The "LTX1 Cloud"

The technology used for the Cloud software works with a database. It was designed to work with all kind of Data Loggers that are compatible to the LTX protocol and supports

- (global) Connectivity via Mobile Internet via 2G, 3G and LTE-M (4G) as well as

- (local) Connectivity via Bluetooth Low Energy (Version >= V4.2)

The User Interface oft LTX1 Cloud is continuously evolving. So this short form manual describes only some basics!

Each LTX Data Logger comes with access infos:

Device MAC: This is a unique 8 Byte number for each device.

Owner Token: This number identifies you as the owner of the device. <u>Keep it secret!</u>

Server Login: The Internet URL to access the LTX1-Cloud.

Server Ticket: Required only for registering new users (multiple new users allowed) on
      LTX1-Cloud. <u>Keep it secret from other persons than users!</u>

Link to a LTX1 demo installation: joembedded.de/ltx

Demo login to LTX1

You may first try the (public) demo login to the LTX1 cloud.

You will find there a varying number of different devices. Feel free to try everything, functions that can change anything are blocked.

Demo login: User "demo" Password "123456"

Registering to LTX1 and basic use

Login to LTX1

At least one registered account is necessary. Register with the 'Server Ticket', a valid Email and confirm it, then log in. Optionally a verification link can be sent to the Email.

Now you can add the device to your owners list, via "Add own Device" and entering the Device MAC and the Device owner token. The number of devices for an owner is not limited.
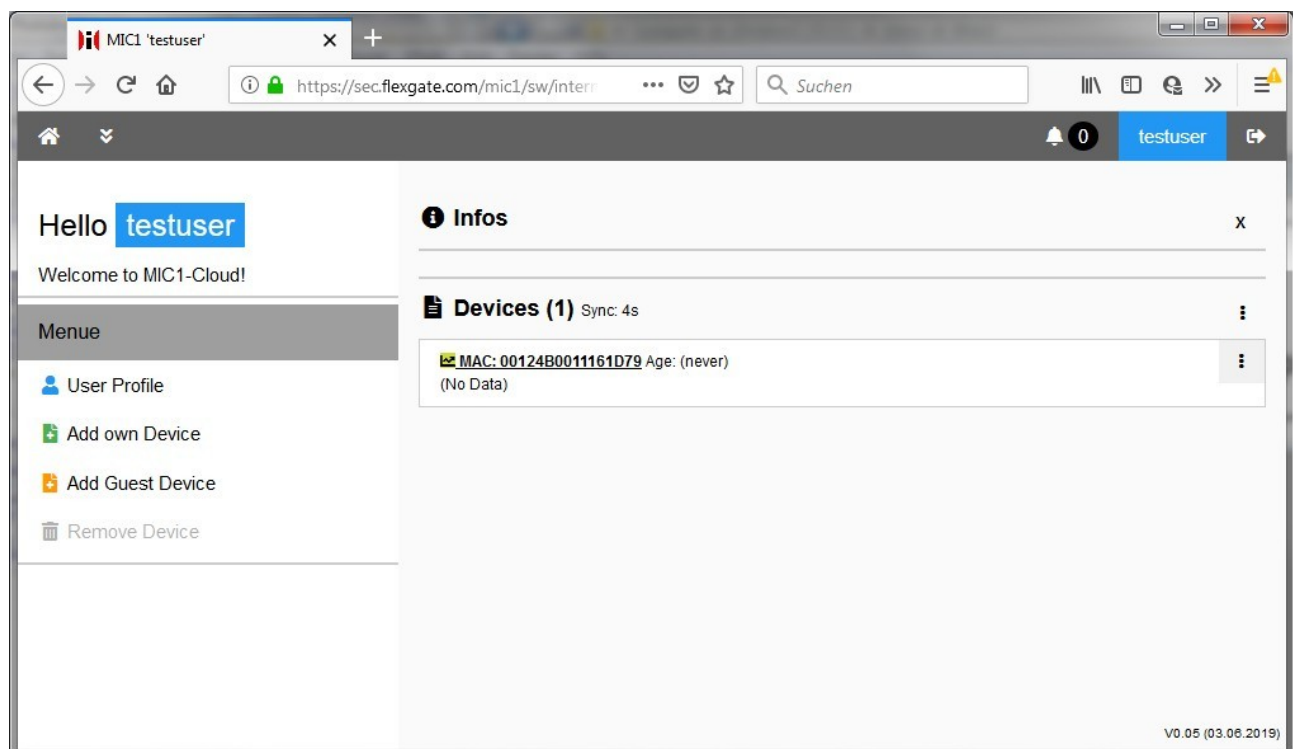
Just as an info: the owner of a device can give other users 'Guest'-access to this device, as shown later. This makes it easy to build logical groups of devices. Of course automatic push functions, exports, alarms cascades, etc. are also possible. See the FAQ and the (evolving) online docs.

And after a transmission:
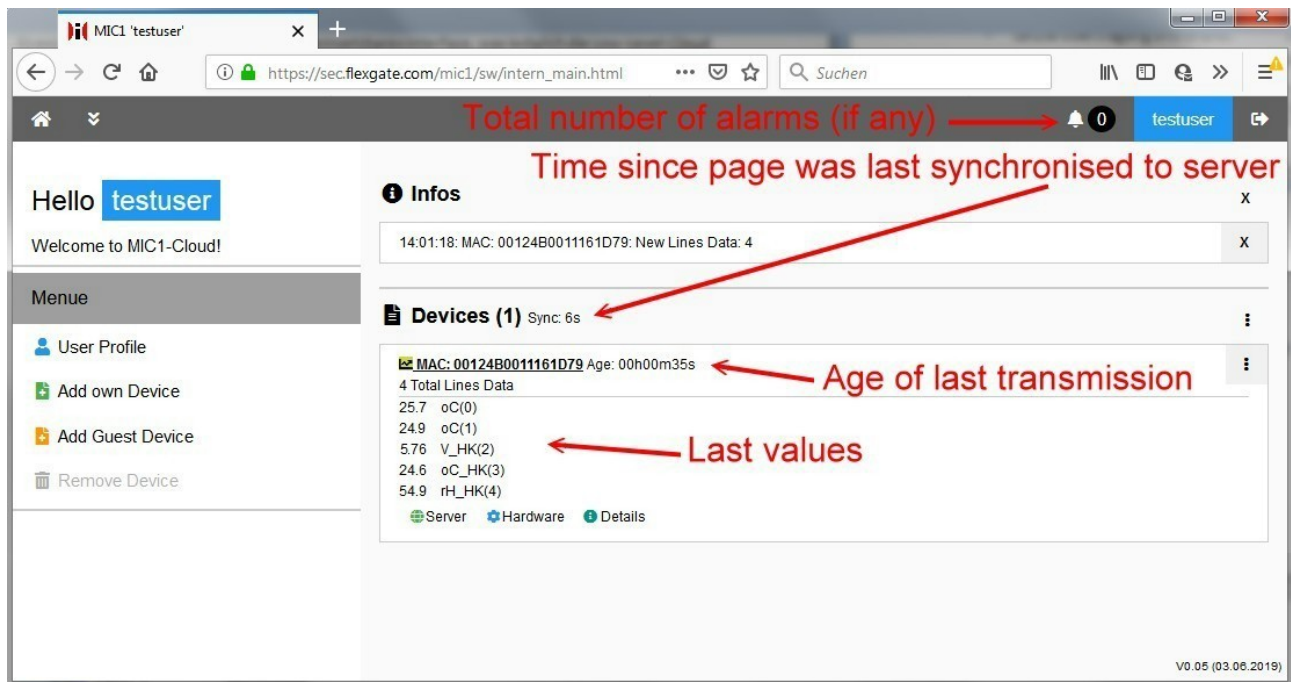
The small green graph icon opens a Graph-View for this device.

There are currently 3 blocks of configurable data (here only as a minimal overview):

User Profile

Currently only the user name can be changed.

Add own Device

As shown above. A device can have only one owner. If another user registers it with the owner token, it will disappear from the old owner's list.

Add Guest Device

An owner of a device can give other users access to this device (with restricted rights, see "Server"). A device can be guest for multiple users.

Remove Device

Removes own or guest devices from the user's list.

Server

The server has some additional infos about the device (like a logical name to display instead of the MAC) as well as alarm settings (rules), contacts and access roles for "guest"-access.

UTC Offset: This is the device's Time Zone in seconds (valid: +/- 12 * 3600 s)

Timeout for Warning / Error: Sometimes connections to the Internet / Mobile Net / Server fail. This is normal and no data is lost (repeated on the next connection). But after a certain time a Warning or

Error may be generated. The granularity of this scan depends on the internal Setup of LTX1 and is normally something between 1 and 24h.

HK-Alarms: If the HK-Values ("House Keeping") signals a problem, an alarm may be generated. Also the battery voltage can be translated to a value in percent (but this is not very precise and only a 'hint').

Guest Token #0: For each device several tokens are available (standard is 1). Select what the guest user is allowed to access and pass the device MAC and Guest token to him.

Contact #0: This is the mail address where notifications (warnings, errors, alarms) are sent to. On demand also SMS and data push services are available.

Condition (for Contact #0): There are three types of notifications:
- Warnings: nothing to react very fast, like "Battery below a limit"
- Errors: e.g. if the device can not read a sensor or other hardware problems
- Alarms: generated if a value is over/under a limit on the device (the limits can be enabled in the next block "Hardware").

INFO: There are 3 different colours used:
`YELLOW`	*for Warnings*
`RED`	*for Errors*
`PINK`	*for Alarms*

A notification to a contact is sent, if a "term" in the condition is true. A condition can consist of 1 or more terms, each separated by a space. A term can have these "Variables":

`An`	New Alarms
`At`	Total Alarms
`Wn`	New Warnings
`Wt`	Total Warnings
`En`	New Errors
`Et`	Total Errors
`M`	Time since last Notification was sent to this contact in seconds

A term is built of several variables, optional "+" and a value, separated by a '*' character. The term is "true", if everything in the term is true. The "+" stands for "greater or equal". A small example:

`An+1*M+3600`   means: "true" if there is 1 or more new Alarms AND the last notification was sent more or equal than 3600 s.

The most simple condition to send a notification after every contact is e.g.

`M`   is always "true": means "true" if the last notification is older than 0 s

`An+3 Wt+10*M+43200`   means: send notification, if there are three or more new Alarms in a transmission OR there are 10 or more Warnings (total) and last notification is older than 12h (= 43200 s).

INFO: If you have questions / problems / suggestions with notifications, please contact us!

Hardware

Each device has local parameters, stored on the hardware, like logging interval, alarm limits, …
These parameters are mirrored to the Cloud. The user can modify them and with the next
transmission the changed parameters are sent back to the device.

*TECHNICAL INFO: All hardware settings are stored in files, that are mirrored between device and
server. So only after a transmission changes can be transferred from one to the other.*

Hardwarename: If the device has a display, this name will be shown and it might be different from
the logical name in the block "Server".

Measurement Period: This is the normal period in seconds.
> **Please regard: If you set the period to low values, this will generate a lot of data!**
> **To save energy: do not set the period to smaller values than you really need!**

Alarm Period: In case of alarms the device can switch (as long as the alarm is active) to a faster
period. **Please do not set the alarm period to smaller values than you really need!**

Internet Period: This is the period at which the data are transferred to the server.

*INFO: About the Retries and Error Policy: There are some hidden parameters (so called
"Secondary Parameters", that are not important for regular use and not explained in this short
manual. If using Mobile Internet it is important to have a strategy to deal with errors. By default,
for normal Internet transmission there is only one try per Internet Period (this is OK to save
power). But for alarms the default is set to three retries (per Alarm Period). We call this system
"Lazy transmissions".*

Record ON Flag: If this flag is not set, no data will be recorded, but the device will contact the
Server periodically.

HK-Flags: "House Keeping" values are only recorded less often than normal values.

Channel Parameters:

Each channel can be linearised before saving to memory. From the "MEASURED" value first an
"Offset" is subtracted, then the result is multiplied by "MULTI". If alarms are enabled, this value is
checked for the limits and then stored. Very simple.

Infos

This block consists of

- Geo Position: each device knows roughly its distance to the used cell tower and the
positions of almost all cell towers worldwide is known (also roughly). With each
transmission the device also sends these data. Hence it is possible to make an estimation of
the rough position of the device. Either only once ore automatically more often. The user
can also manually set an exact (or fake) position (set the "Accuracy" manually to 0).

INFO: Estimating a Geo Position is cheap, but not completely free, hence the estimation is limited to a minimal interval (currently 1h). The Demo Server offers a limited number of free requests per day. Requests over this daily level are ignored.

- Log Files for data and connections

There are currently two logfiles for each device; one for the connections and one for all other things. Both files are automatically clipped to a certain length.

- System Infos: some statistic data about the device.

The Graph
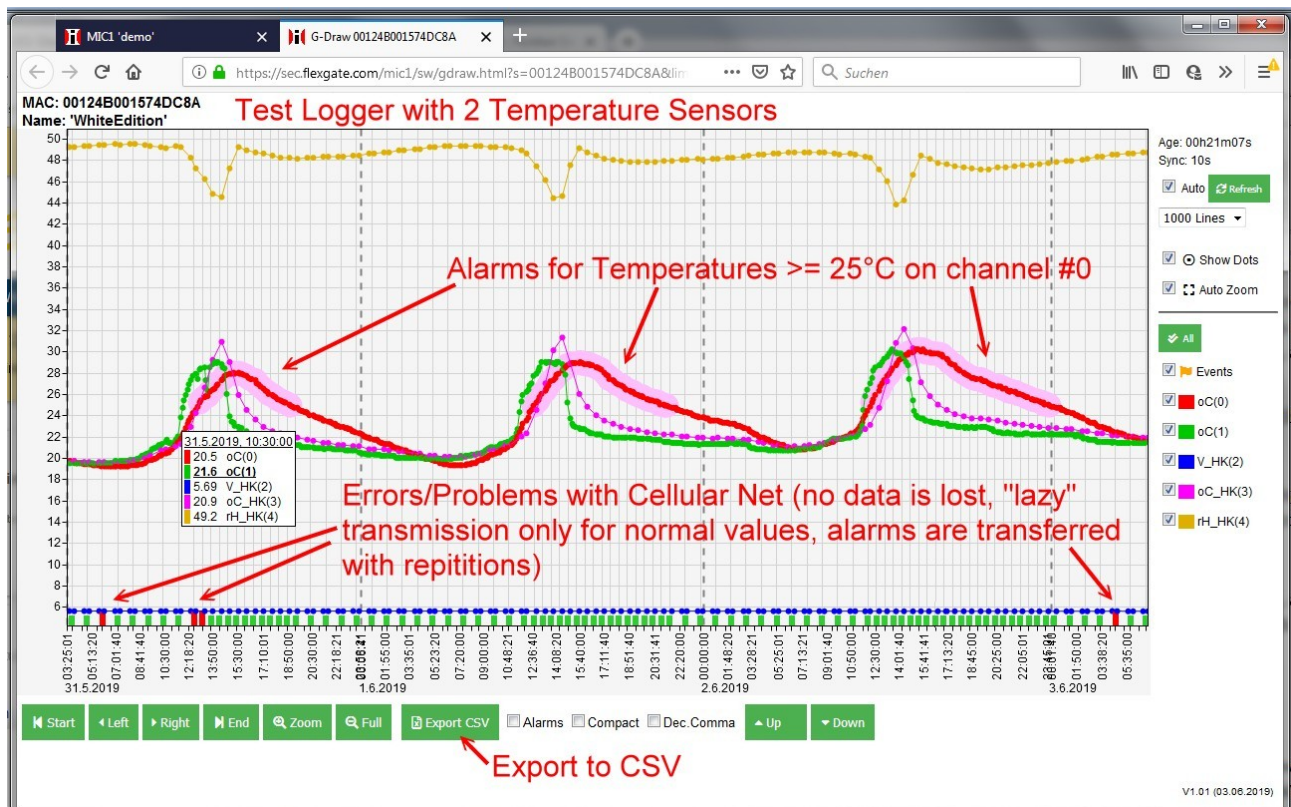
G-Draw can also export data as CSV files.

Technology

If you are interested in the technology around LTX1 Cloud and/or the hardware, please let us know! We will be happy about any kind of cooperation. There are still many features that could be implemented, also it is possible for you to run your own instance of LTX1 or to easily access the LTX1 database.

The software was designed to be highly portable and does only require minimal server ressources: A simple HTTP/HTTPS Server, PHP and SQL (commomnly known as "LAMP-Server") is sufficient. A (default) quota limit can be enabled, so even small databases can manage a large number of devices.

All critical parts (runtime and security) of the LTX1 Cloud are written in PHP (Version 5 – 8beta have been tested), a standard SQL/MySQL database is used for the data and all non critical parts of the software make intensively use of Javascript (ES6) and HTML5.

Feedback

We highly appreciate your feedback! If you have any ideas, wishes or anything else, please contact us!

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