ALICE and the Megatable

Megatable input

- What were the assumptions for beam time ?
  - Running conditions of a standard year:
    - pp: 10^7 seconds leading to 10^9 events/year
    - AA: 2×10^6 seconds of AA leading to 2×10^8 events/year
  - A similar amount of MC data will be produced yearly
    - pp: 10^9 events/year
    - AA: 2×10^7 background events/year reused 10 times with different signals
  - Startup scenario

	2007	2008	2009	2010
Pp	7%	40%	60%	100%
AA	0%	10%	50%	100%

Megatable input

▶ What was used for the trigger and data rates and efficiencies ?

- The recording rate is 100Hz in pp and AA
- The corresponding data rate is 0.11GB/s for pp and 1.38GB/s for AA (averaged over centrality and assuming $dN_{central}/dy = 4000$)
- A security factor of 10% has been assumed
- No efficiency factor enters the calculation at this stage

Megatable input

- What determines the data transfer rates ?
  - T0 $\to$ T1
    - Distributed copy of raw data
    - Distributed copy of ESD from first pass reconstruction
  - T1 $\leftrightarrow$ T1
    - Distributed copy of ESD from MC and $2^{nd}+3^{rd}$ pass reconstruction
    - Distributed copy of AOD from scheduled analysis
  - T2 $\to$ T1
    - MC data (raw and ESD) produced exclusively in T2s
    - AOD produced by user driven analysis
  - T1 $\to$ T2
    - ESD and AOD from scheduled analysis

Megatable input

- Have you used any other scaling, efficiencies, safety factors ?
  - The resources pledged by the T1 and T2 sites have been scaled to the ALICE requirements as discussed in the Computing TDR
  - The efficiency for the usage of CPU is (see C-TDR)
    - 85% for scheduled processing
    - 60% for user driven processing
  - The disk and data transfer efficiencies are taken to be 100% (as decided by the megatable group)

Megatable input

▸ Which data sets are included ? which sort of processing is included ?

- Data sets: Raw, ESD, AOD, Tag, calibration
- Processing:
  - MC generation, reconstruction and analysis
  - 1st, 2nd, 3rd pass reconstruction
  - Scheduled analysis
  - User driven analysis
  - On line processing at the CAF is NOT included

Megatable input

▶ Does the table include all sites now ?

- The table includes
  - all sites which have signed the LCG MoU
  - sites which have not (yet) signed the LCG MoU
  - sites which have announced that they will join (before the start of LHC) but have not yet pledged resources
- The table does not include
  - Sites which might join in a near future but are not yet member of the ALICE collaboration

Megatable input

▶ How is the cpu/storage load distributed over the sites ?

- The cpu load is distributed according the pledged cpu resources scaled to the ALICE requirements
- The storage load is distributed according:
  - To the pledged fraction of the total pledged resources
  - And to the T1/T2 relationship announced by the T2s (this information has been made available to the T1s)

Megatable input

- ▶ What is the role of CERN as a site ?
  - ● CERN provides
    - T0 services
    - T1 services with no raw data storage requirement
    - CAF services for online processing

Megatable input

- T1-T2 associations
  - Several orphan T2s arbitrarily assigned to CERN T1 in the Megatable
  - These T2 sites will be redistributed to T1s (NDGF, NL T1, UK T1, CERN) serving no or only few T2s … negotiations have started (NL T1 and UK T1 provided only limited resources to ALICE):
    - Cape Town (1% of ALICE CPU resources)
    - Kolkata (5%)
    - RU T2 federation (7%)
    - Hungary (1%)
    - Athenes (<1%)
    - So T2 federation (1%)
    - Uk T2 federation (6%)
    - Pl T2 federation (4%)
    - Hiroshima (?)
    - Wuhan (1%)

Megatable input

- Running time

Run time for physics (seconds)

year	pp	PbPb
	pp	PbPb
2007	7×10^5	0
2008	4×10^6	2×10^5
2009	6×10^6	1×10^6
2010	1×10^7	2×10^6

Megatable input

- Requirements

New 2007	CERN				External			Total
	Tier0	CAF	Tier1	Total	Tier1s	Tier2s	Total	
CPU(MSI2K)	0.062	0.030	0.90	0.90	1.62	2.50	4.12	4.21
DISK(PB)	0.017	0.060	0.17	0.24	0.30	0.90	1.20	1.44
MS (PB)	0.077	-	0.22	0.30	0.63	-	0.63	0.92

New 2008	CERN				External			Total
	Tier0	CAF	Tier1	Total	Tier1s	Tier2s	Total	
CPU(MSI2K)	1.80	0.52	1.44	1.94	6.92	7.76	14.68	16.61
DISK(PB)	0.024	0.064	0.97	1.06	1.84	0.95	2.79	3.85
MS (PB)	0.79	-	0.83	1.62	3.28	-	3.28	4.90

Megatable input

- Requirements

New 2009	CERN				External			Total
	Tier0	CAF	Tier1	Total	Tier1s	Tier2s	Total	
CPU(MSI2K)	9.04	2.61	3.40	9.69	19.86	15.79	35.65	45.34
DISK(PB)	0.24	0.49	2.89	3.62	11.68	7.38	19.06	22.68
MS (PB)	4.64	-	1.92	6.56	12.67	-	12.67	19.23

New 2010	CERN				External			Total
	Tier0	CAF	Tier1	Total	Tier1s	Tier2s	Total	
CPU(MSI2K)	18.08	5.22	18.35	19.39	37.54	20.52	58.06	81.4
DISK(PB)	0.24	0.49	11.22	11.95	23.62	9.59	33.20	45.2
MS (PB)	8.49	-	1.50	9.99	23.59	-	23.59	33.6