BRAHMS data rates and volumes.

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I have been performing preliminary re-evaluation of BRAHMS data volumes and data as discussions on the RHIC computing center is going on. RCF has an upcoming review towards the end of July 1999. I realized that the original rate and data volume estimate were likely not accounting properly for the time spend at various angle and field settings. On the other hand we may have underestimated for some setting the number of tracks / filling factor in the MRS TPCs. Particular those number are subject to large uncertainty since the particle densities expected for RHIC central collisions are not known. The number so far assumed the VENUS predictions.

There will be a reduced efficiency of data taking in 99 and 00. Also the presumed mixture of beam different from Au in all years and our limitations due to data rate will reduce data volumes. I made a new rough estimate based on different configuration, eg. Running at 2 deg, at 1/6 time, 6 deg 1/3 time and high p at remaining time. The max rate goes up to approximately 7 Mb/sec, but is only 0.5 at the lower end. Overall I still get around 2-2.5Mb/sec for the average rate.

Task: It is necessary for the collaboration to get a better handle and understanding of rate and data volumes. To achieve this we need define the raw data structures and thus the sizes of events. In addition the overall data-flow and generation of derived data must be defined. This task should be done in a systematically for angle and field settings similar to the previous study on event and rate acceptance.

Changes in computing requirements

- Band width for raw data may be up to 7-8Mb/sec in extreme cases. The average over angle and field settings is still about 2-2.5 Mb/sec
- Data storage needs. The amount of data generated by calibration, and other intermediate data is probably around 20 not 40 Mb.
- CPU needs. The statement in Rococo II was based early estimates with a prototype tracking. The re-writing of the code is still ongoing but it seems that the expected gain factor are achievable.

Estimated Storage needs in Tb.

	FY99	**FY00**	**FY01**	**RococoII**
Raw Data	<1	10	30	40
processed data	,1	5	20	40
Simulated data	1	1	1	1
"DST"		5	10	10
μDST		.5	1	1
RCF(5%)	1.25+5	1.4+6.5	2+13	

This table is a preliminary attempt to put the BRAHMS information into the format of STAR as presented last Friday. It further assumes that the contents of an event is distributed like in an object model.

Estimated CPU needs in kspecint92

	FY99	**FY00**	**FY01**	**RococoII**
Event Reconstruction	<1	5	18	18
Physics	,1	2	5	5
Simulated data+rec	1	2	5	10
Simulations	-	-	-	4
RCF(5%)	21	30	40	

Max Rate estimated from 34 deg MRS and 2 deg low P setting.

detector	channels	rawdata	bytes/ch	overhead	filling		Compresse kbyte
T1	768	144	1	0.2	15	216.0	19.44
T2	768	144	1	0.2	5	216.0	6.5
T3	1000	2	2	0.2	15	3.9	0.7
T4	400	2	2	0.2	10	1.6	0.2
T5	400	2	2	0.1	10	1.6	0.2
H1	48	5	2	0.2	15	0.5	0.1
H1	48	5	2	0.2	15	0.5	0.1
C1	32	2	2	0.2	100	0.1	0.2
RICH	400	1	2	0.2	100	0.8	0.9
M-TPC1	1152	144	1	0.2	20	324.0	38.9
M-TPC2	1152	144	1	0.2	5	324.0	9.7
TOFW	120	5	2	0.2	15	1.2	0.2
Beam Bea	72	4	2	0.2	20	0.6	0.1
Mult	160	2	2	0.2	100	0.6	0.8
Total	6520					1091.2	**77.9**
Rate/sec							**7014.1**

In addition to this was made another set of utility estimates based on number of tracks in a given detector (TPC) and the estimated number of bytes which would be needed

Fill factor for TPC per track.

N tracks	Nrows	pixel/clust	bytes/ev	overhead	Bytes/ev
T1					
1	14	28	392	168	560
3	14	28	1176	504	1680
5	14	28	1960	840	2800
10	14	28	3920	1680	5600
20	14	28	7840	3360	11200
T2					
1	8	28	224	96	320
3	8	28	672	288	960
5	8	28	1120	480	1600
10	8	28	2240	960	3200
20	8	28	4480	1920	6400
MT1					
1	12	28	336	144	480
3	12	28	1008	432	1440
5	12	28	1680	720	2400
10	12	28	3360	1440	4800
20	12	28	6720	2880	9600
40	12	28	13440	5760	19200
MT2					
1	6	28	168	72	240
3	6	28	504	216	720
5	6	28	840	360	1200
10	6	28	1680	720	2400
20	6	28	3360	1440	4800

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