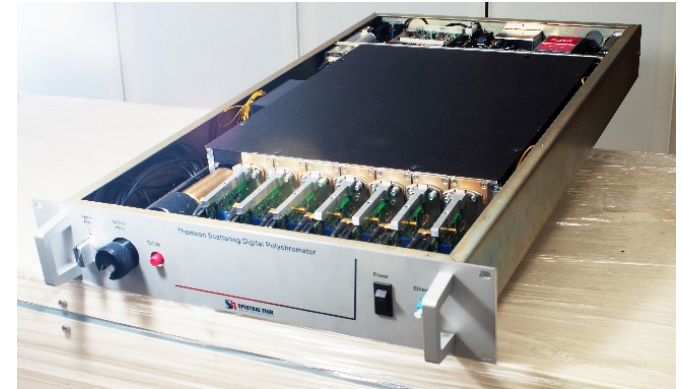


Framework development: challenges & background

Everyday development of scientific equipment and small- and medium-scale experimental stands.

Requirements:

- Complicated non-linear experiment or technological processes support
- On-line mathematical processing of data in closed-loop control
- Out-of-the-box remote participation support
- Availability of acquired and processed data directly from IPython, MatLab, etc.
- Data storage flexible enough to provide an experimental stand an ability to adopt to the experiment process modifications



The framework

- The core of the framework - modules & message passing system
- Distributed by design
- Various modules types, with specific tools for each task:
 - Device driver module (C++)
 - Logic module (Lua)
 - Math module (Octave)
- Standard out-of-the box modules
 - Device Manager (`devmgr`)
 - Database (`database`)
 - Notifier (`notifier`)
 - Etc
- Run-time loading and unloading of modules; force unloads, if needed
- Nice and pretty propagation of exceptions to the client or calling module
- External access is dead simple, only two mandatory fields in request structure
 - ```
$ curl -X POST http://...:8080/flugegeheimen \
-d '{"subsystem":"...", "reqtype":"..."}'
```
  - Web browser, IPython, Matlab, IDL - you name it.
  - Integrate into EPICS, MDSPlus, etc
  - HTTPS Basic Auth is the preferred way of authentication
- Default web interface using jQuery + Twitter Bootstrap
- Document-oriented datastore wrapped into common LabBot module.
  - Allows to write data acquired from device module right to the database
  - Possible to add support of other backends (Postgre, time-series databases)
- Embedded platforms (RaspberryPi, Tarrasic Atlas-SoC ARM+FPGA) support

# Future development

- The project is switching to a frequent (2-week) rolling release cycle to intensify development and interact with possible early adopters
- The effort will be focused on supporting the needs of external users: documentation, case studies, how-tos, direct support of users
- Adding support and ready-to-install images for more embedded platforms