Key parts of LocalDB

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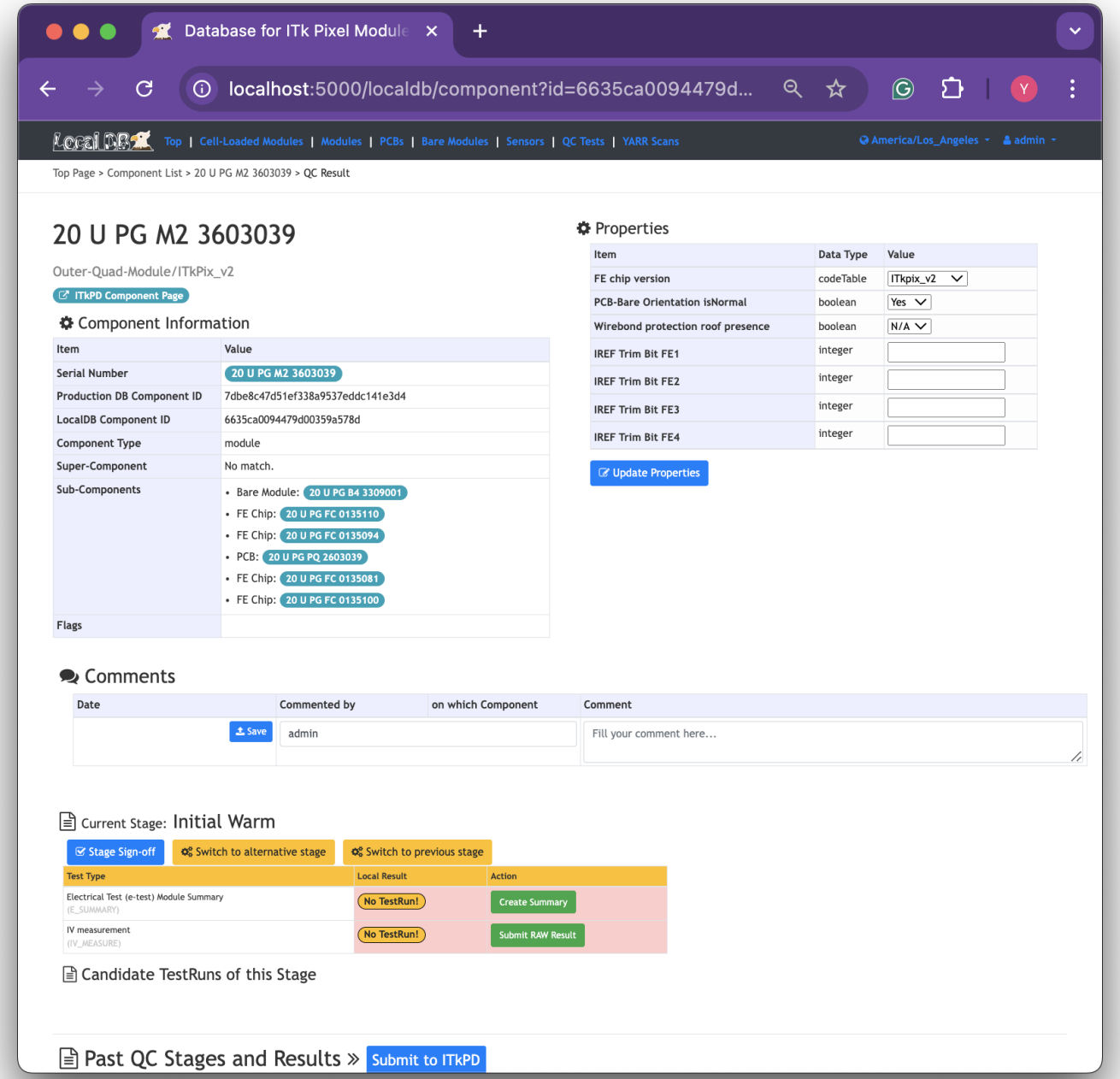
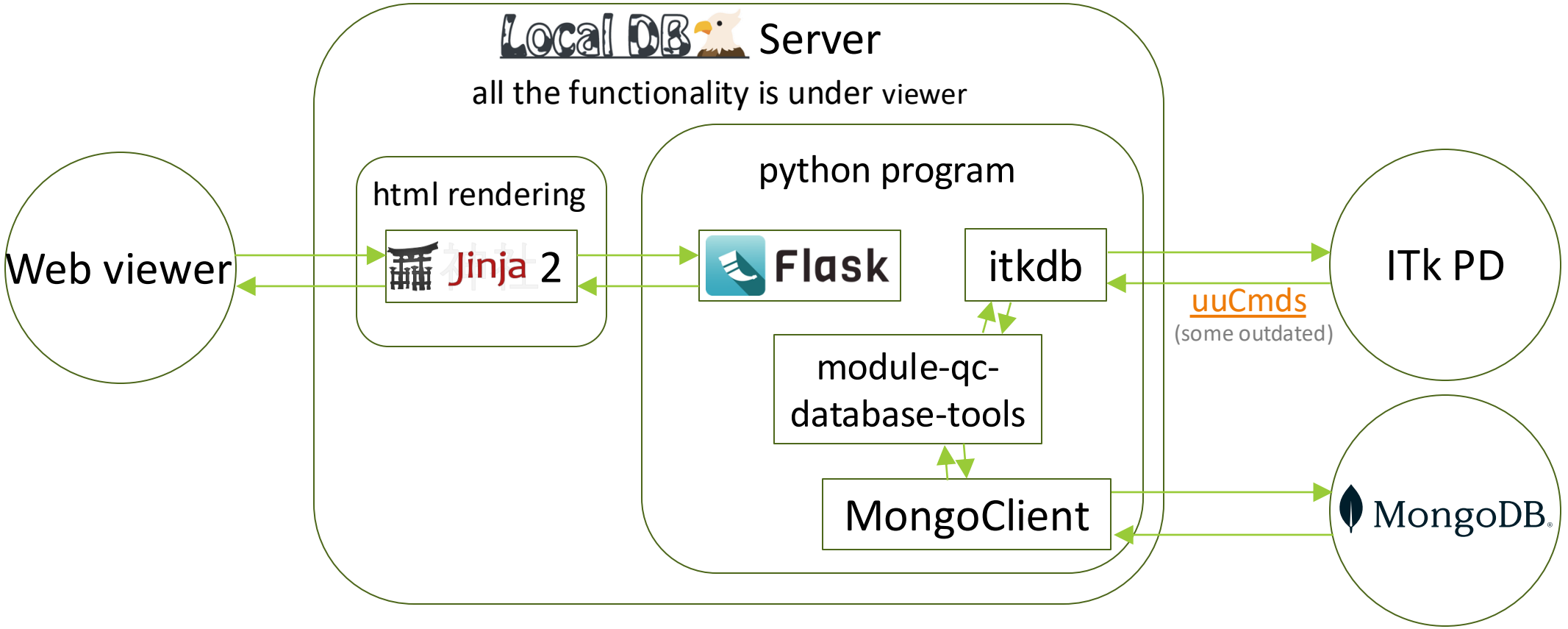


Focusing on Parts.
LocalDB provides

- Web viewer
- interfacing “local database”
- interacting with ITk PD

Illustrate a bit more…



interaction with ITk PD

- functionalities in functions/itkpd_interface based on itkdb
  - recursiveComponentSynchronizer for pulling components from PDB
  - recursiveUploader to update PDB with Local status

functions/common.py

```
def process_request(code1, code2):
    global pd_client


    success = 0
    try:
        user = itkdb.core.User(access_code1=code1, access_code2=code2)
        pd_client = itkdb.Client(user=user, use_eos=True)
        mount_retry_adapter(pd_client)
                                                    ⋮
```

functions/itkpd_interface/PDInterface.py

```
class PDInterface:

    def getCompFromProdDB(self, component_id):
        return self.pd_client.get("getComponent", json={"component": component_id})
```

functions/itkpd_interface/recursiveUploader.py

```
class RecursiveUploader(PDInterface.PDInterface):
    def __submitTest(self, serialNumber, stage, test):
                                                    ⋮
        # submit a new TestRun
        tr_new = self.pd_client.post("uploadTestRunResults", json=out)
```

MongoDB

- “local database” is a MongoDB
  - data (=document) is saved in JSON-like binary, BSON
  - you can do whatever you like
    - need to respect the data format defined by ourselves to keep integrity
- Document Type
  - component
  - parent-child relation
  - QC status
  - test
  - message
  - …

Example: QC status

```
{
'QC_results’: {…,
                'MODULE/INITIAL_WARM’: {
                                'E_SUMMARY': '65bccdc72d1ca36262b8bb53',
                                'IV_MEASURE': '-1’
                }, …
},
'QC_results_pdb’: {…,
                'MODULE/INITIAL_WARM’: {
                                'E_SUMMARY': '664d04fdad15db00355cb2dc',
                                'IV_MEASURE': '-1’
                }, …
},
'_id': ObjectId('6643d220f60bf95d7acae221'),
'component': '65a133c1bc46d00042ed96fd',
'componentType': 'MODULE’,
…,
'stage': 'MODULE/FINAL_WARM’,
…,
'upload_status’: {…, 'MODULE/INITIAL_WARM': '1’, …}
}
```

On the Web viewer

MongoClient

- MongoDB can be handled with MongoClient
  - find existing document (find, find_one)
    - e.g. by ID
  - update exisitng document
  - delete existing document
  - insert new document

pages/qc.py

```
def save_raw_and_analyze(test, component):
                                                    ⋮
    rawHash = hashlib.md5(json.dumps(test).encode()).hexdigest()
                                                    ⋮
    rawRecord = localdb.QC.testRAW.find_one({"rawHash": rawHash, "stage": stage})


    if rawRecord is None:
        raw_id = localdb.QC.testRAW.insert_one(
            {"raw": raw, "rawHash": rawHash, "stage": stage}
        ).inserted_id
                                                    ⋮
```

mongosh

- mongosh allows interactive access to MongoDB

```
% MONGO
MongoDB shell version v5.0.21
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("42c14f1c-a138-4e08-b99e-c79e053df40b") }
MongoDB server version: 7.0.2
WARNING: shell and server versions do not match
================
Warning: the "mongo" shell has been superseded by "mongosh",
which delivers improved usability and compatibility.The "mongo" shell has been deprecated and will be removed in
an upcoming release.
For installation instructions, see
https://docs.mongodb.com/mongodb-shell/install/
================
---
The server generated these startup warnings when booting:
        2025-01-15T03:22:49.138-08:00: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
---
> show dbs
admin        0.000GB
config       0.000GB
local        0.000GB
localdb      3.099GB
localdbtools  0.002GB
> use localdb
switched to db localdb
```

mongosh

- mongosh allows interactive access to MongoDB
  - note: find_one (MongoClient) vs. findOne (mongosh)

```
> db.getCollectionNames()
[
"QC.module.status",
"QC.result",
"QC.testRAW",
"QC.testRuns_pdb_ldb_map",
"childParentRelation",
"component",
"componentTestRun",
"config",
"fe_config_revision",
"fe_configs",
"fs.chunks",
"fs.files",
"institution",
"pd.institution",
"testRun",
"user"
]
```

```
## obtain component ID from serial number
> db.component.find({"serialNumber": "20UPGM22601095"})
{ "_id" : ObjectId("6572c6066316ce00414314bb"), "name" : "20UPGM22601095", "chipType" : "2", "serialNumber" :
"20UPGM22601095", ...

## obtain QC status from component ID
> db.QC.module.status.find({"component": "6572c6066316ce00414314bb"})
{ "_id" : ObjectId("671d390214877824fc765aae"), "sys" : { "mts" : ISODate("2025-01-16T01:55:32.018Z"), "cts" : ISODate("2025-01-
16T01:55:32.018Z"), "rev" : 0 }, "dbVersion" : 1.01, "proddbVersion" : 1.02, "componentType" : "MODULE", "component" :
"6572c6066316ce00414314bb", "stage" : "MODULE/QC_STATUS", "status" : "created", "rework_stage" : [ ], "QC_results" : {
"MODULE/INIT" : {  }, "MODULE/ASSEMBLY" : { "MASS_MEASUREMENT" : "-1", "GLUE_MODULE_FLEX_ATTACH" :
"6576611bd24c620783d80c61", "TRIPLET_METROLOGY" : "-1", "VISUAL_INSPECTION" : "65765dc1d24c620783d80c56",
"FLATNESS" : "-1", "QUAD_MODULE_METROLOGY" : "673ffd065f5366e933e0f2a9" }, "MODULE/WIREBONDING" : {
"WIREBONDING" : "65766848d24c620783d80c7b", "WIREBOND_PULL_TEST" : "673d7fd10ba3326c369ba3cb",
"VISUAL_INSPECTION" : "657666a7d24c620783d80c77" }, "MODULE/INITIAL_WARM" : { "E_SUMMARY" :
"66785a1146198bd10c3aa535", "IV_MEASURE" : "66a5b84b08600a2577c37ec1" }, ...

## list IV_MEASURE related to the component
> db.QC.result.find({"component": "6572c6066316ce00414314bb", "testType": "IV_MEASURE"})
```

Web viewer: html

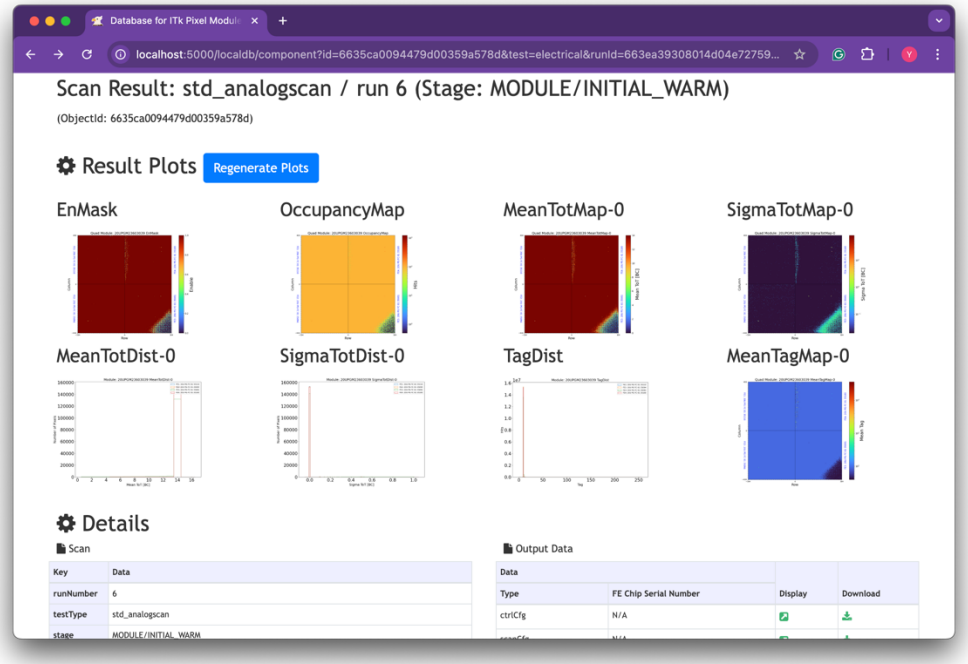
- page rendered based on Jinja2 html template (templates)

templates/yarr_scans/plot.html

```
<form ...>
 <input type="hidden" name="regeneratePlots" value="true" placeholder="View" />
 <h3>
  <i class="fa fa-cog"></i> Result Plots
  <button class="btn btn-primary" name="regeneratePlots" title="Click this button when e.g. cache is broken.">Regenerate Plots</button>
 </h3>
</form>

<div class="row align-items-center justify-content-flex-start">
 <div class="col">


  {% if 'plots_light' in component['electrical'] %}
   <div class="row align-items-top justify-content-center">
    {% for plot_key in component['electrical']['plots_light'] %}
     <div class="col" align="left">
      <h4>{{ plot_key }}</h4>
      <a href="{{ component['electrical']['plots_light'][plot_key] }}"
       ><img src="{{ component['electrical']['plots_light'][plot_key] }}" width="200"
      /></a>
     </div>
    {% endfor %}
   </div>
  {% endif %}
 </div>
</div>
```



Web viewer: python

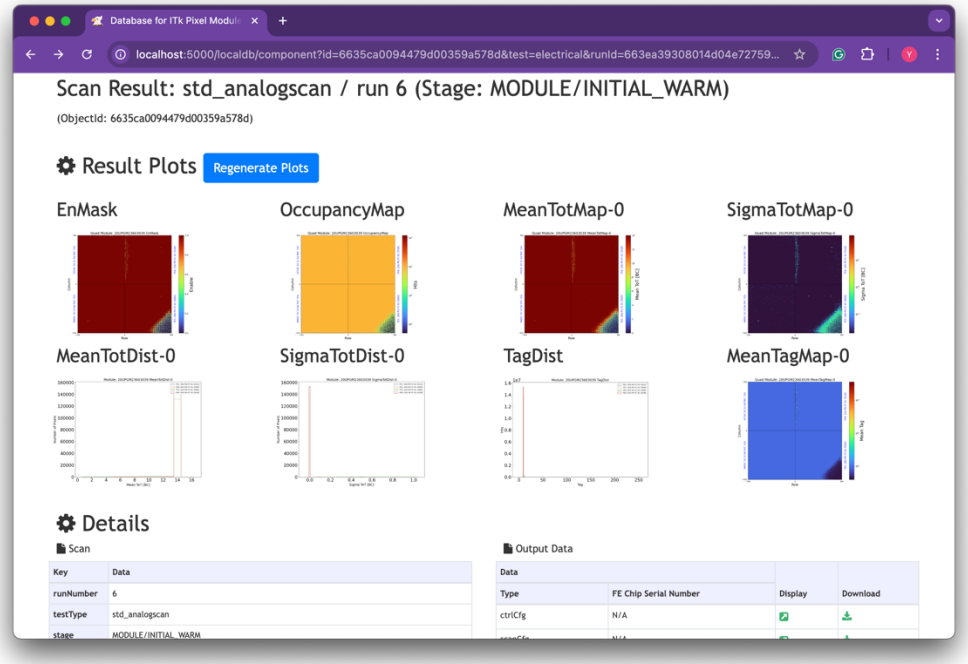
- python script gives what is rendered in template using Flask (pages)

pages/component.py

```
# display component page
@component_api.route("/component", methods=["GET", "POST"])
def show_component():
  global plotting_mutex_lock
                                    ⋮
  try:
    plots_light = set_light_plots(
      session["this"],
      component_type,
      session["runId"],
      session["regeneratePlots"],
    )
                                    ⋮
  electrical = {
                                    ⋮
    "plots_light": plots_light,
  }

  component = {
                                    ⋮
    "electrical": electrical,
                                    ⋮
  }
```

```
                ⋮
return render_template(
  "component.html",
  component=component,
  table_docs=table_docs,
)
```



Summary

- Key parts for LocalDB
  - itkdb to communicate with ITk PD
  - MongoClient to manipulate “local” MongoDB
  - Flask + Jinja2 to render web page

Backup