BAB TECHNOLOGIE GmbH

LOGIKEDITOR **REST**-API
Documentation

EIB**PORT** V3

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EN

BAB TECHNOLGIE GmbH

Hörder Burgstr. 18
D-44263 DORTMUND

info@bab-tec.de

Tel.: +49 (0) 231 – 476 425 - 30
Fax.: +49 (0) 231 – 476 425 - 59
www.bab-technologie.com

CONTENT

1   GENERAL

LOGIKEDITOR is a web application that enables the graphical creation of logic and automation functions.

The introduction of the REST API interface in **LOGIK**EDITOR opens up completely new possibilities for the integration of third-party applications and systems.

This enables the integration of software or devices into your KNX system. Use **LOGIK**EDITOR to create individual API commands and make KNX functions available externally in a targeted and efficient manner.
In this way, not only can KNX telegrams be sent to the KNX bus via http request, but telegram values can also be queried from group addresses or logic groups can be triggered.

The graphical **LOGIK**EDITOR is included in the products EIBPORT V3 and can be installed subsequently via firmware update, depending on availability.

This document is a supplement to the **LOGIK**EDITOR documentation and deals exclusively with the topic "REST-API".
The **LOGIK**EDITOR documentation can be found on our website
Downloads (bab-technologie.com)

1.1 INTRODUCTION

A REST API (Representational State Transfer Application Programming Interface) is an interface that makes it possible to integrate web services into an existing system.

It follows the principles of the REST architecture to ensure efficient, scalable and simple communication between different systems.

By using standardized HTTP methods such as GET and POST, a REST API enables the exchange of data and interaction with the **LOGIK**EDITOR in an intuitive and user-friendly way.

This facilitates the extension of applications and at the same time promotes interoperability between different systems.

1.2 PRINCIPLE

The reason for implementing the REST API directly in **LOGIK**EDITOR is that it not only allows requests to be forwarded directly to the KNX system, but also enables specific functions (in the form of logic groups) to be triggered as required and without detours.

For seamless integration of the REST API into **LOGIK**EDITOR, the endpoints are mapped as data points. In this way, the http requests can be used like a typical data point in the **LOGIK**EDITOR.

In order for an http request to be processed by the EIBPORT, the desired endpoints must be created. These are created and managed in the **LOGIK**EDITOR under a separate menu item ("System" / "Data points" / "Internal + REST").

In the logic group, these Internal+Rest data points are to be used like KNX data points.

In order to be able to address the REST API in the **LOGIK**EDITOR, one part is predefined. This is:
1. the **https port** is always port **444**
2. the (**fixed**) path to the REST API is "**/le/rest**"

This results in the default for an http request:
        `https://<IP ADDRESS>:444/le/rest/<user-defined part>`

2   FUNCTIONAL DESCRIPTION HTTP-REST INTERFACE

You can use this interface to query certain values from the **LOGIK**EDITOR or send values to the **LOGIK**EDITOR from an external application via HTTP.

To do this, you create HTTP data points in the data point management, configure the respective data type and the permitted operations and optionally assign "speaking paths". In your logic groups, you then add value inputs or value outputs for the corresponding HTTP data point. Depending on how you design the signal path in the logic group, you can send values to the KNX bus via HTTP request to the **LOGIK**EDITOR or perform any actions in the **LOGIK**EDITOR, e.g. switch the enable input of a logic element or read out the status of a value memory.

INFORMATION: To query external HTTP interfaces from the **LOGIK**EDITOR, i.e. the reverse use case, use the HTTP query logic element.

2.1   SUPPORTED PROTOCOLS

- https (port 444)
- http (Port 81)

NOTE: https is authorized by a certificate signed by BAB TECHNOLOGIE GmbH itself. If necessary, the support of self-signed certificates must first be activated in the external application or is not supported. In case of problems, please inform yourself individually for your application. Even with a self-signed certificate, https is significantly more secure than http because encryption is guaranteed in any case.

ATTENTION: http is not recommended, as authentication details are then transmitted unencrypted in any case. We only offer http if the external application does not support https or self-signed certificates, but integration is absolutely necessary.

2.2   SUPPORTED METHODS

- **GET** to read values from the **LOGIK**EDITOR
- **POST** or **PUT** to set values in the **LOGIK**EDITOR, whereby the currently valid value is also transmitted as a body in the response.

In the configuration of a data point, you have the option of individually enabling the reading and setting of the value. Requests with methods for which the respective data point has not been enabled result in a response with status code 403 (see below).

NOTE: If you want to restrict the permitted value range for setting values, simply use the filter tool downstream of the corresponding value input for this data point in your logic group, for example.

2.3 GETTING STARTED

Authentication is optional, but recommended, with static tokens. This means that if authentication is activated, the external application must also transmit a fixed, secret character string so that the request is permitted.

The token can be transmitted in two ways
- by means of an **authorization** header. Both the so-called bearer scheme and the pure token are supported as header values.
- as URL parameter **token**

ATTENTION: Transmission as a URL parameter is not recommended because, unlike headers, a URL is transmitted unencrypted even when https is used. Attackers in the same network could therefore read the token in this case and then send requests themselves. We only offer this method if the external application does not offer adjustable headers, but integration is absolutely necessary.

NOTE: You can configure a token as the default for all data points. However, you can also assign individual tokens to the data points. Our recommendation is to create an individual token for at least every external application. It can also be useful to differentiate between tokens for read and write access.
Example: You have a webcam that should switch on the light via **LOGIK**EDITOR REST-API when there is movement and protect this data point with token 1, and you have a smart lawnmower that should switch a data point via REST-API if there is a problem with the device. You protect this data point with token 2. If someone gains unauthorized access to the lawn mowers web configuration, they will not be able to switch on the light with the token 2 stored there.

NOTE: A high number of requests with a missing or incorrect token will lead to a temporary lockout with increasing lockout time (response with status code 429, see below).

2.4 STRUCTURE OF THE URL

The REST URL for a data point results from the combination of the base URL and the URL part of the data point.

BASIS-URL

Depending on whether you are using https or http, you can access the REST interface via:

- `https://<IP address EIBPORT>:444/le/rest/`
- `http://<IP address EIBPORT>:81/le/rest/`

URL PORTION OF THE DATA POINT

Each data point has a random identification string, a so-called UUID. You can always use its UUID directly for the URL, or you can also assign an individual path.

INFORMATION: In principle, any type of structure is conceivable here. For example, it would make sense to structure the paths based on the building topology and devices. However, you should bear in mind that such descriptive URLs could also reveal details about the implemented function or private information about the building and residents.

Examples:
- `https://192.168.1.21:444/le/rest/og/room-lena/deckenleuchter/schalter`
- `https://192.168.1.21:444/le/rest/lamps/01`
- `https://192.168.1.21:444/le/rest/41611b55-b54d-4b0a-a36d-aa9ba766a163`
- `http://192.168.1.21:81/le/rest/41611b55-b54d-4b0a-a36d-aa9ba766a163?token=secret`
  (insecure, because http and token in the URL)

DATA FORMAT OF THE INTERFACE

The data format can be selected from 3 formats, and can even be set per data point if required, e.g. if you want to allow several external applications accesses and one only supports JSON, while another only supports text:

- JSON - Json object with a pair, or several pairs in the case of complex data points, of identifier and value. You configure the identifiers yourself in the data point.
  Example:
  ```
  {
      "red": 128,
      "green": 128,
      "blue": 128
  }
  ```

- CSV - a line of comma-separated values without an identifier (if it is a complex data point, otherwise only exactly one value).
  Example:
  ```
  128;128;128
  ```

- - Text - one value of the data point per line (without identifier). No final line break.
  Example:
  ```
  128
  128
  128
  ```

The configured data format applies equally to the response body of read GET calls and the request body of write **POST/PUT** calls. In the case of a write call to a data point with a complex data type (as here in the example RGB), all values of the data point must always be sent, otherwise you will receive error code 422 in response (see below).

Which format you should choose depends on what the calling page supports and how clear your integration should be. Text and CSV are a little more performant than JSON, but JSON offers better comprehensibility, especially for data points with complex data types.

2.5   ANSWER

Possible status codes:

| Status Code	Erklärung
200 (OK)	• for **GET** requests: current value of the data point successfully read out • for **POST/PUT**: the data point was successfully set to the desired value
204 (No Content)	The data point requested via **GET** has no value.
400 (Bad Request)	General error when receiving the **POST/PUT** command (the body cannot be read in).
401 (Unauthorized)	An authentication token is expected, but was neither transmitted via the Authorization Header nor via the **Token** URL parameter, or the transmitted token does not correspond to the configured token.
403 (Forbidden)	• for **GET** requests: the desired data point has not been configured as readable • for **POST/PUT**: the desired data point has not been configured as writable
404 (Not Found)	The requested URL cannot be assigned to a configured data point.
405 (Method Not Allowed)	The interface only allows **GET, POST, PUT**
422 (Unprocessable Entity)	The data point could not be set to the value sent via **POST/PUT** due to errors in the transmitted data or incomplete data. Possible reasons include: incorrect identifier when using data type Json (case-sensitive, for example), incorrect decimal separator in a floating point value, missing single value for complex data types with multiple values.
429 (Too Many Requests)	The required authentication was too often unsuccessful within a short time. Further requests are temporarily rejected. Further unsuccessful attempts extend the blocking period. Possible sources of error: see status code 401. Correct the error and wait a few minutes. Depending on how many such 429 responses you have already received, they will be temporarily blocked for between a few seconds or almost an hour.

2.6 HEADER-INFORMATIONRMATION

Header	Beschreibung
Last-Modified	• for **GET** requests: returns the time at which the current value of the data point was set (regardless of whether via the HTTP REST interface or via an action in a logic group). • for **POST/PUT** requests (only if sent with invalid data): if you send an invalid POST/PUT request, the value on the data point is not updated. Accordingly, this header in the response with the error then provides the time of the last actually successful update.
Content-Type	Information on the data format according to the Mime standard. Depending on what you have configured, returns the following values `application/json`, `text/csv` or `text/plain`.
Content-Length	The length of the response in bytes

2.7 BODY

The body of the response in the event of success corresponds exactly to the data format as described above, depending on which format you configure. In the event of an error, it is usually empty. Only in the case of a POST/PUT request that generates error 422 is the still valid value on the data point output in the body.

3   DATENPUNKTE „INTERN + REST

The data points for the REST API are created and managed under the menu item "System" / "Data points".
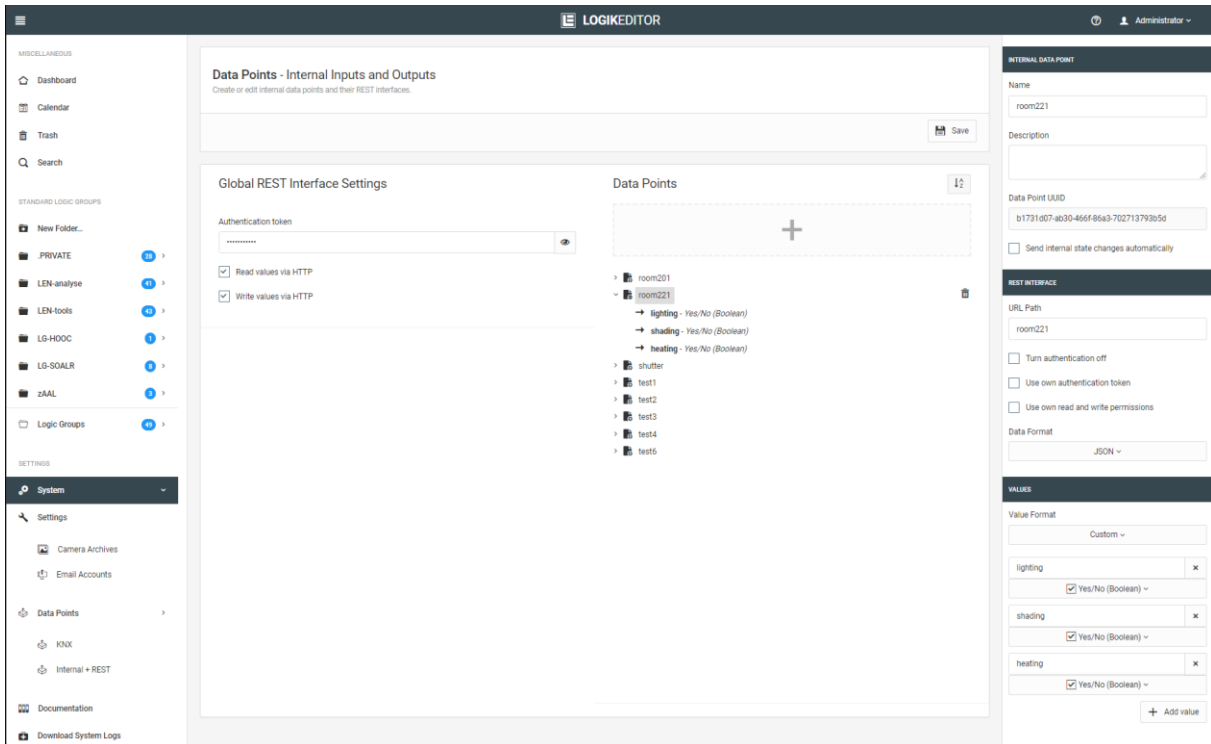
GLOBAL RESIDUAL INTERFACE SETTINGS

- Authentication token
  The password entered here applies to all data points.
  Alternatively, an individual password can also be assigned under the data points

- Rights
  The two options available here can be used to define whether data may be read or written via http.
  The rights for reading or writing can also be overwritten individually for each data point (regardless of this setting).

DATA POINTS

All existing "Internal+REST" data points are listed in the right-hand half of the middle view.
The associated configuration is displayed in the right-hand column as soon as a data point is selected.

3.1   CREATE DATA POINT

A new data point is created by clicking on the grey area with the PLUS sign.

When creating new data points, a window opens in which the following parameters are specified:

GENERAL
- Name:
  A descriptive name for the data point is assigned here

- Description:
  A more detailed description or important information can be stored for the data point in this text field

- Data point UUID:
  This field is automatically filled in by the **LOGIK**EDITOR and cannot be changed. It is used for unique internal identification.
  Alternatively, this data point UUID can be used as a URL path.

- Output status changes automatically:
  This option defines whether a change to the telegram value should be output automatically via the REST-API.

REST-INTERFACE
- URL path
  The path for the end point is entered in this field. This path is entered in the "user-defined" part.
  NOTE: The path must be unique.

- Switch off authentication
  This option deactivates authentication for this data point if required. This allows the global setting to be overwritten.

- Authenticate with your own token
  To assign an individual authentication token to data points, this option can be used to assign the data point its own token. This is useful for assigning different devices their own token.
  If this option is deactivated, the authentication token that was assigned in the global settings applies.

- Authentication token
  This input field is only visible if the option "Authenticate with own token" is activated.
  The individual authentication token for this data point is entered in this field.

- Own read and write authorizations
  You can also define whether the data point has read or write authorization independently of the global setting.

- Data format
  Data/values that are transferred to the **LOGIK**EDITOR via this data point can be transferred in the following three types:
  o   JSON,
  o   CSV
  o   and PLAIN TEXT

VALUES
- Format
  A format can be selected for the expected values. There are two formats to choose from:
  - Individual
    With this selection, the values can be compiled individually.
    TIP: This option also makes it possible to transfer a list of values with an http request instead of many individual nhttp requests.
  - KNX data point type
    With this selection, the values are predefined according to the definition of the KNX data point type and are created automatically.

  Info: The values that are created here can be found in the logic group in the residual value input and value output as inputs or outputs.

- "Add value"
  This button is used to add the values for this data point. A name can be assigned for each value created and one of five data types can be selected (see appendix "Data types in the **LOGIK**EDITOR").
  NOTE: This button is only activated if "Individual" is selected.

Finally, the new data point is added in the **LOGIK**EDITOR using the "Create new data point" button.

4 ELEMENTS "RESIDUAL VALUE INPUT" AND "RESIDUAL VALUE OUTPUT"

In addition to the "Value input" and "Value output" elements for KNX data points, separate elements for the REST API are available in **LOGIK**EDITOR.
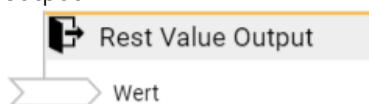These elements, "REST value input" and "REST value output", function in logic groups as interfaces to the created data points of the REST API.

The "Internal+REST" data points created are used in a similar way to KNX data points within the logic groups.

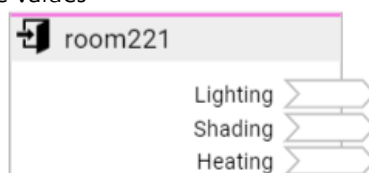**LOGIK**EDITOR ELEMENT "Rest value input"
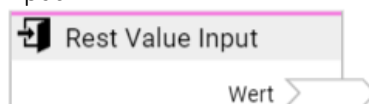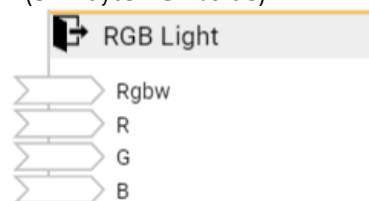

LOGIKEDITOR ELEMENT "Rest value output"

The inputs and outputs of the elements are defined by the configuration of the "values". Depending on the KNX data point type or individual configuration, an input or output is available for each value. Here are two examples:

- Individual format with three values

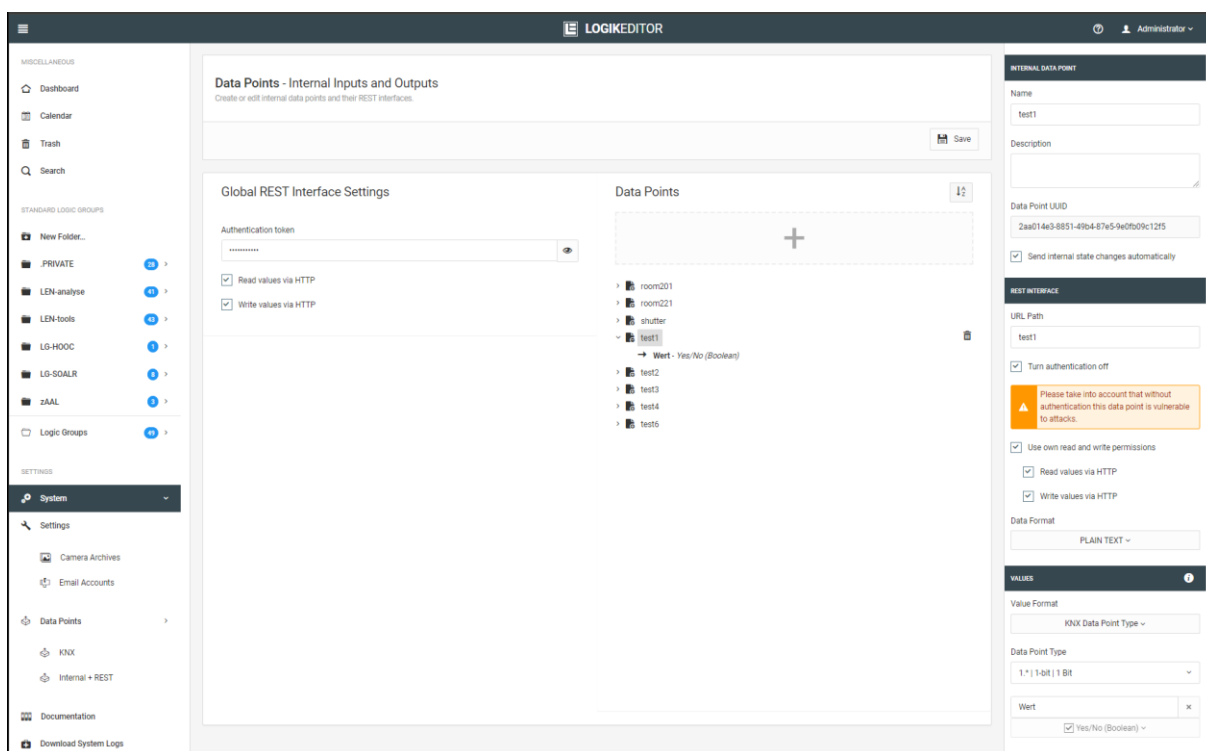- KNX data point type DPT232 (3x 1byte RGB value)

5 APPENDIX

- Samples
- Data types in the **LOGIK**EDITOR
- Open-Source Packages

5.1 BEISPIELE

EXAMPLE 1

- Switch command. Send value "1"
- Protocoll: http
- Data format: PLAIN/TEXT
- Value format KNX data point type DPT1 (switch)
- Authentication: deactivated

Command via CURL:

curl -vvv -H "Content-Type: text/plain" http://192.168.1.222:81/le/rest/test1 -d "1"

```
janni@bt-laptop2:~$ curl -vvv -H "Content-Type: text/plain" http://172.31.160.145:81/le/rest/test1 -d "1"
*   Trying 192.168.1.222:81...
* Connected to 192.168.1.222 (192.168.1.222) port 81 (#0)
> POST /le/rest/test1 HTTP/1.1
> Host: 192.168.1.222:81
> User-Agent: curl/7.81.0
> Accept: */*
> Content-Type: text/plain
> Content-Length: 1
>
* Mark bundle as not supporting multiuse
< HTTP/1.1 200 OK
< content-type: text/plain
< date: Mon, 24 Jun 2024 12:05:53 GMT
< content-length: 1
< access-control-allow-origin: *
< x-xss-protection: 1; mode=block
<
* Connection #0 to host 192.168.1.222 left intact
1
```

EXAMPLE 2
- Query. Current status is queried
- Protocoll: http
- Data format: PLAIN/TEXT
- Value format KNX data point type DPT1 (switch)
- Authentication: deactivated

Command via CURL:
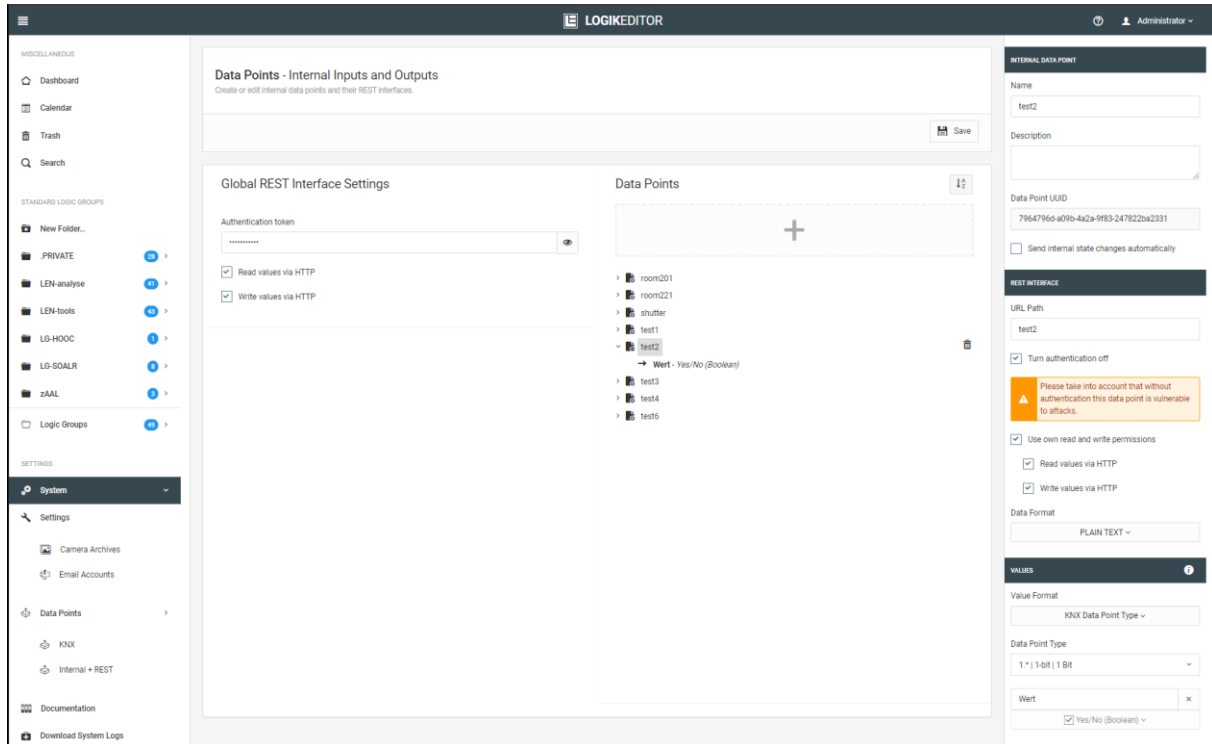curl -vvv http://192.168.1.222:81/le/rest/test2

```
janni@bt-laptop2:~$ curl -vvv http://192.168.1.222:81/le/rest/test2
*   Trying 192.168.1.222:81...
* Connected to 192.168.1.222 (192.168.1.222) port 81 (#0)
> GET /le/rest/test2 HTTP/1.1
> Host: 192.168.1.222:81
> User-Agent: curl/7.81.0
> Accept: */*
>
* Mark bundle as not supporting multiuse
< HTTP/1.1 200 OK
< content-length: 5
< content-type: text/plain
< last-modified: Mon, 24 Jun 2024 12:07:21 GMT
< date: Mon, 24 Jun 2024 12:07:22 GMT
< access-control-allow-origin: *
< x-xss-protection: 1; mode=block
<
* Connection #0 to host 192.168.1.222 left intact
false
```

EXAMPLE 3

- Switch command. RGB value is sent
- Protocoll: http
- Data format: JSON
- Value format KNX data point type DPT232 (3x 1-byte value)
- Authentication: activated
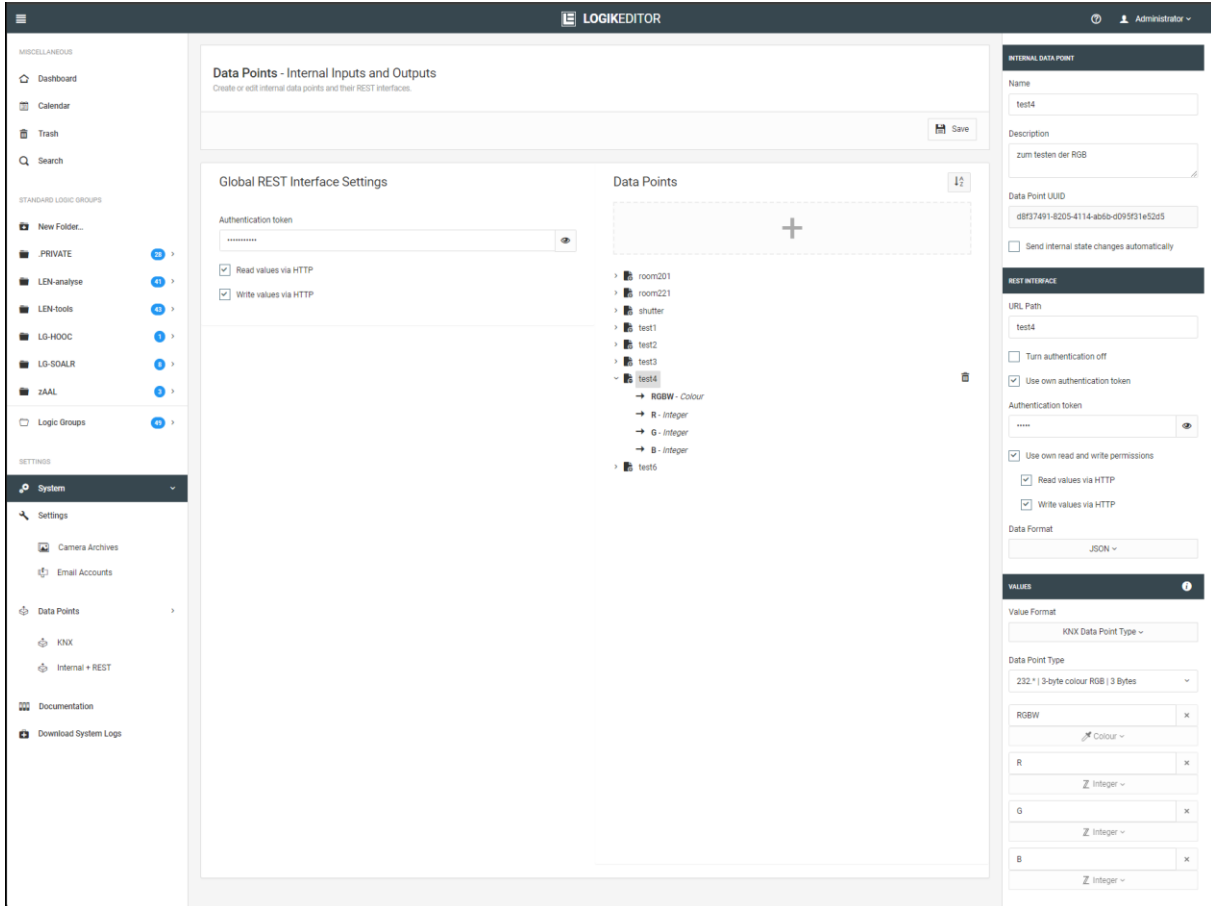
Command via CURL:

curl -vvv -H "Content-Type: application/json" -H "Authorization: test4"
http://192.168.1.222:81/le/rest/test4 -d '{"RGBW":"-4718592","R":"127","G":"127","B":"127"}'

```
janni@bt-laptop2:~$ curl -vvv -H "Content-Type: application/json" -H "Authorization: test4" -X POST
http://192.168.1.222:81/le/rest/test4 -d '{"RGBW":"-4718592","R":"127","G":"127","B":"127"}'
*   Trying 192.168.1.222:81...
* Connected to 192.168.1.222 (192.168.1.222) port 81 (#0)
> POST /le/rest/test4 HTTP/1.1
> Host: 192.168.1.222:81
> User-Agent: curl/7.81.0
> Accept: */*
> Content-Type: application/json
> Authorization: test4
> Content-Length: 49
>
* Mark bundle as not supporting multiuse
< HTTP/1.1 200 OK
< content-type: application/json
< date: Mon, 24 Jun 2024 12:16:11 GMT
< content-length: 49
< access-control-allow-origin: *
< x-xss-protection: 1; mode=block
<
* Connection #0 to host 192.168.1.222 left intact
{"RGBW":"-4718592","R":"127","G":"127","B":"127"}
```

EXAMPLE 4

- Switch command. Consisting of 1x Boolean and 1x integer value
- Protocol: **https**
- Data format: JSON
- Value format: Individual (consists of two values; 1x Boolean and 1x integer)
- Authentication: activated
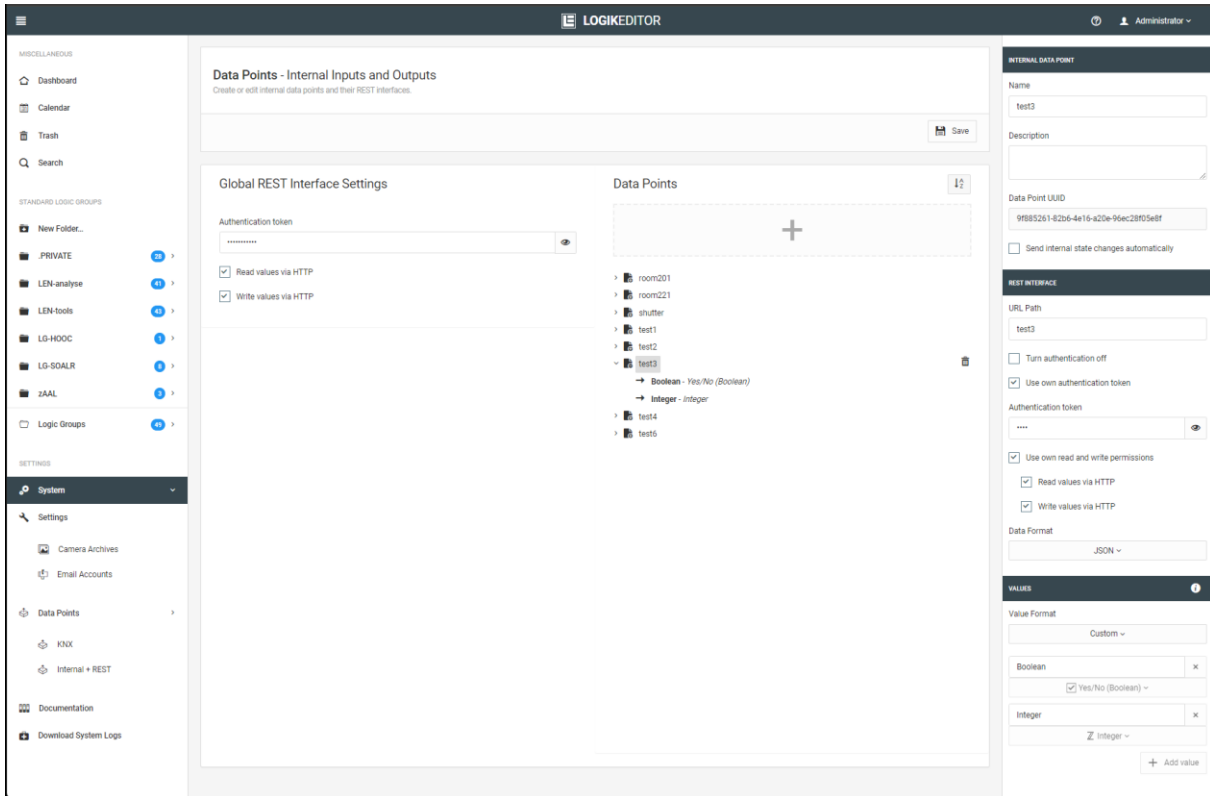
Command via CURL:

curl -k -vvv -H "Content-Type: application/json" -H "Authorization: test" https://192.168.1.222:444/le/rest/test3 -d '{"Boolean":true, "Integer":99}'

```
janni@bt-laptop2:~$ curl -k -vvv -H "Content-Type: application/json" -H "Authorization: test"
https://192.168.1.222:444/le/rest/test3 -d '{"Boolean":true, "Integer":99}'
*   Trying 192.168.1.222:444...
* Connected to 192.168.1.222 (192.168.1.222) port 444 (#0)
* ALPN, offering h2
* ALPN, offering http/1.1
* TLSv1.0 (OUT), TLS header, Certificate Status (22):
* TLSv1.3 (OUT), TLS handshake, Client hello (1):
* TLSv1.2 (IN), TLS header, Certificate Status (22):
* TLSv1.3 (IN), TLS handshake, Server hello (2):
* TLSv1.2 (IN), TLS header, Finished (20):
* TLSv1.2 (IN), TLS header, Supplemental data (23):
* TLSv1.3 (IN), TLS handshake, Encrypted Extensions (8):
* TLSv1.2 (IN), TLS header, Supplemental data (23):
* TLSv1.3 (IN), TLS handshake, Certificate (11):
* TLSv1.2 (IN), TLS header, Supplemental data (23):
* TLSv1.3 (IN), TLS handshake, CERT verify (15):
* TLSv1.2 (IN), TLS header, Supplemental data (23):
* TLSv1.3 (IN), TLS handshake, Finished (20):
* TLSv1.2 (OUT), TLS header, Finished (20):
* TLSv1.3 (OUT), TLS change cipher, Change cipher spec (1):
* TLSv1.2 (OUT), TLS header, Supplemental data (23):
* TLSv1.3 (OUT), TLS handshake, Finished (20):
* SSL connection using TLSv1.3 / TLS_AES_256_GCM_SHA384
* ALPN, server did not agree to a protocol
* Server certificate:
*  subject: C=de; DC=de; DC=BAB TECHNOLOGIE; O=BAB TECHNOLOGIE GmbH; CN=epv3.bab-tec.de
*  start date: Aug 16 08:29:34 2019 GMT
*  expire date: Aug 13 08:29:34 2029 GMT
*  issuer: C=de; DC=de; DC=BAB TECHNOLOGIE; O=BAB TECHNOLOGIE GmbH; OU=BAB TECHNOLOGIE Signing CA; CN=BAB TECHNOLOGIE Signing CA
*  SSL certificate verify result: self-signed certificate in certificate chain (19), continuing anyway.
* TLSv1.2 (OUT), TLS header, Supplemental data (23):
> POST /le/rest/test3 HTTP/1.1
> Host: 192.168.1.222:444
> User-Agent: curl/7.81.0
> Accept: */*
> Content-Type: application/json
> Authorization: test
> Content-Length: 30
```

```
>
* TLSv1.2 (IN), TLS header, Supplemental data (23):
* TLSv1.3 (IN), TLS handshake, Newsession Ticket (4):
* TLSv1.2 (IN), TLS header, Supplemental data (23):
* TLSv1.3 (IN), TLS handshake, Newsession Ticket (4):
* old SSL session ID is stale, removing
* TLSv1.2 (IN), TLS header, Supplemental data (23):
* Mark bundle as not supporting multiuse
< HTTP/1.1 200 OK
< content-type: application/json
< date: Mon, 24 Jun 2024 12:21:16 GMT
< content-length: 30
< access-control-allow-origin: *
< x-xss-protection: 1; mode=block
<
* Connection #0 to host 192.168.1.222 left intact
{"Boolean":true, "Integer":99}
```

5.2   DATA TYPES IN THE **LOGIK**EDITOR

Within the logic groups, four file types are differentiated.

Data type	Value range	Comment
Boolean	true / false	Boolean is a logic value that may only be logic true and logic false.
Integer	64 bit integer	Signed integer. 64 bits result in a possible numerical range of -9223372036854775808 to 9223372036854775807
Float	64 bit float	Float meets the IEEE-754 standard. The value range is from about 5×10^{-324} to $1{,}798 \times 10^{308}$
String	Text	Text in UTF-8 format. There is no limitation regarding length. Please note that very long texts may cause delays for some operations in logic groups.
Colour	RGBW (32 bit)	A special type for transporting colour settings. The light scene is the application example. In other logic elements, the colour value is interpreted as integer.

The logic elements try to convert the data types of the incoming data for their own use case, if possible. If this is not possible, the logic element will normally not execute any action.

Examples for converting between the data types:

Start data type	Value	Target data type	Value
Boolean	true	Integer	1
Boolean	false	Integer	0
Float	33.5	Integer	33
String	"55"	Integer	55
String	"BAB"	Integer	-
Integer	10	Boolean	True
Integer	0	Boolean	False

If possible, the data types are converted if necessary. If a necessary conversion is not possible, processing is usually aborted.

5.3   OPEN SOURCE PACKAGES

- Open Source Licences Logik Editor
  - Apache
  - MIT
  - Mozilla Public Licence
  - BSD
  - ISC
- Open Source Licences YaLE
  - MIT
  - BSD
  - BSD Like

OPEN SOURCE LICENCES LOGIK EDITOR

Apache

- angular-bootstrap-switch
- dexie
- indexeddbshim
- rxjs

MIT

- AngularJS
- angular-bootstrap
- angular-bootstrap-datetimepicker
- angular-dynamic-locale
- angular-hotkeys
- angular-loading-bar
- angular-local-storage
- angular-modal-service
- angular-moment
- angular-ui-ace
- angular-ui-calendar
- angular-ui-notification
- angular-toArrayFilter
- angular-translate
- angular-translate-loader-static-files
- angular-spectrum-colorpicker
- Bootstrap
- crypto-js
- dragular
- es6-promise
- file-saver
- jquery.fancytree
- fullcalendar
- jszip (Dual licenced MIT & GPL v3)
- lodash
- moment.js
- moment-timezone
- ngHandsontable
- ng-dialog
- node-uuid
- pegjs
- xmldom

Mozilla Public Licence

- ical.js

BSD

- ace-builds
- d3-selection
- immutable
- suncalc

ISC

- nouislider-angular

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