

Updates to the DatabaseUtil service

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Summary

- Disclaimer: This talk is significantly late – the changes have been in LarSoft for a good couple of months. Not much new since then – I'm presenting a summary of the changes:
- Separate databases for each experiment.
- Picking up values at run-start + ShouldRun and ToughErrorTreatment variables.
- Minimizing connection time.
- Avoiding time out.

The DatabaseUtil service (repeated)

- A Service in Utilities:

```
DatabaseUtil:          @local::argoneut_database
```

- The service connects to a temporary development PostgreSQL database (FNAL CD standard) and can read the parameters from there.
- For now, the idea is that the end user should rarely or never call the service explicitly. Instead this is taken care of by services which return detector or run properties.
- For example, the LarProperties service calls the database when a new run starts and sets the value of fElectronLifetime accordingly. Most code will only need to call LarProperties::ElectronLifetime().
- This is (and will be for some time) a work in progress.

The current table schema.

Two Tables:
“main_run”
and
“efield”

fid	planegap	efbet
1	0	0.481
1	1	0.7
1	2	0.89

run				tau		temp	fid	temp_top	temp_bottom
run	duration	pot	tottime	tau	tau_err	temp	fid	temp_top	temp_bottom
811	716	580000	184621	611	25	88.4	1		
851	72	30000	229687	554	22	88.4	1	87.5	88
849	1574	1.3e+06	228333	593	19	88.4	1	87.5	87.8
847	874	750000	226759	584	14	88.4	1	87.5	88
846	468	380000	225868	571	36	88.4	1	87.4	87.8
845	1205	940000	225389	559	21	88.4	1	87.5	87.8
841	1459	1.2e+06	219626	469	5	88.4	1	87.5	87.8
840	1263	990000	218166	444	2	88.4	1	87.5	88
839	1363	700000	216697	419	5	88.4	1	87.4	87.8
838	1346	1.2e+06	215325	401	3	88.4	1	87.5	88.1
837	1259	970000	213950	378	7	88.4	1	87.3	87.8
832	1147	1e+06	210723	334	7	88.4	1	87.4	87.8
831	1503	1.4e+06	209566	463	2	88.4	1	87.3	87.8
830	1289	1.2e+06	208063	477	2	88.4	1	87.3	87.8
825	1671	1.4e+06	202629	580	25	88.4	1	87	87
823	1529	1.3e+06	199485	699	51	88.4	1	87.3	88
820	1342	1e+06	196622	727	54	88.4	1	87.3	88
819	595	260000	194993	699	51	88.4	1	87.4	88.1
815	1126	890000	190600	656	28	88.4	1	87.4	87.8
814	1418	580000	189465	654	22	88.4	1	87.3	87.8
812	1329	1e+06	186495	614	18	88.4	1	87.3	87.8
807	1436	1.2e+06	183892	601	22	88.4	1	87.4	88
806	1637	1.1e+06	182413	596	26	88.4	1	87.4	88
805	1303	820000	180776	576	23	88.4	1	87.4	88.1
..	(135 runs)								

The Separation of Databases

- All three experiments now have a separate database – thanks to Svetlana Lebedeva from CD.
- They are on fnalpgsdev.fnal.gov – a development DB server.
- The DBs are:
 - `argoneut_dev`: port 5457, 100 connections allowed
 - `uboone_dev`: port 5436, 125 connections allowed
 - `lbne_dev`: port 5438, 50 connections allowed.
- Total number of connections is currently saturated – could grow when we move to work servers (or an experiment gets its own server)
- Each DB has its respective `_reader`, `_writer` and `_web` accounts. These are md5 authorized.
- The `_admin` accounts are krb authorized.

Picking up values at run-start.

- Due to ART architecture (and logic) it is impossible to pickup run dependent values from the Database before the services' ***preBeginRun()*** method gets called. This happens **AFTER** any module constructor or ***beginJob()***.
- If a module calls an instance of util::LArProperties in any of those cases to get the Temperature, Electric Field or Electron lifetime this will cause it to pick up the .fcl hardcoded values instead of the Database stored ones. Right now, only ArgoNeuT data analysis jobs could be affected.
- The LArProperties service will be aware if this happens and will respond based on the set values in databaseutilservices.fcl: ***ToughErrorTreatment*** and ***ShouldConnect*** (next slide)

ToughErrorTreatment and ***ShouldConnect*** (in *databaseutil.fcl*)

- Currently set to false and true, respectively. → LArProperties will throw out a warning if values are extracted before the Database has been accessed.
- If you see this warning, try to modify your module to pick up these values later. E.g. in a beginRun or produce method - the wiki examples have been updated to incorporate this
https://cdcvcs.fnal.gov/redmine/projects/larsoftsvn/wiki/Using_the_Framework#EDProducer
- At some point in the future the ***ToughErrorTreatment*** variable will be set to true, at which point instead of a warning a cet::exception will be thrown.
- The ***ToughErrorTreatment*** value will basically be ignored if the ***ShouldConnect*** variable is set to false, since LArProperties will not try to connect to the DB at all in that case.

Other Changes

- To avoid hogging the (limited?) connection slots – the code now connects and disconnects to the DB before and after each query.
- Still, if when connecting to the DB a “too many connections” type of error is received the code will try wait for 2,4,6,8,...20 seconds trying to reconnect after each pause. What happens after 20 seconds depends on ***ToughErrorTreatment***.
- The Wiki has been updated:
<https://cdcv.s.fnal.gov/redmine/projects/larsoftsvn/wiki/DatabaseUtil>

External Installs:

- External LArSoft installs – IPs can be enabled to communicate with the FNAL DB. If you have an external install contact me and I will tell you the other details needed to log in.
- Bill Seligman has succeeded in running LarSoft with DB from Columbia (if I'm not mistaken).
- An external install is also doable at this point (from the LArSoft point of view), but would need to solve synchronization issues – need to see if NOVA has come up with something.
- If number of connections becomes too high might need a “proxy” http server – REX has a solution like that ready/in development.

ToDo list:

- Solve writing to the DB – might be an experiment specific decision, as it will be mainly needed for offline codes – like E-lifetime and slow control.
- Clean up the text output.
- Anything else ?

Summary

- The DatabaseUtil seems to be working with the newest settings.
- As always, let me know if you encounter problems.
- Or if you need something implemented.
- Please check if you're not getting run specific information before the the code has had a chance to pick it up (if you haven't done so already).