



Hello! My name is Lina!



Blu2Light •••



Technical Application Guide LAN Gateway Server Demo



Contents

Vers Char	ion assignment
1 Wo	arranty, warnings, limitation4
1.1	License of the demo software
2 Tei	ms used in this document4
3 Int	roduction4
3.1	Why Python™?4
4 Ins	tallation and configuration of the VS demo
so	tware 4
4.1	Installation on Raspberry Pi5
4.2	Installation on Windows server5
4.3	Update of the VS demo software on Raspberry Pi5
4.4	Configuration
4.5	Configuration page
4.6	Grafana Login
4.7	Data storage in the demo8
4.8	Expected database size8
4.9	Backup 9
4.10	Sample configuration of the actual working system9
5 Up	dating the VS LAN Gateway firmware
5.1	General limitations of the update process
5.2	Update process with VS Update Tool for Windows14
5.3	Update via web configuration page of VS demo server 15
6 Su	bstitution or replacement of a Blu2Light
LA	N Gateway 17
7 Co	mmunication between the LAN Gateway and
the	server
7.1	The BluzLight protocol
7.2	Available events from sensors
7.3	Used Cipher Suite
7.4	Ports
8 (Commands
8.1	Ping
8.2	How to encode a B2L command
8.3	How to send a B2L frame
8.4	How to create a light control command



Hello!

3.5	How to read the function aroup state	
3.6	How to create a DALI tunnel	
3.7	PMD commands	22
3.7.1	PMD initialization	22
3.7.2	PMD retrieve	22
3.7.3	PMD quit	23
8.7.4	Using PMD with the server demo	23
3.7.5	Adding the power measurements to Grafana	24
3.8	B2L Encryption method	24
3.9	Scan nodes	25
) \A/h =		9 E
	Poad detabase (recommended)	25
7.1) ()	When written to database	25
/.∠) ?	Database page of the server III	25
л.о ЭД	Retrieve events	25
2.5	Using B21 commands	2.5
		20
0 Bea	coning	26
0.1	How to set up a Beacon message in our web UI	26
0.2	How to set up a Beacon message using the web API	26
	litional Information	26
1.1	WEB-API calls	. 26
1.1.1	/api/get_status	26
1.1.2	/api/pmd_init	26
1.1.3	/api/get_config	27
1.1.4	/api/get_rtc_time	27
1.1.5	/api/set_rtc_time	. 27
1.1.6	/api/set_config	. 27
1.1.7	/api/delete_system	28
1.1.8	/api/get_errors	28
1.1.9	/api/get_messages	28
1.1.10	/api/get_update_status	28
1.1.11	/api/upload	. 28
1.1.12	/api/update	. 29
1.1.13	/api/light_control	. 29
2 Tro		31
	ubleshooting	~ -
2.1	ubleshoofing Bad CSRF token	31
2.1	ubleshooting Bad CSRF token LED 1 red	31
2.1 2.2 2.3	Bad CSRF token LED 1 red No response of commands send nodes in a Blu2Liaht	31
2.1 2.2 2.3	Bad CSRF token LED 1 red No response of commands send nodes in a Blu2Light system	31 31



Blu2Light

Hello! My name is Lina!



Version assignment

Firmware	Document	Firmware on gateway
1.15	1.13	
1.16	1.14	1.31

Changelog

Document	Changes
1.14	Version assignment, Changelog and API incompatibility list added, Chapter 8.9 "Scan Nodes" added, Chapter 11.1.13 "Scan Nodes" added to the API, Chapter 9.3 "Database page of the server UI" added, Chapter 10.1 "enable Beaconing" added, Some minor corrections







Warranty, warnings, limitation

VS does not provide any warranty. Also, the document may change without prior notice. Vossloh-Schwabe is not responsible for any kind of usage of the software, especially Vossloh-Schwabe is/does not:

- Provide warranty on data loss
- Care about necessary network security
- Provide data protection
- Provide bug-free code

The user of the documentation and the user of the final installation are responsible that all legal requirements in the country where this is used are fulfilled. Especially requirements on data protection, security have to be fulfilled.

License of the demo software

The demo software is provided according the MIT-license. This is the granted license therefore:

Copyright© 2022 Vossloh-Schwabe Deutschland GmbH

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "software"), to deal in the software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the software, and to permit persons to whom the software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Terms used in this document

VS	Vossloh-Schwabe Deutschland GmbH
PSK	Pre-shared key

3 Introduction

VS provides a LAN Gateway (187055) to connect a Blu2Light system to ethernet. This enables the integration of a Blu2Light system in various kinds of application.

To enable the integration Vossloh-Schwabe provides a demonstration written in Python™ running for example on a Raspberry Pi. The demonstration is easy to setup and builds a basic for all different variants of implementation.

3.1 Why Python™?

The LAN Gateway software is written in Python[™] because it's a common high-level interpreted programming language. One of its advantages is, that it runs on every common OS. It's also easy to read and it is open source.

4 Installation and configuration of the VS demo software

All required installation files can be found here: https://www.vossloh-schwabe.com/en/products/light-management-indoor/blu2light-iot-devices/blu2light-gateway

The VS demo software is intended to be installed on the stock Raspberry Pi OS. Please follow the instructions provided at <u>https://www.raspberrypi.com/software/</u> how to basically set up a new Raspberry Pi OS and gain SSH login. The demo software will show:

- How to establish a connection between the server and the Gateway
- How to receive and decode incoming mesh events





Hello!

- Store the incoming events in a database
- Visualize incoming data in Grafana
- Provide an easy web-based UI to control functional groups in a Blu2Light system
- Read out the systems PMD data (if provided by the DALI drivers)

4.1 Installation on Raspberry Pi

1. Download the latest version of "Raspberry Pi OS" or "Raspberry Pi OS lite" (32 Bit or 64 Bit) on an SD card. The instructions therefore and all required downloads can be found here: <u>https://www.raspberrypi.com/software/</u>.

Tip: for installation with "Raspberry Pi Imager" press CTRL + SHIFT + X for advanced settings like SSH or WIFI. It's important to set the time zone on the Raspberry Pi correctly, because the server time will be sent into the B2L system.

2. Copy the provided .zip file to the Raspberry Pi and to the desired installation path.

- Method 1: get https://www.vossloh-schwabe.com/fileadmin/perfion/files/b2l_gateway_Demo_server_1.16.zip (file is located under the tab SAFTEY & INSTALLATION)
- Method 2: if you use "Raspberry Pi OS" with a graphical interface, you can download the zip file directly
- Method 3: use an USB drive
- Method 4: use other file transfer methods, like Samba or SCP
- 3. Extract the contents of the file with unzip <filename>
- 4. Go into the extracted folder and run sudo chmod +x setup.sh to make setup.sh executable.
- 5. Run sudo ./setup.sh to start the setup routine.

While the setup is running, you will be asked which database system you want to use (MariaDB or InfluxDB) and for the credentials and the database name, so that the database and the server can be configured.

Attention: If you use MariaDB-database, please do not use the user "root" as a username for the MariaDB-database. This will cause a malfunction of the VS LAN Gateway software after every start and the device will not work properly.

The setup script updates all packages on the Raspberry Pi and installs the necessary packages for the server.

6. After the setup has been run successfully, it will show you the hostname / IP of your devices. Note down this information carefully.

7. After the setup has finished, you can now enable the server service to start on every reboot of the Raspberry Pi by the the following command sudo systemctl enable lan-gateway

8. After that, start the server service the first time with sudo systemctl start lan-gateway

4.2 Installation on Windows server

- 1. Download and unzip the installation files.
- 2. Start PowerShell 7 (or higher) as administrator.
- 3. Type in & "[path]\setup.ps1" f.e.: & "T:\media converter\setup.ps1"

4.3 Update of the VS demo software on Raspberry Pi

- 1. Copy the provided .zip file to the Raspberry Pi and to the desired installation path.
- Method 1: get <u>www.vossloh-schwabe.com/xxx</u> (recommended)
- (file is located under the tab SAFTEY & INSTALLATION)
- Method 2: If you use "Raspberry Pi OS" with a graphical interface, you can download the zip file directly
- Method 3: Use an USB drive.
- Method 4: Use another file transfer methods, like Samba or SCP.
- 2. Extract the contents of the file with unzip <filename>
- 3. Go into the extracted folder and run sudo chmod +x update.sh to make update.sh executable.

4. Run sudo ./update.sh to start the update routine.

The update script updates all packages on the Raspberry Pi and updates the necessary packages for the server

Blu2Ligh

My name is Lina!

Hello!

5. After the update has been finished successfully, it will show you the hostname / IP of your devices. Note down this information carefully.

5. After the successful update, start the server service with sudo systemctl start lan-gateway

4.4 Configuration

1. All configuration of the server can be done via the web interface, which is accessible at http://<IP or domain of the device>:31460/

2. Before the LAN Gateway can connect to the server, a pre-shared key (PSK) must be generated via the web interface. For simplicity a QR-Code with the PSK is created, which can be scanned and copied (f.e. with the iPad camera app). Afterwards, the IP address, port and preshared key must be configured to the LAN Gateway via the LiNA Connect app. Therefore, the Gateway must have been added to a system in the LiNA Connect app and the system must be in expert mode. When everything was configured correctly, LED1 on the LAN Gateway will light up green.

The pre-shared key is generated in the web interface of the raspberry pi (http://<IP or domain of the device>:31460). The pre-shared key is used to encrypt the communication between the Raspberry Pi and the Blu2Light LAN Gateway.

The following screenshot shows the generating of the key. By clicking on the field "Generate PSK" a pre-shared key is generated randomly.





Figure 1: Generating the pre-shared key in the web interface of the Raspberry PI

The key must now be copied into the appropriate field in the LiNA Connect app. For that, go into the network settings of the Gateway and choose "pre-shared key".

If an additional Blu2Light LAN Gateway will be used, a click on "Show as QR-Code" will open the suitable QR-Code for the current server, which has already been generated before. The code can then be assigned to the new Blu2Light LAN Gateway that shall be added to this server

It is important to know, that only one "pre-shared key" exists or can exist for a server. At the end, all connected Blu2Light LAN Gateways must have the same "pre-shared key" assigned.





Figure 2: "pre-shared key" button for adding the generated pre-shared key from the raspberry pi.

Now select the QR symbol to scan the PSK from your screen and then press "save".

	Pre Shared Key	×
Pre Shared Key:		
21 75 19 13 31 CD CD 77 7C 7B 4E 08 DC 17 9E	BF 05 65 F4 15 9A 9C 94 83 20 B0 7C CD A1 DB 2A CC	
	Save	
Figure 3	• Add the PSK to the	Ann

After the pre-shared key has been copied to LiNA Connect, it shall be saved in the web interface of the Raspberry Pi:





lan c	Gateway	Server	Demo	

Hello!



After this step has been done successfully, the LED 1 on the Blu2Light LAN Gateway should be green. The pre-shared key will be visible in the web configuration. If needed at a later point it can be taken out of the following field:

General			
Pre-Shared Key:	C919B4E376E6594EE0C556D40533DF12A3A465D178122E66A22A0EDD5B9C6C08	Generate PSK	Show as QR-Code
Server port:	(default: 31461)		

Figure 4: pre-shared key - visible in the web configuration

Additional Information: The used encryption method for the communication between Server and IAN Gateway is: TLSv1.2 ECDHE-PSK-CHACHA20-POLY1305.

4.5 Configuration page

The demo provides a configuration and control interface via web browser. Navigate to http://<IP or domain of the device>:31460 to access the configuration

4.6 Grafana Login

The demo software will create a template of Grafana screens depending on your system. To access Grafana go to http://<IP or domain of the device>: 3000 and login with the default credentials admin / admin. You then must change your password.

4.7 Data storage in the demo

The configuration of the demo software is stored in the following location: Raspberry Pi OS: /var/vs_lan_gateway_server/config.json Windows Server:

C:/Users/All Users/.vs_lan_gateway_server/config.json

If you have selected MariaDB, the database is located here: Raspberry Pi OS: /var/lib/mysql

Windows Server: C:/Users/All Users/scoop/persist/mariadb/data For more information about MariaDB: <u>https://mariadb.org/</u>

The pre-defined templates for Grafana are located here: Raspberry Pi OS:

/var/vs_lan_gateway_server/dashboards Windows Server: C:/Users/All Users/.vs_lan_gateway_server/dashboards

Some additional data for Grafana are located here: Raspberry Pi OS:

/etc/grafana/provisioning/datasources

/etc/grafana/provisioning/dashboards

Windows Server:

C:/Users/All Users/scoop/persist/grafana/conf/provisioning/datasources

C:/Users/All Users/scoop/persist/grafana/conf/provisioning/dashboards

For more information about Grafana, and how graphical panels are created: <u>https://grafana.com/</u>

4.8 Expected Database size

For every B2L device added to the system, the user should expect about 2-10 Mbyte of data per month. Make sure that you have enough memory or add a cleaning function.



4.9 Backup

To prevent data loss, it is generally recommended to frequently backup your data. Beside the basic data from the OS, make sure the data locations mentioned in paragraph 4.7 are also backed up.

4.10 Sample configuration of the actual working system

To get the sample configuration running, a backup of the B2L system must have been created in the LiNA Connect app. For that go to the "..." menu in the system overview 1042 T024 FB



Select "Backup/Restore"



Now go to "Create new backup/Export current configuration". If desired, give the system a new name. Now, a new backup on the tablet can be created, by tapping on "Create new backup", but to import the system to the Gateway web interface the system needs get exported to the device, where the web interface is opened. Therefore, go to "Export of system configuration" and then "Share". Now the backup can be up-loaded to the cloud or sent to an email address.

Now go back to the web interface and upload the backup with the MAC address of the Blu2Light LAN Gateway.

Blu2Light systems

You can import your Blu2Light systems exported in the LINA Connect app to unlock more features like controlling luminaires and retrieving power management data (if you have eligible luminaires)

select bluzught system file	Durchsuchen Testsystem_20-01-2022_08-52-0
MAC address	6c:4b:7f:00:00:35
Import file	

Figure 5: Import of the recorded backup-file in the web configuration

After clicking on "*import file*" a message shall appear, that the configuration has been imported successfully. If the message has been appeared, a login to Grafana (*http:// < IP or domain>: 3000*) can be done. Please keep in mind that the first login to Grafana is only successful with "*admin*" as user and as well as password.

You will be forced to change the password directly after the first login has been successful. After the password has been changed you will be forwarded to the welcome page.



a!	

The "imported system" shall be visible in the Grafana environment. When you login the first time you will have to click on the upper left corner on "manage". The system shall become visible:

¢ 0 3		Dashboards Manage dashboards and folders		
		品 Brow 및 Playlists		
88	Dashboards			New ~
¢	Browse			
	Playlists	Filter by g Starred		
		U VS LAN Gateway Server auto-generated		

Figure 6: Dashboard-settings – the automatic generated dashboard shall be visible in the middle after a click on "Dashboards"

After the 2nd login, the dashboard should appear on the starting page in Grafana:

6,	器 General / Home	E
Q ☆ 『	Welcome to Grafana	Need help? Documentation Tutorials Community Public Slack
66	Dashboards	Latest from the blog
¢	Starred dashboards	Sep 12
	Recently viewed dashboards	Building Grafana dashboards for a large-scale deployment in a tight timeline: Inside Clsco Live How many Marvel movies' worth of internet traffic do 28,000 conference
	VS LAN Gateway Demo	2x 4k 5x goers create during a five day Cisco Live event? There's a Grafana 0275 8272 dashboard for that. Cisco Live is the network industry's largest annual event,
		O / 3, O / 2 delivering education and inspiration to technology innovators worldwide with a week's worldwide announcements, with a week's worldwide worldwide announcements, with a week's worldwide announcements, entertainment, and more. With events held across multiple venues, it takes a dedicated IT support staff working triedesity to deliver comprehensive wireless connectivity and uniterupted service for digital signage, recording systems, and presentation computers.
		Sep 09

Figure 7: The imported "system" shall be visible in Grafana after a successful import





Hello!

If you click on the dashboard, the demo site shall be visible where the incoming data can be viewed:



Figure 8: Example site of the imported system

You can adjust all settings add or delete a dashboard and its content as you wish and desire. To this end the "debug-mode" in LiNA Connect must be enabled to access this feature in the settings of the Blu2Light Multisensor AIR:

08:53 Mon	5. Sep				? 72 % 🔲
Ġ			Project overview		•••
	5th Floor Schorndorf 5. Stock 3 Systems				
			Cottione	~	
			Settings	~	
		Enabl	e Debug		
		Show	Introduction		
					+

Figure 9: Enabling the "debug-mode" in LiNA Connect





There is one important thing to prepare before you can see data like shown in the figure above. The interval of the incoming data must be set up at the corresponding device. The following example shows the neces-sary steps on a Blu2Light Multisensor AIR.

09:00 Mon 5. Sep			09:00 Mon 5. Sep		奈 72 % 🔲
<	Device 1 BYKGH	•	<	Device 1 BYKGH	
Sensor	Switches	Debug	Sensor	Switches	Debug
Motion	Sensor settings		Motion	Sensor settings	
Brightness	Activate sensor		Brightness	Activate sensor	
Air	Send always to mesh or automatic	automatic (currently off)		Send always to mesh or automatic	automatic (currently off)
Digital input 1 - Opening contact			Digital input 1 - Opening contact		
Digital input 1 · Closing contact			Digital input 1 · Closing contact		
Digital input 2 · Opening contact			Digital input 2 · Opening contact		
Digital input 2 · Closing contact			Digital input 2 · Closing contact		
	Event configu	ration		Event configure	ation

Figure 10: Step 1 (left) and step 2 (right) - activating the motion sensor

09:00 Mon 5. Sep			09:00 Mon 5. Sep		\$71%,■)
<	Device 1 BYKGH	•	<	Device 1 BYKGH	
Sensor	Switches	Debug	Sensor	Switches	Debug
Motion	Sensor settings		Motion	Sensor settings	
Brightness	Activate sensor		Brightness	Activate sensor	
Air	Send always to mesh or automatic	alvays 🚺	Air	Send always to mesh or automatic	automatic (currently off)
Digital input 1 + Opening contact			Digital input 1 + Opening contact	Before you can start the light regulation you have to con	nect a functional group!
				Light level	50.5 %
Digital input 1 · Closing contact			Digital input 1 · Closing contact	Manual sensor value	0 Start
Digital input 2 · Opening contact			Digital input 2 · Opening contact	Actual sensor value	- Start
Digital input 2 · Closing contact			Digital input 2 · Closing contact	Reference sensor value	
	Event configu	ration		Event configu	ration

Figure 11: Step 3 (left) - activating "send always to mesh" of the motion sensor and step 4 (right) - brightness menu

09:00 Mon 5. Sep		\$71%■	09:00 Mon 5. Sep		奈71% ■0
<	Device 1 BYKGH		<	Device 1 BYKGH	6
Sensor	Switches	Debug	Sensor	Switches	Debug
Mction	Sensor settings		Motion	Sensor settings	
Brightness	Activate sensor		Brightness	Activate sensor	
Air	Send always to mesh or automatic	automatic (currently off)	Air	Send always to mesh or automatic	always 🚺
Digital input 1 - Opening contact	Before you can start the light regulation you have to con	nnect a functional group!	Digital input 1 · Opening contact	Before you can start the light regulation you have to conner	ct a functional group!
Digital input 1 . Closing contact	Light level	50.5 %	Digital input 1 . Closing contract	Light level	50.5 %
	Manual sensor value	0 Start		Manual sensor value	0 Start
Digital input 2 · Opening contact	Actual sensor value	442 Start	Digital input 2 · Opening contact	Actual sensor value	442 Start
Digital input 2 - Closing contact	Reference sensor value		Digital input 2 - Closing contact	Reference sensor value	
		Active state Passive state			Active state Passive state
	Event configuration	Functional group settings		Event configuration	Functional group settings

Figure 12: Step 5 (left) - activating the brightness sensor and step 6 (right) - activating "send always to mesh" of the brightness sensor



Davica 1 RYKGH Air sensor settings × 803 • 0 • 55.9 0 idity in %RH • 0 21.1 • • • 0 •

Hello!

My name is Lina!

LAN Gateway Server Demo

Figure 13: Step 6 (left) –and step 7 (right) – setting the data interval for data from Blu2Light Multisensor AIR

09:01 Mon 5. Sep				🕈 71 % 🔲	09:01 Mon 5. Sep						🗢 71 % 🔳
Sensor	Switches				Sensor						
	Air sensor settings		×		Motion		Air sensor settings		×		
	Brightness refresh interval (sec)	56	•	803	Brightness	Tempera	ature high threshold (°C)	0	•		803
	Brightness low threshold	0	•	55.9	Air	Humidit	y refresh interval (sec)	0	•		55.9
	Brightness high threshold	0	•	21.1	Digital input 1 · Opening contact	Humidit	y low threshold (%RH)	0	•		21.1
	CO2 refresh interval (sec)	0	•		Digital input 1 · Closing contact	Humidit	y high threshold (%RH)	0	•		
	CO2 low threshold (ppm)	0	•		Diaital input 2 - Opening centert	Air quali	ty indicator on/off				
	CO2 high threshold (ppm)	0	•		Digital input 2 · Opening contact	Orange	threshold	800	•		
	Temperature refresh interval (sec)	0	•		Digital input 2 · Closing contact	Red thre	ishold	1400	•		
	Save						Save				
	Refresh status			Air sensor settings			Refresh status			ir sensor settings	

Figure 14: Step 7 (left) –and step 8 (right) – setting the data interval for data from Blu2Light Multisensor AIR

09:02 Mon 5. Sep			🕈 71 % 🔲	09:02 Mon 5. Sep			?1% ■
<							
Sensor	Switches			Sensor	Switches		
Motion	Air sensor settings	×			Air sensor settings	;	×
Brightness	Temperature refresh interval (sec)	56 🗸	803		Brightness refresh interval (sec)	56 •	803
Air	Temperature low threshold (°C)	0 •	55.9	Air	Brightness low threshold	• •	55.9
Digital input 1 - Opening contact	Temperature high threshold (°C)	0 •	21.1	Digital input 1 · Opening contact	Brightness high threshold	0 •	21.1
Digital input 1 · Closing contact	Humidity refresh interval (sec)	0 •			CO2 refresh interval (sec)	• •	
Digital input 2 · Opening contact	Humidity low threshold (%RH)	0 •			CO2 low threshold (ppm)	• •	
Digital input 2 · Closing contact	Humidity high threshold (%RH)	0 •		Digital input 2 · Closing contact	CO2 high inreshold (ppm)	•	
	Air quality indicator on/off				temperature retresh interval (sec)	•	
	Save				Save		
	Refresh status		Air sensor settings		Refresh status		Air sensor settings

Figure 15: Step 9 (left) -and step 10 (right) - setting the data interval for data from Blu2Light Multisensor AIR

If the steps above have been configured, the data shall appear in Grafana within the configured time intervals. For a Blu2Light Multisensor XS, the brightness and motion sensor has only to be activated in the menu. As well as "*send always to mesh*". The interval is fixed and cannot be changed.





Updating the VS LAN Gateway

The VS LAN Gateway has a firmware update function. You can use either the demo software provided by VS to update the device, or you can use a separate update program. The Gateway can be updated within the web configuration site. In the following, the general limitations of the update process are being described:

5.1 General limitations of the update process

- The device must be in the same subnet for the update process.
- If the device is powered via PoE and is supplying other devices in a daisy chain, note that the chained devices will be disconnected form PoE during the update process.
- If you use the Windows update tool you must provide a DHCP server in your network.
- Attention: Allow Windows firewall to release the port for an update.

${f 5.2}$ Update process with VS Update Tool for Windows

For the update process you must fill in the IP of the device and the MAC Address. You can find the IP in the LINA-Connect App. The MAC address you can find on the device label.

The indication of the LEDs is as well shown by the horizontal and vertical bar in the software. After setting up the IP address and the MAC address of the Blu2Light LAN Gateway that shall be updated, the update can be started by clicking on the button "*update Firmware*" (yellow arrow):



Figure 16: Update with the VS Update Tool for the Blu2Light LAN Gateway #1

If a timeout occurs somehow, the Update Tool will automatically make another try to load the firmware onto the device.

IP des Gerätes ergeben Update Permuare ISE LiGitTIOS IP des Gerätes ergeb 192.166.1.237 132.166.1.237 132.166.1.237 132.166.1.237 132.168.1.237 192.166.1.237 132.166.1.237 132.168.1.237 132.168.1.237 132.168.1.237 MAC des Gerätes ergeben Gc.=ei.77: 00 (00 33) MAC des Gerätes ergeben Gc.=ei.77: (00 00) Parameter /mXXXXX definet MAC. Parameter /mXXXXX Parameter /mXXXXX Parameter /mXXXXXX	Lodder Fremake Lodder Fremake Fremake Depolered update finished
Parameter / Joccocc.cocc definent IP Parameter / Joccocc Loccocc definent IP Parameter / Locded de App Ix Parameter / Locded I de App Ixch entrig Parameter / Locded I de App Ixch entrig Parameter / Locded I de App I definent einen timeut (2 define für zeit in sec) Parameter / XX definient einen timeut (2 define für zeit in sec)	s sfreet MAL: xxxxx deferet IP le App Ix & App nutre felg tenen timeout (2 stellen für zeit in soc)
ACK 37	

Figure 17: Update with the VS Update Tool for the Blu2Light LAN Gateway #1





5.3 Update via web configuration page of VS demo server

The device can as well be updated via the web configuration. The following steps describe the update process and show the LED indication in each corresponding mode.

The LED 1 and LED 2 of the Blu2Light LAN Gateway will show the following color while the LAN Gateway is in standard mode when it is receiving data from the mesh where it is commissioned to. LED 1 shines constantly green while LED 2 flashes green while data from the mesh is incoming:



By selecting the VS provided "bin-File" and putting the MAC address of the Blu2Light LAN Gateway in the field "MAC address" the update process will start by clicking on "Start update" (see the red arrow in the next picture):

Update LAN gateway Select firmware update file Durchsuchen... firmwareMediaConverter.bin MAC address 6c:4b:7f:00:00:35





After a click on "Start update", the Gateway is being put into update mode. LED 1 will shine blue, while LED 2 will be off. The message "Restart gateway in update mode" will be shown as well:

Save configuration and restart server

Update LAN gateway

Select firmware update file Durchsuchen... firmwareMediaConverter.bin

MAC address

6c:4b:7f:00:00:35

Start update Restart gateway in update mode...

Figure 19: The Blu2Light LAN Gateway is put into "update mode"

LED 1 and LED 2 will indicate the following status:

LED 1	LED 2
	\bigcirc

LED 1 shines green and LED 2 will be dark for about 15 seconds.



Hello! My name is Lina!





LED 1 will be dark and LED2 shines green for about 10 seconds.



LED 1 will blink blue (1 Hz) and LED 2 will be dark for about 2 seconds.

LED 1	LED 2
	\bigcirc

LED will shine constantly blue and LED 2 will be dark for about 1 second.

The update process starts when LED 1 becomes dark and when LED 2 will constantly shine green. The whole progress will be shown down in the update windows in the web configuration:



Start update Transmitting frame 1 of 371...

Figure 20: Frame 1 of 371 is being transmitted

While the update process takes place, the LED 2 on the Blu2Light LAN Gateway will shine green. LED 1 will stay dark:

LED 1	LED 2
0	

The update process will take around approximately 60 seconds – LED 1 will be dark and LED 2 will be constantly green depending on the firmware size that is being flashed.

When the update process has been successfully finished, the following message "Update finished" will appear down next to the button "Start update":

6 L + 6 L + 6L	
Select firmware update file	Durchsuchen firmwareMediaConverter.bin
MAC address	6c:4b:7f:00:00:35
Start update Update finished	d.



JAN_Gateway_Server_Demo_V1.14_EN_04 April, 2023

After a successful update, LED 1 will be constantly blue and LED 2 will be off. The Blu2Light LAN Gateway will restart and after a short
yellow phase of LED 1 (Blu2light LAN Gateway has a "IP address"), the LED 1 will shine constantly, while LED 2 will flash when data is
incoming:



LED 1 will be constantly blue and LED 2 will be off for about 8 seconds.

LED 1	LED 2
\bigcirc	\bigcirc

LED 1 constantly yellow and LED 2 will be off for about 0,5 seconds

LED 1	LED 2

The Blu2Light LAN Gateway will be back in normal operation mode (LED 1 constantly green and LED 2 flashing when data from the mesh arrives).

Substitution or replacement of a Blu2Light LAN Gateway

If it is necessary to replace an already full configured Blu2Light LAN Gateway, the following steps shall be done:

1. Delete the "old" Blu2Light LAN Gateway in the corresponding system in LiNA Connect.

2. In the next step, make a commissioning of the new Blu2Light LAN Gateway into the corresponding system.

3. Configure the new Blu2Light LAN Gateway with the same parameters as IP-Address, Subnet-Mask, Server IP Address and Port of the "old" Blu2Light LAN Gateway.

4. Create a new "pre-shared key" or take the old key and put it into the corresponding field in the App LiNA Connect at the Blu2Light LAN Gateway options.

5. Make a new copy of the current system in the option menu of Blu2Light LiNA Connect ("Backup and Restore).

6. Import the "Backup and Restore" configuration-file and import this file into the configuration of the Raspberry Pi. Navigate to http://<IP or domain of the device>:31460 to access the configuration like shown in the following screenshot:

Blu2Light systems

You can import your Blu2Light systems exported in the LINA Connect app to unlock more features like controlling luminaires and retrieving power management data (if you have eligible luminaires)		
Select Blu2Light system file	Durchsuchen Testsystem_26-01-2022_08-52-17.b2lsystem	
MAC address	6c:4b:7f:00:00:35	
Import file		

Figure 22: Import of the configuration file of the corresponding system in the web configuration

7. The LED1 on the Blu2light LAN Gateway shall be green then and the configuration of the replaced or substituted Blu2light LAN Gateway has been successfully completed.





Communication between the LAN Gateway and the server

The communication is based on a SSL/PSK encrypted connection. The server acts as a socket for several Gateways to connect to. All incoming traffic on the Bluetooth side is forwarded to the ethernet socket.

7.1 The Blu2Light protocol

The communication frames follow the Blu2Light protocol.

Group	Offset	Size	Field	Value	Description
-	0]	Sync Byte	0x42 = 66 = 'B'	Serial sync byte; always 0x42
	1	1	Address Length = AL	Oxnn	
	2	2	Block Count = BC	Oxnnnn	Data Length (DL) is BC * 8 - PL - 2
	4	2	Packet Type	Oxnnnn	See Appendix F
Header					
	6	1	Packet Version	Oxnn	
	7	2	Manufacturer	Oxnnnn	0 = according open standard 1 = VS
	9	1	CRC Header	Oxnn	
	10	1	Address Status	0xnn = 0b0f0edcba	Bit field for present Ad- dress data (1 = present): a = Source ID field b = Destination ID field c = Destination Type field d = Packet ID field e = Encryption Type field (O=unencrypted) f = Timestamp field
		2	Source ID	Oxnnnn	ID of the source node
Address		2	Destination ID	Oxnnnn	ID of destination node
		1	Destination Type	Oxnn	0 = Message between BT-/MWAYfirmware 1 = Mesh-Message
		1	Packet ID	Oxnn	Necessary to identify response frame
		1	Encryption Type	Oxnn	0 = NodekeyID 1 = SystemkeyID N= UserkeyID#N-2; (N=2251)
		4	Timestamp	Oxnnnnnnn	
		1	CRC Address	Oxnn	
Data (encrypted)		1	PL	Oxnn	Length of Padding Data
		DL	Data		DL = BC * 8 - PL - 2
		1	CRC of Data	Oxnn	CRC of decrypted Data
		PL	Padding data 0x00		Add Padding to reach DL + PL + 2 = BC * 8
		1	CRC Data	Oxnn	
		1	CRC of CRCs	Oxnn	CRC of CRC Header & CRC Address & CRC Data





7.2 Available events from sensors

ET_SENSE_MOVEMENT (Movement events; MultiSensor XS, XL, Air)

EventNumber	Input number	Count of movement events in measurement interval
6 (1 Byte)	(1 Byte)	(1 Byte)

ET_SENSE_BRIGHTNESS (Brightness events; MultiSensor XS, XL, Air)

EventNumber	Input number	Current brightness value	Target brightness value
7 (1 Byte)	(1 Byte)	(2 Byte, big endian)	(2 Byte, big endian)

ET_SENSE_AIR (Brightness, CO2, temperature & humidity events; MultiSensor Air)

EventNumber	Sensor ID	Measurement value	Alarm
251 (1 Byte)	(1 Byte) SENSOR_ID_LIGHT = 0, SENSOR_ID_CO2 = 1, SENSOR_ID_TEMPERATURE = 2, SENSOR_ID_HUMIDITY = 3	(4 Byte), float, little, endian	(1 Byte)

7.3 Used Cipher Suite

IANA name:	TLS_ECDHE_PSK_WITH_CHACHA20_POLY1305_SHA256
OpenSSL name:	ECDHE-PSK-CHACHA20-POLY 1 305
GnuTLS name:	TLS_ECDHE_PSK_CHACHA20_POLY1305
Hex code:	0xCC, 0xAC
TLS Version(s):	TLS1.2
Protocol:	Transport Layer Security (TLS)
Key Exchange:	Elliptic Curve Diffie-Hellman Ephemeral (ECDHE)
Authentication:	Pre-Shared Key (PSK)
Encryption:	ChaCha stream cipher and Poly1305 authenticator (CHACHA20 POLY1305)
Hash:	Secure Hash Algorithm 256 (SHA256)
Included in RFC:	RFC 7905

7.4 Ports

TCP 31460	used for web interface
TCP 31461	used for LAN Gateway connection (configurable)
UDP 31462	used for LAN Gateway update
TCP 3000	used by Grafana



8.1 Ping

The ping command is used to check the communication, if the LAN Gateway is connected and if the keys are correct. To ping the Gateway simply use the command ping without any parameters.

Example:

ping()

Example description:

Ping command will be sent and gateway will answer.



8.2 How to encode a B2L command

To send commands to nodes in mesh, the command. must be encoded with Systemkey. To encode a B2L command, we use the function *build_enc_frame*.

Command parameters:

build_enc_frame(data: bytearray,	#data to be sent
	source_id: int,	#who sent the package
	destination_id: int,	#package destination
	packet_id: int,	#ID to identify response frame
	key: UUID)	# the key to encrypt with

Range of values:

command to be encoded (example: set_fg_state)
O to OxFFFF
O to OxFFFF
0 = broadcast
O to OxFF
key as UUID

Example:

build_enc_frame(set_fg_state(...), 0, data['targetId'], 99, sys[1]. net_key)))

Example description:

A frame with the command *set_fg_state* will be created. Source ID is 0 and target ID will be added from an array. Packet ID is 99 and the key will also be added from an array.

8.3 How to send a B2L frame

Use config.send_queue.put to send a B2L frame. config.send_queue is a Queue object, to send data over ethernet, to the LAN Gateway

Command parameters:

config.send_queue.put((socket_id, data))

Range of values:

socket_id: The socket ID of the gateway to which the data should be sent data: The data to send

Example:

config.send_queue.put((sys[0], build_enc_frame(X))

Example description:

The encoded B2L frame will be added to the send queue, with socket ID added from an array.

8.4 How to create a light control command

To create a light control command, *set_fg_state* is used. With *build_enc_frame* the frame gets encoded into a B2L command. Use *config.send_queue.put* to send the frame.

Command parameters:

set_fg_state(

FGNumber: int, newState: FGStates, sceneNum: int, lightLevel: int, param: int = 0} #function group number #state of function group #scene number #DALI light level #?





Range of values:

FGNumber:	0 to 15
FGStates:	$STATE_MANUAL = 0$
	$STATE_AUTO_ACTIVE = 1$
	$STATE_AUTO_PASSIVE = 2$
	$STATE_AUTO_BASIC = 3$
	$STATE_AUTO_OFF = 4$
	STATE_SEQUENCE = 5
	STATE_KEEP_CURRENT = 255
sceneNum:	0 to 63
lightLevel:	0 to 254

Example:

set_fg_state(1, STATE_MANUAL, 2, 200)

Example description:

The light command will set function group 1 to FG state to manual switch to scene 2 at 42%.

8.5 How to read the function group state

To read the function group state, *get_fg_state* is used. With *build_enc_frame* the frame gets encoded into a B2L command. Use *config.send_queue.put* to send the frame.

Command parameters:

get_fg_state(FGNumber: int)

#function group number

Range of values: FGNumber: 0 to 15

Example: get_fg_state(FGNumber=0)

Example description: Function group 0 will be read.

8.6 How to create a DALI tunnel

The DALI tunnel is used to send DALI commands through a B2L device directly to a DALI driver (for example to read out parameters). To create a DALI command use the function *dali_tunnel*. With *build_enc_frame* the frame gets encoded into a B2L command. Use *config.send_queue.put* to send the frame.

WARNING: Do not use the DALI tunnel to change any DALI parameters, because this may cause the B2L system to not work correctly.

Command parameters: dali tunnel(dali cmd: int,

nel(dali_cmd: int,
	dtr0: int = None,
	dtr1: int = None,
	dtr2: int = None,
	edtx: int = None,
	dri_addr: int = 0xFE,
	repetition: int = 0 ,
	prio: int = 0 ,
	answer: int = 0 ,
	repeat: int = 0)

#DALI command (DALI standard)
#dtrO register
#dtr1 register
#dtr2 register
#enable device type
#DALI address byte (DALI standard)
#send multiple times
#priority
#answer required
#command must be sent twice (DALI standard)





Range of values:

dali_cmd:	0 to 255 (0xFF)
dtrO:	O to 255 (OxFF)
dtr 1 :	O to 255 (OxFF)
dtr2:	O to 255 (OxFF)
edtx:	O to 255 (OxFF)
dri_addr:	O to 255 (OxFF) (YAAA AAAS)
	Y: short or group, A: address bits, S: standard or DAPC
repetition:	0 to 64
prio:	O: high
	1: low
answer:	0: no
	1: yes
repeat:	O: no repetition (default)
	1: repetition

Example:

dali_tunnel(dali_cmd=0xC5, dtr0=0, dtr1=202, dri_addr=0b0000 0011, repetition=1, answer=1)

Example description:

The **DALI command 0xC5** (READ MEMORY LOCATION) is send **twice**, with the parameters **DTR0=0** and **DTR1=202**, addressed with **short address 1**. An **answer is required**, and **no device type** is set. This example will read byte 0 and 1 of memory bank 202.

8.7 PMD commands

PMD (power metering and monitoring device) commands are used to monitor different parameters of DALI devices, like power or energy consumption. Therefore the DALI device has to support device type 49, 50, 51 and/or 52. To get the PMD readings, we use the dali_tunnel functionality of our B2L devices with DALI interface.

8.7.1 PMD initialization

The command *pmd_init_start* is used to search for all devices, which are compatible with PMD. Therefore, the list of all DALI devices in the B2L system must be added (4.8). This function will activate the *pmd_init_handler*, which will receive the answer.

Command parameters:

pmd_init_start() -> None

Example:

pmd_init_start()

Example description:

PMD will be initialized. This is necessary after every new import of a Blu2Light system file to the Server. It will check all configured DALI devices on all nodes with DALI devices for supported PMD functionality.

8.7.2 PMD retrieve

The function pmd_retrieve_start is used to read out the PMD parameter Actual power of every DALI device on every B2L node, which support PMD functionality and is initialized.

This function will activate the pmd_retrieve_handler, which will receive/collect the answer of the devices.

Command parameters:

pmd_retrieve_start() -> None

Example:

pmd_retrieve_start()

Example description:

All PMD parameters will be read.



Hello! My name is Lina!



8.7.3 PMD quit

The command *pmd_init_quit* is used, to abort a PMD search after timeout.

Command parameters:

pmd_init_quit() -> None

Example: pmd_init_quit()

Example description:

The running PMD search will be aborted.

8.7.4 Using PMD with the Server-Demo

In the LAN Gateway server demo you can find a section named "Power measurement (only for drivers with PMD)".

Power measurement (only for drivers with PMD)

Initialize PMD			
Enable power measurement			
Power measurement interval		seconds	(default: 30,
Save configuration and restart set	rver		

By pressing the button "Initialize PMD" the pmd_init_start function gets triggered. As mentioned before, therefore a B2L system has to be added. While the PMD initialization is running "pmd_init: PMD initialization running..." is displayed in the status section. When the initialization is done, the check mark for "Enable power measurement" can be set. By enabling the power measurement, every 30 seconds the current PMD parameters will be red from the compatible drivers. This interval can be changed in the "Power measurement interval" text field. After changing the configuration click "Save configuration and restart server".

Important: As soon as a new B2L system gets uploaded to the server, PMD must be initialized again.

In "System overview and light control" for every node with physical devices, the number of devices with and without PMD is shown. If the count of physical devices and the sum of those with and without PMD doesn't match up, like in the following picture, this means there wasn't a PMD search yet or some devices weren't able to respond (f.e. turned off or disconnected from the DALI bus). In this case, PMD must be initialized again, with all physical devices available.

Count of physical devices: 2 with PMD: 0 w/o PMD: 0





8.7.5 Adding the power measurements to Grafana

On every new start of Server Demo, it will be checked, if any PMD devices are initialized and the dashboard template will be updated. If there any DALI devices active (initialized), the LED power graph will automatically be shown, in the Grafana dashboard.



8.8 B2L Encryption method

The data transfer in the B2L mesh is encrypted with XTEA (eXtended Tiny Encryption Algorithm). To ensure, that the B2L network is safe, the commands for the B2L network must be sent XTEA encrypted, from the server.



*Answers to server commands will get passed through to the server. B2L-events will get decoded in the gateway.







8.9 Scan Nodes

"Send Nodes" was added with Server Demo v1.16. With this command all nodes of a system will be checked, if they are reachable. This function can be found in "System overview and light control".

System	"Entwicklungstest	Groß"
Scan Nodes		

As soon "Scan Nodes" is clicked on, the system will check for every device. After this the page must be re-freshed. Inactive nodes will be grayed out.



Under "System Statistics" the number of nodes, active nodes and lighting devices can be found.

Ē	System Statistics				 	
l	Number of Nodes :	15	Active :	15		
	Number of Devices:	0				



Where to pull data If you need data from your B2L system, there are several different ways to get them:

9.1 Read database (recommended)

Movement events from the different Blu2Light MultiSensors, as well as measurements from the "Blu2Light MultiSensor AIR" are directly stored into the database and can be read from there. If PMD is initialized (8.7), this data will also be stored to the database.

9.2 When written to database

Another way to get data is by modifying a function, that writes to the database. For example, a modified DBHelper based on the functions MariaDBHelper (maria_db.py) or InfluxDBHelper (influx_db.py) can be created for that. Which DBHelper will be used can be modified in _main_.py.

9.3 Database page of the server UI

T The database page can be found under http://<IP or domain of the device>:31460/database. Here the last ten entries for CO2, light level, LED power (PMD), movement, humidity, temperature and brightness can be found.

Additional: light level is the combination of Master dimmer and Channel brightness combined. So this is the actual DAPC value of the functional group.

9.4 Retrieve events

The third possible way to get data, is in the event handler. Therefore, the function parse_event (b2l_parser.py) can be modified to also pull data.

9.5 Using B2L commands

The fourth possible way is by using B2L commands. How to create B2L events can be found in 8.2.





10 Beaconing

With the Beaconing functionality of all Blu2Light nodes, including LAN Gateway, the user can configure advertising messages, up to 31 Bytes, which will be send out periodically. This can be an URL for example. Common profiles for Bluetooth Beacons are iBeacon by Apple or Eddystone by Google. But also custom advertising messages are supported by Blu2Light, as long these are below 31 Bytes long.

For more information, read these documentations provided by our Partner M-Way:

https://www.bluerange.io/docs/fruitymesh/BeaconingModule.html https://www.bluerange.io/docs-commercial/bluerange-manual/Beaconing/Beaconing.html

10.1 How to set up a Beacon message in our Web-UI

The easiest way to set up a beaconing/advertising message is the Gateway Demo Software. To set it up it first has to be enabled. This can be found on the main page under 'Configuration'. To use beaconing the checkbox "Enable Beaconing" has to be activated. When beaconing is enabled beacon messages can be set in "System overview and light control":

Beacon Messag	ge :		
02.01.06:03:03:A	A:FE:0D:16:AA:FE:	10:00:01:67:6F:6F:67:6C:65:00	•
Set Beacon	Remove Beacon		
			·

Insert the Beacon Message and the click "Set Beacon", to write the message to the node.

Click "Remove Beacon", if you want to delete the Beacon Message from the node.

The Beacon Message can only be set or deleted, but not read.

There are 2 example Beacon messages selectable by pressing the triangle sign at the text box.

10.2 How to set up a Beacon message using the Web-API

A beacon can be set or removed via Web-API by using /api/light_control and the commands sb (set beacon) or rb (remove beacon). More information can be found in chapter 11.1.1.3.

Additional information

WEB-API calls

All API calls are handled in webconfig.py. In this file additional calls should be added.

11.1.1 /api/get_status

Read out active connections and how many packages were received.

 Parameter:
 none

 Output:
 JSON: connections, received_packets (since) f.e.: {"connections": ["XX:XX:XX:XX:XX:XX:XX"], "received_packets": "399 since 2022-07-26 17:17:07"}

11.1.2 /api/pmd_init

(login required) Initialize and start PMD (see 8.7).

Parameter:	noi
Output:	noi

none none (or error)



Hello! My name is Lina!

11.1.3 /api/get_config

Read out config data.

Parameter: Output:	system: setting systems mac adress f.e.: /api/get_config?system= XX:XX:XX:XX:XX:XX - Pre-shared key for connection between server and Gateway (see 4.3) - Config of Maria Database (enabled, host, port, username, password, dbname) - Config of Influx Database (enabled, host, port, username, password, dbname) - Config of PMD (enabled, interval)
Example (out):	{"mariadb": {"enabled": true, "port": "", "username": "pi", "password": " pwd123", "dbname": "maria", "host": ""}, "web":{"username": "pi", "password": "pbkdf2:sha256:260000\$i3lanlaCOSO5tLzD\$96198848c7b55225a2 344924b70c6cb39826b73c7e0b19b12845bf3a013954b"}, "influxdb": {"enabled": false, "port": "", "userna me": "", "pass-word": "", "dbname": "", "host": ""}, "psk": "A5A387DADD5B219E51ECF65B1973A8295F9430C 186C9EB006375C5656CE32701", "system": ["6C:4B:7F:01:02:43"], "pmd": {"enabled": false, "interval": ""}

11.1.4 /api/get_rtc_time

Read out RTC time of Gateway.

Parameter:	system: setting systems mac adress f.e.: /api/get_config?system= XX:XX:XX:XX:XX:XX:XX
Output:	RTC Time f.e.: {"msgType":"GetRTCTime","time":"2022-07-27 16-56-26"}

11.1.5 /api/set_rtc_time

Set RTC Time. Uses local time of the server.

11.1.6 /api/set_config

(login required) Set all Configurations (f.e. PSK, port and database) and restarts the server software.

post	
csrf	- CSRF-Token
psk	- Pre-shared key for connection between server and Gateway (see 4.3)
port	- Server port
mariadb	- Config Maria Database (enabled, host, port, username, password, dbname)
influxdb	- Config Influx Database (enabled, host, port, username, password, dbname)
pmd	- Config PMD (enabled, interval)
	POST csrf psk port mariadb influxdb pmd

Example:

data = {

```
port: 31461,
                                                               (default: 31461)
psk: A5A387DADD5B219E51ECF65B1973A8295F9430C186C9EB006375C5656CE32701,
mariadb: {
         enabled:
                                        true.
                                        3306,
         port:
                                                               (default: 3306)
         username:
                                        pi,
                                        pwd123,
         password:
         dbname:
                                        maria,
                                        127.0.0.1
                                                               (default: localhost)
         host:
},
influxdb: {
         enabled:
                                        false,
                                                               (default: 8086)
         port: ,
         username: ,
         password: ,
         dbname: ,
```

Blu2Light

Hello! My name is Lina!



```
host: (default: localhost)
}
;
data.pmd = {
    enabled: true,
    interval: 30 (default: 30)
};
fetch('/api/light_control?csrf=' + document.getElementById('csrf-token').value, {
    method: 'POST',
    headers: {
        'Content-Type': 'application/json',
    },
    body: JSON.stringify(data),
};
```

Output: none (or error)

11.1.7 /api/delete_system

(login required) Delete a system.

Methods:	GET
Parameter:	csrf,
System:	setting systems mac adress
-	f.e.: /api/delete_system?csrf=XXXX&system= XX:XX:XX:XX:XX:XX
Output:	none (or error)

11.1.8 /api/get_errors

Gets errors from Server.

Parameter:noneOutput:list of errors, f.e.: {"mariadb": null, "server": null}

11.1.9 /api/get_messages

(login required) Get the list of messages for the web interface.

Methods:	GET
Parameter:	none
Output:	list of messages, if no message available: []

11.1.10 /api/get_update_status

Get the status of a running update.

Parameter: none

Output:

update status or none if no update running f.e.: Transmitting frame 42 of 69...

11.1.11 /api/upload

(login required) Upload a *.b2lsystem file of the connected B2L system to get the connected devices.

Methods: POST Parameter: csrf,

ameter:





IAN_Gateway_Server_Demo_V1.14_EN_04 April, 2023

Hello! My name is Lina!

Blu2Light



	file (* h2lsystem)			
	macaddr			
Example:	mple: let b2lsystem = document.getElementById("b2lsystem-file").files[0];			
•	let formData = new FormData();			
	formData.append("file", b2ls	ystem);		
	formData.append("csrf", document.getElementById('csrf-token').value);			
	formData.append("macaddr"	", document.querySelector('macaddress').value);		
	tetch('/api/upload', {method	1: "POST", body: tormData}];		
Outerinte				
	none (or error)			
11.1.12	/api/update			
(login required)				
Upload an update fi	le for the Gateway (.bin).			
Methods:	POST			
Parameter:	csrt,			
	tile (* .bin),			
	macaddr			
F				
Example:	let update = document.getElementById["update-tile"].tiles[U];			
	e o u a = e w o u a			
	formData.appendl"file", update);			
	formData append/"csrf" doc	ument aetElementBvldl'osrf-token'l valuel:		
	formData append/"macaddr"	" document query Selector/"macaddress') value):		
	fetch[/api/upload'. {method	: "POST". body: formData}I:		
Output:	none (or error)			
11 1 10				
11.1.13	/api/light_control			
(login required)				
Light control API				
AA I				
mernoas:	GEI	- Get values (detault)		
	POSI	- Set values		
Parameter (GFT)	• csrf	- CSPF-Tokan		
	syst	- System (str)		
	node	- Selected node (int)		
	lum	- Selected functional aroup (FG) of the node (int)		
	cmd	- Command lint) (see below)		
Commands (GET): 41	- get_version_init		
•	80	- get_fg_state_init		
	89	- get_gps_position_init		
Example (GET):	fetch('/api/light_control?csrf=' + document.getElementById('csrf-token').value + '&system=XX:XX:XX:XX:XX:XX'+ '&node='			
	+ ids[2] + '&lum=' + ids[3] +	+ '&cmd=80')		
D . (D00	-			
Parameter (POS	T):csrt	- CSKF-loken		
	Vata	- Command (stgs, eu, sb, rb) and parameter (see below)		
Data (stac).	command	- stas (sat EG state) au lanaray undate) shiset haacan) in Iramova haacan		
leas 8 2 and 8 1	lightlevel	- DALL value (int)		
1000 U.Z UIU U.4)	FGNumber	- Selected function aroun lint		
		- Jelected function group (Infl) Now EC state (manual: 0, auto (active: 1 / accessive: 2 / basic: 2 / affr. 4)		
	nevvolule	There i Charle (manual, C, auto (active, T) passive, 27 basic, 37 off, 4), 👘 🛡 🛡		

LAN_Gateway_Server_Demo_V1.14_EN_04 April, 2023

keep current state: 255) (int)

```
LAN Gateway Server Demo
                                                                                                  Hello!
                                                                                                  My name is Lina!
                                                      - Selected Scene Number
                      sceneNum
                      targetId
                                                      - ID of the Target Node (also named destination_id) (int)
                                                      - Selected System (str)
                      system
Example (sfgs):
data =
                                                       'sfgs',
           command:
                                                       ids[1],
           system:
           targetId:
                                                       Number(ids[2]),
           FGNumber:
                                                       Number(ids[3]),
           newState:
                                                       Number(state),
                                                       Number(scene),
           sceneNum:
           lightLevel:
                                                       Number(II),
};
fetch['/api/light_control?csrf=' + document.getElementById['csrf-token'].value, {
   method: 'POST',
   headers: {
            'Content-Type': 'application/json',
   body: JSON.stringify(data),
};
Data (eu):
                      command
                                                      - eu (Energy Update / Set Emergency)
                                                      - Energy Update Value (signed 8-bit value, range -100 to 100, unit: %, negative
                      energyUpdate
                                                       value will increase brightness, positive will reduce)
                                                      - Selected System (str)
                      system
Example (eu):
data =
           command:
                                                       'eu',
                                                       ids[1],
           system:
           energyUpdate:
                                                       Number(eu)
fetch('/api/light_control?csrf=' + document.getElementById('csrf-token').value, {
   method: 'POST',
   headers: {
            'Content-Type': 'application/json',
   body: JSON.stringify(data),
};
Data (sb):
                      command
                                                      - sb (set beacon)
                                                      - slot is a parameter to send more than one advertising mes-sage per Node.
                      slot
                                                       Currently only one slot (0) is available
                      beacon_msg
                                                      - The message that will be sent by the Node (see 10)
                                                      - ID of the Target Node (also named destination_id) (int)
                      targetId
                                                      - Selected System (str)
                      system
Example (sb):
data =
           {
                                                       'sb',
           command:
                                                       ids[1],
           system:
                                                       Number(ids[2]),
           targetId:
           slot:
                                                       0.
                                                       '02:01:06:03:03:AA:FE:0D:16:AA:FE:10:00:01:67:6F:6F:67:6C:65:00'
           beacon_msg:
fetch('/api/light_control?csrf=' + document.getElementById('csrf-token').value, {
   method: 'POST',
   headers: {
            'Content-Type': 'application/json',
```

},

30

Blu2Light

Hello! My name is Lina!

body: JSON.stringify(data),

};			
Data (rb):		command slot	 rb (remove beacon) slot is a parameter for more than one advertising message per Node. Currently only one slot (0) is available D of the Target Node (also pamod destingtion id) (int)
		system	- Selected System (str)
Examp data =	ple (rb): { commanc system: targetId:] :	'rb', ids[1], Number(ids[2]),
	slot:		О,
; fetch('/c meth heac }, body };	api/light_cont iod: 'POST', ders: { 'Content [_] 1 y: JSON.string	trol?csrf=' + document.getEleme Type': 'application/json', gify(data),	ntById['csrf+oken'].value, {
Data (:	sn): commc	system - sn (scan nodes, r	requires server softfirmware 1.168 or newer) - Selected System (str)
Example commar system:	ə (sn): nd: ,sn', ids[1]		data = {
}; fetch(,/c method: headers ,Conten },	api/light_cont : ,POST', :: { t-Type': ,applic	trol?csrf=' + document.getEleme cation/json',	ntById(,csrf-token').value, {

body: JSON.stringify(data),),



12.1 Bad CSRF token

The CSRF token is stored in the client browser and on the server. It's needed to authorize the communication between the web interface and the server. "Bad CSRF Token" means that the token stored in the client browser is outdated.

How to fix: Refresh the web page (f.e. press "F5"-key)

12.2 LED 1 red

The red LED shows, that the Gateway doesn't have an IP and something is wrong with the network connec-tion.

How to fix: Check the ethernet cable and check the router settings.





12.3 No response of commands send nodes in a Blu2Light system If there is no response of commands like 'GetFGState' which were sent over Lightcontrol page , please check the following :

- Make firmware update with LiNA connect app for your System
- Check if the node is switched on and active in the System with LiNA connect app.
- Check if you had the latest system configuration exported from LiNA connect app and imported in the VS LAN-Gateway server Demo.

