Database integration within the DAQ software

HGTD Production DataBase meeting,
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DAQ software

Will need to access those data as inputs for scans

Process scans

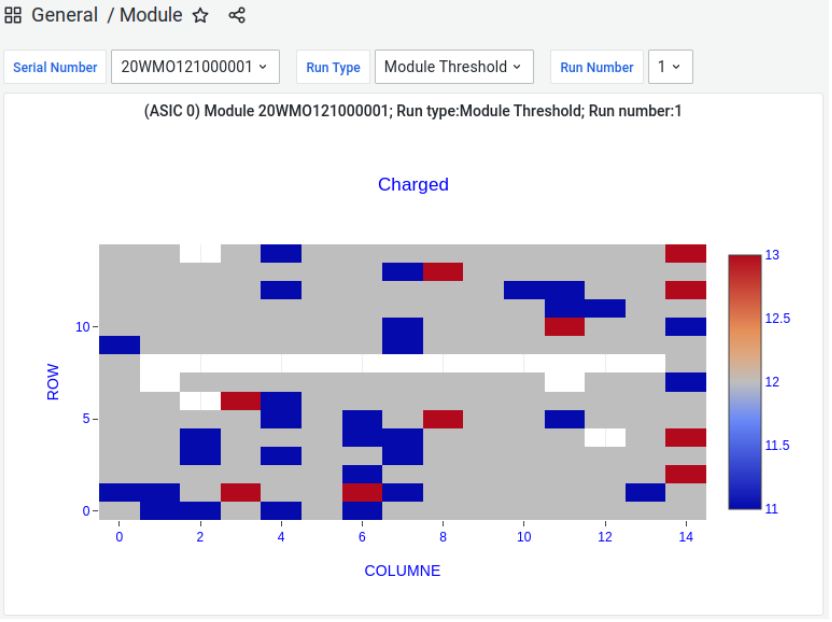
Save scan output to the database

Production Database

- IV_PAD — General
- iv_test — developes
- IV_total — developes
- Json table — developes
- Module — General
- Module_squareGrid — developes
- sensor JsonAPI — developes
- Sensor_CV — General
- Sensor_IV — General
- Sensor_IV_test — developes
- test — developes
- testpa — developes

Starting from the database you build !

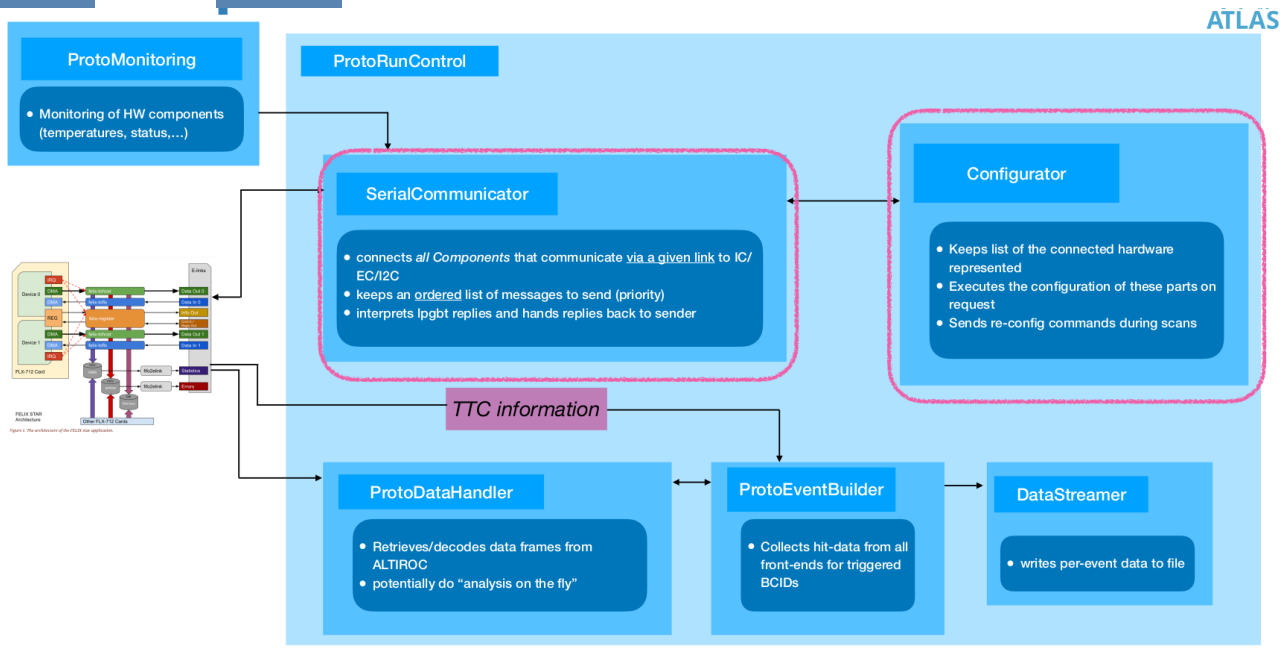
HGTD database in Grafana



0. An overview of the DAQ software

- The DAQ software is living in HGTD-felix DAQ software repository.
- It’s purpose it to allow **data acquisition with Felix card(s)** and to be a baseline for **surface commissioning**.
- Existing software's such as AlVin and FADA are not meant to be used for those tasks.

Borrowed from
A. Leopold slides !



1. Setup connection to the database

(1) Install **Node.js** and **Oracle Instant Client**
(Basic Package + SQL*Plus Package).

(2) **Configure your oracle database** as explained originally in the HGTD database docs and compiled in CodiMD: DataBase setup

(3) Install required Node.js packages : **express oracledb cors dotenv**.

(4) Go to *MonitoringAndControl/data/WebInterface/* and add a **.env** containing database credentials (To be requested).

Thanks to M. Imran for providing me help to
setup a connection to the DB as a starting point.

2. Instructions to make use of the database
→ To do systematically

(1) Create an SSH tunnel connect to the Oracle database at CERN:
(leave it open while working !)

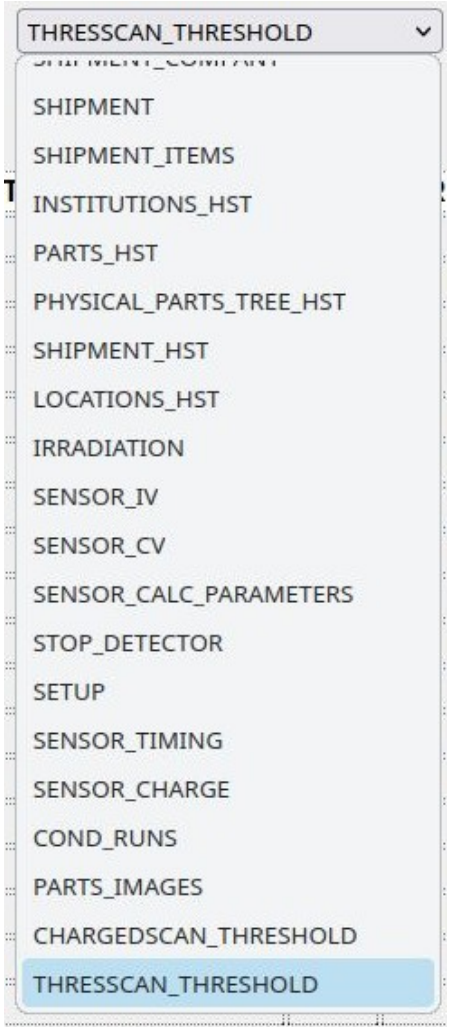
ssh username@lxplus.cern.ch -L 10004:itrac1601-v.cern.ch:10121 -L 10005:itrac1609-v.cern.ch:10121

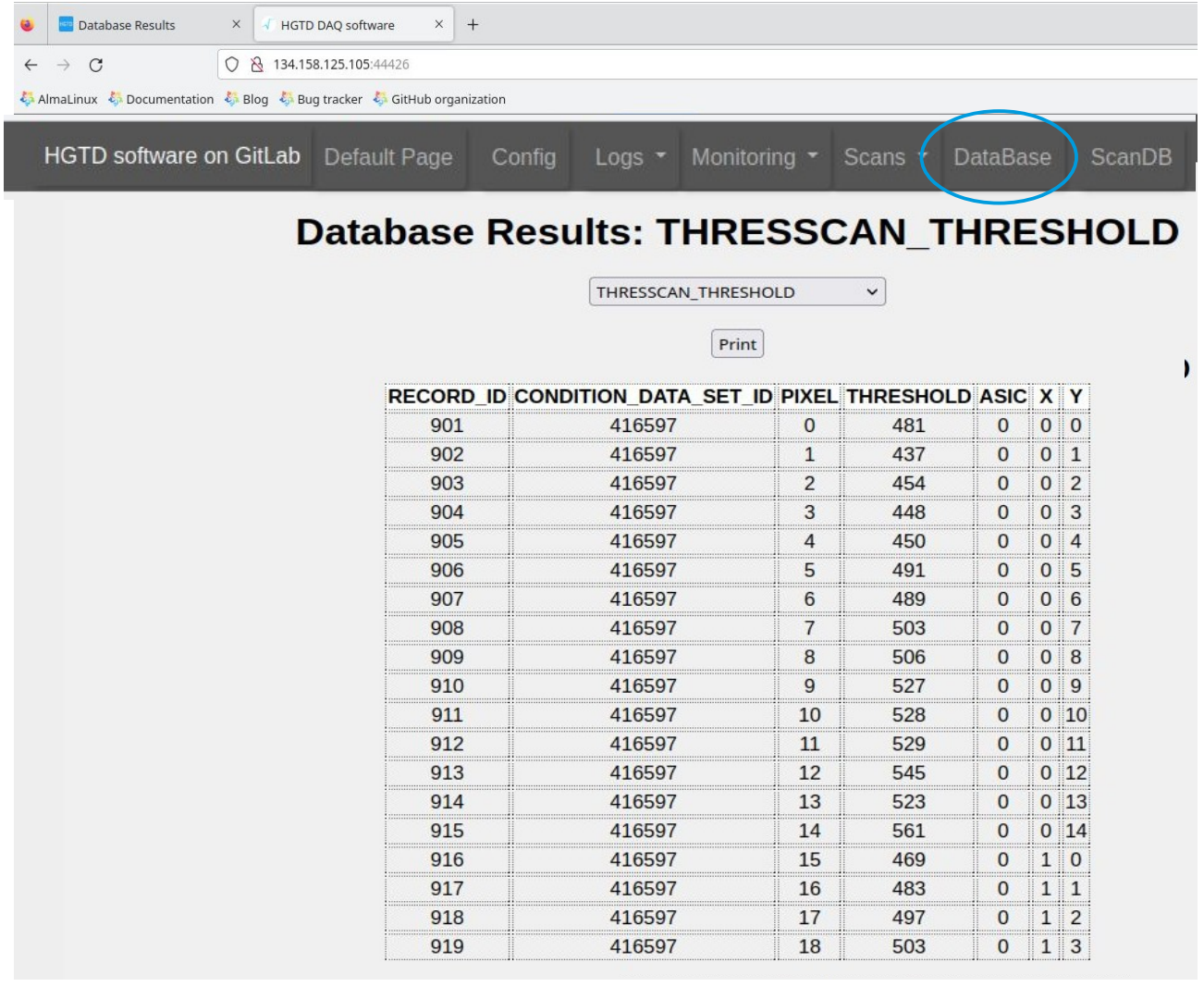
(2) Run the Node.js Server in *MonitoringAndControl/data/WebInterface/*

node DBserver.js

(3) Run the software and have your access to the database !

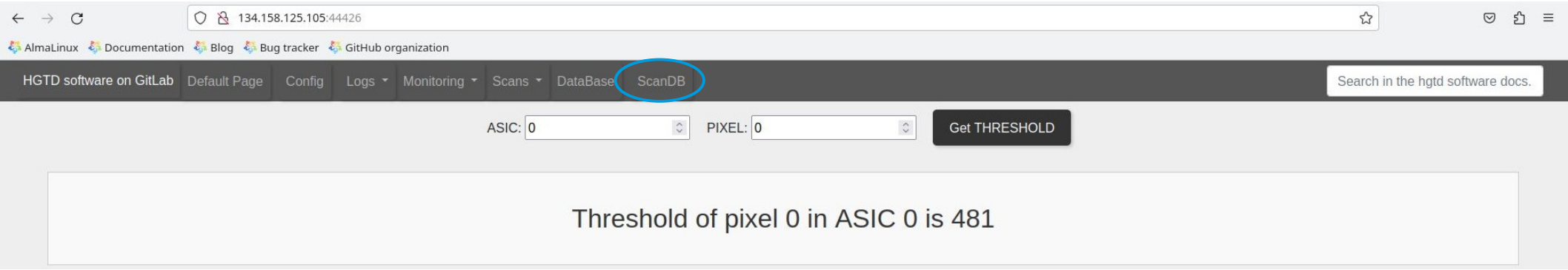
3. Access the different database tables





RECORD_ID	CONDITION_DATA_SET_ID	PIXEL	THRESHOLD	ASIC	X	Y
901	416597	0	481	0	0	0
902	416597	1	437	0	0	1
903	416597	2	454	0	0	2
904	416597	3	448	0	0	3
905	416597	4	450	0	0	4
906	416597	5	491	0	0	5
907	416597	6	489	0	0	6
908	416597	7	503	0	0	7
909	416597	8	506	0	0	8
910	416597	9	527	0	0	9
911	416597	10	528	0	0	10
912	416597	11	529	0	0	11
913	416597	12	545	0	0	12
914	416597	13	523	0	0	13
915	416597	14	561	0	0	14
916	416597	15	469	0	1	0
917	416597	16	483	0	1	1
918	416597	17	497	0	1	2
919	416597	18	503	0	1	3

4. Access database table values one-by-one



The purpose here was to make a test that we can pick-up specific values from the DB and input them to scans

5. Some details on the code

(1) The main component in this “framework” is the ***Dbserver.js*** that handles the requests from our software to the database through end-points.

```
app.get('/entries/:tableName', async (req, res) => {
    try {
        const connection = await oracledb.getConnection(dbConfig);
        console.log(`Fetching entries from table: ${req.params.tableName}`);

        // Get the rows and columns of the specified table
        const result = await connection.execute(`SELECT * FROM ${req.params.tableName}`);

        const table = {
            name: req.params.tableName,
            metaData: result.metaData,
            rows: result.rows,
        };

        await connection.close();

        // Send the table to the client
        res.json(table);
    } catch (err) {
        console.error('Error fetching entries:', err.message);
        console.error(err.stack);
        res.status(500).send('Error fetching entries');
    }
});
```

For accessing full tables

```
app.get('/threshold/:asic/:pixel', async (req, res) => {
    try {
        const connection = await oracledb.getConnection(dbConfig);
        console.log(`Fetching Threshold value for PIXEL ${req.params.pixel} in ASIC ${req.params.asic}`);
        const result = await connection.execute(
            `SELECT THRESHOLD FROM THRESSCAN_THRESHOLD WHERE ASIC = :asic AND PIXEL = :pixel`,
            [req.params.asic, req.params.pixel]
        );
        res.json(result.rows[0] || {});
    } catch (err) {
        console.error(err);
        res.status(500).json({ error: err.message });
    }
});
```

From a table, access a specific value

5. Some details on the code

(2) The response of the database server get appended directly to our WebInterface html and js,
without more profound changes !

```html
<div id="DataBase" class="hidden">
    <iframe src="http://localhost:3000/DataBase.html" width="100%" height="1000px"></iframe>
</div>

<div id="ScanDB" class="hidden">
    <form id="threshold-form">
        <label for="asic-input">ASIC:</label>
        <input id="asic-input" type="number" required style="margin-right: 1em;">
        <label for="pixel-input">PIXEL:</label>
        <input id="pixel-input" type="number" required style="margin-right: 1em;">
        <button type="submit">Get THRESHOLD</button>
    </form>
    <div id="threshold-display" style="
        font-size: 2em; /* Make the text bigger */
        color: #333; /* Change the text color */
        background-color: #f9f9f9; /* Change the background
        border: 1px solid #ccc; /* Add a border */
        padding: 1em; /* Add some padding */
        margin-top: 1em; /* Add some margin at the top */
        text-align: center; /* Center the text */
    "></div>
</div>
```

```javascript
document.getElementById('threshold-form').onsubmit = async function(event) {
event.preventDefault();

const asic = document.getElementById('asic-input').value;
const pixel = document.getElementById('pixel-input').value;

try {
    const response = await fetch(`http://localhost:3000/threshold/${asic}/${pixel}`);
    const data = await response.json();

    if (data.THRESHOLD) {
        document.getElementById('threshold-display').textContent = `Threshold of pixel ${pixel} in ASIC ${asic} is ${data.THRESHOLD}`;
    } else {
        document.getElementById('threshold-display').textContent = 'No data found';
    }
} catch (error) {
    console.error('Error:', error);
}
```

Something to keep in mind

The way we are connecting the database is done such that if you modify something on your side (Adding/removing tables, culumns, ...),

→ It appears « directly » in our page without further settings !

Summary

- ✔ A link is now set from the DAQ software to the production database.
- ✔ We can read data from it and use it as input for scans (not yet tested).
- ✔ Some documentation has been written about it: CodiMD: DataBase setup
- ➢ Still need to try and write in the database (not urgent).
- ➢ Feedback's are welcome !

Thank you!


LPC
Particules
pLasmas
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ATLAS
EXPERIMENT


cnrs
dépasser les frontières
IN2P3
Les deux infinis