How to run GstLAL - A Simple Cheatsheet (Updated)

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LIGO SURF 2018 Program, California Institute of Technology
CUHK Physics Final Year Project 2018 - 2019
Date : 23^{rd} January, 2019

1 Step 1 : Finding Start / End Times

The first thing to do is to pick a particular observation run and chunk for your analysis. Depending on the start and end times you would like to work on, you will have to use different chunks. Table 1 and 2 list the information of the chunks for observation run 1 (O1) and 2 (O2) respectively. One may find the respective start and end times, the clusters which store the chunk data and the run locations of the chunk. Note that AEI cluster will be leaving LIGO soon, so there might be migration of data stored in the AEI cluster. For updates, please visit [1].

Table 1: **Information of the chunks in Observation Run 1 (O1)**

Chunk	**GPS Start and End Times**	**Cluster**	**Run Location**
1	1126051217 - 1127271617	CIT	/home/gstlalcbc/observing/2/catalog/runs/ O1_chunk_01_run_1_180831
2	1127271617 - 1128299417	CIT	//home/gstlalcbc/observing/2/catalog/runs/ O1_chunk_02_run_1_180829
3	1128398848 - 1129383017	LHO	/home/gstlalcbc/observing/2/catalog/runs/ O1_chunk_03_run_1_180828
4	1129383017 - 1130754617	UWM	/work/gstlalcbc/observing/2/catalog/runs/ O1_chunk_04_run_1_180828
5	1130754617 - 1132104617	LLO	/home/gstlalcbc/observing/2/catalog/runs/ O1_chunk_05_run_1_180827
6	1132104617 - 1133173817	LHO	/home/gstlalcbc/observing/2/catalog/runs/ O1_chunk_06_run_1_180825
7	1133173817 - 1134450017	CIT	/home/gstlalcbc/observing/2/catalog/runs/ O1_chunk_07_run_1_180825
8	1134450017 - 1135652417	PSU	/ligo/home/ligo.org/duncan.meacher/observing/ 2/catalog/runs/O1_chunk_08_run_1_180823
9	1135652417 - 1137258496	LLO	/home/gstlalcbc/observing/2/catalog/runs/ O1_chunk_09_run_1_180823

Table 2: **Information of the chunks in Observation Run 2 (O2)**

Chunk	**GPS Start and End Times**	**Cluster**	**Run Location**
2	1164556817 - 1166486416	UWM	/work/gstlalcbc/observing/2/catalog/runs/ O2_chunk_02_run_2_180806
3	1167523218 - 1169107218	LHO	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_03_run_1_180819
4	1169107218 - 1170174018	CIT	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_4_run_1_180820
5	1170174018 - 1170948618	LLO	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_05_run_1_180820
6	1170174018 - 1170948618	UWM	/work/gstlalcbc/observing/2/catalog/runs/ O2_chunk_06_run_1_180821
7	1171632618 - 1172334618	LHO	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_07_run_1_180822
8	1172334618 - 1173188118	CIT	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_08_run_1_180818
9	1173188118 - 1173902418	LLO	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_09_run_1_180725
10	1173902418 - 1174651218	PSU	/ligo/home/ligo.org/chad.hanna/observing/ 2/catalog/runs/O2_chunk_10_run_1_180803
11	1174651218 - 1175356818	PSU	/ligo/home/ligo.org/chad.hanna/observing/ 2/catalog/runs/O2_chunk_11_run_1_180806
12	1175356818 - 1176240318	PSU	/ligo/home/ligo.org/duncan.meacher/observing/ 2/catalog/runs/O2_chunk_12_run_1_180816/
13	1176240318 - 1176955218	LLO	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_13_run_1_180813
14	1176955218 - 1178294418	UWM	/work/gstlalcbc/observing/2/catalog/runs/ O2_chunk_14_run_1_180725
GW170608	1180911618 - 1181059218	CIT	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_GW170608_run_1_180820
15	1179813618 - 1181845818	LHO	home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_15_run_1_180813
16	1181845818 - 1182825018	UWM	/work/gstlalcbc/observing/2/catalog/runs/ O2_chunk_16_run_2_180808
17	1182825018 - 1184112018	CIT	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_17_run_1_180813
18	1184112018 - 1185217218	LLO	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_18_run_1_180813
19	1185217218 - 1185937218	LHO	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_19_run_2_180805
20	1185937218 - 1186624818	CIT	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_20_run_1_180804
21	1186624818 - 1187312718	CIT	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_21_run_1_180725
22	1187312718 - 1187740818	LLO	/home/gstlalcbc/observing/2/catalog/runs/ O2_chunk_22_run_1_180804

2 Step 2 : Making a Run Directory

Once you identified the chunk in which your range of time of analysis lies, log into the corresponding cluster of that chunk. (You might have to gain permission from the cluster by sending an email to the help-email-address of the cluster.)

Now make a run directory for your GstLAL run. The naming convention is (using O1 chunk 1 as an example):

- **Without vetoes**:
  chunk_1_1126051217-1127271617_run_1-min-vetoes
- **With vetoes**:
  chunk_1_1126051217-1127271617_run_2

In case you are re-doing a run with a new veto-bank, then apply the following naming convention :

- chunk_1_1126051217-1127271617_run_3-new-bank

3 Step 3 : Copying necessary files

From the run directory of your chunk to be analysed listed in Table 1 or 2, copy (use : cp <path-to-file> .) the following files to the directory you made in the previous step :

- **The environment file**:
  Example : env_170525_gstlal-inspiral-1.4.3-test.sh
- **The Makefile**:
  Example : Makefile.offline_dag_O1_C02
- **The Splitbanks**:
  Example : bank_mtotal80split_00.xml.gz and bank_mtotal80split_01.xml.gz
- **Vetoes files**:
  vetoes.xml.gz

4 Step 4 : Preparing Injections

Now, make a new directory *injections* in your current directory. Change your directory (use : cd injections/) to *injections*. From the CIT cluster copy over the file *Makefile.O2rerun_injection_gen*.

You can use the command :
gsiscp <username>@ldas-grid.ligo.caltech.edu:/home/gstlalcbc/observing/2/offline/C02/injections/box_opening_sets/Makefile.O2rerun_injection_gen .

where <username> is your LIGO username.

Now, by using *vim*, *emacs* or any text editor, read the file *Makefile.O2rerun_injection_gen*. Change the start and stop GPS times corresponding to your analysis time range. You should look for the lines like :

- START = 1127271617
- STOP = 1128299417

for your modifications.

Before we continue, it is **IMPORTANT** for us to **source the environment**. We can source the environment by using the command:
source env_170525_gstlal-inspiral-1.4.3-test.sh

To make the makefile, use the command :
make -f Makefile.O2rerun_injection_gen (> inj_make.out)

The command in the bracket is **not a must**. It saves the output of the make process into the file *inj_make.out*.

When the make process is finished, the last several lines of the output should look something like :
MCHIRP_INJECTIONS := 0.57:10.83:split_injections_0000.xml 5.00:347.75:split_injections_0001.xml

Copy this line to any temporary text file on your computer. In case you include the **bracketed** command, read the file *inj_make.out* and look for the line starting with **MCHIRP_INJECTIONS**.

Copy over the split injection files (simply use : cp *.xml ..) to your run directory. Then change the directory (use : cd ..) to the run directory. Read the file *Makefile.offline_dag_O1_C02*. There are several items you might have to change in this makefile. The items with an asteroid * indicates items that are not necessary to be changed:

- **GROUP_USER** : Change this to your own LIGO username.
- **START** : The start GPS time of your analysis.
- **STOP** : The stop GPS time of your analysis.
- **TAG** : This is a tag to label the nature of your run. You can generate an appropriate tag from `https://ldas-gridmon.ligo.caltech.edu/ldg_accounting/user`.
- **RUN** : Use *run_1-min-vetoes* for **no vetoes**, *run_2* for **with vetoes** and *run_3_new_bank* if you are re-running a chunk that was run with an older bank previously.
- **WEBDIR*** : This is the directory for storing plots and results. You can modify its name, depending on how you want it to be named.
- **MCHIRP_INJECTIONS**: Replace this line with the line in your temporary text file.

Save and exit the makefile.

5 Step 5 : Making the dag

We are now all set. Again, source the environment by using the command :
source env_170525_gstlal-inspiral-1.4.3-test.sh

Make the file *Makefile.offline_dag_O1_C02* by running the command :
make -f Makefile.offline_dag_O1_C02 (> make.out)

Again, the command in bracket is **not a must**. It stores the output of the make process to the file *make.out*.

Once the make process is finished, you should see something like

- Submit with: condor_submit_dag -maxjobs 3000 -maxidle 50 trigger_pipe.dag
- Monitor with: tail -f trigger_pipe.dag.dagman.out — grep -v -e ULOG -e monitoring

at the bottom of the output. If you include the bracketed command, read the file *make.out* and go to the bottom to find the lines above.

Run the command after "*Submit with:* ". After running the command, the system should display a line like *Submitting job(s). 1 job(s) submitted to cluster 26302139.*.

To monitor your job, you can use the command :
tail -f trigger_pipe.dag.dagman.out

To look at all the dags running on the cluster, use the command :
condor_q

6 Acknowledgement

The writer would like to acknowledge the information provided in [2].

References

[1] https://www.lsc-group.phys.uwm.edu/ligovirgo/cbcnote/gstlal/o2ratesrunschedule.

[2] https://www.lsc-group.phys.uwm.edu/ligovirgo/cbcnote/gstlal/offline