Hall-D Online/Monitoring Status

David Lawrence JLab

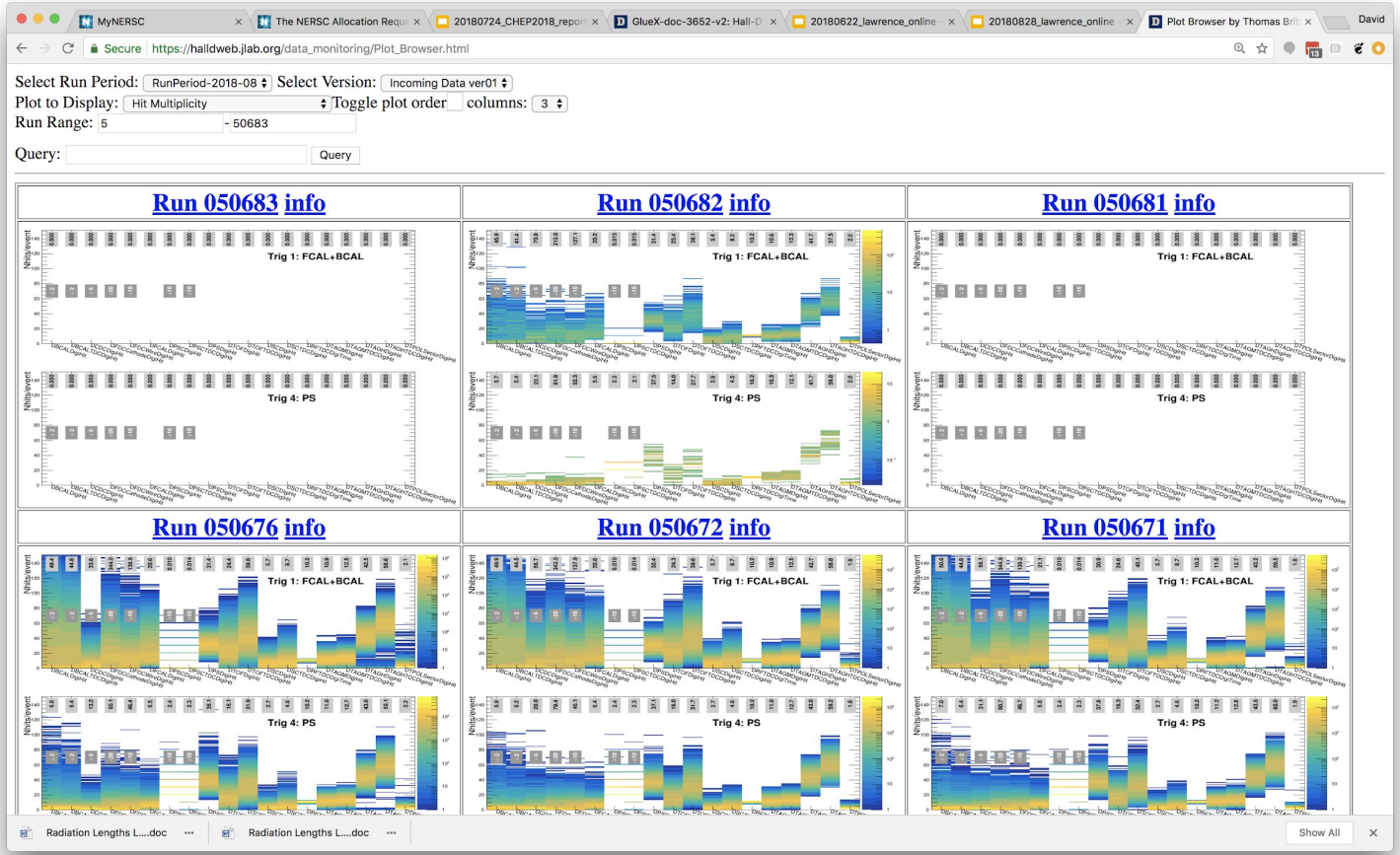
September 28, 2018

Plot Browser updated to respond much quicker to user changes

ver00 - RootSpy

ver01 - Incoming Data

verXX - Monitoring Launches



Time Series Database

(Grafana + InfluxDB)

Mass fit results

Number of particles per 1k L1 triggers (π^o, ρ, ω, φ)

Number of particles per 1k PS coincidences > 7GeV (π^o, ρ, ω, φ)

Hits per event by detector

Tim…ries Data…se

(Grafana + InfluxDB)

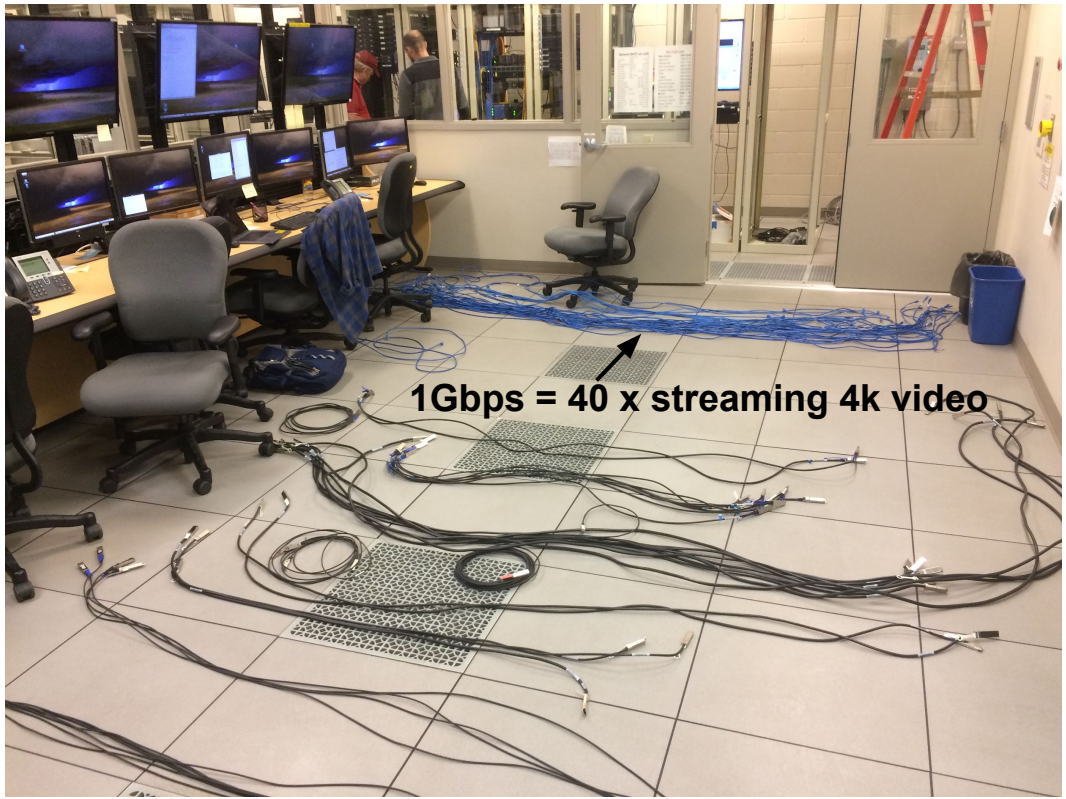
Mass fit results

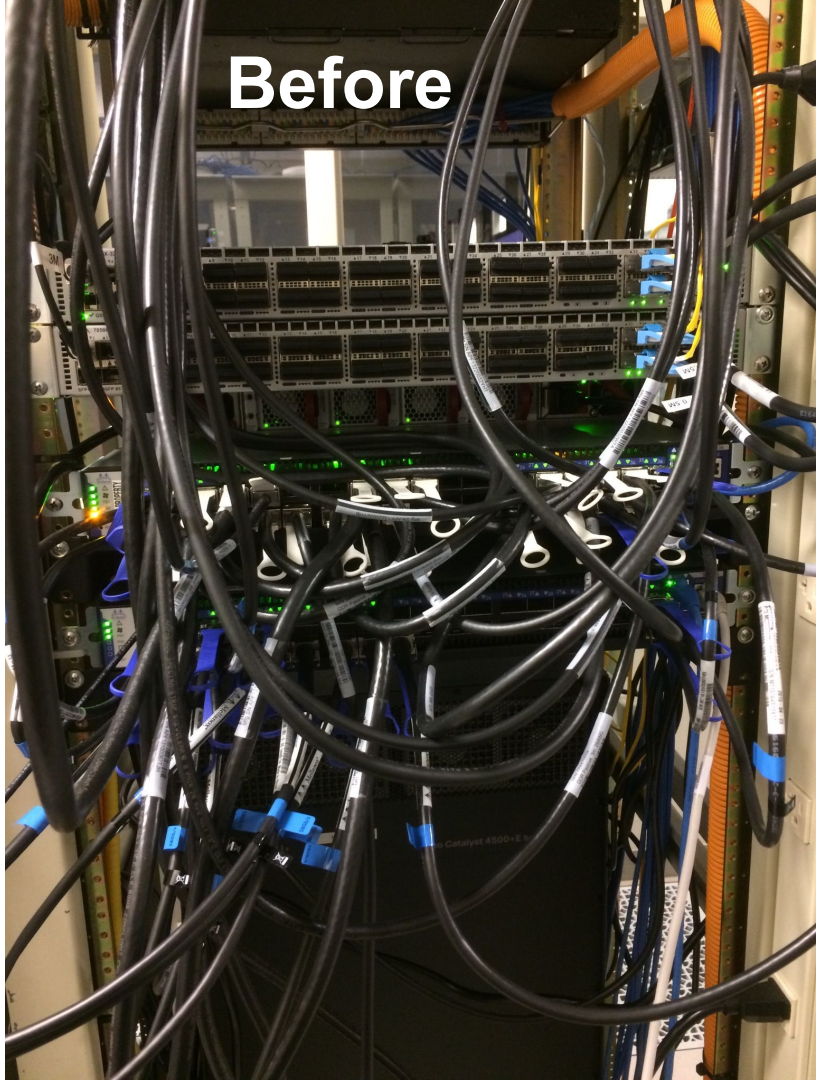
Number of particles p… L1 triggers
…, ρ, ω, φ)

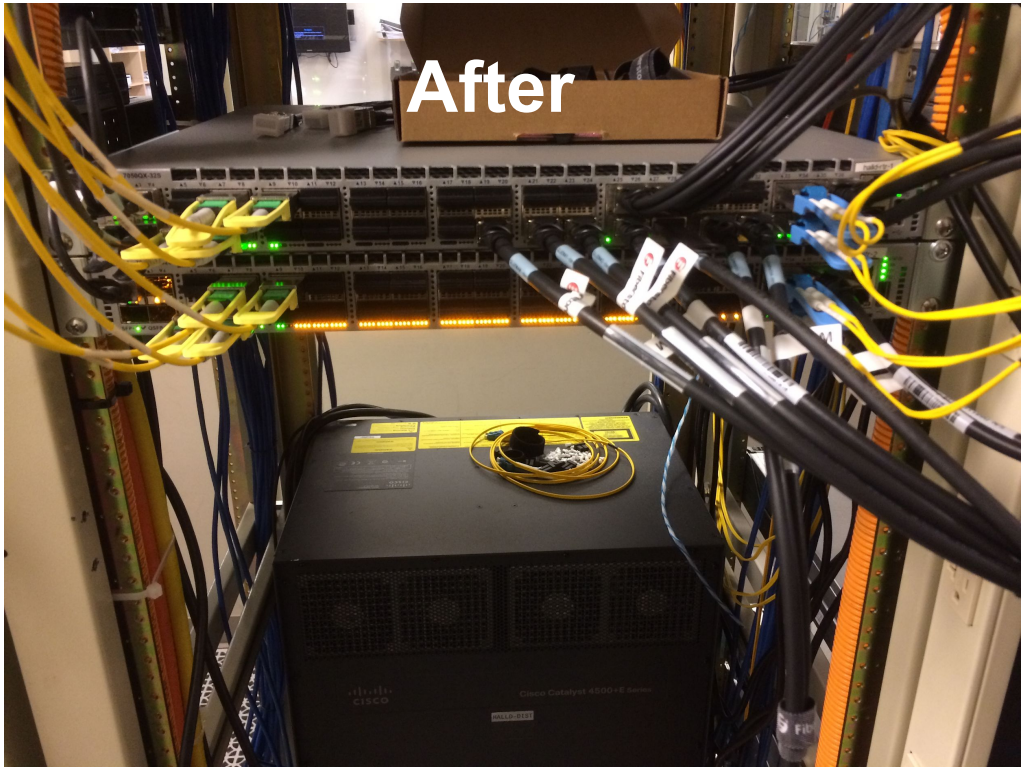
N… f particl… 1k PS
coinc… >…
(π⁰, ρ, ω…

…nt by detector

Hall-D Control Room Networking/Gluon Cleanup and DAQ Hardening




Before


After

Networking/Computing Work Summary

- 40 Gbps Ethernet cards and switch installed
- Second 10Gbps uplink from switches in Hall-D
- Nodes rearranged to group DAQ nodes in same location
  - gluon118,gluon119 renamed gluon43,gluon44
- IB switches moved closer to compute nodes
- New 56Gbps IB cables installed with shorter runs
  - Old, less reliable cables have been excessed
- gluondaqfs w/ 10Gbps ethernet connection used for CODA and config files

- Counting House Desktops upgraded to RHEL7
- gluon48 “accidentally” upgraded
- gluon46 has been RHEL7 for some time

Welcome 7

RED HAT ENTERPRISE LINUX

Keep in mind

gluons come in two types:
(not perfectly correlated with OS)

GLUON_TYPE = GENERAL
GLUON_TYPE = CONTROLS

CONTROLS: gluonXX where XX<40
GENERAL: everything else


SOAP

Example 1: Make your software citable

- Publish it – if it's on GitHub, follow steps in https://guides.github.com/activities/citable-code/
- Otherwise, submit it to zenodo or figshare, with appropriate metadata (including authors, title, …, citations of … & software that you use)
- Get a DOI
- Create a CITATION file, update your README, tell people how to cite
- Also, can write a software paper and ask people to cite that (but this is secondary, just since our current system doesn't work well)

[1] A. C. Irving and R. P. Worden, Phys. Rep. **34**, 117 (1977).

[2] V. Mathieu, I. V. Danilkin, C. Fernandez-Ramirez, M. R. Pennington, D. Schott, A. P. Szczepaniak, and G. Fox, Phys. Rev. D **92**, 074004 (2015).

[3] V. Crede and W. Roberts, Rep. Prog. Phys. **76**, 076301 (2013).

[4] G. R. Goldstein and J. F. Owens, Phys. Rev. D **7**, 865 (1973), G. R. Goldstein work in progress.

[5] J. M. Laget, Phys. Rev. C **72**, 022202 (2005).

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[7] V. Mathieu, G. Fox, and A. P. Szczepaniak, Phys. Rev. D **92**, 074013 (2015).

[8] J. Nys, V. Mathieu, C. Fernández-Ramírez, A. N. H. Blin, A. Jackura, M. Mikhasenko, A. Pilloni, A. P. Szczepaniak, G. Fox, and J. Ryckebusch (JPAC), Phys. Rev. D **95**, 034014 (2017).

[9] A. Donnachie and Yu. S. Kalashnikova, Phys. Rev. C **93**, 025203 (2016).

[10] H. Al Ghoul *et al.* (GlueX Collaboration), AIP Conf. Proc. **1735**, 020001 (2016).

[11] F. Barbosa, C. Hutton, A. Sitnikov, A. Somov, S. Somov, and I. Tolstukhin, Nucl. Instrum. Methods A **795**, 376 (2015).

[12] M. Dugger *et al.*, arXiv:1703.07875 (Unpublished).

[13] Y. Van Haarlem *et al.*, Nucl. Instrum. Methods A **622**, 142 (2010).

[14] V. V. Berdnikov, S. V. Somov, L. Pentchev, and B. Zihlmann, Instrum. Exp. Tech. **58**, 25 (2015).

[15] B. D. Leverington *et al.*, Nucl. Instrum. Methods A **596**, 327 (2008).

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[17] K. Moriya *et al.*, Nucl. Instrum. Methods A **726**, 60 (2013).

[18] R. Brun *et al.*, Report No. CERN-DD-78-2-REV (1978).

[19] R. L. Anderson, D. Gustavson, J. R. Johnson, I. Overman, D. Ritson, B. H. Wiik, and D. Worcester, Phys. Rev. D **4**, 1937 (1971).

[20] R. L. Anderson, D. Gustavson, J. R. Johnson, D. Ritson, B. H. Wiik, W. G. Jones, D. Kreinick, F. V. Murphy, and R. Weinstein, Phys. Rev. D **1**, 27 (1970).

[21] I. S. Barker, A. Donnachie, and J. K. Storrow, Nucl. Phys. B **95**, 347 (1975).

[22] See Supplemental Material at http://link.aps.org/supplemental/10.1103/PhysRevC.95.042201 for a table of the measured asymmetry values and uncertainties as a function of proton momentum transfer, which are also available at https://www.hepdata.net/record/ins1511149.

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[20] R. L. Anderson, D. Gustavson, J. R. Johnson, D. Ritson, B. H. Wiik, W. G. Jones, D. Kreinick, F. V. Murphy, and R. Weinstein, Phys. R[illegible] I. S. Bar[illegible]l. Phys. B **95**, 347 (19[illegible]

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CDC

FDC

BCAL

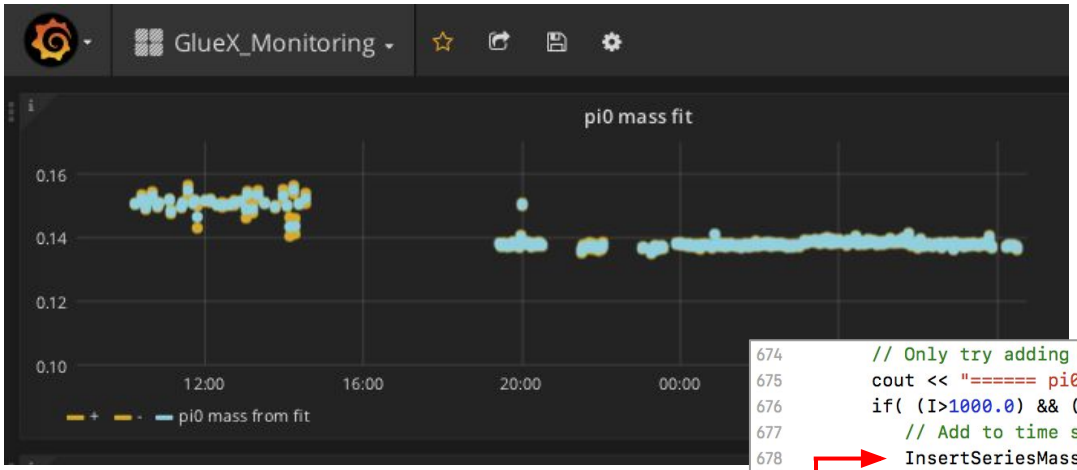
FCAL

SiPM Timing

Polarimeter Design

User's guide and reference manual for Geant

Backups



- Values may be added to time series DB from online macros using special RootSpy calls
- No special preparation of tables in DB is needed a priori
- Special RSTimeSeries program is run in background that handles this independent of RootSpy GUI

code from root macro used by monitoring

```
674      // Only try adding to time series if we have more than 20 particles in peak
675      cout << "====== pi0: I="<<I<<"  mean: " << pars[1] << " +/- " << errs[1] << "   sigma: "<< p
676      if( (I>1000.0) && (errs[1]<0.1*pars[1]) && (errs[2]<0.2*pars[2]) ){
677         // Add to time series
678         InsertSeriesMassFit("pi0", pars[1], pars[2], errs[1], errs[2], unix_time);
679
680         // per 1k triggers
681         if(Ntrig>0.0){
682            stringstream ss;
683            ss << "fit_stats,ptype=pi0 ";
684            ss << "rate_per_1ktrig="<<rate_per_1ktrig;
685            ss << ",rate_per_1kps="<<rate_per_ps;
686            ss << ",counts="<<I;
687            ss << ",Ntrig_phys="<<Ntrig_phys;
688            ss << ",Ntrig_ps="<<Ntrig_ps;
689            ss << ",Nps="<<Nmy_ps;
690            if(unix_time!=0.0) ss<<" "<<(uint64_t)(unix_time*1.0E9);  // time is in units of ns
691            InsertSeriesData( ss.str() );
692         }
693
694         // Optionally reset the histogram so next fit is independent of this one
695         if(rs_GetFlag("RESET_AFTER_FIT")) {
696            rs_ResetHisto("/highlevel/TwoGammaMass");
697            PIDNorms->SetBinContent(NORM_pi0_trig, Ntrig_tot);
698            PIDNorms->SetBinContent(NORM_pi0_ps  , Nps);
699         }
700      }
```

RootSpy Family of Programs

hd_ana	Farm monitoring processes that produce histograms
RootSpy	GUI program shift-takers use to view live histograms/macros
RSelog	Program launched from GUI to make e-log entry into HDMONITOR
RSArchiver	Started by DAQ to continuously rewrite ROOT file with cumulative histograms. File is source of *ver00 RootSpy* in Plot Browser
RSTimeSeries	Started by DAQ to continuously gather statistics and run macros in background to write to time series DB

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Data Acquisition Support

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Documentation and downloads

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  - Experiment Control System (Afecs)
  - Messaging (cMsg)
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    - javadoc
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Messaging (cMsg)

Page summary:
Documentation for the cMsg publish and subscribe messaging system

Current version - 3.6

cMsg is a publish-subscribe, interprocess messaging system developed at Jefferson Lab. At the most basic level it is an API for sending and receiving messages. This API is used to wrap a variety of communication protocols, and is most often used to access a popular and useful, full publish-subscribe messaging system. The package is supported in C, C++ and java on Linux. All online CODA components use cMsg to communicate control information (not data) to each other.

Files associated with this page:

Attachment	Size
Readme file	7.96 KB
Change log	1.15 KB
cMsg User's Guide	751.25 KB
cMsg Developer's Guide	537.85 KB

Not Secure | https://claraweb.jlab.org/xmsg/

Documentation Download About

xMsg

Multilingual publish-subscribe messaging system

Get Started

xMsg represents many-to-many communication model

xMsg creates an environment where various information producers and consumers can communicate all at the same time. Each piece of information can be delivered to various consumers concurrently, while each consumer can receive information from different producers.

Space decoupling

xMsg actors, i.e. information producers and consumers do not need to know each other. Message addressing is based on the message topic. Information is published to a topic or named logical channel. Consumers will receive all messages published to the topic to which they subscribe, and all subscribers to a topic will receive the same message. The producer is responsible for defining classes of message topics to which consumers can subscribe.

Time decoupling

xMsg actors do not have to be actively participating in the information handling at the same time. Information delivery is mediated through the xMsg proxy. Even though synchronization among information processing actors in most cases is not required, xMsg presents synchronized communication channels as well.