UconDB and Conditions database development

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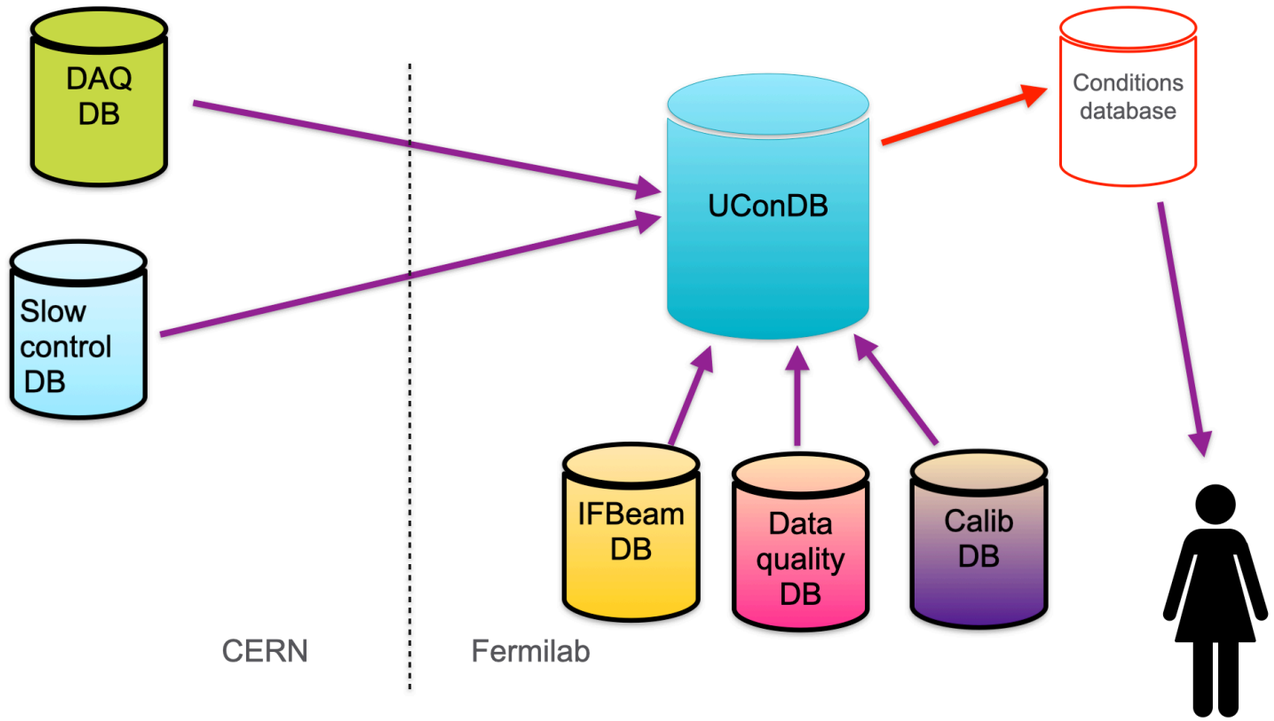


DEEP UNDERGROUND NEUTRINO EXPERIMENT

Colorado State University

Outline

- Introduction to ProtoDUNE databases
  - UconDB
  - Conditions DB
- Data transfer from the databases to UconDB and Conditions Database
  - Run Configuration DB
  - IFBeam DB

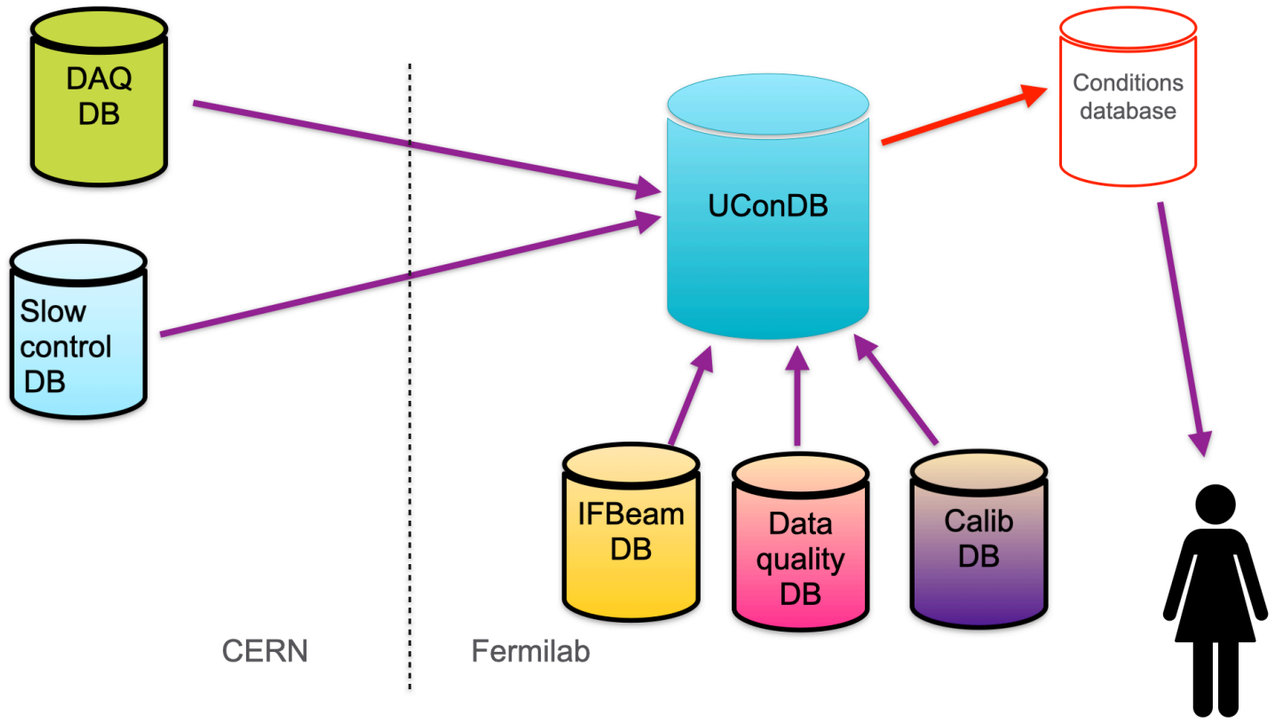
ProtoDUNE Databases

UConDB

- Contains all the conditions metadata relevant for offline analysis, prevents a priori schema
- Purpose: centralized place to store all the conditions data

Conditions DB

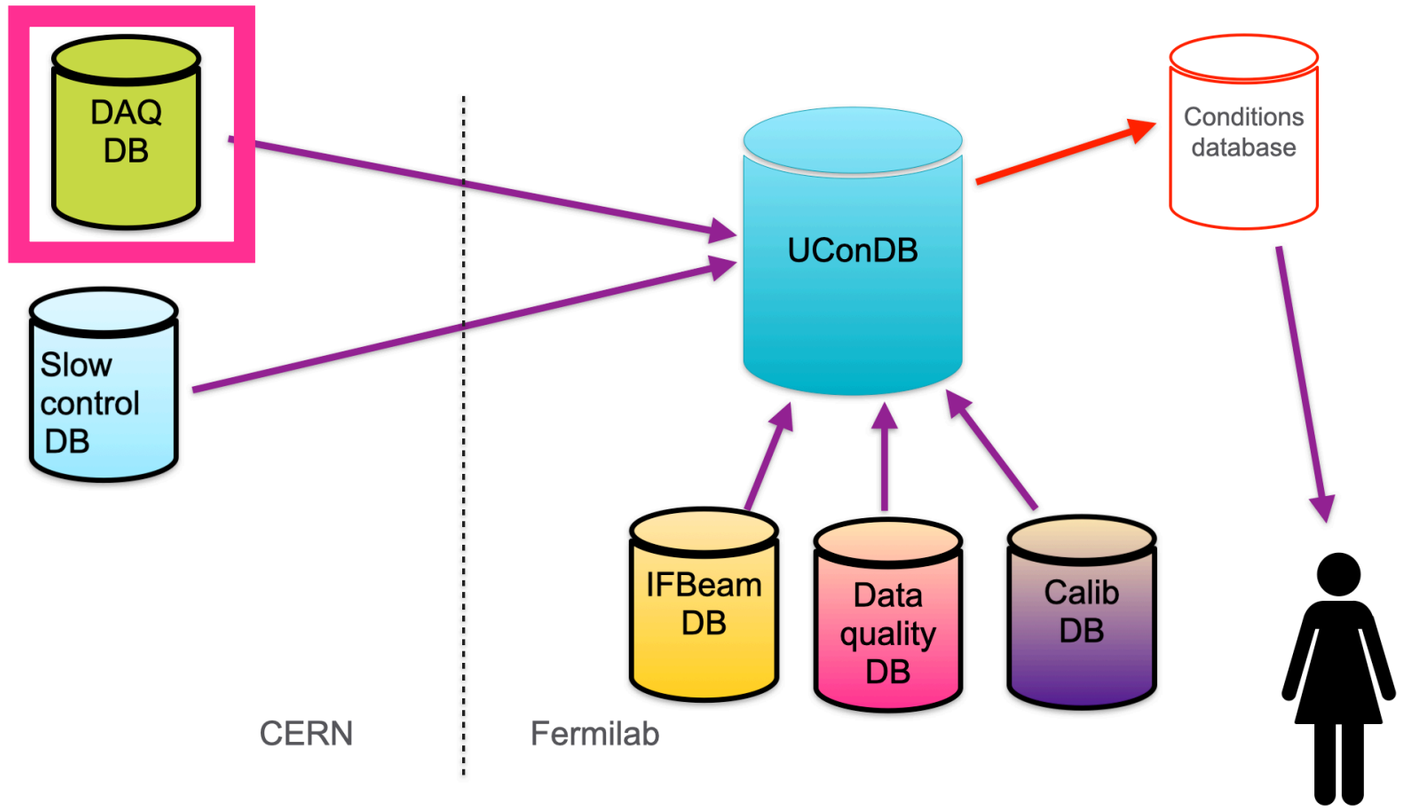
- Database/API with specialized schema that contains a subset of the UConDB metadata
- Purpose: provide easy and quick access to a subset of conditions data that comply with user needs, like correct version



DAQ - Run Configuration DB

The data was successfully transferred during ProtoDUNE I but the DAQ DB framework changed afterwards

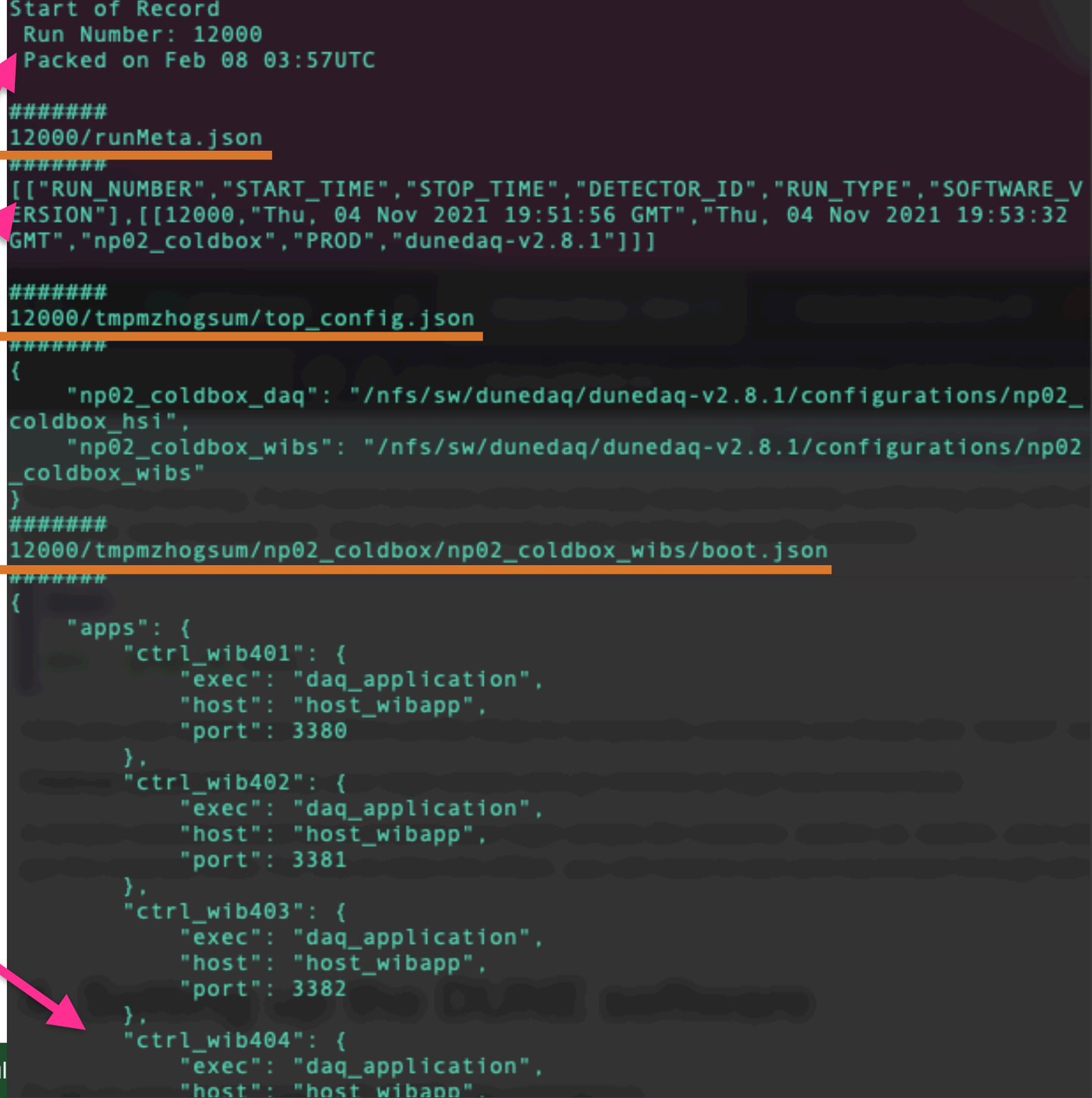
Task: extract all the metadata from the run configuration DB and send it to the UConDB



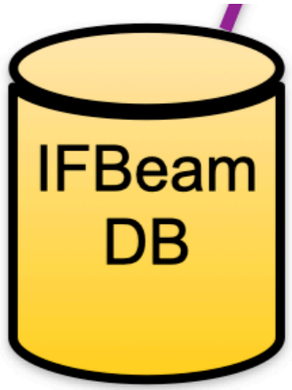
Run Config blobs sent to UConDB

The new Run Config - UConDB blobs contain:

- Run number and record of creation
- Metadata information
- Name of config files with path:
  - Front end electronics configuration files (wibs files)
  - DAQ run configuration files (DAQ files)



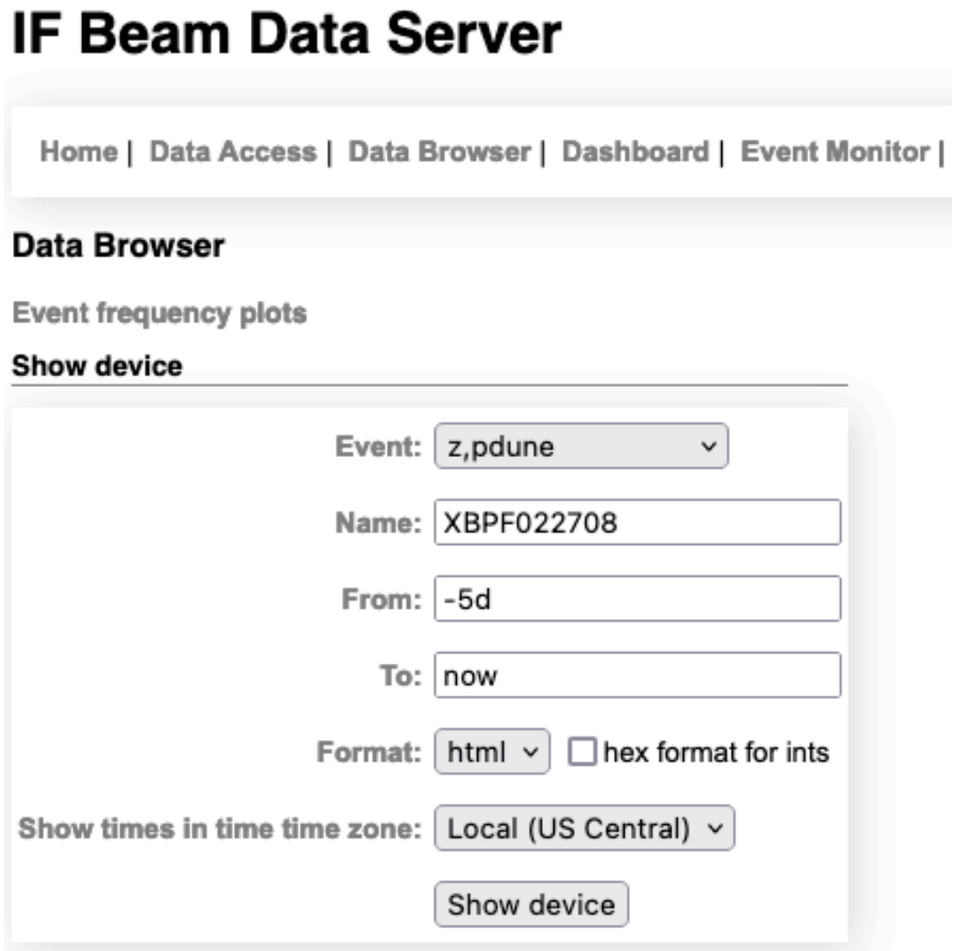
IFBeam DB



Task: extract data of a ‘selection of devices’ from the IFBeam and send it to the uconDB

The DB can be access via:

- A web interface https://dbweb8.fnal.gov:8443/ifbeam/app
- A curl command:




```
-bash-4.2$ curl https://ifb-data.fnal.gov:8104/ifbeam/data/data?b=DUNE_CERN_SEP2018_TIMBER&t
0=1539856440.0&t1=1539857040.0&f=csv
```

Bundles from the IFBeam data server

- The bundles from the IFBeam contain a list of devices
- Devices from different bundles are currently used in ProtoDUNE analysis
- Devices can appear in more than one bundle

Task: create a new bundle that contains all the devices that will be used for offline analysis.

- A draft list has been made with the devices that I found on the analysis, but more can be added

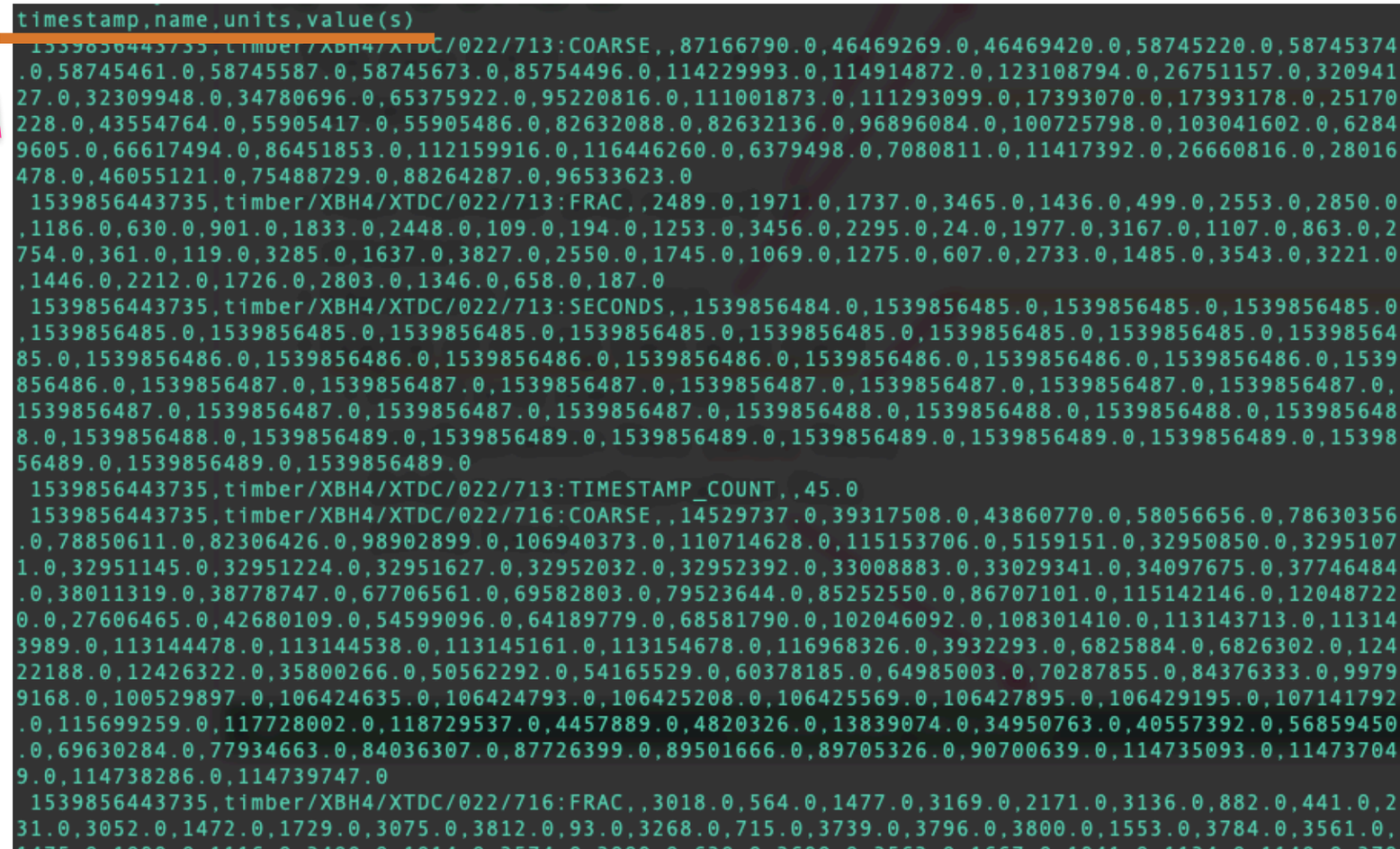
Bundle Name	Event	Device Count
DUNE_CERN_DATA	z,pdune	168
DUNE_CERN_NORTH	z,pdune	104
DUNE_CERN_SEP2018	z,pdune	304
DUNE_CERN_SEP2018_ANALYSIS	z,pdune	43
DUNE_CERN_SEP2018_AUX	z,pdune	93
DUNE_CERN_SEP2018_PROF	z,pdune	176
DUNE_CERN_SEP2018_TIMBER	z,pdune	8
DUNE_CERN_SEP2018_TOF	z,pdune	35

IFBeam blobs sent to UConDB

The data from a bundle is extracted for a time period and then it's send to the UConDB. One blob is created per timestamp

The IFBeam blobs contain:

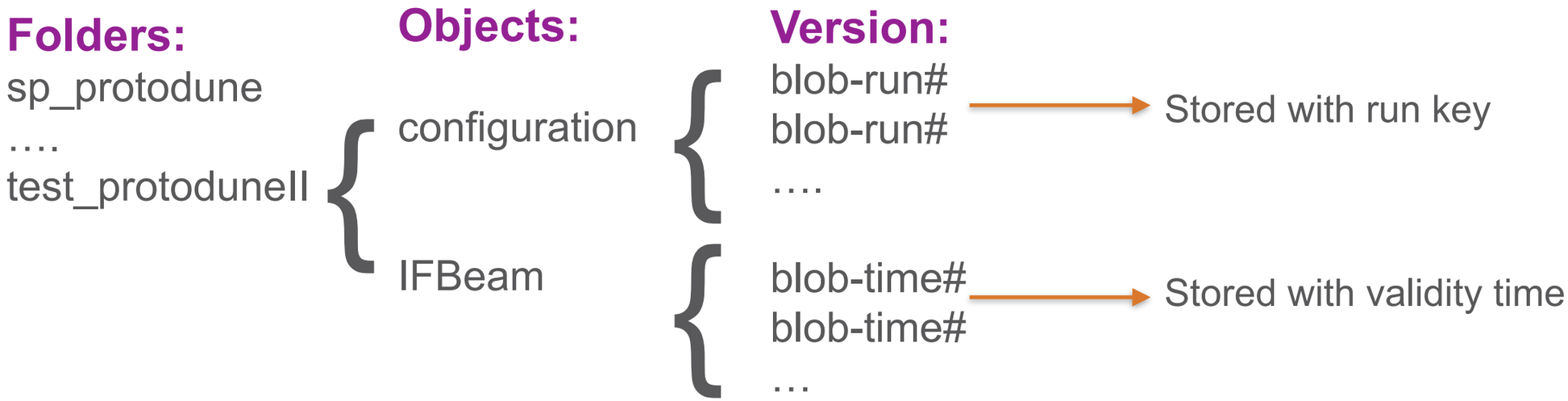
- Timestamp
- Name of device
- Units
- Values(s)



UconDB structure and challenges

Data from the DAQ DB is given by runs, and that is the way it is stored in the uconDB

Data from the other Databases is mostly stored continuously (not run based) and with high granularity.

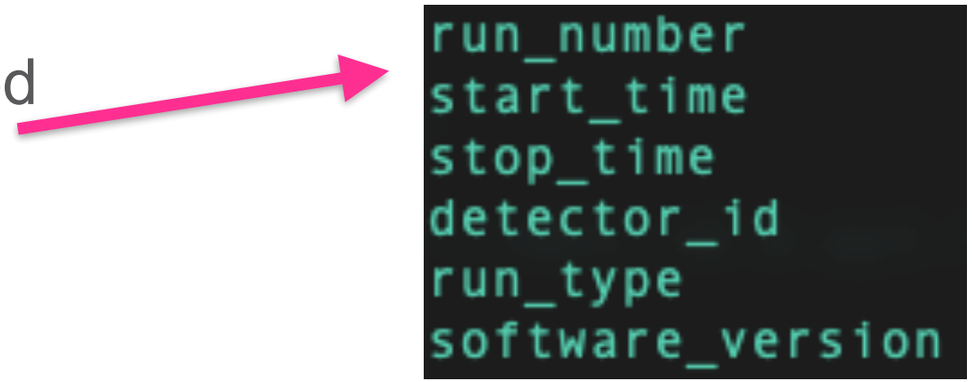


Run Conditions metadata for the Conditions DB

UConDB blobs to the Conditions DB

- Select the subset of data (we started with a few parameters)
- Unpack the blobs
- Extract the data subset as python dictionaries
- Save the data subset and pass the path to the Conditions DB - either on new DB pdunesp_prod or CVMSF

Some parameters that are ready for transfer:



If other parameters are needed, they will have to be unpacked from the UConDB blob

IFBeam metadata for the Conditions DB

These steps are really similar to the previous case,

- Unpack the blobs
- Extract the data as python dictionaries
- Task: Change data granularity from inherit timestamp to run-period based, by averaging the data taken during each run
- Save the data and pass the path to the Conditions DB - either on new DB pdunesp_prod or CVMSF

Summary and outlook

- Conditions data can be transferred from the Run Conditions DB and the IFBeam DB into the UConDB
- A subset of data from the Run Conditions database can be loaded into the Conditions DB
- One to-do item so that we can load the IFBeam data into the Conditions DB
  - Average the data over each run
- Develop ART service that can extract information from the Conditions DB

Thank you

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Backup slides

How to access the run configuration files

- DAQ DB is not accessible via ArtDAQ anymore
- It's now accessible via a micro service found in: https://github.com/DUNE-DAQ/microservices/blob/develop/runregistry-rest/queries.py
- Metadata information is also accessible via de micro service, like: time at the start and end of the run, software version, run type

```
['RUN_NUMBER', 'START_TIME', 'STOP_TIME', 'DETECTOR_ID', 'RUN_TYPE', 'SOFTWARE_VERSION']
```

- Test
- Prod
- ...