

Conditions Databases at FNAL

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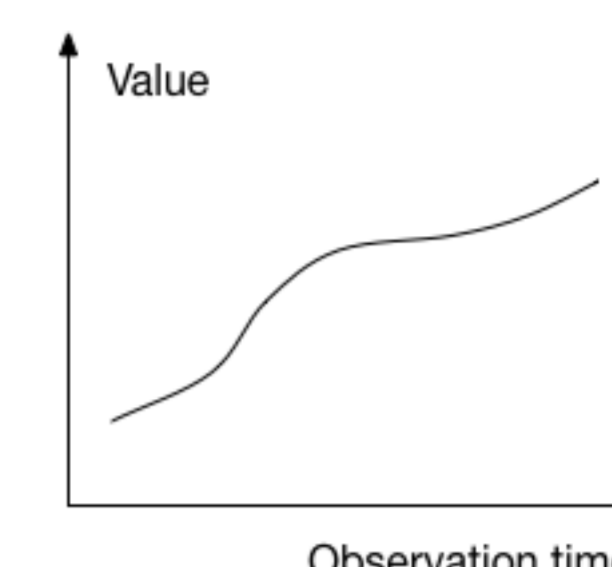
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Conditions databases – what are they ?

Conditions database is a record of a *quantity* as a function of *observation time* or *validity time*

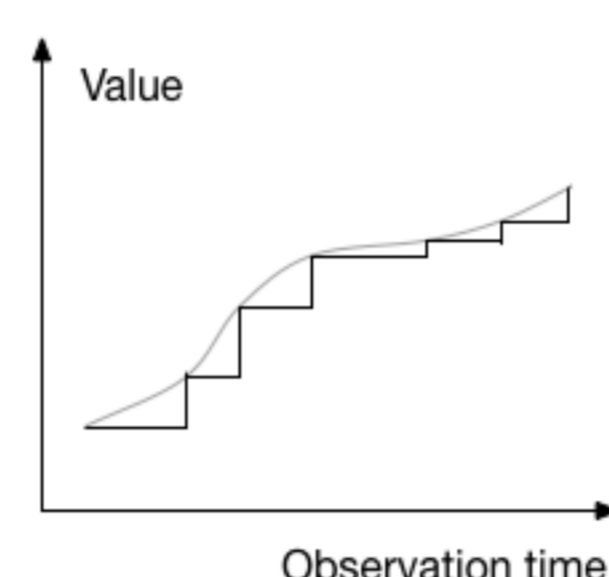
Quantity can be: scalar, tuple, array, BLOB

Time can be date-time representation or just a number

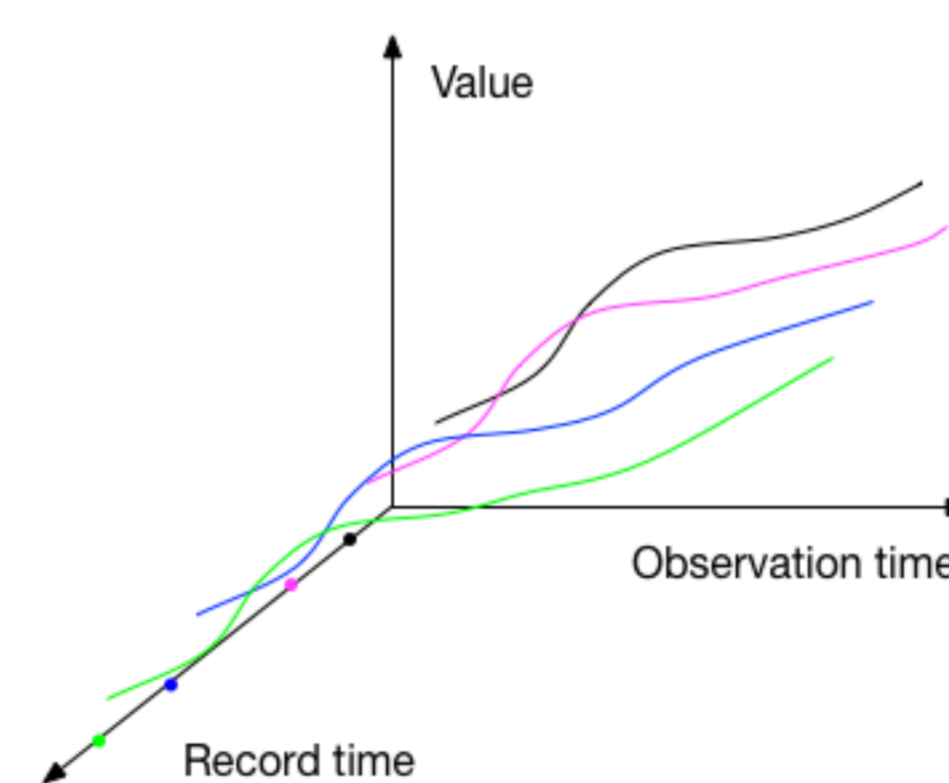


Interpolation

- Data interpolation between actual measurements



Version Control



- Go back to a previous state of the database, specified by
- Record time
- Text tag

Minerva Conditions Database

Time	channel	X	Y	Z
1	1	...	...	...
2	2	...	...	...
3	3	...	...	...
4	4	...	...	...
5	5	...	...	...

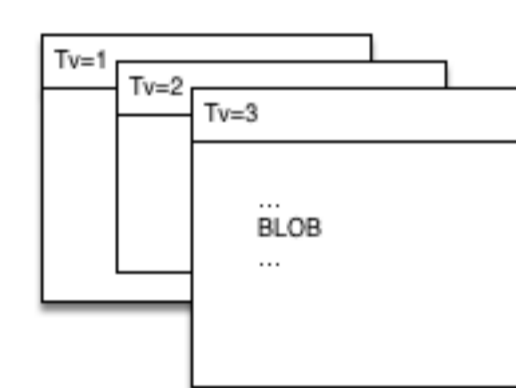
- Introduced in 2011 to replace COOL
- Records state of an array of tuples indexed by integer channel number
- All channels are measured simultaneously
- Currently used by MNERvA, MicroBooNe, G-2

NOvA Conditions Database

Time	channel	X	Y	Z
1	1	...	...	...
2	2	...	...	...
3	3	...	...	...
4	4	...	...	...
5	5	...	...	...

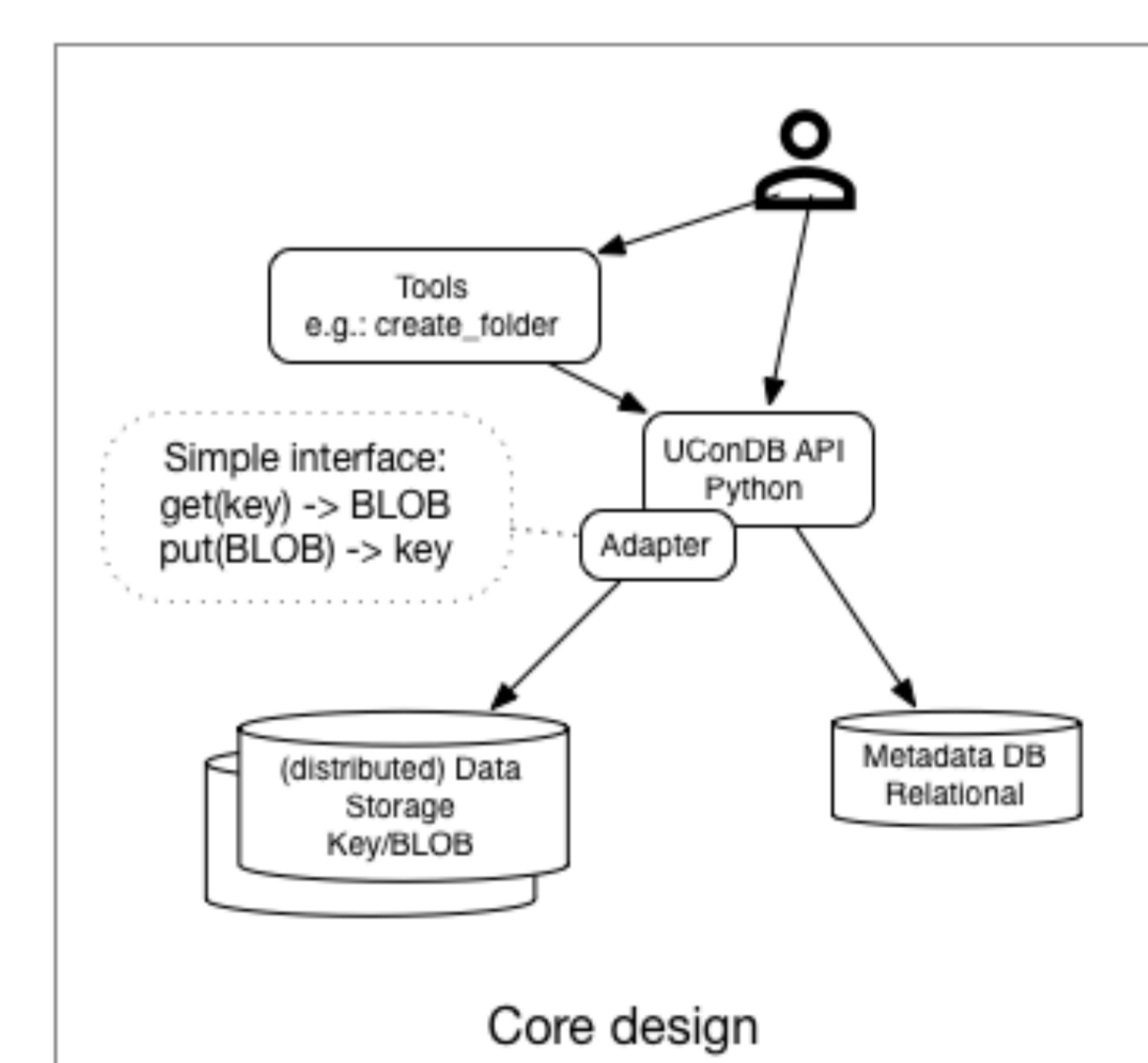
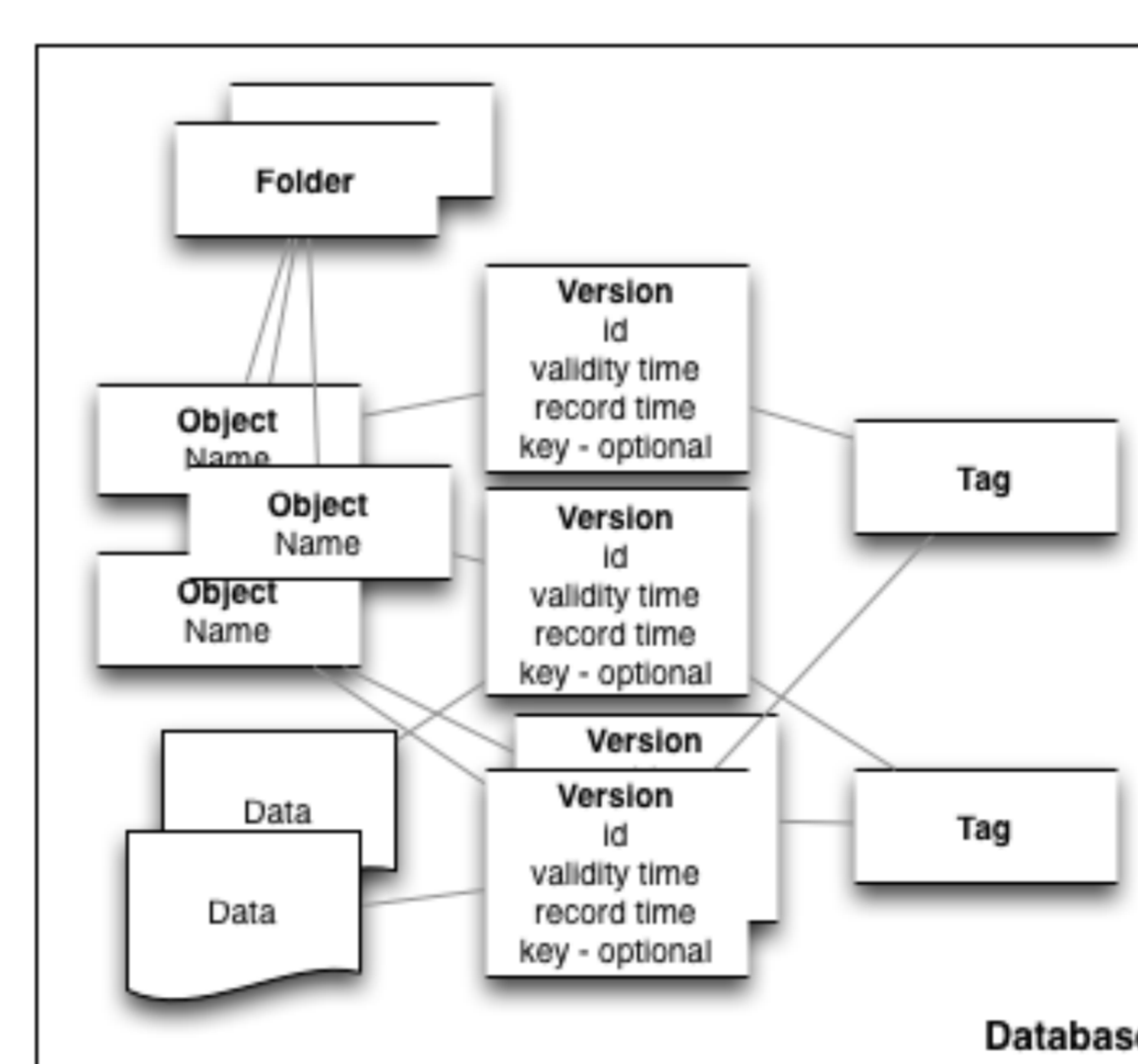
- Since 2013
- Records state of an array of tuples indexed by integer channel number
- Each channel measured independently
- Data compression by not recording new value if it is too close to the previous
- Used by NOvA

Unstructured Conditions Database (UConDB)

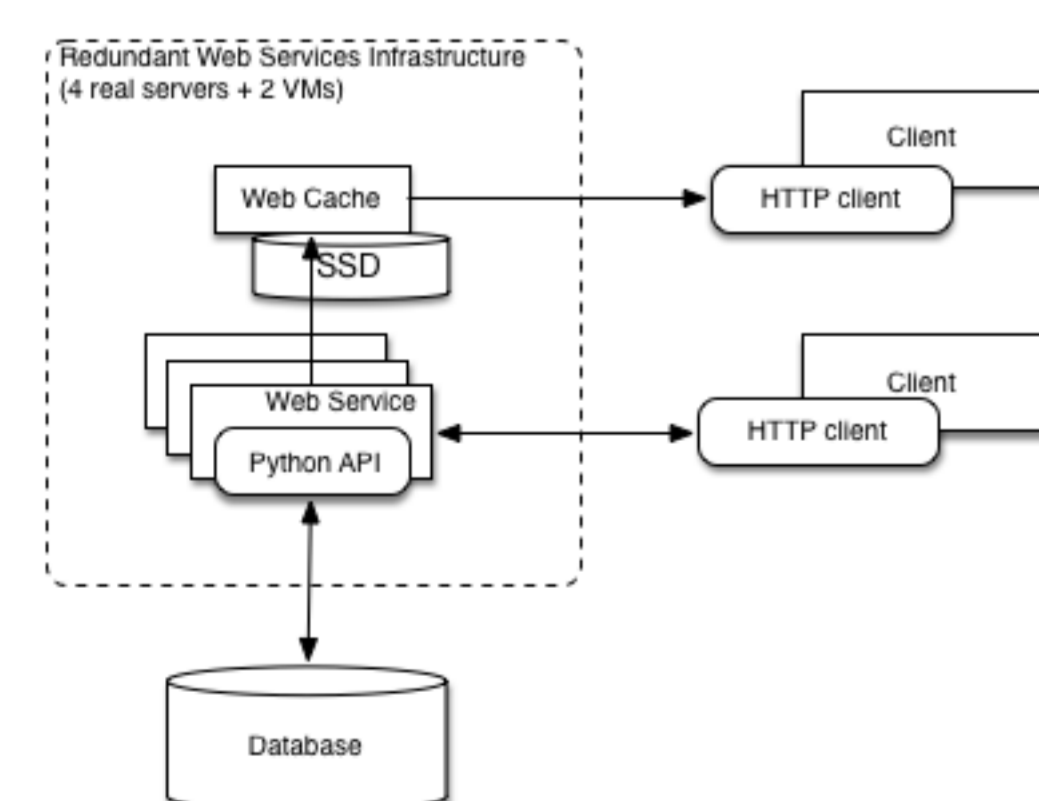


- Introduced in 2015
- Stores state of large number of BLOBs as a function of time
- Documents
- Binary data
- Anything else interpretable by the client
- Currently used by ProtoDUNE to record run configurations

UConDB Data Model and Design



Redundant Web Services Infrastructure



All conditions databases are accessed as web services via REST interface.

Redundant Web Services Infrastructure provides horizontal scalability and availability

Web cache is used to increase performance and scalability

UConDB REST Interface

Uploading:

```
curl -T /data/file.txt -X POST \
http://server.fnal.gov/ucondb/data/folder/object?...
```

Retrieving:

```
curl -o /data/file.txt \
http://server.fnal.gov/ucondb/data/folder/object?...
```

This manuscript has been authored by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the U.S. Department of Energy, Office of Science, Office of High Energy Physics.