read it carefully and confirm your agreement by clicking on the box "I have read and accept the Privacy policy". Press the "next step" button to continue.

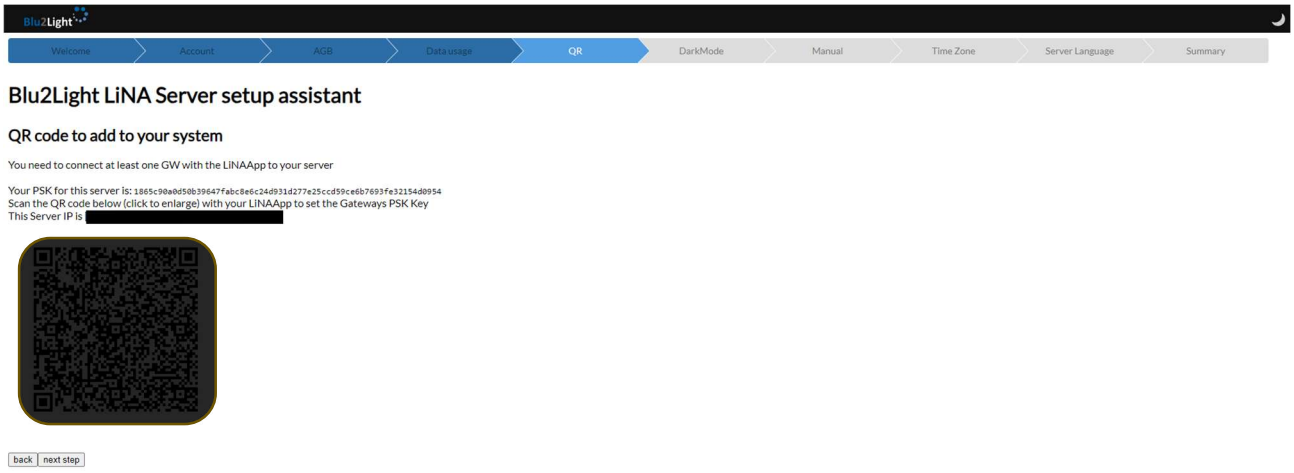

Figure 5: Gateway to add to your system

You need to connect at least one gateway with the LiNA Connect App to your server. After that please go to the next page by pressing the "next step" button.

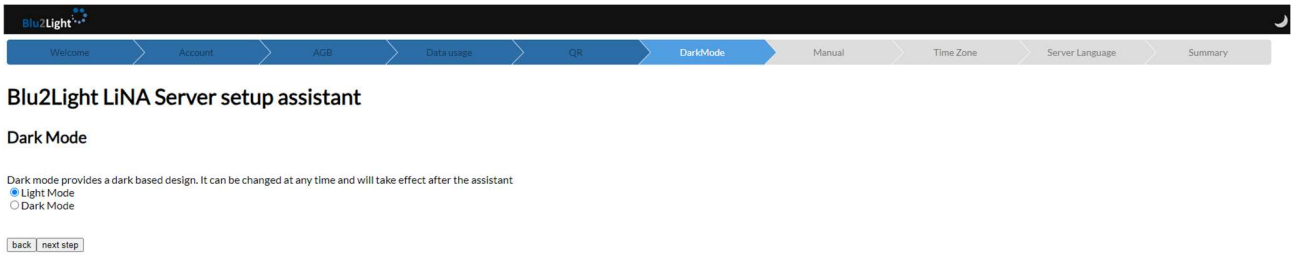

Figure 6: Selection of Display mode

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The display mode is selected by default. You can switch to the dark design. The selected mode becomes active once the wizard has been completed. You can change the setting later at any time.

After that please go to the next page by pressing the “next step” button.

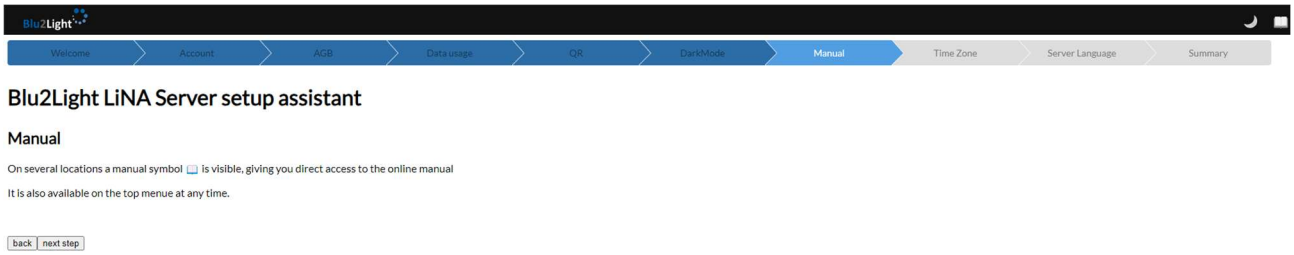

Figure 7: Operating manual

A manual icon 📖 can be seen in several places, which you can use to access the online manual directly. It is also available at any time in the top menu.

Please proceed to the next page by pressing the “next step” button.

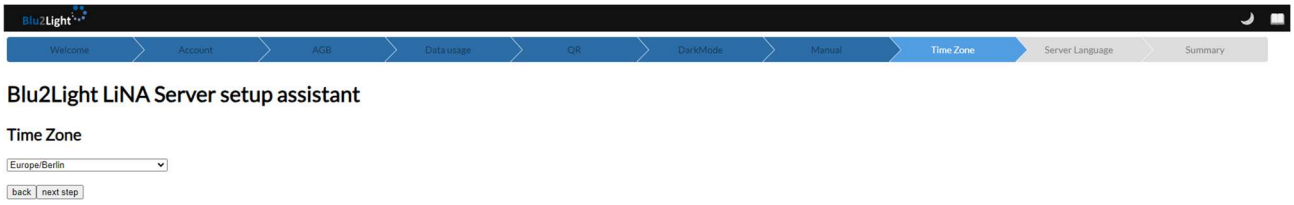

Figure 8: Setting of time zone

Set up the correct time zone. Please refer to the next page.

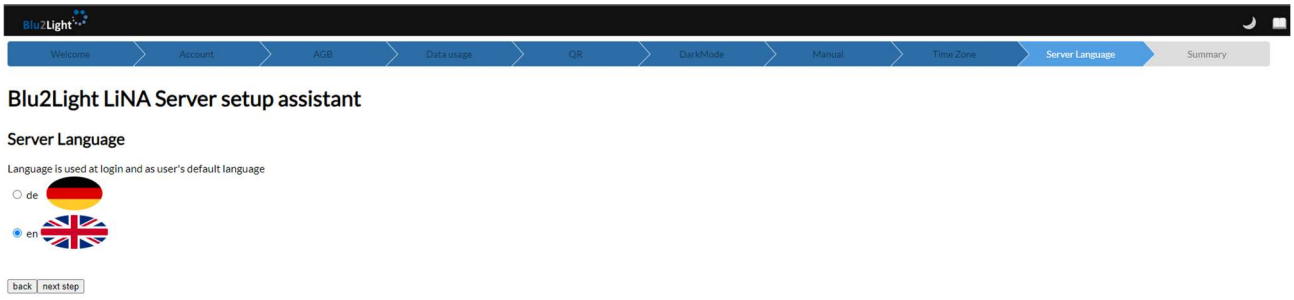

Figure 9: Selection of server language

Defines the system language for login and the default language of new users. It is also available at any time in the top menu. Spanish and Italian languages are also available.

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Please refer to the next page.

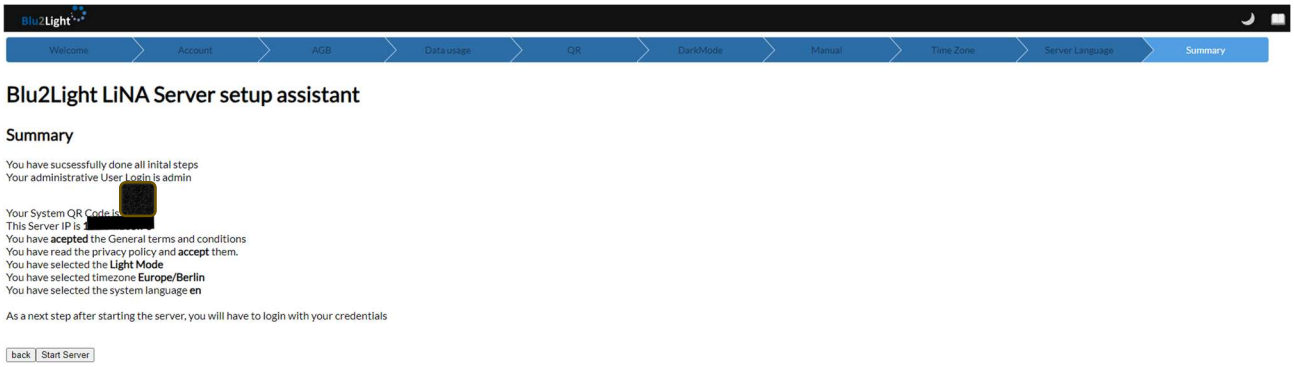

Figure 10: Summary of initial steps

After completing all the steps, proceed to start the server and log in with your credentials.

4 LOGIN

Please log in with your credentials to access the server.

Figure 11: Login mask

After successful login, the welcome page of the Vossloh-Schwabe LiNA server opens. It contains the current information about the existing system. Pending notifications are displayed in an orange-coloured field on the right-hand side.

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If you press the Blu2Light symbol, you will always return to this view.

If you want to log out, simply click on the logout link, icon on the far right of the menu bar.

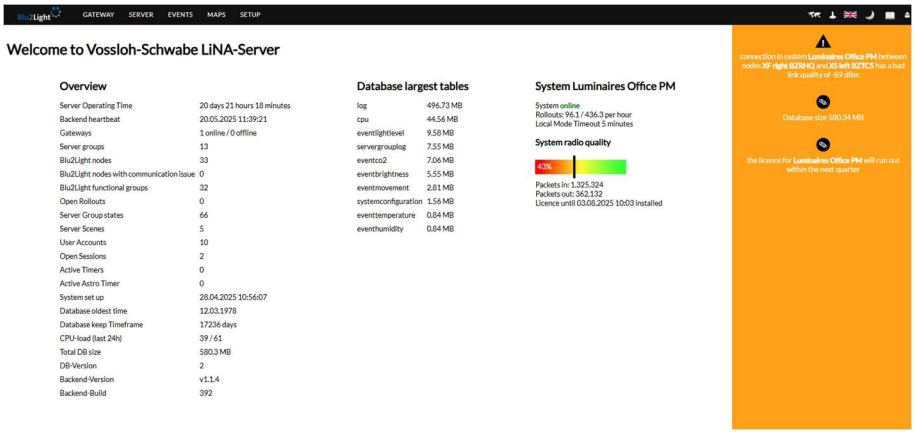

Figure 12: Welcome page of Vossloh-Schwabe LiNA Server

5 GATEWAY SETUP

Please continue setting up the gateway by clicking on the "GATEWAY" tab.

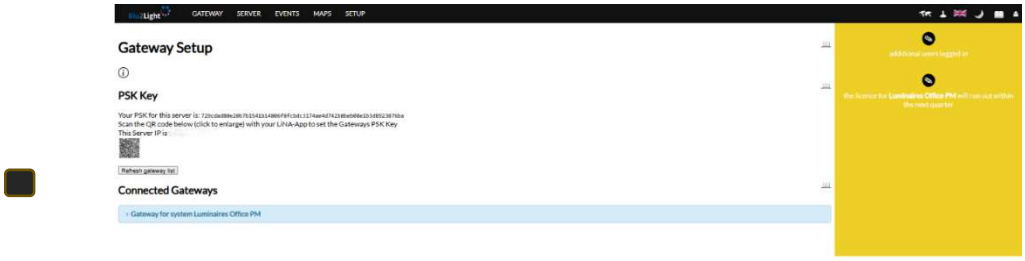

Figure 13: Gateway setup

Here you can add gateway(s) to your server system. The PSK key is randomly generated for your server at the first start and cannot be changed.

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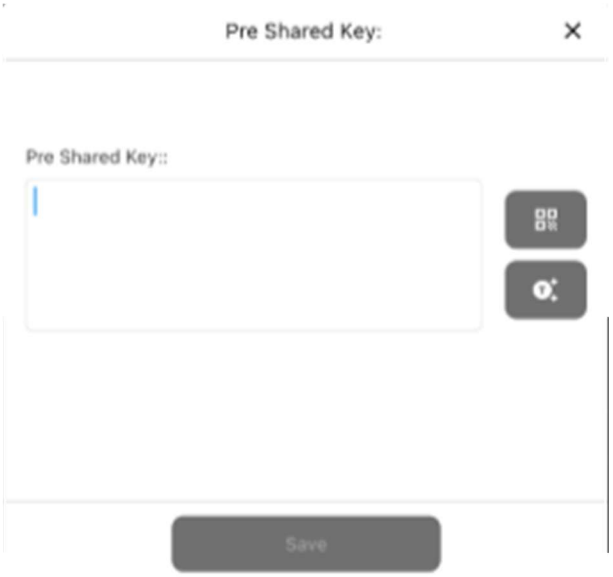
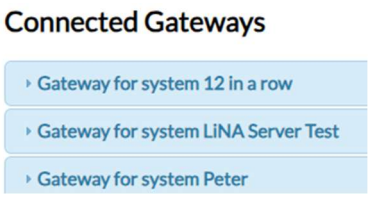
Open the Gateway menu in the LiNA Connect App.

Enter the server's IP address. Click "Pre Shared Key".

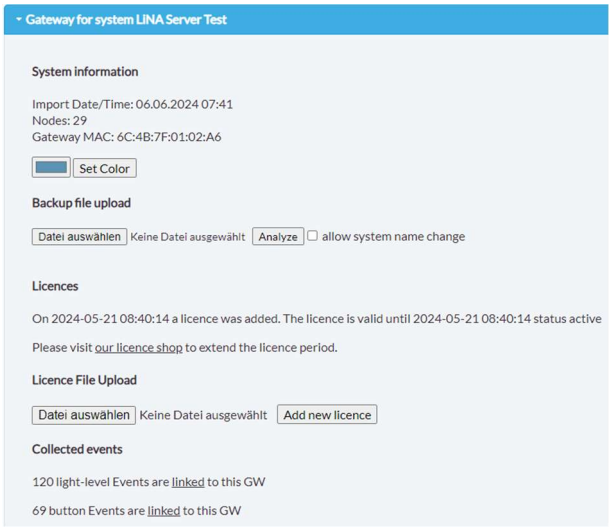


Please manually enter the PSK in the opened window or scan the QR code.

If the gateway is not displayed on the page after scanning the QR code, try pressing F5 (or refreshing the page in another way) to see the updated data.



The number of connected gateways can be viewed in this menu. Please note that actively connected gateways cannot be removed!



After selecting a gateway, you will be taken to the following overview:

- System information:

- with import date/time,
- number of nodes,
- MAC address of the gateway,
- Colour setting of tiles of connected FGs,
- Selection of features

- Upload the backup file
- Licenses
- License file upload
- Collected events - number of events linked to the selected gateway

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Licenses are required for the gateways!

If a gateway does not have a valid license, the system is restricted in operation and only basic functions are possible.

To activate a license, at least VS firmware version 1.61 or newer must be installed on the gateway. Update Tool Firmware is available on the VS webpage: https://www.vossloh-schwabe.com/en/service-downloads/software

or refer to point 9.2 in this operating instruction.

6 SERVER SETUP

6.1 SERVER SCENES

Please continue by clicking on SERVER in the menu and then on Server scenes. An overview of existing scenes appears.

You can use the filter to reduce the number of server scenes displayed. The filter is applied live. Enter at least 3 contiguous characters to perform the filter search correctly. If the filter is applied incorrectly or is too large, you will receive a result with no hits. Deleting the filter takes you back to the complete overview.

A Server scene (short form: SC) is a light scene of a Server group status (SGS). Name the Server scene according to your wishes and press the button "Create new server scene".

A SC consists always of a brightness channel and 6 colour channels, which will be configured according to the driver used (e.g. single channel, Tuneable White, RGB, RGBW …). If you set all channel values to 0%, no event (button pressing, motion detection or light control) can trigger the light.

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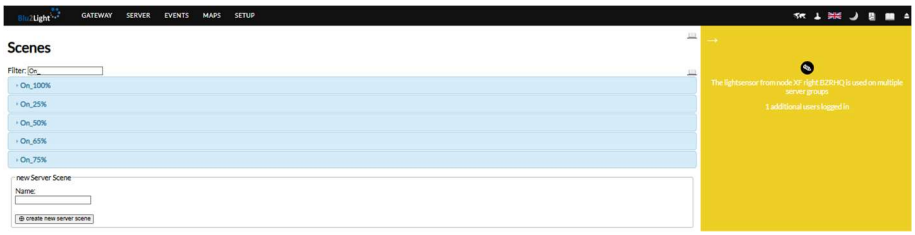
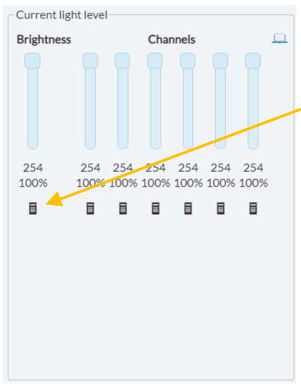
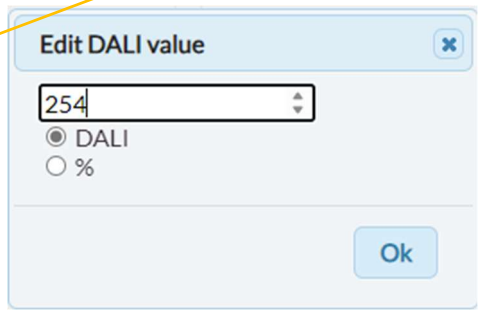


Figure 14: Creation of Server scenes

The master brightness, as well as the brightness for each specific channel (1-6), can be configured.



By pressing the button, you have the option to enter the desired light level as a DALI or percentage value.



If you want to edit an existing scene, click on it.

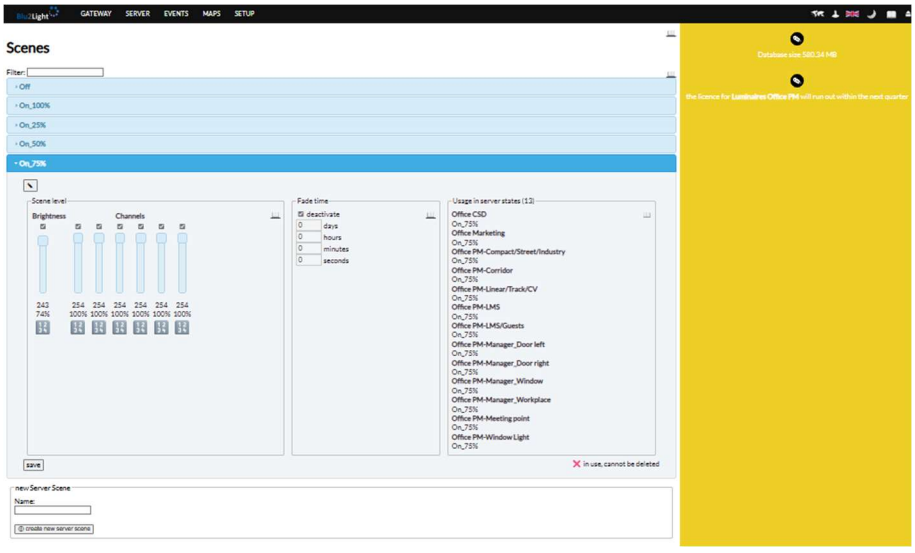


Figure 15: Editing Server scenes

You can change brightness and fade time. On the right, you can see the use of the selected scene in the existing server states.

6.2 SETTING UP SERVER GROUPS

Please click on SERVER in the menu and then on Server groups.

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A server group is the corresponding functional group in LiNA-Connect. A list of existing server groups appears.

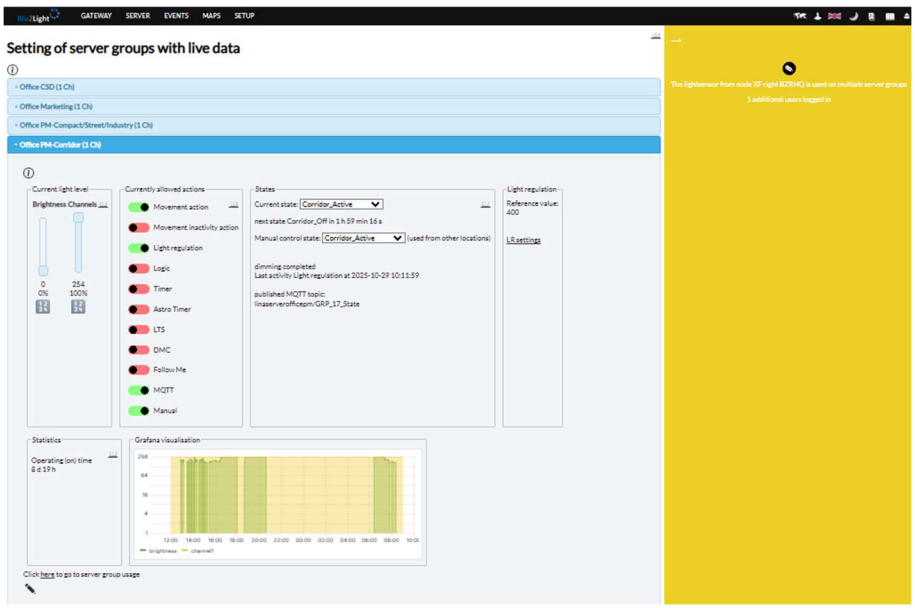
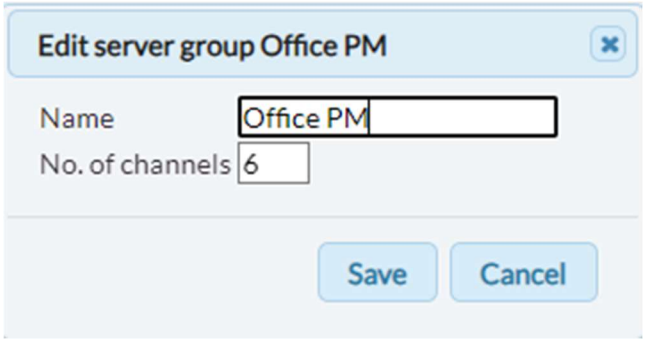


Figure 16: Creation of server groups

Name the server group according to your wishes and press the button "Create server group". By clicking the pencil symbol, you can edit the Server group name and the number of channels.



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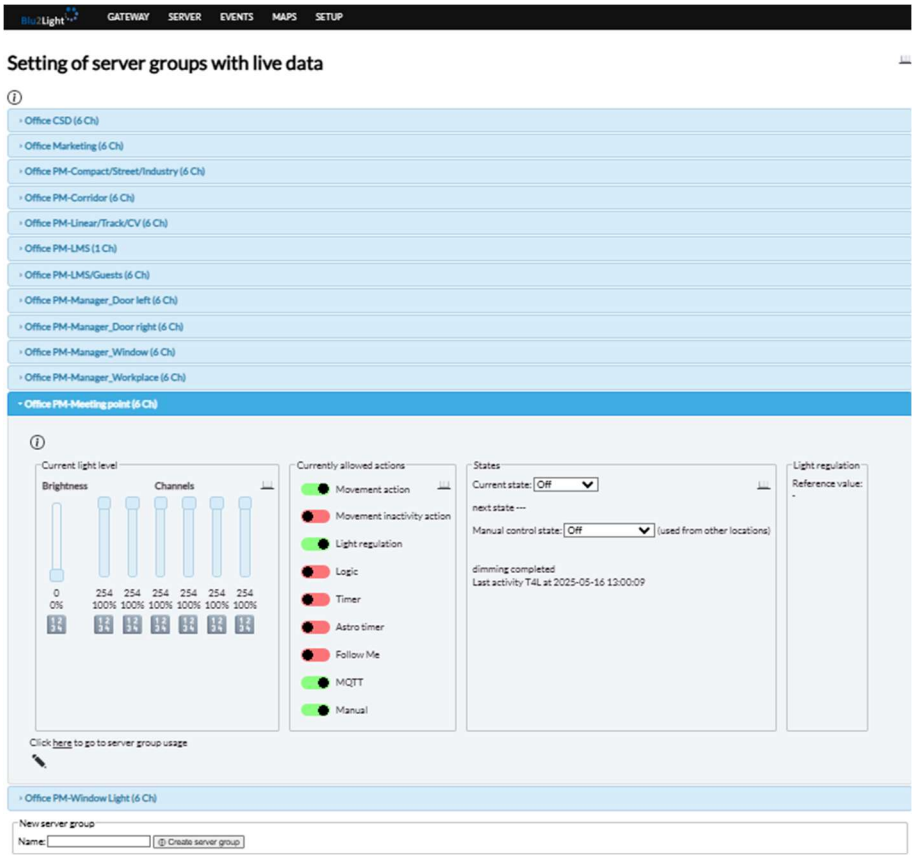
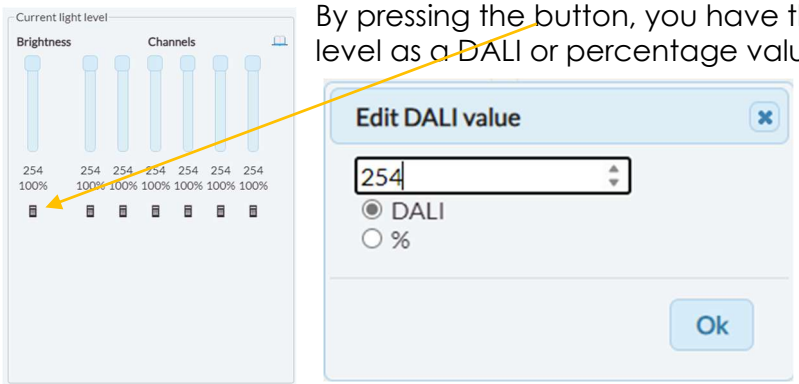


Figure 17: Setting of server groups

Please select the server group you would like to set.

Please note: The page for configuring the server group is the only page where settings are saved automatically. All changes are transferred directly to the system.
The master brightness, as well as the brightness for each specific channel (1-6), can be configured.



By pressing the button, you have the option to enter the desired light level as a DALI or percentage value.

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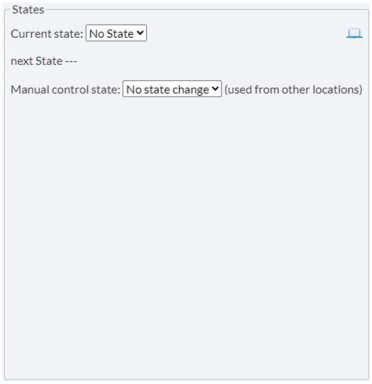
The possible states can be selected as active or inactive. The switches determine whether certain events or operating elements may change the server group (SG). If manual control is deactivated, the server does not accept any changes to the values.

- **Movement action:** Movement actions triggering light
- **Movement inactivity action:** Used for Return to auto (short form: RTA).
- **Light regulation:** Automatic light control, e.g. constant light regulation
- **Logic:** Logic functions
- **Timer:** Timer Control
- **Astro Timer:** Astronomic timers
- **LTS:** Light threshold switch (for outdoor use)
- **DMC:** Daylight multi-channel control (for example, for HCL)
- **Follow Me:** Follow to external group values
- **MQTT:** External control via MQTT
- **Manual:** Manual control e.g. via Buttons or WEB-GUI

If RTA is used, movement will be also detected if the functional group is in manual mode, but without changing the state. A timer is restarted with every incoming movement event. If the detected movement ends, and the timer reaches the defined level, the Server group will change to automatic mode, switching to the selected auto state. This allows the server group to return to active mode as soon as the next movement is detected.



The status of a SG can be displayed and changed in the Status field. Please note that changing the status can also change the action switches and light levels.

6.3 ASSIGNMENT OF FUNCTIONAL GROUP

Please click on SERVER in the menu and then on Assignment of functional group to server group.

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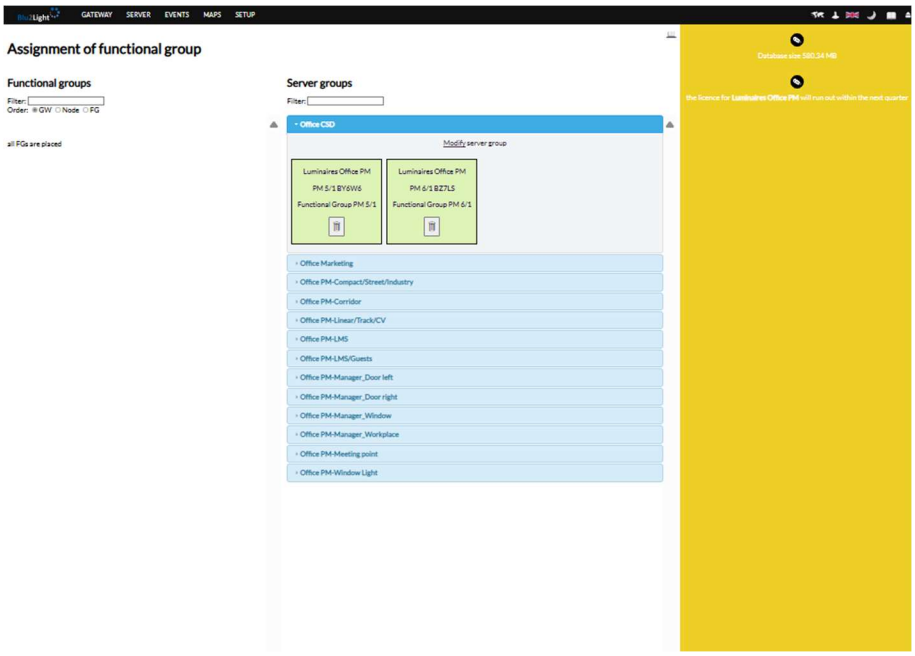

Figure 18: Assignment of functional group

You can sort and/or filter the existing functional groups (FG). A FG can only be assigned once.
Use drag & drop to copy the desired FG(s) to the selected server group. Once it has been assigned, it is no longer listed in the overview on the left-hand side. The assignment of an FG can also be undone. It will reappear on the left-hand overview page.

6.4 SERVER GROUP STATES

Please click on SERVER in the menu and then on Server group states.

A Server group status (short form: SGS) is a specific status of a Server group SG.

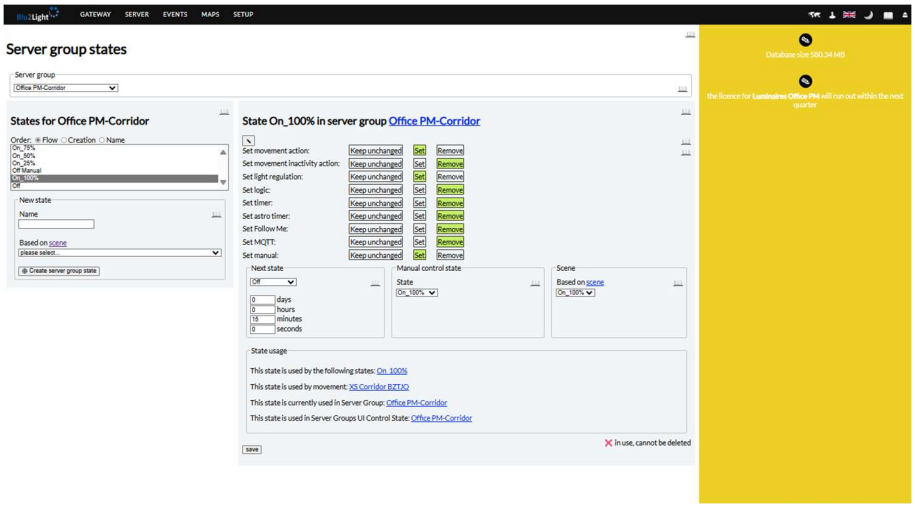

Figure 19: Server group states

You can sort the existing states by flow, creation date or name after selecting the server group.

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- Flow: Sequence based on the following status. The states appear in the order in which they are most likely to be used later.
- Creation: The order is based on the creation of the state.
- Name: The order is based on the name of the respective state.

After selecting the desired server group, a list of the existing states appears on the left-hand side. When a status is selected, the actions associated with this status are displayed on the right-hand side.
Changing a status that is currently in use directly changes the status of the server group. It is strongly recommended to check the correct configuration of the SG after changing statuses. Every change must be saved by pressing the "Save" button.

If you select a server group that does not yet contain a server group state, you have three options to add a state:

1) Name the new state, link it to the desired scene, and press the button to create the new state.
2) Insert a standard state template with pre-defined server group states: Active, Manual, Passive and Off. The associated scenes will be created automatically if they do not already exist.
3) Copy existing server group states from another server group.

Options 2 and 3 are available only if the selected server group has no existing state.

6.5 TOUCH4LIGHT SETUP

Click SERVER in the menu, then select Touch4Light setup.

Touch4Light lets you create unlimited virtual buttons to activate SGS on SG.

Touch4Light (short form: T4L) buttons are grouped and enable individual control panels for all requirements. Naming the group based on the name of the corresponding locally configured B2L system facilitates later identification. Create the new T4L group. A T4L group can be renamed by pressing the pencil button.

Figure 20: Overview of Touch4Light setup

After creating a T4L group, you can add, name, sort by using drag and drop, rename, delete, and assign custom colours to T4L buttons. Buttons can also be grouped under a generic name (in column Tab) for easier access in the T4L interface. Buttons sharing an identical tab name are organized into the same group. The number of buttons on each tab and the number of tabs should be aligned to the device used to control the system. If

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a tab name is not specified, tabs will not be displayed. All buttons are located within a single view.

Save your T4L configuration.

Finally, the created T4L switches must be assigned to the corresponding server groups in the Event Mapping menu item. After assigning a T4L button to the desired server group, you can select the corresponding server group state. Save your settings. When a button is assigned to manage a SG, the corresponding SG will be displayed, and removal of that button from the Touch4Light setup table will not be allowed.

T4L allows access to panels to be limited to specific users. If the final user with panel access rights is removed, access becomes available to all users.

The direct link gives access to a page showing only the relevant T4L group. It can be used on a wall-mounted tablet for control.

6.6 PMD SETUP

The power measurement device (PMD) function enables the regular data acquisition from DALI drivers. The PMD settings are applied at the beginning of the data acquisition cycle and remain in effect for its entire duration. Any queries added or removed during an ongoing cycle will only affect future cycles.

PMD data can only be collected from compatible DALI drivers that provide the necessary information. If unsupported devices or drivers with insufficient functionality are used, no data will be available for them.

The PMD interval can be set manually in minutes between 1 minute and 44.640 minutes (= 31 days). The ideal interval varies depending on the system. For small systems, typical values are once a day (1.440 minutes) or once an hour (60 minutes).

If data acquisition is delayed by two or more cycles, these cycles are skipped.

The start of the next data acquisition can be set within a minute range.

The required data can be selected individually. If at least one data point is enabled, a DALI luminaire fault message is always requested. Selecting only the necessary data reduces the load and allows for faster delivery. The relevant basis for the display of the PMD values is the international standard IEC 62386.

If no cycle is running, you can manually start a new one without affecting the interval.

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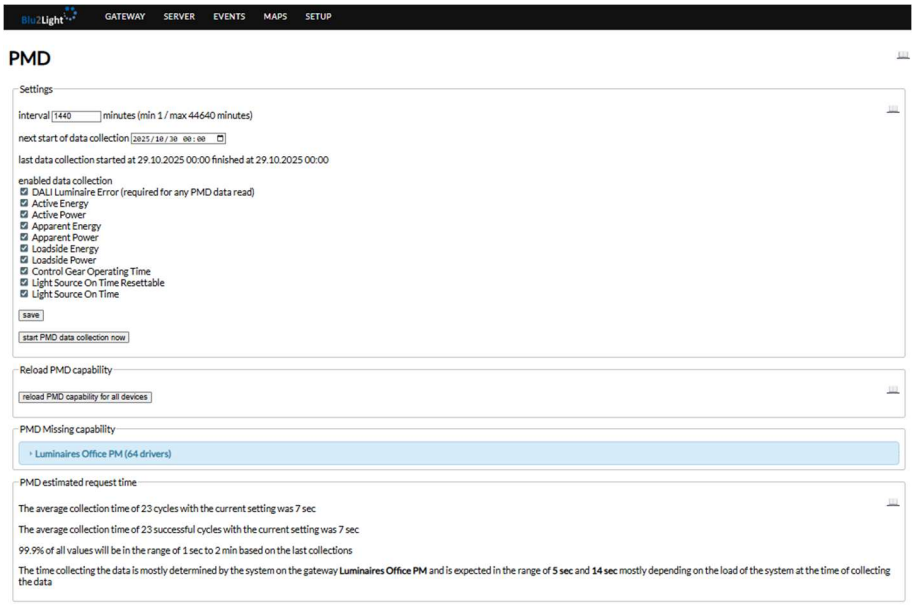

Figure 21: Settings of PMD

The server stores information about the functions of each driver. These values can be queried again if needed, for example, if a driver has been changed. It is not necessary to request the functions again during normal operation.

Missing capabilities:
All devices in the system that do not support the requested data are listed in the table, which is sorted by node and DALI address, as well as by missing functions.

Estimated data acquisition time:
Depending on the system structure, the server estimates the acquisition time for the enabled data points. The average acquisition time for 100 successful cycles with the current settings is displayed. This value is highly dependent on the system's data load and can vary from cycle to cycle.

Result from last data collection:
The total values for the last reporting period are listed. These include the PMD query number, the start and end times of the query, its duration, the requested data, the query result, the MQTT transmission, the number of luminaire errors, and the number of queried devices and data points.

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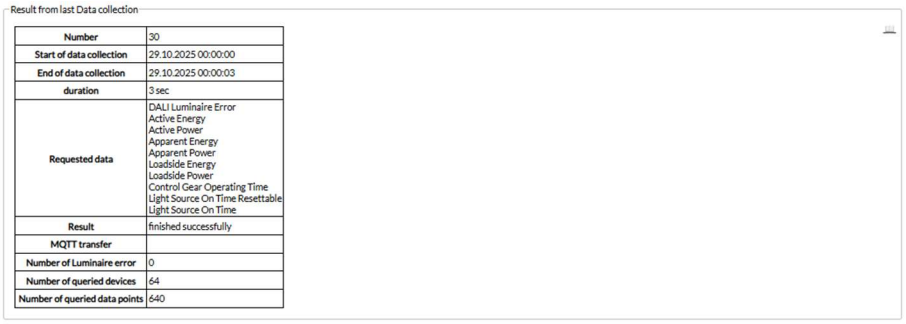

Figure 22: Result of the last data collection

A list provides an overview of all processed and stored values.
It includes the PMD query number, the start and end time of the query, the requested data, the query result, the MQTT transmission, and a link to the query report.
The PMD report contains the query configuration and an overview of the physical devices in the system. It also indicates which data each device supports. In addition, it provides detailed data for each individual device. The reports are sorted by month.
Data can also be transmitted via the MQTT protocol. Please refer to Chapter 9.4, 'MQTT'.

7 EVENTS SETUP

Please continue by clicking on EVENTS in the menu and then on Event mapping. An overview of existing events appears. Only events that have been triggered in the last 48 hours are displayed.

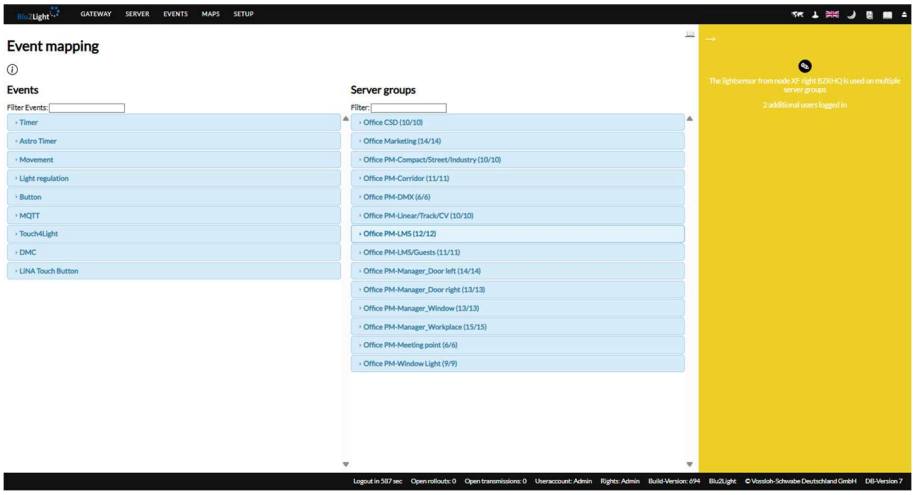

Figure 23: Overview of existing events

Events are used to control SG. Different events offer different functions that meet the requirements of a Blu2Light system, e.g. timer, astro timer or constant light control.

To connect the LiNA Touch app on your smartphone to the LiNA server, press all the buttons within the profile. These will then appear as LiNA Touch buttons on the left under the Event Mapping menu and can be assigned to the corresponding server group. Sliders cannot be transferred. They are in an undefined state that cannot be associated with any server group status.

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Drag and drop an existing event onto the server groups listed on the right side.

7.1 TIMER SETUP

Timers are used to control the light at specific times. Timers are deactivated if the switching action has been triggered and no repetition is assigned. The repetition can be daily and weekly. Timers can be set and configured in this menu. In comparison to LiNA-Connect, the number of defined timers is not limited to 32, but only by the storage space on the hard disk on which the database is stored. Timer functions can be set for each individual day of the week. A timer can also be repeated after one minute, adjustable up to a maximum of 9999 minutes. In addition, a blacklist or whitelist can be defined for certain days on which timers should or should not be executed (e.g. for public holidays). Timer actions can be set for motion actions, motion activity actions, FollowMe, Auto, Timer, Logic and for the Astro timer. All conditions are described individually in the following chapters.

Timers can be used for several SGs. It is not necessary to create a separate timer for each SG. Using the same timer for several SGs also has the advantage that if the timer is changed, the change must be made only once.

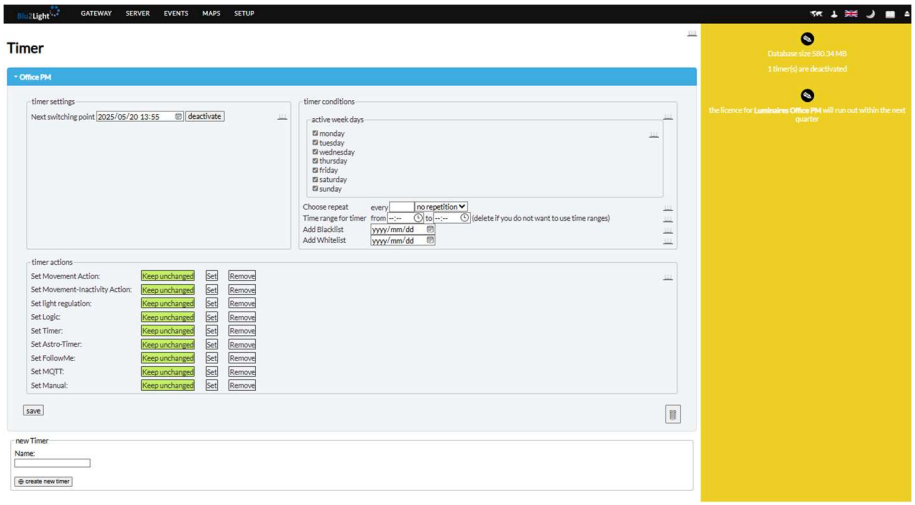

Figure 24: Timer settings

7.1.1 TIMER SETTINGS

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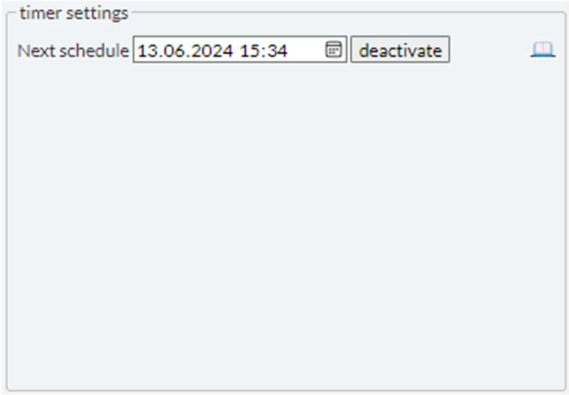

Activating or deactivating starts the entire timer function. A deactivated timer is not called up at all.

The timer schedule must be in the future, otherwise the behaviour of the system is undefined.

A timer is automatically deactivated if the schedule is only a one-off event, and the schedule has already been executed.

Set the timer completely, including the event link to the SG, before coming back and activating the timer.

7.1.2 TIMER CONDITIONS

Various conditions can apply to the timer function. For example, a timer can be set to be active on certain days of the week. The repetition can also be set. A blacklist and whitelist can also be defined. It is also possible to deactivate the timer function.

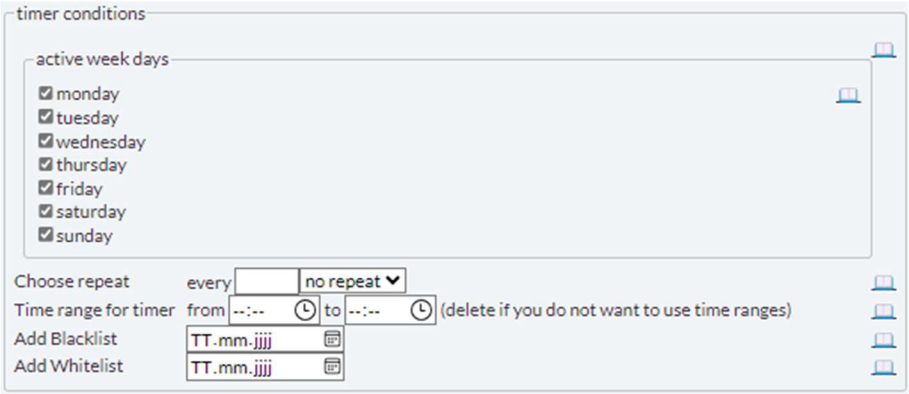

Figure 25: Timer conditions

All conditions are described below.

7.1.2.1 WEEKDAYS

It activates a timer action for a day or for several specific days of the week. If a timer schedule is triggered on a deactivated day of the week, the action is not executed and when the timer is repeated, the next schedule is planned.

A timer schedule must be in the future, otherwise the behaviour of the system is undefined.

The timer weekdays work together with the timer conditions. The action is only executed if both points are fulfilled.

7.1.2.2 REPETITION

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The repetition in minutes, hours, days, weeks, months, quarters and years can be set. Also, the amount of the unit, e.g. every 3 hours means that if the first event is at 8:00 am, the next timer event will be at 11:00 am.

If the repetition is too fast so that there is no time to set the function group (abbreviation: FG) to its state, the behaviour is unpredictable.

7.1.2.3 TIME PERIOD

If specified, the timer action is called only between the "from" and "to" times.

If the "from" time is greater than the "to" time, the active time range applies throughout the night.

7.1.2.4 LISTS

Blacklists prevent the timer action on certain days.

Whitelists execute the timer action even if the day of the week does not match.

Do not set a date on the white- and blacklist.

7.1.2.5 ACTIONS

Timer actions allow you to change the future behaviour of the SG.

Figure 26: Timer actions

Changing the SG behaviour for incoming actions allows, for example, a different behaviour at a predefined time.

Please note that other actions can also change the behaviour.

7.2 ASTRO TIMER SETUP

Astro timers behave like timers, with the difference that the time is not fixed, but depends on the calculated sunrise and sunset of the location.

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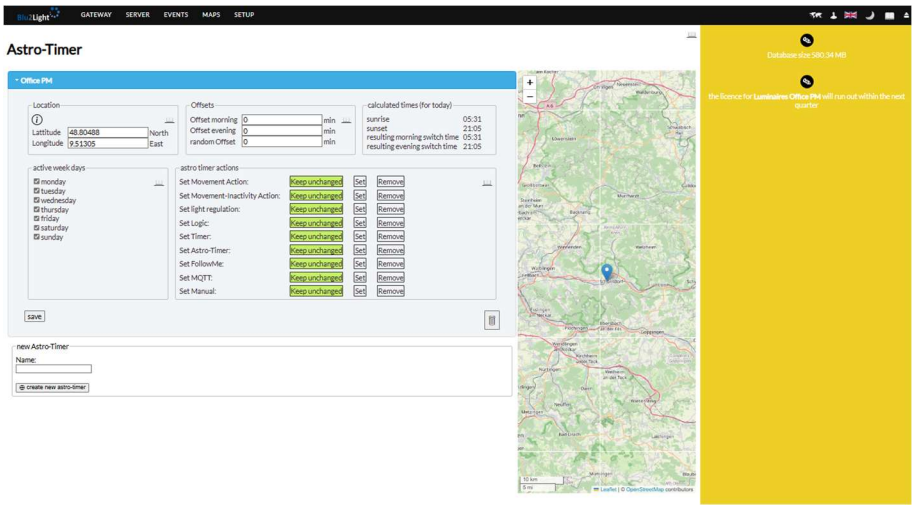

Figure 27: Settings of Astro-Timer

If the entered system location is closer to the Earth's poles than the Arctic Circle (e.g. 66°33'N or 66°33'S), the Astro Timer may behave unexpectedly if there is no sunrise or sunset on some days.

7.2.1 LOCATION

Location is used to calculate sunrise and sunset on the globe. This information is required for the Astro Timer to function correctly.

Enter coordinates manually or click the map to set the location. Use +/- or the mouse wheel to zoom.

If the location is east of Greenwich or on the south side of the globe, enter negative values.

7.2.2 OFFSETS

Offsets can be used with positive or negative values to set the action after or before the calculated sunrise or sunset.

Entering values that are greater than the length of the day or night can lead to undesirable behaviour.

7.2.3 ACTIVE DAYS OF THE WEEK

The astro timer weekdays behave in the same way as the regular timers.

The description of the active weekdays of the timer can be found here.

7.2.4 ACTIONS

The Astro Timer actions behave in the same way as a regular timer.

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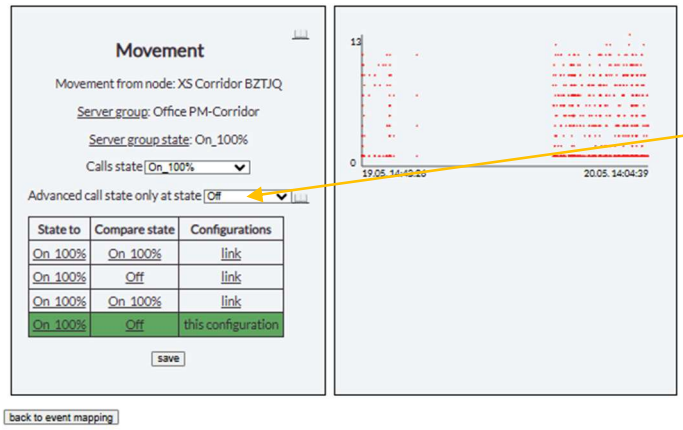
7.3 MOVEMENT SETUP

Motion events from a motion sensor can switch the light on or off or trigger a defined action (e.g. with a Blu2Light relay).

Event Settings



If a motion event is detected, the desired state is called. Additionally, a current active state can be added as a condition.

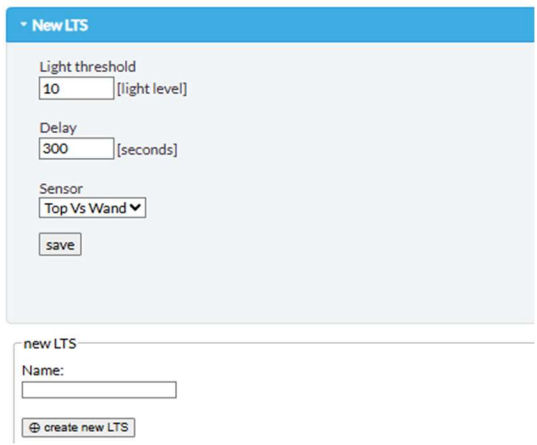
A motion event can be associated with one or more SGs. The state to be invoked can be defined or changed in the settings.

7.4 LTS SETUP

A light threshold switch (abbreviation: LTS) can be used to control a SG, e.g. at a crosswalk.

If the light intensity measured by a light sensor is below or above a certain value, a delayed reaction can be triggered to switch the light off or on.

Light threshold switch



The threshold value defines the light intensity above which the defined reaction is executed.

The light level has no physical unit. The level depends on the system and the surfaces in the system environment.

The delay defines the time that the value must be above or below the threshold value before the event is triggered.

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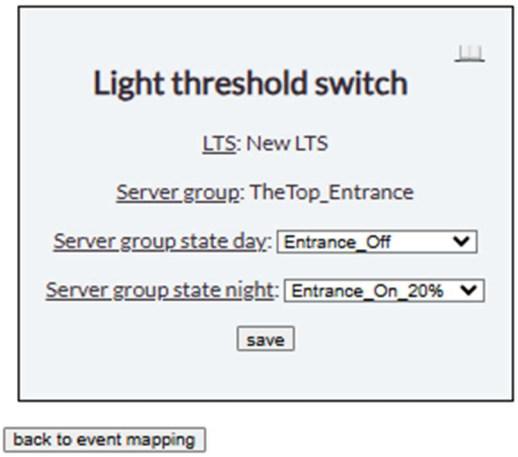
Event Settings



After assigning the LTS event to a server group, the desired states of the server group must be defined, which are to be activated during the day or at night.

7.5 LIGHT REGULATION SETUP

A constant light control (short form: CLR) can be used, for example, to control a SG in a room so that a certain light level is minimized.

Constant light control is used to save energy, e.g. when daylight illuminates a certain area. Constant light control constantly compares the current illuminance measured by a light sensor with a reference value and adjusts the basic brightness of the current scene for each connected SG to achieve a balance. The first connected local functional group is used as the reference SG to control the light regulation. If the measured light is above the setpoint for longer than one minute and the absolute minimum of the leading function group is zero, the light switches off. It switches on again and continues control when the measured value falls below the reference value.

Click on EVENTS in the menu and then on Event mapping. Drag and drop the desired node onto the selected server group.

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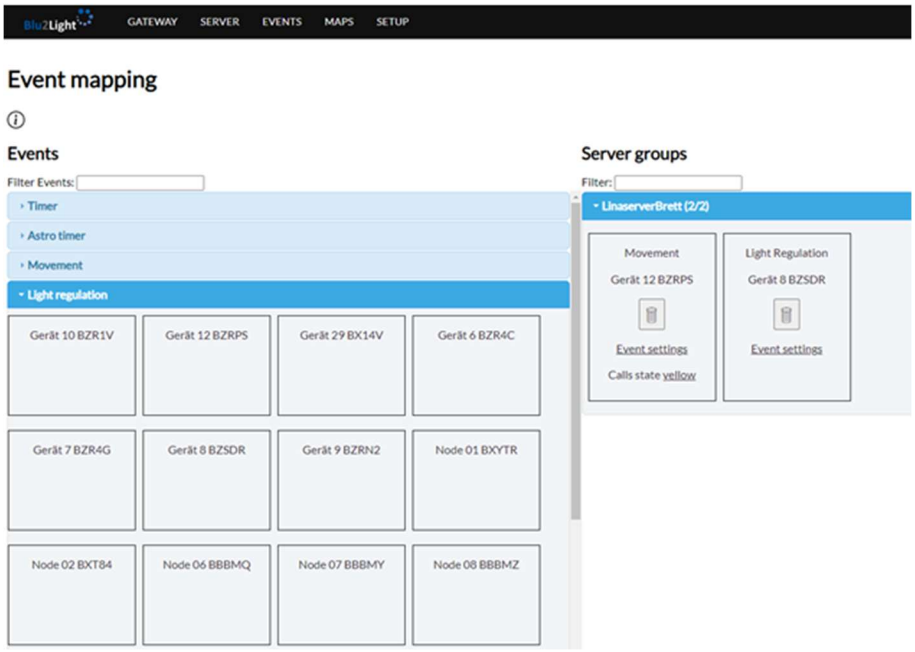
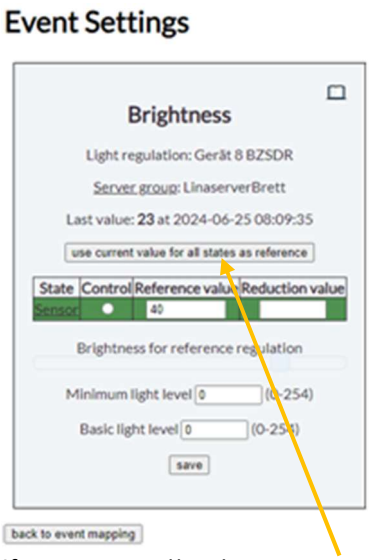


Figure 28: Assignment of Light regulation



The reference values for light control must be set carefully and without unwanted light, otherwise the light control may not work.

Avoid having luminaires from other function groups too close to a light sensor. This can affect the accuracy of the light control, or the light control may not work at all.

You can use the slider for the light intensity to try out how bright the light control will be. The last value shows the automatic measured sensor value.

Using a lux meter, you can adjust the setpoint lux value in-between 0 - 9999 digits.

If you press the 'use current value for all states as reference' button, you transfer the current value to all states where light control is active.

The user has two options:

1. He can use a server group state SGS to call up a scene that is set to a specific brightness value.
2. He can use an SGS to call up a scene where the master brightness is deactivated and set to zero, and the channels are set to 100%. The minimum light level is then set in the LR menu, with which the LR starts after detecting motion. This can be 126 for a 3% light level, 170 for a 10% light level, or the value to which the LR was previously configured.

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7.6 DMC - DAYLIGHT MULTI-CHANNEL CONTROL

The daylight-dependent multi-channel control (DMC) enables automatic adjustment of the light colour to the respective time of day. By considering the daylight conditions, DMC creates an environment that corresponds to natural circadian rhythms, thereby increasing comfort and well-being.

DMC may be configured to enable time-of-day dependent colour control, as implemented in Human Centric Lighting (HCL) systems.

DMC can be used together with other controls that adjust only brightness.

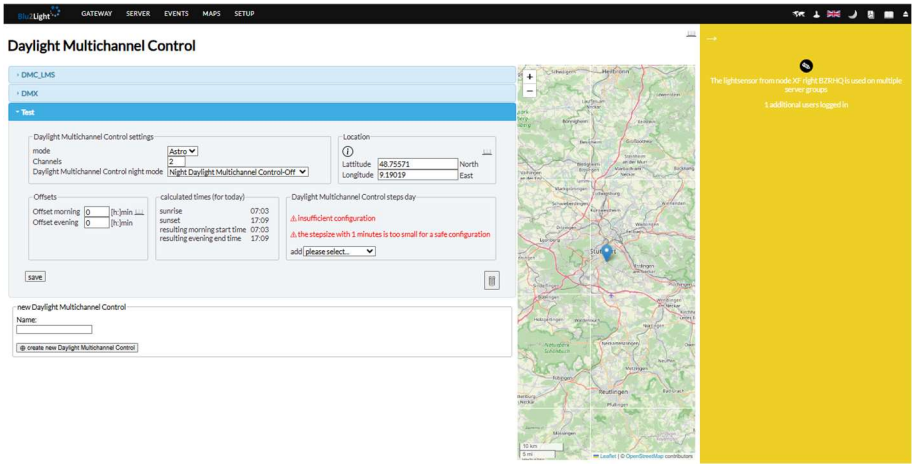
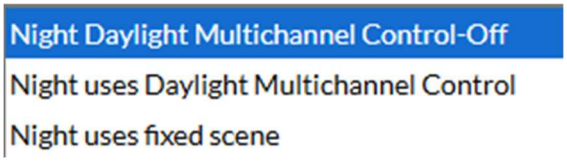


Figure 29: Setup of Daylight Multi-channel Control

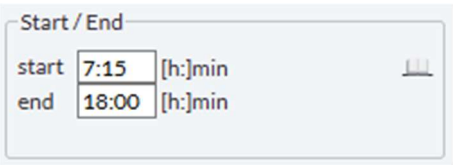
DMC provides two operational modes: Fixed and Astro. The Fixed mode enables the scheduling of colour flow based on predetermined start and end times, while the Astro mode adjusts the schedule according to the geographic coordinates of the installation site.

You can also set up how many channels are used for each scene, such as single channel, Tuneable White, RGB, or RGBW.



There are three configurable modes for night-time operation. "Control Off" disables all control features during the night, maintaining the current state of the control unit unless altered by external factors. "Multi-channel control" allows for individual settings comparable to those available during daytime operation. The "Fixed scene" option enables the selection of a predetermined lighting scene specifically for nighttime use.

7.6.1 DMC – START AND END



In Fixed mode, set the start and end times here. To run the primary process at night, reverse these times.

The option to enter an offset is not available.

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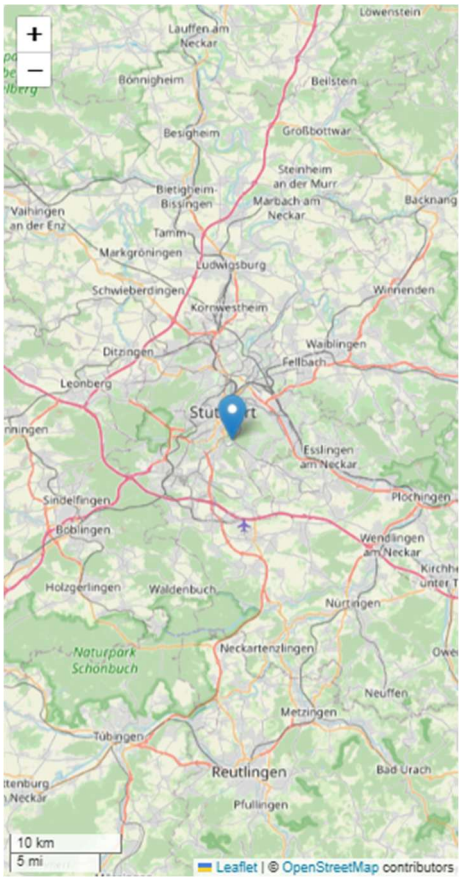
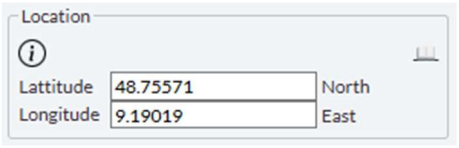
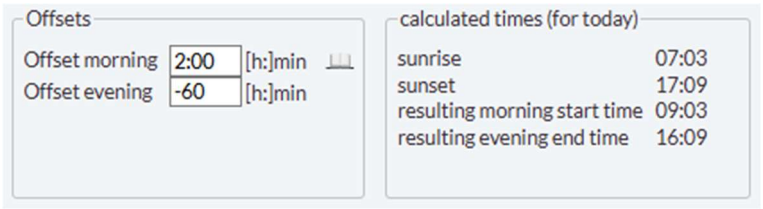
7.6.2 DMC – LOCATION

In Astro mode, please input the latitude and longitude of the installation site, or alternatively, select the desired location on the map.





7.6.3 DMC – OFFSETS



When using Astro mode, you can apply positive or negative offsets to schedule actions either before or after the determined sunrise or sunset times.

Please be aware that, for the chosen location, the offset should not cross into the following day.

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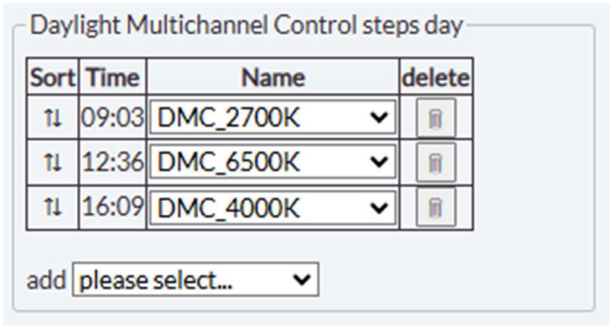
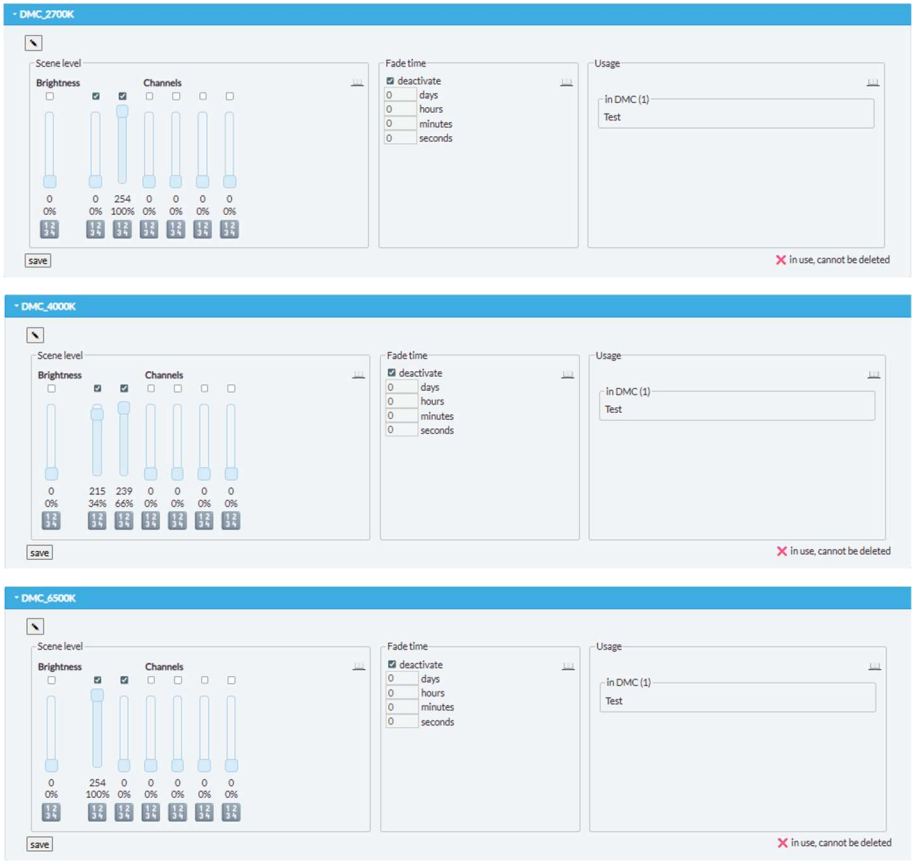
7.6.4 DMC – SCENES SELECTION



Select at least two scenes. You can add scenes during the run, dividing the period into equal intervals to trigger colour changes. Delete a scene by clicking the bin icon.

The created DMC scenes have a disabled master brightness setting. Only the corresponding colour channels are configured.



Drag the created DMC event to the desired server group.

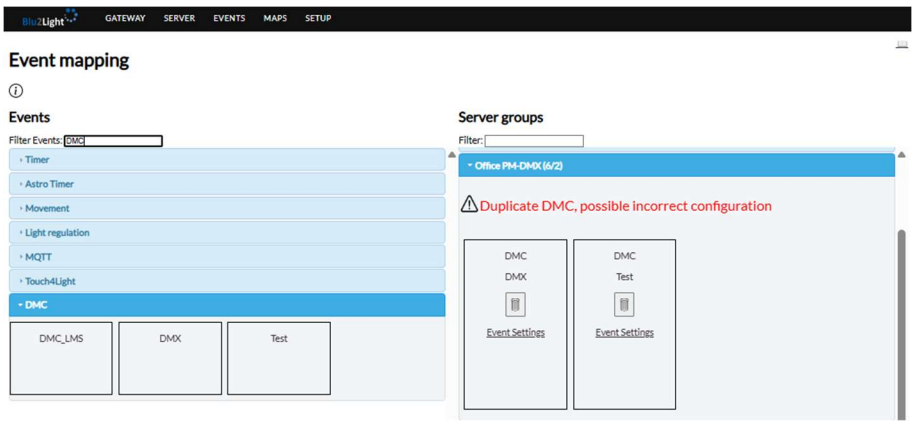


Figure 30: Event mapping of DMC

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The next figure shows the server group with running DMC. Depending on the selected scenes, DMC starts with the scene DMC_2700K (brightness 100%, colour temperature 2700K). Within the preset time interval, it switches to the next scene, DMC_6500K (brightness 100%, colour temperature 6500K). This transition is not abrupt, but rather a smooth fade from one colour temperature to the other.

Figure 31: Overview of server group with running DMC

First, the server group must be set to a state where only the master brightness is activated. This can be done using a timer, button or switch. The corresponding scene will then have the master brightness activated (in our case, this is set to 100%, see figure 33).

The action DMC must be set.

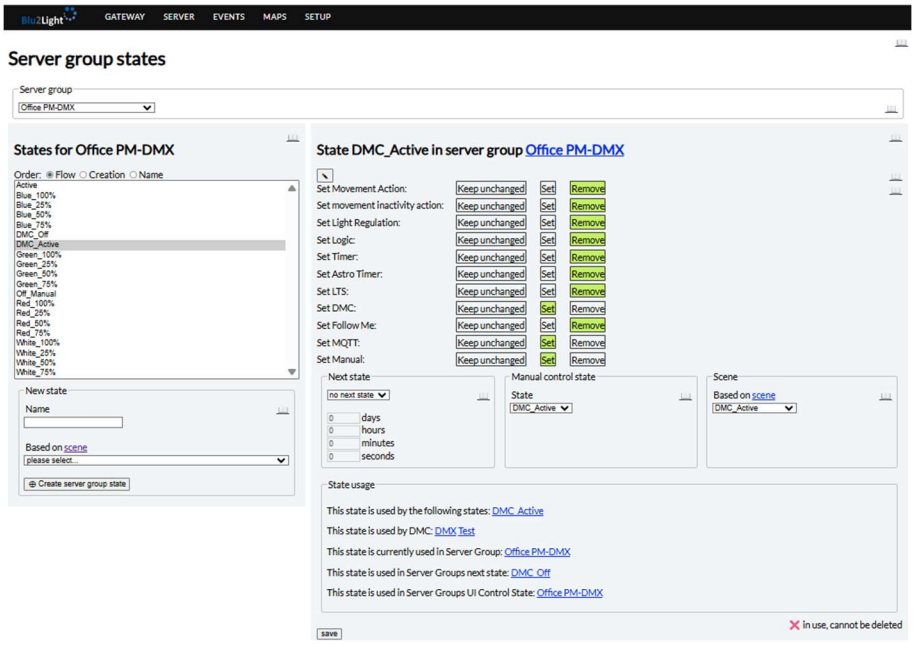

Figure 32: Server group state DMC_Active

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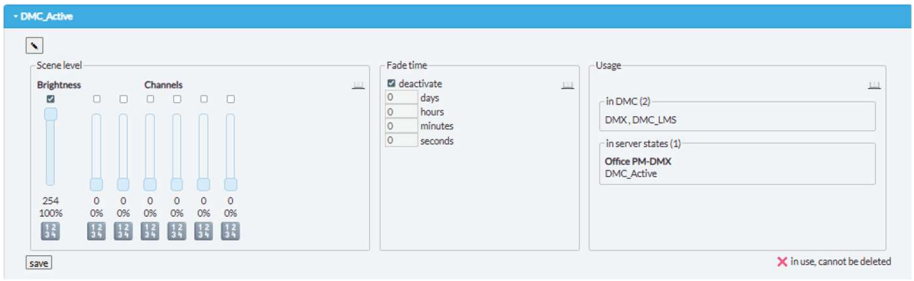


Figure 33: Scene with only activated master brightness

The switch-off scene for DMC deactivates the master brightness and activates the colour channels with 0% brightness.

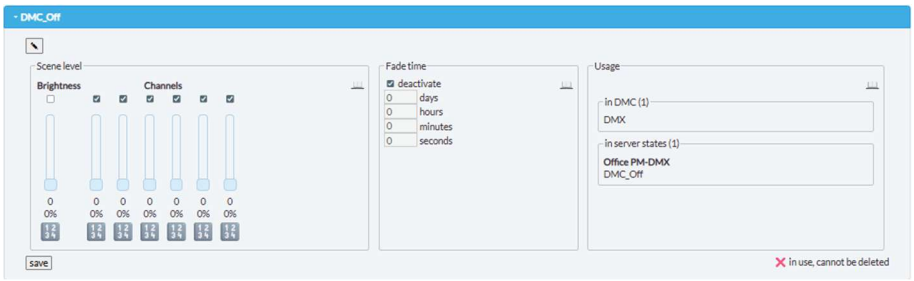
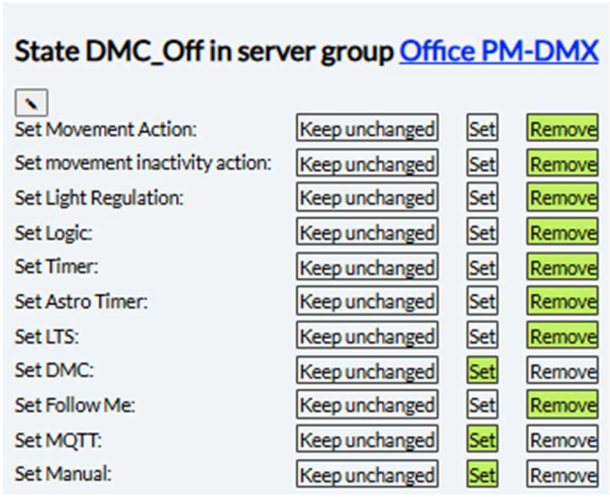


Figure 34: Scene with deactivated master brightness and activated colour channels



On the left you can see the settings for the corresponding server group state.

The DMC feature can be used alongside other actions, such as movement, light control and timers.

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8 MAPS

Activation of map view requires the acceptance of the bound licence agreements.

8.1 MAPS CONTROL

Please continue by clicking on MAPS in the menu and then on Control. An overview of existing nodes and layers appears.

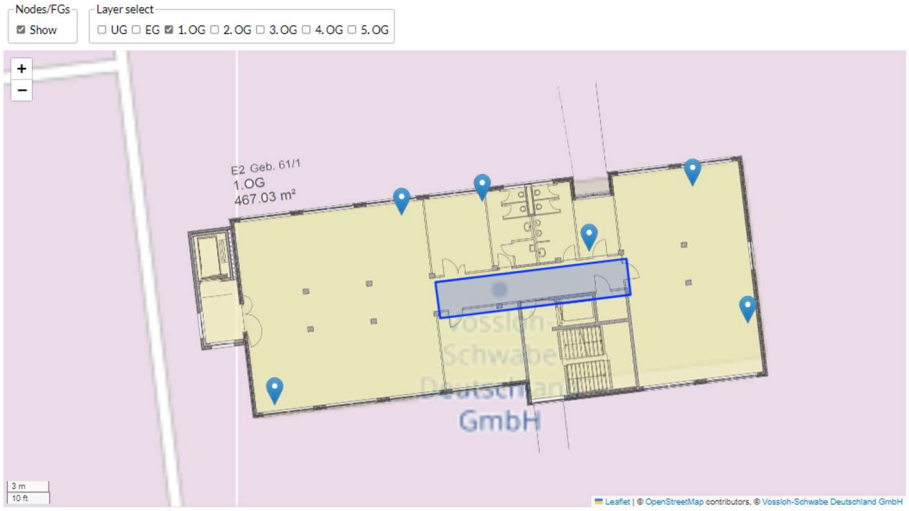

Figure 35: Assignment of Light regulation

If you move the mouse pointer over the created nodes and server groups, additional information is displayed to the right of the map.

Figure 36: Additional information of created nodes and server groups

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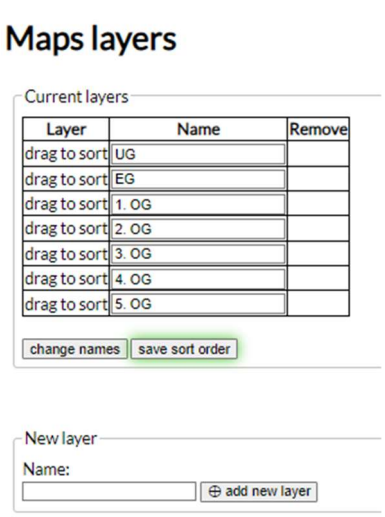
8.2 MAPS LAYER SETUP

Click on MAPS in the menu and then on Layer setup.

Take your time to set up the layers in the order in which they are to be used in your environment. Note: Layers in use cannot be removed!



Create the layers you need to display the environment in your system. You can use drag and drop to specify the order of the layers according to your requirements.

You can also rename the layers in this dialogue and delete them if necessary.

8.3 MAPS FLOOR PLAN SETUP

Please select Floor plan setup in the MAPS menu.

You can upload images in jpeg or png file format. For a good appearance, we recommend using the png file type. Do not add files larger than 2 Mbyte or larger than 2000×3000 pixels. You have the option of adding more than one image per layer.

By using transparent PNG images, you improve the visibility on the map. Set the transparency to a low value when placing the floor plan, increase it for later use.

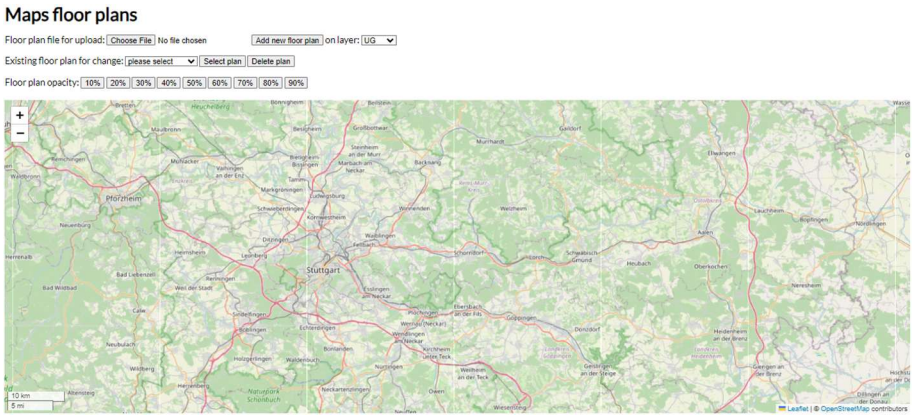


Figure 37: Map overview for creating the floor plans

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Setup guide

1. Prepare your floor plans.
2. Export as png format with transparent colour and files smaller than 2MB per floor.
3. Iterate your prepared layers floor by floor.
4. Move the map to the position of your location in the centre of the screen.
5. Upload the floor plan.
6. Set the transparency to a low value, e.g. 30%, to place the image.
7. Position the tree markers at the corners of your building as a first reference.
8. Rotate all markers clockwise to improve the position of the image. Two iterations should bring the result close enough.
9. Set the transparency to a higher number, e.g. 70%, to use it.
10. Iterate through all the other layers.

Existing floor plans can be changed or deleted later if desired.

8.4 PLACEMENT OF SERVER GROUPS

A server group is the corresponding functional group in LiNA-Connect. A list of existing server groups appears.

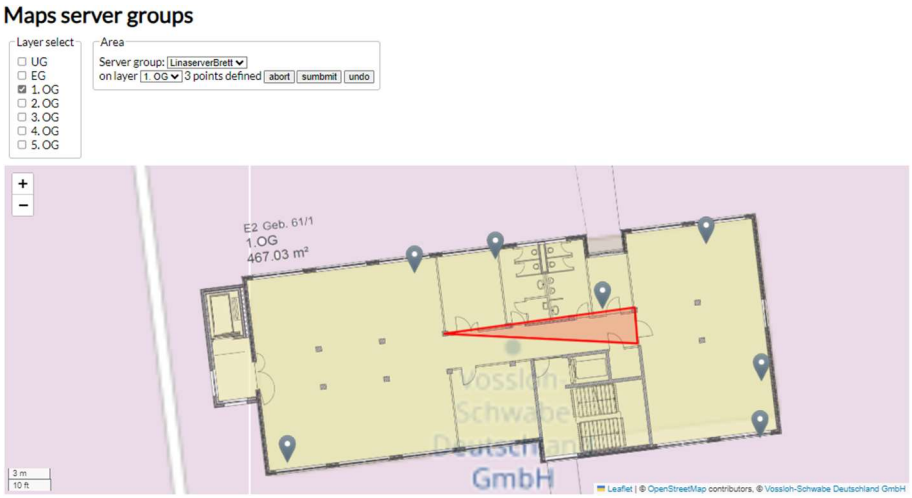

Figure 38: Map overview of created server group

Please select the layer and add the desired SG to the map. By pressing "start" you can set points by using the mouse pointer.

You will see an area after setting of the first three points. You can define the exact area you want by setting additional points. The number of possible points is limited to 99 per server group. Save the created server group by pressing ‘submit’.

Note: Server groups on the map must not overlap.

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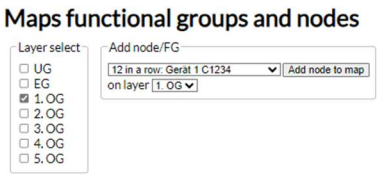
8.5 PLACEMENT OF NODES AND FUNCTIONAL GROUPS

Please choose Placement nodes and functional groups in the MAPS menu.



Select the layer and add the desired node to the map.

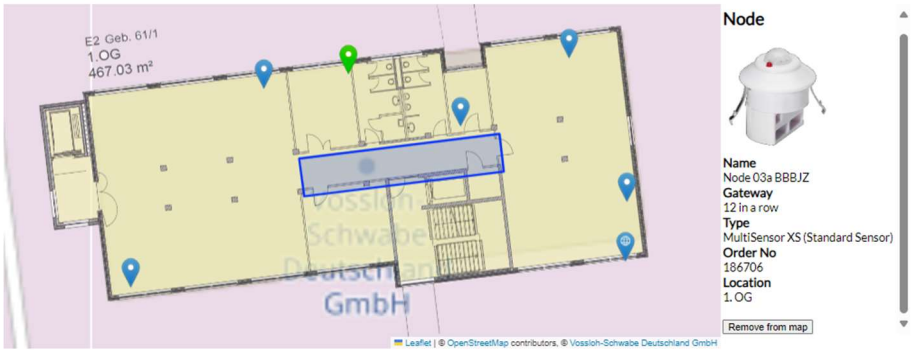


Figure 39: Map overview of created nodes/FG/SG

You will be able to remove a selected node if you move the mouse pointer over it.

8.6 RADIO CONNECTIONS

Please choose Radio connections in the MAPS menu.

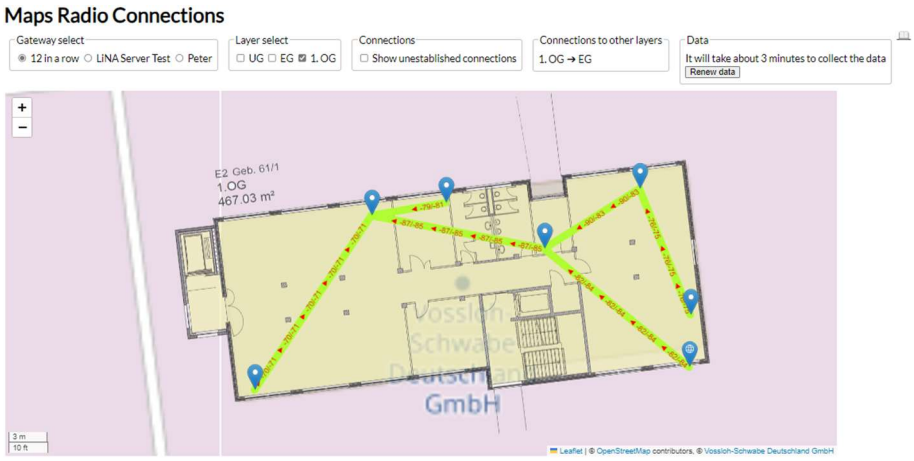


Figure 40: Map overview of created nodes/FG/SG

Select the gateway and the layer and update the data if necessary.

Quality of the connection

- ≥ -70dBm Very good
- ≥ -75dBm Good
- ≥ -80dBm OK
- ≥ -84dBm Acceptable
- ≥ -87dBm Poor
- < -87dBm Not usable

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8.7 HEATMAPS

To create the desired visualisation, please select the layer type (movement, CO_2, temperature) and time interval (last hour, last day, last week, last month, last year).

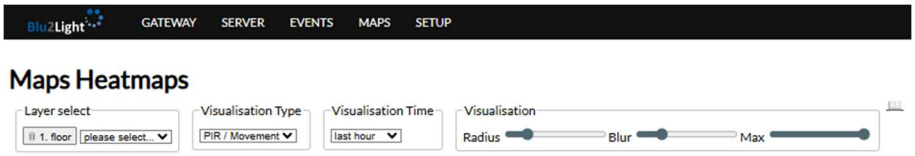

Figure 41: Setting of Heatmaps

You can adjust the display using the sliders for Radius, Blur and Maximum, depending on the selected type. The colour scheme depends on the values measured within the selected layer.

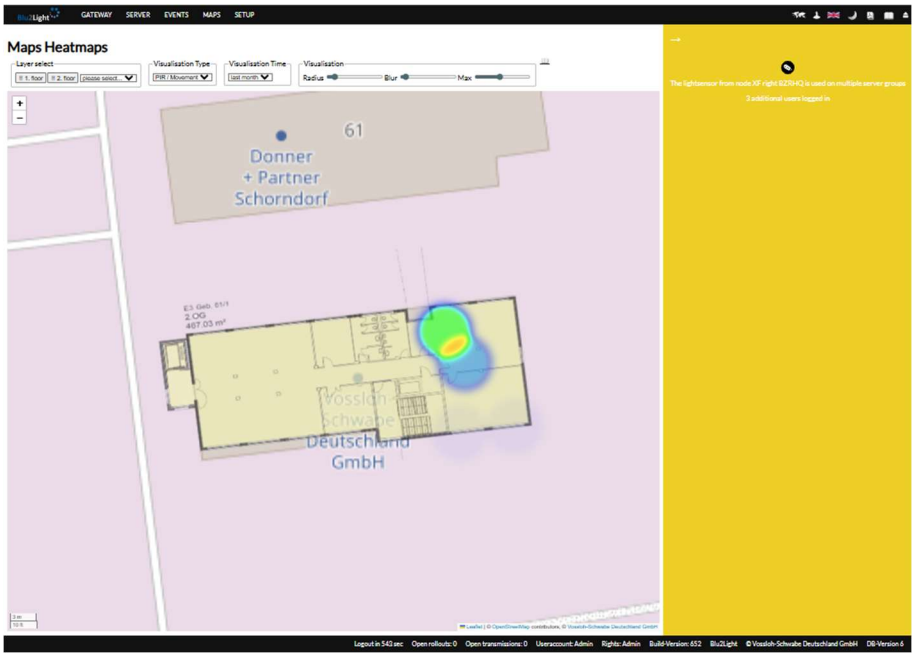

Figure 42: Heatmaps Movement

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9 SERVER SETUP

The setup menu allows you to customise the server settings to a certain extent.

9.1 SERVER SETTINGS

Customization of the server settings.

9.1.1 DEBUG MODE

Enabling debug mode can cause additional data traffic, which makes operation more difficult. Avoid activating it, if it is not required.

The activated debug mode allows direct manipulation of the colour channels by pressing the colour button when accessing a server group with more than 3 channels.

Furthermore, the server group ID, which is also used for MQTT, is displayed above the info icon.

Figure 43: Direct manipulation of colour channels

9.1.2 LOG LEVEL

Settings for logging data (trace, info, warnings and errors).

9.1.3 HTTP/HTTPS

Defines the protocol security for the WEB frontend.

9.1.4 SERVER'S TIME ZONE

Settings for the time zone.

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9.1.5 USER DARK MODE

Enabling dark mode provides a darker orientated view for the eyes.

9.1.6 GLOBAL DARK MODE

Enabling dark mode provides a darker view that is easier on the eyes. It is also available at any time via the top menu.

9.1.7 MAPS

Activating the map view enables access to various map views of the system. It is not required for the operation of LiNA Server. Activation of the map view requires agreement to the associated licence agreements.

If you activate the map view, data is transferred to the external map provider, making your location visible to third parties. See also the topic of maps in this manual here. If you control the light via maps, there is a delay up to 500ms.

9.1.8 SYSTEM LANGUAGE

Defines the system language for login and the default language of new users. It is also available at any time in the top menu.

9.1.9 BAD LINK QUALITY

You can accept the link quality of a node. Consent can be revoked.

9.1.10 FAST ROLLOUT

This feature enables a fast transmission of light control resulting in a more simultaneous light output.

When this feature is enabled, all nodes must be online during the additional programming phase. This can take over 1 minute per node depending on the radio quality. Usually, it is programmed within seconds per node. If the node cannot be programmed, the system may enter an inoperative state.

You can trigger reprogramming by deactivating and reactivating this function.

9.1.11 BLINKING MODE

In certain situations, it is necessary for lights or LEDs to switch to a flashing mode. After activating the function, you have the option of setting the duty cycle between ON/OFF in a ratio of 1:1 or 1:2 and the duration from 0.5 ... 4.0 seconds.

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9.1.12 AUTO DISCOVERY

Auto discovery enables a periodical automatic check for available radio connections to show them on maps. If it is disabled, the search will only start on manual activation, and the data will not be updated automatically.

9.1.13 SYSTEM QUERY INTERVAL

The set polling interval is no guarantee that the set interval will be reached. It is the interval of the query attempts. Vossloh-Schwabe recommends a value of 100ms, any change is at your own risk.

9.1.14 SYSTEM CONFIG RELOAD INTERVAL

The set polling interval is no guarantee that the set interval will be reached. It is the interval of the query attempts. Vossloh-Schwabe recommends a value of 20000, any change is at your own risk.

9.1.15 LOCAL MODE FALLBACK TIMEOUT

The LiNA server has a local fallback. If the server is not operational, e.g. due to an interruption of the connection, a power failure or something else, the system reverts to local operation after a short period of time.

There is a period between server operation and the local fallback. During this period, the system will not change the light level present at that time.

For the local fallback to work, a local configuration is required, which is then executed.

0s (zero seconds) configures automatic calculation.

Warning: Setting this value too low, may result in an inoperable system.

9.1.16 GRAFANA

To install Grafana, at least 2 GB of RAM is required. If Grafana was included in the installation process, the LiNA server provides the capability to visualize sensor data, server group statuses, historical server group information, and PMD data by Grafana.

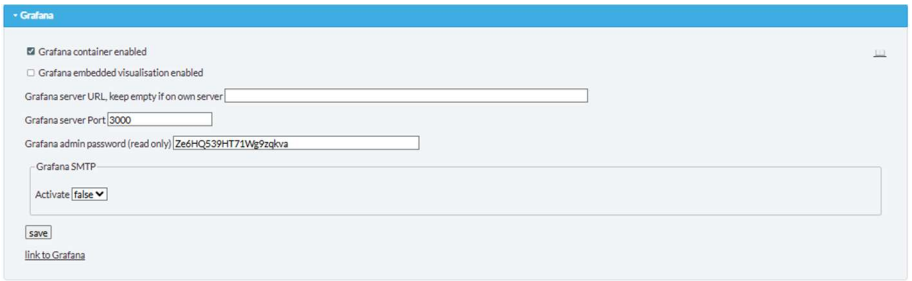

Figure 44: Grafana overview

Additionally, Grafana allows you to process data further, such as by setting up custom alarms or adding your own visualizations.

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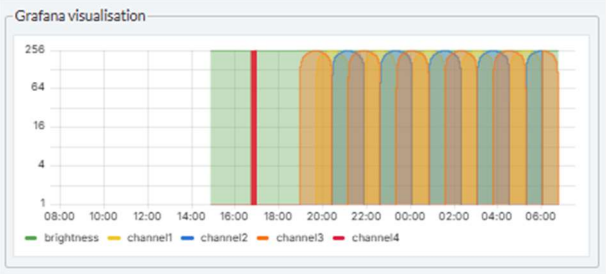
The complete Grafana documentation is available here.



LiNA Server supports visualizing the server group overview, which can be toggled on or off in the settings. The integration increases the loading time of the server group overview.

In Grafana, users have the capability to develop custom visualizations tailored to their specific requirements.

If Grafana is installed separately from the LiNA Server, specify its URL and port for integration.

The admin password is shown for accessing Grafana. Do not share the Grafana admin password with others.

9.1.16.1 GRAFANA SMTP

Grafana supports the configuration of SMTP for sending email notifications. All applicable settings correspond to those provided by Grafana.

The Grafana documentation can be used to configure the SMTP parameters. It is available here.

9.1.17 AUTO STORE BACKUP

This feature enables the automatic storage of a daily backup on an external USB drive.

Please note: A USB drive must be connected to the device for this function to operate.

9.1.18 DATABASE SIZE LIMIT

You may configure the maximum allowable database size in this section. The system regularly compares the current database size, as indicated on the LiNA Server overview page, against this specified limit. If the database exceeds the designated threshold, the system automatically deletes the oldest entries each day until compliance is restored. The 'Database Oldest Time' and 'Database Keep Timeframe' indicators display the date of the oldest data stored and the total retention period, respectively.

9.1.19 SYSTEM RESET

A code is automatically generated to reset the system. This authorises the administrator to reset the system, which deletes the entire configuration.

WARNING: Entering the reset code will delete the entire configuration!

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The system reset will take you back to the Blu2Light LiNA Server installation wizard.

9.1.20 SYSTEM UPDATE

If your system has an online connection, the server will query vossloh-schwabe.com once a day to see if an administrator is logged in.

If a new version is available, a notification will appear on the right side. By clicking on the option, the download of new files will be offered. This requires an online connection. Once all files have been downloaded, an update process can be started.

During the update process, the system is offline and will not respond to any input.

9.2 LINA SERVER REBOOT

This menu item can be used to restart the server, restart container and shut down the server. A confirmation checkbox must be ticked to prevent accidental use.

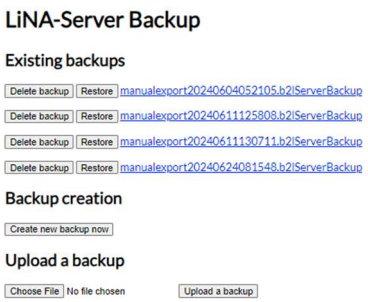
During any of these steps, system operation is restricted until the server is up and running again.

The server is shut down. This allows maintenance work to be carried out on the power supply, for example. It is recommended that this function is used when power is to be switched off. A confirmation checkbox must be ticked to prevent accidental use.

Do not switch off mains power immediately after pressing the button. It is recommended to wait 1 minute before switching off power supply.

Gateways that are already connected can be reconnected directly from the server, eliminating the need for individual interaction. When new firmware becomes available, an update option will appear, allowing the update process to be initiated. After updating, the number of VS firmware version can be updated via the 'Refresh version info' button in the local configuration of the LiNA Connect app. By opening the Properties tab by long pressing the gateway tile, the new version will be displayed.

9.3 LINA SERVER BACKUP



Creating a backup of the existing system is strongly recommended. This ensures that you can restore the system if issues arise. Click on the backup file to start the transfer to the download folder.

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9.4 MQTT

MQTT enables messaging via bi-directional communication between the LiNA Server and an existing Building Management System (BMS). It supports encryption and reliable message transmission. The MQTT protocol is a set of rules that defines how IoT devices can publish and subscribe to data over the Internet.

MQTT must be configured in the settings before it is available. If MQTT is not configured correctly, it may not work at all! MQTT will disable itself, if the configuration is insufficient.

The broker must be established by the customer.

MQTT Publisher (sender), Subscriber (receiver) and Broker, in the example below, VS Lina Server makes certain data available to the external BMS through the broker. The external MQTT client can receive information and send certain server control messages.

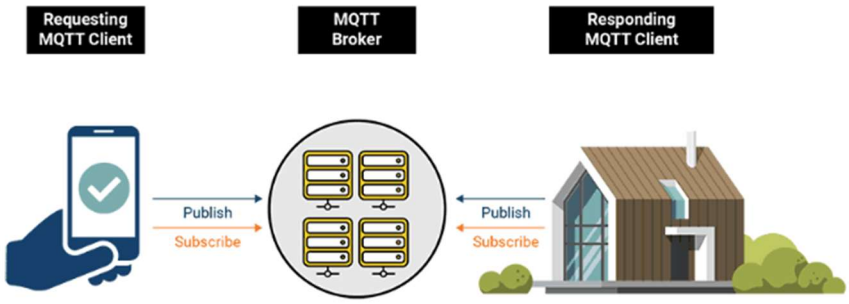

Figure 45: Map overview of created nodes/FG/SG

VS Lina Server External BMS

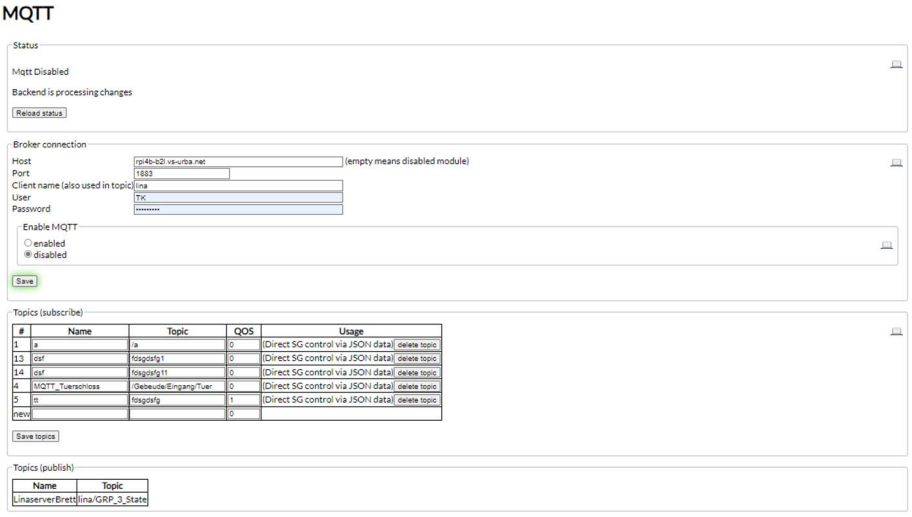

Figure 46: Overview of MQTT setting

MQTT sends these topics to the broker:

- SG states
- Events: Battery; Brightness; CO_2; Follow me; Humidity; LED Power; Light level; Movement; Reboot; Temperature.

MQTT subscribes to these topics.

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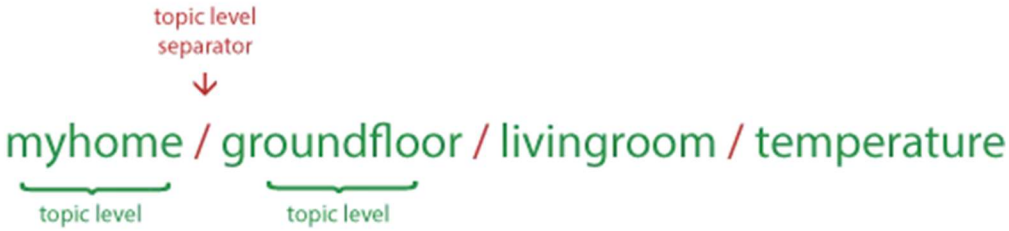
9.4.1 TOPIC

Topic - refers to a UTF-8 string that filters messages for a connected client. A topic (subject-based topic is used in VS Lina server) consists of one or more levels separated by a forward slash. The following shows an example:



Customers can use different methods to interact with the VS Lina server MQTT interface and communicate with the VS Lina server.

- Using No-Code tools and integrations like Node-Red (a drag-and-drop interface for MQTT flows) and Home Assistant MQTT integration is a straightforward method to implement an MQTT client.
- To test the MQTT interface, customers can use desktop apps like MQTT Explorer, MQTT.fx or MQTTX.
- Customers can develop their own Python applications using MQTT libraries available online to interact with an MQTT broker if they do not have an existing MQTT client infrastructure.

9.4.2 VS LINA SERVER PUBLISH

The following topics are published every minute or when an event occurs, depending on the topic (no changes in MQTT GUI required):

- [ServerName]/Groups
- [ServerName]/Gateways
- [ServerName]/GRP_[SG-ID]_State

These topics publish information about the current groups, gateways and states in the VS Lina server. Server Group id, Gateway id and state information can be found in the published JSON message.

The following events-related topics are published when an event is triggered in VS Lina Server (no changes in MQTT GUI required):

Topic structure - [ServerName]/[gw_id]/[node_id]/[event_type]

- battery
- brightness
- humidity

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- ledpower
- movement
- reboots
- temperature
- PMD data

Example topic where a client can subscribe to receive info from VS Lina Server:

LinaServerVSBuilding/5/4/brightness

- [gw_id] and [node_id] can be found in the Groups and Gateways information published as JSON message every minute to the topics mentioned above. ([ServerName]/Groups), ([ServerName]/Gateways)

9.4.3 VS LINA SERVER SUBSCRIBE

VS Lina Server subscribes to the following:

- External Server Group control (no changes in MQTT GUI required):

- Clients must publish using the following topic and JSON msg as described below.
  Topic - [ServerName]/GRP_[ServerGruppenID]/Set
  JSON Msg - {"state": "[state_name_in_lina_server]"}

- Control based on external events (should be set in the GUI as explained below):

- No standard topic structure.
- MQTT Client must publish using a topic and JSON msg should be empty. Example Topic (user may not follow the same structure as below)- [ServerName]/[ServerGruppeName]/[preferred_event_name]
- The topic should be added to the "Topics (Subscribe)" section in MQTT section of the VS Lina server. After adding the topic, go to the "Events Tab" on the top and then click "Events Mapping". MQTT should be available in the list of Events. In the drop down, you can drag the events to the respective Server Groups and then select the appropriate state. As soon as the MQTT client publishes the topic, an event is generated in VS Lina server which will change the state of the Server Group based on the settings done previously.

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9.4.4 QUALITY OF SERVICE (QOS)

- The QOS option in the MQTT GUI "Topics (subscribe)" is the "guarantee level" of message delivery between VS Lina Server and the broker.
- If QOS is 0 ("At most once") is set, then message is delivered by the broker, and no guarantee of delivery is offered. It is fast and ideal for non-critical data.
- If QOS is 1 ("At least once") is set, then message is delivered at least once but may be duplicated if the broker does not receive PUBACK (Publish Acknowledge) from receiver. It is not recommended, if duplications cannot be tolerated.
- If QOS is 2 ("Exactly Once") is set, then message is delivered exactly once. Most reliable but could slow down the receiving of events.

It should be noted that based on MQTT principle, the choice of QOS in the GUI ultimately depends on the QOS used by the publisher to the broker. If the publisher uses a QOS of 0, the broker will send the message with QOS 0, regardless of the GUI setting of 2. Therefore, for the broker the QOS of published messages always has an edge over the QOS requested by the subscriber.

9.5 REST API TOKEN

The LiNA-Server offers a REST API. The data shared with the API is in JSON format.

For security reasons a REST API access is only possible via HTTPS. The API is versioned.

Access to the LiNA server's REST API requires an access token. Multiple API tokens can be active simultaneously, enabling parallel access.

If different external devices need to access the API, it is recommended to generate a separate API token for each device.

If an external party obtains a valid API token, they can access all REST interfaces and manipulate the system.

Please note: Users are responsible for keeping their API tokens confidential and changing them regularly as needed.

For further information on the settings, please refer to the internal manual.

9.6 USER ACCESS MANAGEMENT

Admin accounts can edit everything from accounts and add/delete user accounts. This account level always has all rights, regardless of the selection made during creation.

Always create accounts with the lowest possible and required access rights.

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Usernames up to xx chars are allowed containing the following characters: a-zA-Z0-9_!?-.,: µ€%#=&+;@'äüöÄÜÖß().

Password

A password must be at least 6 characters long, containing at least a number a lowercase letter and an uppercase letter. Avoid passwords depending on the keyboard layout. It needs to be repeated exactly to proceed the operation.
Create your own schedule to change the password if needed.

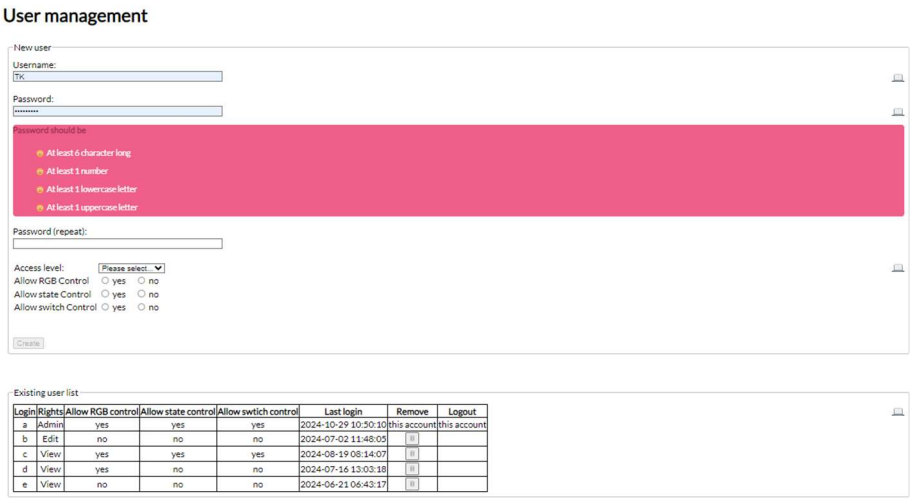

Figure 47: User management

Access Level

Three access levels are available: Admin, Edit and View.

View Accounts can only view some data. They can be extended by following items:
Allow RGB Control: Enables adjustment of the brightness and colour of the currently selected state.
Allow state Control: Enables changing the current state.
Allow switch Control: Enables changing the currently active inputs.
Allow Password change: Enables changing the current password.

Edit Accounts user interface allows you to manage accounts and change their configuration. This account level can also be controlled via the control levels described above.

Admin accounts can do everything from edit an account and add/delete user accounts. This account level has always all rights independent of the selection during creation. Always create accounts with the lowest possible and needed access rights.

User List

A complete list of all existing accounts is available, with the possibility to remove accounts. Warning: Do not remove the last administrative account!

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9.7 CHANGE PASSWORD

If password changes are enabled when creating a user account, the user can change the password at any time. To do this, he can use the existing password. After entering the new password, they must re-enter it. The changes must be saved then.

Figure 48: Password change

9.8 LINA-SERVER LICENCE

You need a valid licence per gateway for your installation to be able to use all the functions of LiNA-Server. The licences can be purchased via the Vossloh-Schwabe web shop.

If a gateway does not have a valid licence, the system is restricted in its function.

You will also see a list of the external libraries used.

10 GLOSSARY

CLR Constant light regulation	Regulation of the light level to a specific minimum level.
FG Functional Group	A collection of light points within a Blu2Light node that behave in the same way.
LTS Light threshold switch	Switches the light on or off with a delay depending on a smoothed measured light level.
RTA Return to auto	Sets a SG to a state in which motion sensors can switch the light on.
SC Server scene	A light scene of a SGS.
SG Server group	A group of one or more FGs that behave in the same way.
SGS Server group state	A state of a server group. A state defines the circumstances under which modules (e.g. Timer, Astro timer, CLR, Movement or buttons) can influence a SG.

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