MINOS Data Stream for Beam Devices and ACNET Readout Issues

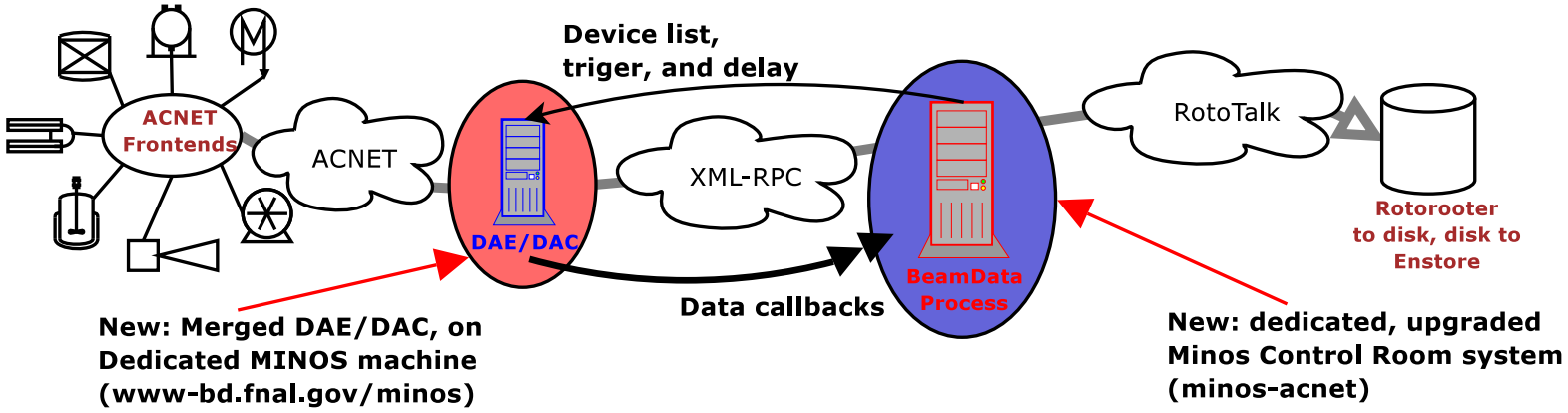
Brett Viren

Brookhaven National Lab

bv@bnl.gov

- Review of the BDP
- Recent Changes
- Offline Access and Analysis Tools
- Open Questions

2/10 – Review of the Beam Data Process



1. BDP sends device list, event & delay the merged Data Acquisition Client/Engine (DAC/DAE)
2. ACNET devices trigger on, potentially different, events+delays
3. DAC/DAE waits for event+delay then polls frontends for data (”soft” mode) and timestamps it
4. DAC/DAE pushes data to Beam Data process
5. BDP pushes data to rotorooter
6. Data Copy Process copies data to enstore

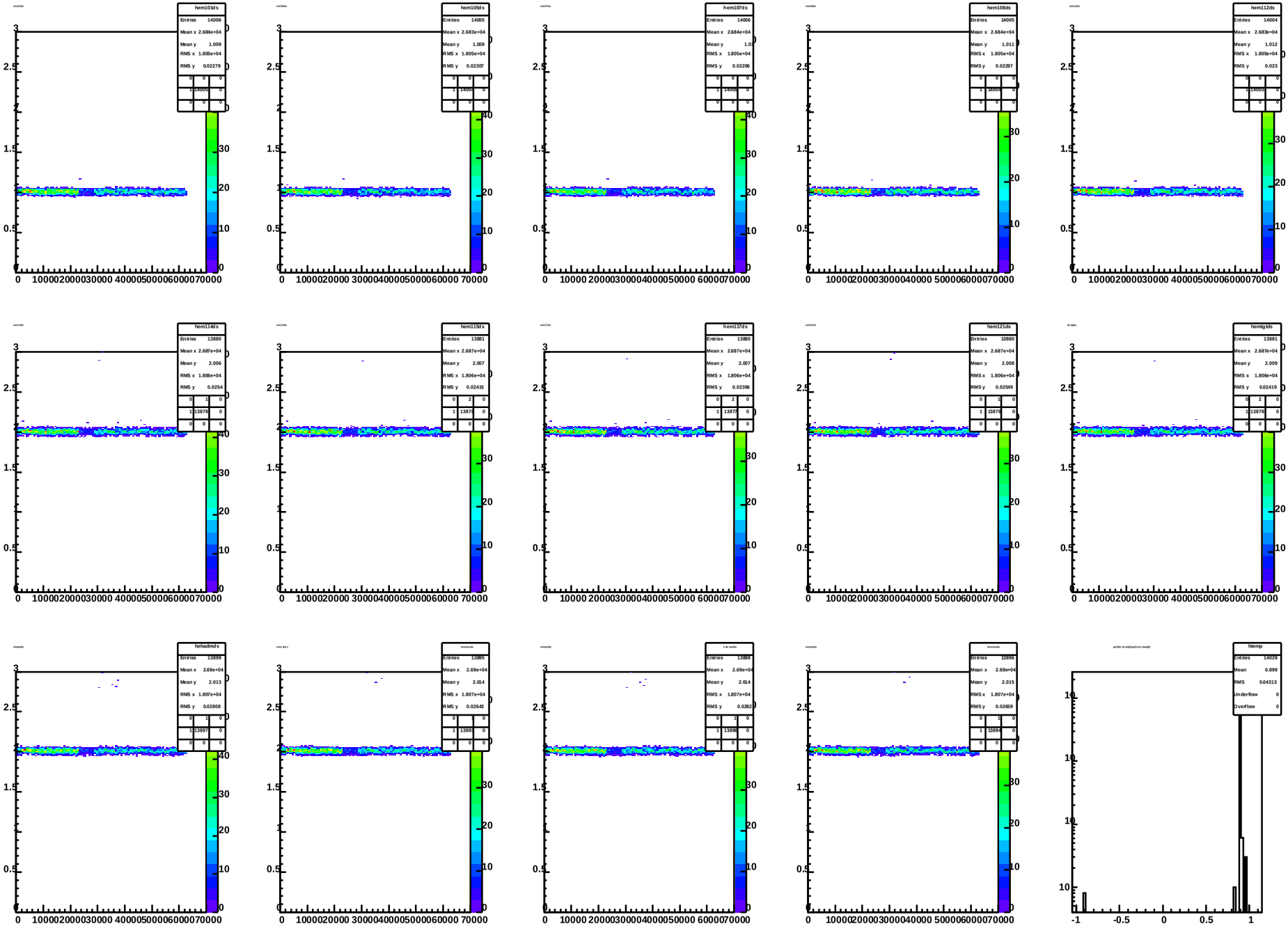
3/10 – Recent Changes

- New Beam Division Server. Dedicated XML-RPC server. Functionality of DAC and DAE combined in one system. Simpler, more robust, some bugs causing late/dropped readouts fixed. Thanks to Charlie King!
- New Minos Control Room Computer The BDP, JAS display and ACNET console now run on minos-acnet.fnal.gov. Upgraded to 2GB RAM and to 4 screens (thanks to Sergei Avvakumov and others!)
- The Data Copy Process has been turned on and data is being saved to the Enstore tape library (thanks to Liz Buckley-Geer!)

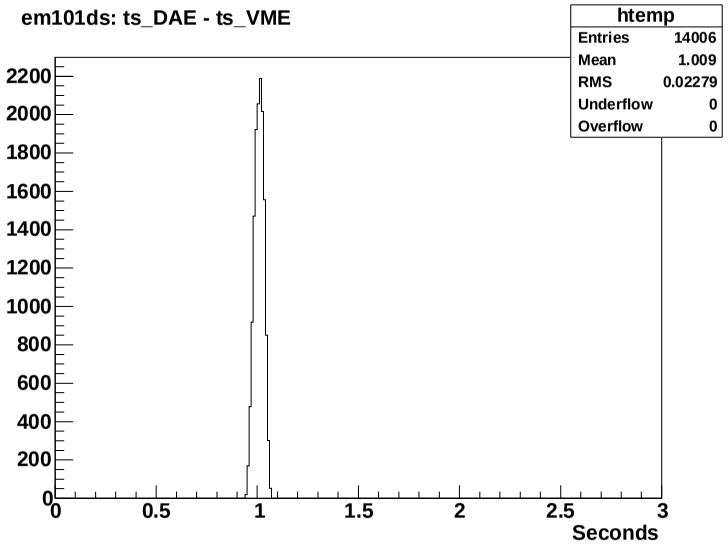
4/10 – Check of New XML-RPC Server

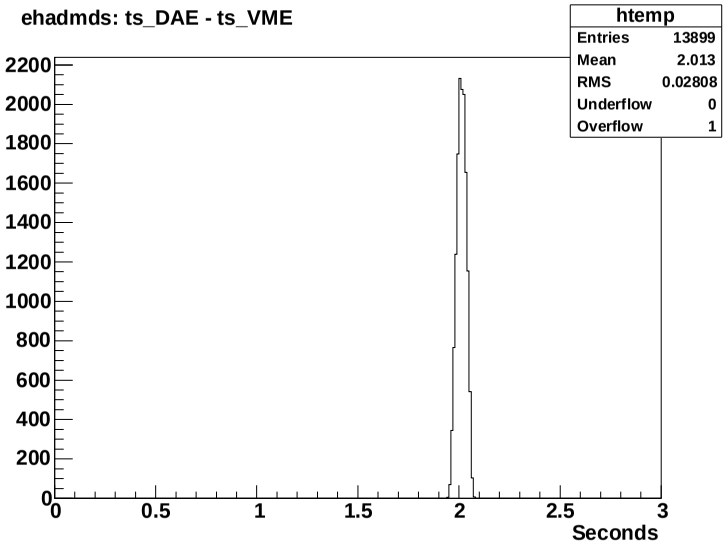
- Essentially a drop in replacement from the point of view of the BDP and JAS display code
- Bob and Sacha set up the profile and mu/had monitors to arm on TCLK event 0x29 (~10 sec period) and sample on 0x51 0.9 sec later
- Read out on 0x51 + 1 second
- Ran over night of Jan 4th, ~14k events (file: B050104_230526.mbeam.root)

5/10 – SWIC scanner DAE - VME timestamp differences



6/10 – DAE - VME timestamp differences, representative histograms





Group 1 em101ds, em105ds, em107ds, em108ds, em112ds

Group 2 em114ds, em115ds, em117ds, em121ds, emtgtds

Group 3 ehadmds, emma1ds, emma2ds, emma3ds

Expect a DAE - VME difference of 1 second. Groups 2 and 3 have are picking up an extra second somewhere. RMS of each is 20-30 msec.

DAE TS are ~20 msec, it is the VME which is off.

(Groups 2 and 3 are differentiated based on Mary's study.)

7/10 – Missing data

Device	W/data	No data	Total
em101ds	14006	24	14030
em105ds	14005	25	14030
em107ds	14006	24	14030
em108ds	14005	25	14030
em112ds	14004	26	14030
em114ds	13880	150	14030
em115ds	13881	149	14030
em117ds	13880	150	14030
em121ds	13880	150	14030
emtgtds	13881	149	14030
ehadmds	13899	131	14030
emma1ds	13895	135	14030
emma2ds	13898	132	14030
emma3ds	13896	134	14030

Missing ~1% of Groups 2 and 3 events.

8/10 – Conclusions with new server

The Good Not a single event from previous "spill"! Before this occured at the level of ~0.5%

The Bad SWIC scanners from groups 2 and 3 consistently have VME timestamps that are 1 second too early!

The Ugly Missing SWIC scanner data at the level of 1% in Groups 2 and 3. Group 1 missing ~0.2%.

9/10 – Offline Access and Analysis Tools

As previously mentioned:

- RawData classes present a `std::map` like interface: Device Name $\longrightarrow$ `RawBeamData` object.
- Specialized RawBeamData unpackers for complex devices (ie, SWIC devices).

New:

- Conversion tools from Offline data format to text or flat ROOT trees `BeamData/ana/{Bdtxt,Bmnt}.{cxx,h}`
- Library of useful classes for analyzing ROOT trees (`libBeamDataAnaNt`)

10/10 – Open Questions

These need addressing:

Hardware What is the source of this off-by-one-second problem with the VME timestamps? What about the missing events, is hardware to blame?

Offline How do we use this data? What data needs to go into the database? How to get it there?