

# BRAHMS

RCF quarterly meeting F.Videbaek April 1, 1999

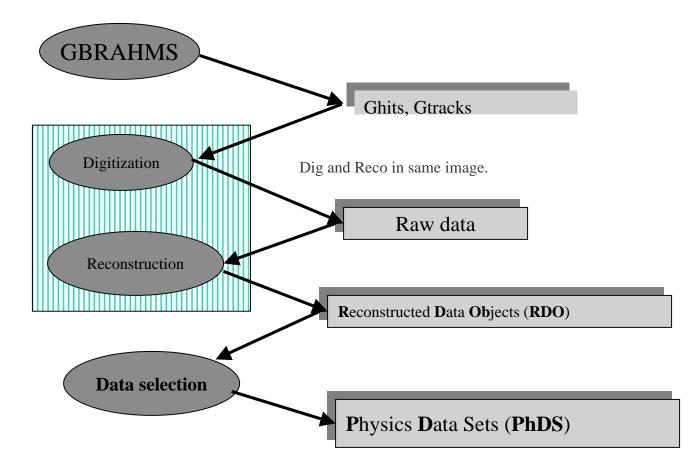


## MDC-II

- Out activities was similar to those in from MDC-I. Coordinator Alv Kjetil Holme.
- Scripts have been written to access the HPSS, CRS system in a controlled fashion
  - Brahms add own layer of scripts, mostly written in PERL.
    - Sinking of *raw* data to HPSS (single or multiple jobs)
    - CRS job submission
    - Un-sinking of reconstructed data from HPSS to CAS disk farm.
    - Sinking of µDST to HPSS.
  - Various utilities to examine HPSS and create job summaries.
- Reconstruction code for Forward Spectrometer (BramReco)
- Event selection code (Bminor)
- Simple analysis code (BramAna)
- The reconstruction software worked quite well during the MDC-II in fact from our end no real bugs were found.
- The web pie charts provided by Dave Morrison was very useful.



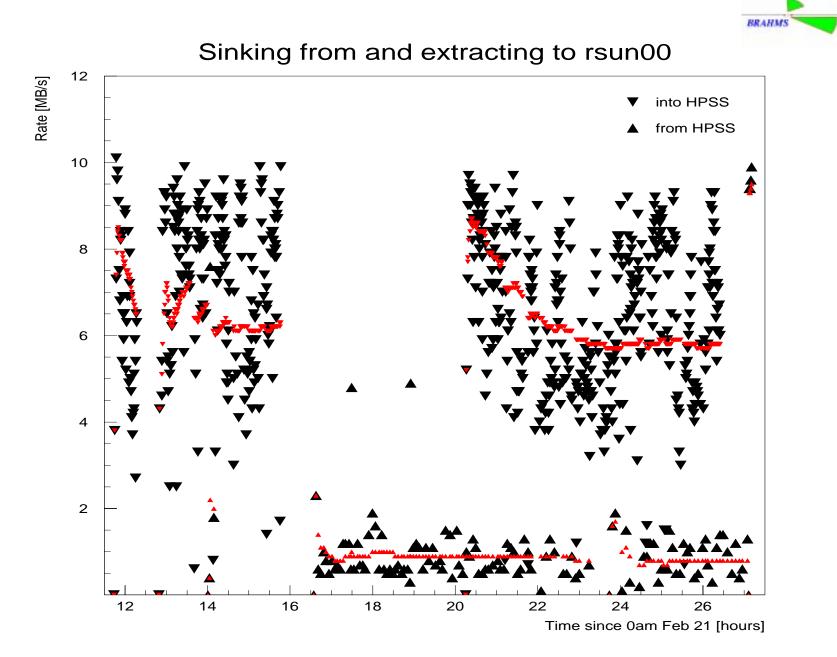
### Data Flow





#### Data mining and Analysis

- The simple data mining and data analysis code were developed for MDC-I were essentially also used for MDC-II. They were judged to be quite typical.
- Additionally 'experiments' were made with more 'fixed' Tree structures that allows for much faster access to parts of a given events thus achieving the very high nominal access speeds for ROOT objects.
- Data mining, was done by selecting events with full spectrometer tracks. For central events at forward angles this reduced data volumes by about 1:3. With the present event model (sequential reading of hierarchical structure of root objects) the data mining is close to being dominated by CPU usage not i/o (for single task).
- One particular sequence of task entailed reading from different files, but executing the same code on 4\*4 parallel jobs on the CAS nodes over a 3 hours sequence. An aggregated reading speed of 4Mb/sec was achieved on the Linux CA farms.
- The following slide show transfers (sinking) into HPSS and data mining reading during a active period towards the end of MDC-II. Note the saturation for writing into at about 6 Mb/s.





## Sample statistics

326641,893,076600019:36:0770,348428,530,156c rsif_104327812,696,6482000024:33:3888,257631,951,376c rsif_105328466,779,6441350013:52:2449,840440,056,997c rsif_106329478,099,952200005:08:2918,452314,618,419c rsif_107330287,187,636117004:37:2316,596189,754,628c rsif_109331492,232,328200007:03:3125,293316,004,730c rsif_110333225,664,408101001:22:204,863129,666,206c rsif_111334444,890,424200004:50:3017,340258,471,045c rsif_112335247,014,352100005:50:5320,991162,479,614c rsif_113336247,014,352100003:09:5411,338112,540,285c rsif_116338244,285,184100003:09:5411,338112,540,285c rsif_117342429,361,920100003:2:48:30117,972433,302,190c rsif_120344294,831,024100008:31:0230,568296,402,262c rsif_123346291,193,176100008:31:0230,568296,402,262c rsif_124347524,861,08049002:25:518.742127,943,799c rsif_126344294,831,02407004:20:1116,104133,853,221c rsif_129351441,037,776<	Run	InputSize	#events	re a l time	cpu(sec)	output	job name
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327812,696,6482000024:33:3888,257631,951,376c rsf_106328466,779,6441350013:52:2449,840440,056,997c rsf_106329478,099,952200005:8:2918,452314,618,419c rsf_107330287,187,636117004:37:2316,596189,754,628c rsf_109331492,232,328200007:03:3125,293316,004,730c rsf_110333225,664,408101001:22:204,863129,666,206c rsf_111334444,890,424200004:50:3017,340258,471,045c rsf_113335247,014,352100006:05:0021,822162,480,583c rsf_113336247,014,352100003:55:411,338112,540,285c rsf_115338244,285,184100003:55:411,383112,540,285c rsf_116339244,144,168100003:248:30117,972433,302,190c rsf_120344294,831,024100008:31:0230,568296,402,262c rsf_122344294,831,024100008:31:0230,568296,402,262c rsf_122344294,861,980490025:47:5292,658379,409,450c rsf_126344294,861,080490025:47:5292,658379,409,450c rsf_126344294,861,080490025:47:5292,658379,409,450c rsf_127350193,269,76074004	325	115,339,264	1000	3:22:23	12,084	78,052,017	c rsjf_103
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	326	641,893,076	6000	19:36:07	70,348	428,530,156	c rsjf_104
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	327	812,696,648	20000	24:33:38	88,257	631,951,376	c rsjf_105
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	328	466,779,644	13500	13:52:24	49,840	440,056,997	c rsjf_106
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	329	478,099,952	20000	5:08:29	18,452	314,618,419	c rsjf_107
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	330	287,187,636	11700	4:37:23	16,596	189,754,628	c rsjf_108
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	331	492,232,328	20000	10:43:12	38,442	329,795,823	c rsjf_109
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	332	479,139,808	20000	7:03:31	25,293	316,004,730	c rsjf_110
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	333	225,664,408	10100	1:22:20	4,863	129,666,206	c rsjf_111
336 $247,014,352$ $10000$ $6:05:00$ $21,822$ $162,480,583$ $crsif_{114}$ 337 $171,907,256$ $6900$ $3:09:54$ $11,338$ $112,540,285$ $crsif_{115}$ 338 $244,285,184$ $10000$ $3:55:14$ $14,092$ $162,558,648$ $crsif_{117}$ 342 $429,361,920$ $10000$ $3:51:17$ $10,886$ $162,573,400$ $crsif_{117}$ 342 $429,361,920$ $10000$ $3:2:48:30$ $117,972$ $433,302,190$ $crsif_{120}$ 344 $294,831,024$ $10000$ $8:42:54$ $31,274$ $299,542,787$ $crsif_{122}$ 345 $297,765,532$ $10000$ $8:50:10$ $31,703$ $301,145,672$ $crsif_{123}$ 346 $291,193,176$ $10000$ $8:31:02$ $30,568$ $296,402,662$ $crsif_{124}$ 347 $524,861,080$ $4900$ $25:47:52$ $92,658$ $379,409,450$ $crsif_{125}$ 348 $189,194,240$ $7400$ $4:07:41$ $14,764$ $128,719,154$ $crsif_{126}$ 349 $188,481,536$ $7400$ $2:25:51$ $8,742$ $127,943,799$ $crsif_{127}$ 350 $193,269,760$ $7400$ $4:29:11$ $16,104$ $133,853,221$ $crsif_{132}$ 351 $441,037,776$ $16900$ $9:57:00$ $35,690$ $309,751,530$ $crsif_{131}$ 353 $236,033,676$ $9100$ $5:21:12$ $19,214$ $163,305,447$ $crsif_{131}$ 354 $236,194,096$ $9100$ $4:27:16$ $16,003$ $164,087,915$ <td>334</td> <td>444,890,424</td> <td>20000</td> <td>4:50:30</td> <td>17,340</td> <td>258,471,045</td> <td>c rsjf_112</td>	334	444,890,424	20000	4:50:30	17,340	258,471,045	c rsjf_112
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	335	247,014,352	10000	5:50:53	20,991	162,479,614	c rsjf_113
338 $244,285,184$ 10000 $3:55:14$ $14,092$ $162,558,648$ $crsif_116$ 339 $244,144,168$ $10000$ $3:01:57$ $10,886$ $162,573,400$ $crsif_117$ $342$ $429,361,920$ $10000$ $32:48:30$ $117,972$ $433,302,190$ $crsif_120$ $344$ $294,831,024$ $10000$ $8:42:54$ $31,274$ $299,542,787$ $crsif_122$ $345$ $297,765,532$ $10000$ $8:50:10$ $31,703$ $301,145,672$ $crsif_123$ $346$ $291,193,176$ $10000$ $8:31:02$ $30,568$ $296,402,262$ $crsif_123$ $347$ $524,861,080$ $4900$ $25:47:52$ $92,658$ $379,409,450$ $crsif_126$ $348$ $189,194,240$ $7400$ $4:07:41$ $14,764$ $128,719,154$ $crsif_127$ $350$ $193,269,760$ $7400$ $4:29:11$ $16,104$ $133,853,221$ $crsif_128$ $351$ $441,037,776$ $16900$ $9:57:00$ $35,690$ $309,751,530$ $crsif_130$ $352$ $235,995,444$ $9100$ $5:43:49$ $20,587$ $163,762,091$ $crsif_131$ $354$ $236,194,096$ $9100$ $5:21:12$ $19,214$ $163,305,447$ $crsif_133$ $355$ $235,159,952$ $9000$ $5:56:46$ $21,371$ $162,815,594$ $crsif_134$ $356$ $236,577,652$ $9100$ $5:48:00$ $20,798$ $164,087,915$ $crsif_134$ $356$ $236,577,652$ $9100$ $5:48:00$ $20,798$ $164,329,073$ <td< td=""><td>336</td><td>247,014,352</td><td>10000</td><td>6:05:00</td><td>21,822</td><td>162,480,583</td><td>c rsjf_114</td></td<>	336	247,014,352	10000	6:05:00	21,822	162,480,583	c rsjf_114
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349188,481,53674002:25:518,742127,943,799c rsjf_127350193,269,76074004:29:1116,104133,853,221c rsjf_128351441,037,776169009:57:0035,690309,751,530c rsjf_129352235,995,44491005:43:4920,587163,762,091c rsjf_130353236,033,67691005:21:1219,214163,305,447c rsjf_131354236,194,09691004:27:1616,003164,087,915c rsjf_132355235,159,95290005:56:4621,371162,815,594c rsjf_133356236,577,65291005:48:0020,798164,329,073c rsjf_134357230,412,14088005:28:1419,639160,477,218c rsjf_135362147,844,784330022:15:1780,032201,643,500c rsjf_136363147,559,800330029:27:03105,957205,270,411c rsjf_137	347	524,861,080	4900	25:47:52	92,658	379,409,450	c rsjf_125
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353236,033,67691005:21:1219,214163,305,447c rsjf_131354236,194,09691004:27:1616,003164,087,915c rsjf_132355235,159,95290005:56:4621,371162,815,594c rsjf_133356236,577,65291005:48:0020,798164,329,073c rsjf_134357230,412,14088005:28:1419,639160,477,218c rsjf_135362147,844,784330022:15:1780,032201,643,500c rsjf_136363147,559,800330029:27:03105,957205,270,411c rsjf_137	351	441,037,776	16900	9:57:00	35,690	309,751,530	c rsjf_129
354236,194,09691004:27:1616,003164,087,915c rsjf_132355235,159,95290005:56:4621,371162,815,594c rsjf_133356236,577,65291005:48:0020,798164,329,073c rsjf_134357230,412,14088005:28:1419,639160,477,218c rsjf_135362147,844,784330022:15:1780,032201,643,500c rsjf_136363147,559,800330029:27:03105,957205,270,411c rsjf_137	352	235,995,444	9100	5:43:49	20,587	163,762,091	c rsjf_130
355235,159,95290005:56:4621,371162,815,594c rsjf_133356236,577,65291005:48:0020,798164,329,073c rsjf_134357230,412,14088005:28:1419,639160,477,218c rsjf_135362147,844,784330022:15:1780,032201,643,500c rsjf_136363147,559,800330029:27:03105,957205,270,411c rsjf_137	353	236,033,676	9100	5:21:12	19,214	163,305,447	c rsjf_131
356236,577,65291005:48:0020,798164,329,073c rsjf_134357230,412,14088005:28:1419,639160,477,218c rsjf_135362147,844,784330022:15:1780,032201,643,500c rsjf_136363147,559,800330029:27:03105,957205,270,411c rsjf_137	354	236,194,096	9100	4:27:16	16,003	164,087,915	c rsjf_132
357230,412,14088005:28:1419,639160,477,218c rsjf_135362147,844,784330022:15:1780,032201,643,500c rsjf_136363147,559,800330029:27:03105,957205,270,411c rsjf_137	355	235,159,952	9000	5:56:46	21,371	162,815,594	c rsjf_133
362 147,844,784 3300 22:15:17 80,032 201,643,500 c rsjf_136   363 147,559,800 3300 29:27:03 105,957 205,270,411 c rsjf_137	356	236,577,652	9100	5:48:00	20,798	164,329,073	c rsjf_134
363 147,559,800 3300 29:27:03 105,957 205,270,411 c rsjf_137	357	230,412,140	8800	5:28:14	19,639	160,477,218	c rsjf_135
	362	147,844,784	3300	22:15:17	80,032	201,643,500	c rsjf_136
9,970.61 344,000 1,124,754 7,681.10	363	147,559,800	3300	29:27:03	105,957	205,270,411	c rsjf_137
		9,970.61	344,000		1,124,754	7,681.10	



## **MDC-II** Conclusions

- MDC-II was a useful with a concentrated effort during a short time. The preparation and startup was hampered by availability of final scripts not until just-in-time and severe network connectivity during this period.
- Increased stability of HPSS systems is needed. More tools for automated handling of errors are needed. Better access to
- Brahms still needs to develop additional scripts to make submission, checking of in particular (calibration), reconstruction and data mining. It is necessary to examine how to incorporate calibration and reconstruction in the CRS environment.).
- We were able to handle an increased number of events (Min Bias) satisfactory in the reconstruction in the order of 340,000 events in spectrometer different configurations.
- Gained experience with (p)ftp access to RCF.
- MDC-II was useful in identifying areas of improvements
  - Data selection
  - simplification of DST data model that makes better use of root trees.
- We did not really get around to study the 'competing' access to HPSS (raw/reco/mining)

### Misc.

- LSF farm software for batch generation is still reasonable. RCF is missing tools to keep it up running (went dead in a couple of instances, without being detected). An example of not having tools to monitor the state of all systems, and report to users.
- The division of the rlnx03 has worked well for us so far, but there will be a need to have a dedicated Linux development machine.
- BRAHMS BRAT progress (K.Hagel, A.Kjetil, JHLee,..)
  - DB Detetor Parameters API defined
  - ROOT based event display
  - Revised Object model for spectrometertracks
  - Improved OO model for TPC data, and gain in reconstruction (\*4-5)
  - Review and revision of mDST data structures.