

D0TrigSim News/Status

Dugan O'Neil
Michigan State University

Trigsim Meeting
September 11, 2001

Outline

- Intro/News
- New Way to Run d0trigsim
- d0trigsim and the Trigger Database
- Running d0trigsim and reco_analyze Together
- Release Status - Historical
- Certification of p10
- Plans for p11

Intro/News

- D0 Trigger Simulation is controlled by the d0trigsim cvs package (Serban and Dugan). L1/L2 default config is in by tsim_l1l2, L3 default config is in tsim_l3.
- d0trigsim-users@fnal.gov mailing list has recently been created. Forum for developers and users to discuss bugs, ask questions.
- d0trigsim webpage is linked from D0-at-work

`http://www-d0.fnal.gov/computing/trigsim/trigsim.html`

Has recently been rewritten....please visit.

- Overall documentation is still poor. No trigsim user's guide exists. However, webpage has links to known problems, practical info about each production release, sample macros, contact people, etc.

D0 Trigger Simulator Homepage

Report a bug in the trigger simulation

General Info

- [Contacts](#)
- [Meetings](#) (ON weeks, Thurs. 3:30-5:30 in 9th circle)
- [Trigsim Docs](#)

Release Status

- TEST [p10.02.00](#)
- NEW [p09.10.00](#)
- CURRENT [p08.12.00](#)
- OLD [p06.00.01](#)

MC Samples

- [General Recommendations](#)
- [QCD files in SAM](#)
- [Sample Ntuples](#)

Tools

- [Collected ROOT macros](#)

Other Trigger Links

- [D0 Trigger](#)
- [TriggerMeister Home](#)
- [Levan's Working Page](#)
- [Trigger Database](#)

Other Links

- [D0 Simulation](#)
- [Monte Carlo Challenge](#)

Updated: oneil@fnal.gov

A New Way to TrigSim

- D0 Trigger Simulation used to be run using a script (Runme.sh) stored in the d0trigsim package. Now we have joined d0tools.
- Why?
 - Common environment to run reco, scriptrunner, trigsim and other executables
 - d0tools has many wonderful features (thanks Harry Melanson!) which can be used for any D0 executable. SAM, batch, debug, purify, etc.
- In current cvs head of d0tools package you will find a **runD0TrigSim** script. This is a trigsim wrapper for the general D0 executable run script. Features include:
 - sets up all necessary config files for trigger simulation
 - allows use of **xml trigger list** produced from trigger database, or default list from release or specified config files

A New Way to TrigSim

- Cookbook:

```
setup D0RunII p10.02.00 |
setup d0cvs | general stuff
cvs checkout d0tools |

setup python | general d0tools
setup sam | Should be in .login
setenv DOTOOLS_DIR $HOME/d0tools | or a script until
setenv DOTOOLS_BIN $DOTOOLS_DIR/bin | setup d0tools works
setenv DOTOOLS_DOC $DOTOOLS_DIR/doc |
setenv DOTOOLS_PY $DOTOOLS_DIR/python | replace $HOME with
setenv PATH $PATH:"$DOTOOLS_BIN | working dir
setenv PYTHONPATH $PYTHONPATH:"$DOTOOLS_PY |

cd d0tools/bin
./runD0trigsim -nocoorsim -filelist=myfiles.dat
```

- Other interesting examples:

```
./runD0trigsim -h
./runD0trigsim -nocoorsim -filelist=myfiles.dat -localbuild
./runD0trigsim -nocoorsim -filelist=myfiles.dat -num=10
./runD0trigsim -nocoorsim -filelist=myfiles.dat -batch -q=short
```

- Everything listed above is well tested. SAM datasets, XML triggerlist, etc. SHOULD also work but are not well tested.

D0TrigSim and the Trigger Database

- The design has always been that users grab a trigger list from the trigger database (or make a new one), hand that list to trigsim and wait for the results. How close are we?
- The trigger database is now in production. A 20 trigger list has been written for MC use and is available from the web.

http://www-d0.fnal.gov/trigger_meister/private/trigdb/tdb_front-gallas-prd.html

(not necessarily permanent location....)

- The new d0tools script will (in theory) allow users to take any XML file generated from the trigger database, and send it through coorsim.
- Coorsim creates configuration files which can be read by d0trigsim.
- D0trigsim runs, creates an ntuple, washes the dishes, does your taxes and returns.
- The chain is now in place! Needs more testing, but great progress has been made!

D0TrigSim and the Trigger Database

Trigger List Report

TRIGGER LIST Name= **X.test_xml** , Version= **0.03** , Use_Status= **unused** , Current_Status= **local**
 Implementation in: **primary** DAQ system , Configuration Type = **global** , autopause= **no** , comics_runtype= **data**
 Description: **A trigger list to test the xml generator**
 Device Group Name/Version = **allcrates** / (version 1) , l3_type= **regular** , num_nodes= **0**
 created /modified by **gallas / gallas** on **29-Aug-2001 / 30-Aug-2001**

index	Trigger Name	Level 1	Level 2	Level 3
0	SRtools	This trigger definition includes a SRDirective to useL1=yes and a set of tools required by Level 3 ScriptRunner (a run configuration and an error handling tool). Because it includes 'null' scripts at Level 1 and 2, it is not part of any specific trigger (a bit is not assigned), rather, it defines tools used by general programming instructions to Level 3 for this configuration to be listed before any trigger specific tools or filters in the element.		
				SRtools
The following triggers belong to the same Exposure Group. They share Device Group = allcrates / (version 1) and Exposure related L1 And/Or Terms: [ALiveBX & ASkip0 &]				
1	EM_5C_ps_tg	Central (eta <1.5) electron with track (at L1) and preshower match (L2) with E_T>5 GeV CER(1,C,5)TEL(L,3)	EM(9,0.,5.,EM(3,3,5.,0,1))	L3FEle(ELE_TGHT_G,1,5.,0.,1,5)
2	EM_10C_ls	Trigger on central (eta <1.5) EM candidates with loose selection criteria (no tracking or preshower match required). CER(1,C,10)	EM(9,0.,10.,EM(3,3,5.,0,0))	L3FEle(ELE_LOOSE,1,10.,0.,1,5)
3	EM_10C_ps_ls	Central (eta <1.5) electron with preshower match (L2) with E_T>10 GeV CER(1,C,10)	EM(9,0.,10.,EM(3,3,5.,0,1))	L3FEle(ELE_LOOSE,1,10.,0.,1,5)
4	EM_10_ls	Central (eta <3.0) electron with E_T>10 GeV meeting loose criteria CEM(1,10)	EM(9,0.,10.,EM(3,3,5.,0,0))	L3FEle(ELE_LOOSE,1,10.,0.,3.)
5	2EM_1hc_ps_ls	A J/Psi --> di-EM trigger. Requires 2 low E_T central electrons meeting loose requirements (E_T>1.5 GeV, eta <1.5). CER(2,C,1.5)	2EM(9,0.,1.5,EM(3,3,1.5,0,1))	L3FEle(ELE_LOOSE,2,1.5,0.,1,5)
6	2EM_1hc_ps_mass	A low mass (J/Psi) --> di-EM trigger. Requires 2 low E_T central electrons meeting loose requirements and E_T>1.5 GeV and eta <1.5). An electron pair must have a combined invariant mass between 1.5 and 15 GeV. CER(2,C,1.5)	2EM(9,0.,1.5,EM(3,3,1.5,0,1))	L3InvMass(ele_1h_ls,ele_1h_ls,1.5,15.)
7	MU_11AT_local	requires one muon track with p_T>11 GeV within eta <1.5 satisfying tight requirements at Level 1. At least one segment is required at Level 3. MUO(1,pt4,A,T,T,X)	none	L3FMuoLocal(MUO_LOCAL,1)
8	MU_11CL_local	requires one central muon track with p_T>11 GeV within eta <1.0 satisfying loose requirements at Level 1. At least one segment is required at Level 3. MUO(1,pt4,C,L,L,X)	none	L3FMuoLocal(MUO_LOCAL,1)
9	MU_7CL_local	requires one central muon track with p_T>7 GeV within eta <1.0 satisfying loose requirements at Level 1. At least one segment is required at Level 3. MUO(1,pt3,C,L,L,X)	none	L3FMuoLocal(MUO_LOCAL,1)
10	2MU_2CL_local	requires two central muon tracks with p_T>2 GeV within eta <1.0 satisfying loose requirements at Level 1. At least two segments are required at Level 3. MUO(2,pt1,C,L,L,X)MUO(1,pt2,C,T,T,X)	none	L3FMuoLocal(MUO_LOCAL,2)
11	TAU_5C_ls	requires a tau candidate with E_T>5 GeV, eta <1.5 CEM(1,5)CJT(2,5)CJR(1,C,5)TIS(3)	2JET(5.,JET(5.,0.,10.))_EM(9,0.,5.,EM(3,3,5.,0,0))	L3FTau(TAU_LOOSE,1,5.,0.,1,5)
12	MET20_2JT5	Requires missing E_T>20 GeV along with 2 kt jets with E_T>5 GeV CME(20)CJT(2,5)	2JET(5.,JET(5.,0.,10.))_MET(20.,MET)	met20_2kjet5
13	MET35	Requires missing E_T>35 GeV CME(35)	MET35	L3FMEt(CALMET,35.,2000.,0.)
14	3JT_10_kj	Requires 3 kt jets with E_T>10 GeV CJT(3,5)CJT(1,7)	3JET(10.,JET(5.,0.,10.))	L3FJet(KTJET_10,3,10.,0.,3.,0.,1.)
15	HT100_3JT10_kj	Requires a scalar H_T>100 GeV including 3 kt jets with E_T>10 GeV CET(70)CJT(3,5)	HT100(JT5)	L3FJet(KTJET_10,3,10.,0.,3.,0.,1.)
16	JT30	requires at least one jet with E_T>30 GeV found using a simple cone algorithm CJT(1,3)	JET(15.,JET(15.,0.,10.))	L3FJet(SCJET_30,1,30.,0.,3.,0.,1.)
17	JT50	requires at least one jet with E_T>50 GeV found using a simple cone algorithm CJT(1,10)	JET(30.,JET(15.,0.,10.))	L3FJet(SCJET_50,1,50.,0.,3.,0.,1.)
18	JT85	requires at least one jet with E_T>85 GeV found using a simple cone algorithm CJT(1,20)	JET(50.,JET(15.,0.,10.))	L3FJet(SCJET_85,1,85.,0.,3.,0.,1.)
19	JT115	requires at least one jet with E_T>115 GeV found using a simple cone algorithm CJT(1,30)	JET(70.,JET(15.,0.,10.))	L3FJet(SCJET_115,1,115.,0.,3.,0.,1.)
20	grack5	requires a track found by the GlobalTracker tool with E_T>5 GeV TTK(2,3)TIS(3)	EM(9,0.,5.,EM(3,3,5.,0,0))	L3FTrack(GlobalTracker,5.)

purple ==> **current** green ==> **future (test)** yellow ==> **local** pink ==> **obsolete** white ==> **unknown**

Combining d0trigsim and reco_analyze Ntuples

- Many people are interested in seeing MC info, reconstruction info and trigger info in the same global ntuple.
- This should be accomplished using the d0_analyze package. This requires creation of trigsim_analyze which can run independently of d0trigsim.
- L1 provides a couple of delays here. trigsim_analyze and d0_analyze exist in p10 but are not ready for general use.
- While you wait you can combine d0trigsim with individual reco packages if you want....add to the d0trigsim executable. Laurent Duflot has provided a set of scripts which do this automatically....tested in p09.08.00, samples on the web.

Release Status - Historical

- p06.00.01 - don't use this anymore...too old
- p08.12.00 - has run on Nx100k samples without crashing. Stable but getting old already.
- p09.10.00 - p09 has been plagued by fpes in last several versions. More fixes in p09.10.00....I haven't tried it yet.

p10 Certification

- p10 contains a lot of big changes for d0trigsim infrastructure. For example, L1/L2 changes to run on real data:
 - l1l2unpacker learns VRB format (interface change to l2iogen)
 - more analyze packages read directly from RDC (l1cal, l1muon, l2caljet, l2calmet, l2calem, l2cps, l2gbl)
 - tsim_l1ft completely rewrites L3 output classes to better emulate real data. New unpacker to be written for l1ft analyze package and examine.
- More functionality added to l2gbl (track match), L3 filters/tools, l2errorlogger integration, etc.
- So, we'd better test it....

p10 Certification

- p10.00.00 and p10.01.00 have some nasty bugs. p10.02.00 looks much better. The results I am showing are primarily for p10.01.00 + patches.....my private p10.02.00. This morning I ran official p10.02.00 on linux - looked fine.

- Run d0trigsim on p09.08.00 MC reco certification samples:

process	# events
$t\bar{t}$	1k
$wh - \tau\nu$	1k
single e	15k
single μ	10k
QCD ($P_t > 20$)	2k
z-bb	≈ 200

- Saw one crash in z-bb sample due to memory overwrite (?). Looking into it now. All other samples ran fine.

p10 Trigsim Known Problems

- Known Problems:

- number of entries in some ntuple variables is double number of events. This must be deeper than d0trigsim.
- inefficiencies, phi problems in l2cps, l2cttcft
- cal weights chosen incorrectly in default L3 trigger list...makes L3Cal look bad.

Plans for P11

- D0Trigsim is formalizing its certification. We will be more reco-like in our tests (many samples).
- New functionality deadline for trigsim p11 is October 15.
- Expected:
 - All L1 packages pack like real data
 - All L1 packages work in data pass-through mode
 - L1FPS joins the simulation
 - All L2 analyze packages work on real data
 - L2STT joins the simulation
 - XML files from trigger database are all we ever use for trigsim config (no hand-editing XML or sim files)
 - d0_analyze works fully as designed