

Device Control Database Tool (DCDB)

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Abstract

In a physics facility containing numerous instruments, it is advantageous to reduce the amount of effort and repetitive work needed for changing the control system (CS) configuration: adding new devices, moving instruments from beamline to beamline, and more.

We have developed a *CS configuration tool*, which provides an easy-to-use interface for quick configuration of the entire facility. It uses Excel as the front-end application and allows the user to quickly generate and deploy IOC configuration (EPICS start-up scripts, alarms and archive configuration) onto IOCs, start, stop, restart IOCs, alarm servers and archive engines, and more.

The DCDB tool utilizes a relational database, which stores information about all the elements of the accelerator. The communication between the client, database and IOCs is realized by a REST server written in Python. The key feature of the DCDB tool is that the user does not need to recompile the source code. It is achieved by using a dynamic library loader, which automatically loads and links device support libraries.

The DCDB tool is compliant with CODAC (used ITER, ELI-NP), but can also be used in any other EPICS environment (i.e. ESS).

Server side

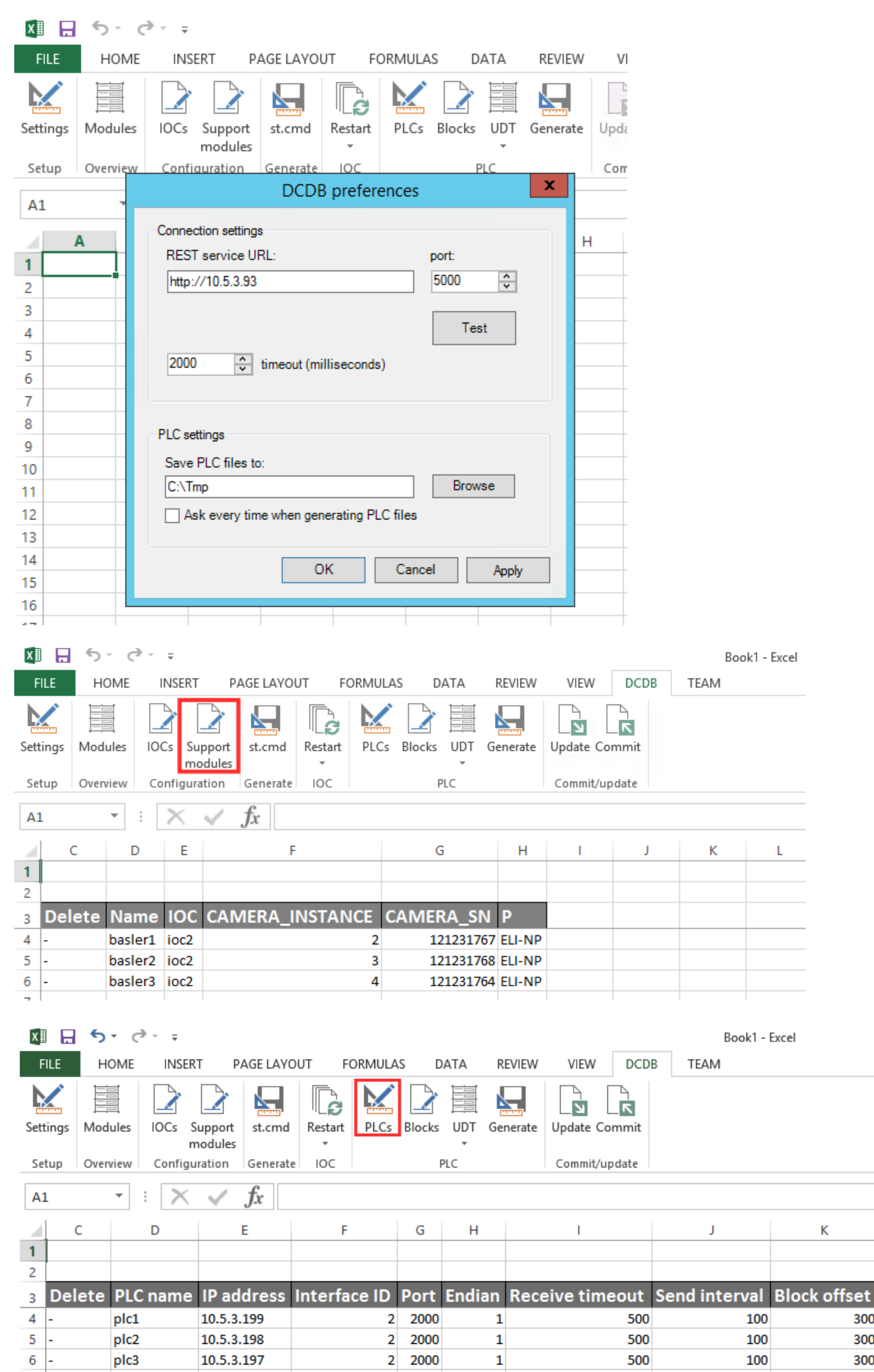
- REST server written in Python
- Uses JSON as the data exchange format
- Uses SSH to deploy configuration onto IOCs
- Deployed as CODAC-service:

```
bled@bled:~$ dcdb
Usage: dcdb {start|stop|status|restart|fg|log} [--port=5000]
```

- Tested on Windows/Linux/Mac OS X

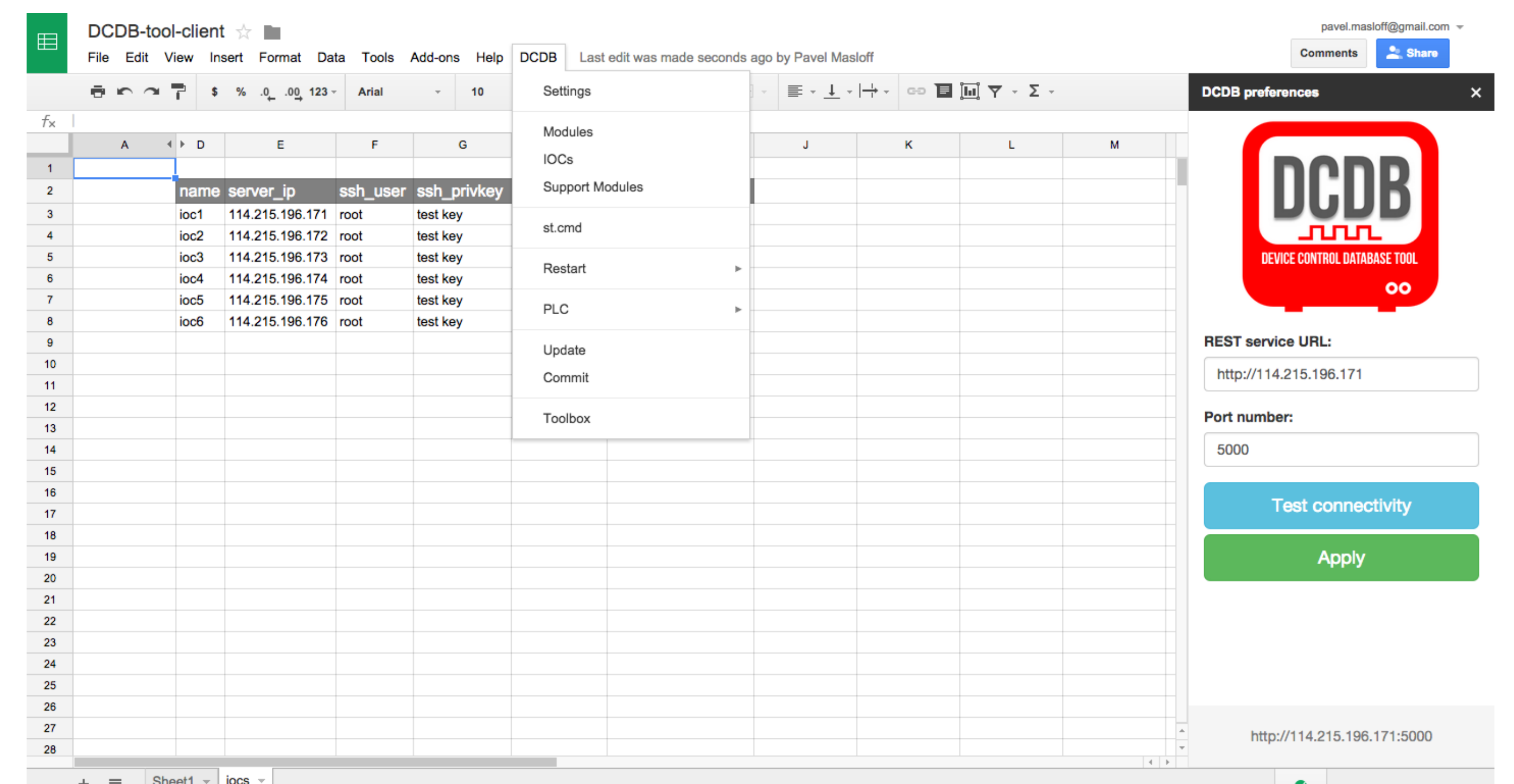
Client side

- Microsoft Excel



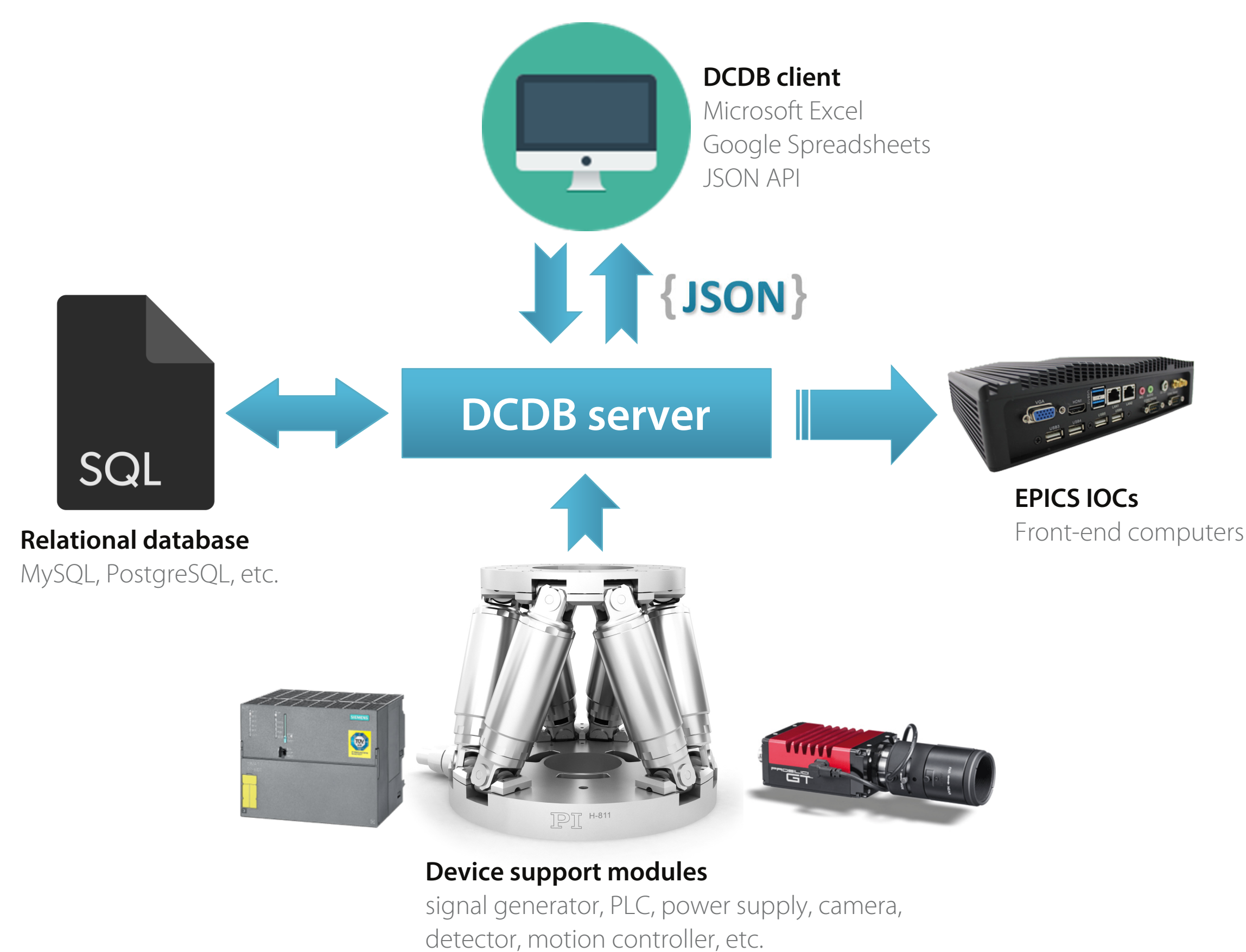
Delete	Name	IOC	CAMERA_INSTANCE	CAMERA_SN	P
-	basler1	ioc2	2	121231767	ELI-NP
-	basler2	ioc2	3	121231768	ELI-NP
-	basler3	ioc2	4	121231764	ELI-NP

- Google Spreadsheets



Delete	PLC name	IP address	Interface ID	Port	Endian	Receive timeout	Send interval	Block offset
-	plc1	10.5.3.199	2	2000	1	500	100	300
-	plc2	10.5.3.198	2	2000	1	500	100	300
-	plc3	10.5.3.197	2	2000	1	500	100	300

DCDB architecture



Features

- Python back-end (flask-restful, sqlalchemy, paramiko)
- IOC/Alarms/Archive configuration
- Generation and deployment of st.cmd scripts
- Start/stop/restart IOCs
- Restart alarm/archive servers
- Change IOC parameters (PV macros) on the fly
- Utilizes *dloader* (by Dirk Zimoch, PSI)
- S7 PLC support
- *StreamDevice* support
- Google Spreadsheets client
- Compliant with CODAC v4 (ESS, ITER, ELI-NP)
- Chinese localisation



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