ALICE computing resources

An update of the 2009-2010 requirements

13/03/09

Running scenario

The LHC running scenario used in this document is the one distributed by Ian Bird on March 3 and reported in Table 1. The foreseen integrated running time for proton-proton collisions is 0.5×10^6 s in 2009 and 5.6×10^6 s in 2010. During this time ALICE will store 1.5×10^9 events at an average rate of about 300 Hz compensating the foreseen reduced availability and efficiency of the machine with respect to standard running conditions with an increased bandwidth to storage. The rational behind this is based on the following arguments:

- The initial LHC running scheme will allow to deliver at Point 2 a luminosity, in the range required by ALICE (order 10^{29} to few times 10^{31}) without resorting to special machine manipulation needed later on (e.g. displaced beams). We will have much cleaner operation conditions (less pile-up in the TPC) which will be easier to analyze, of better quality, and for many physics topics (e.g. very high multiplicity physics, heavy-flavor physics,...) even unique. As stated previously, the LHC start-up is prime time for proton data in ALICE and it is necessary to make maximum use of beam time during this phase.

- The statistics we take in this first proton-proton run will be the final one at 10 TeV. This energy is closer to the PbPb energy (5.5 TeV) and intermediate between known FNAL data (2 TeV) and the full energy (14 TeV); this will be important when interpolating results (e.g. on p_t spectra, QCD cross sections etc..) to the PbPb energy. Unlike for discovery physics (where low energy is less favorable), for the ALICE program (event characterization, QCD physics in proton-proton, comparison data) 10 TeV is practically as good and in some respects even better; therefore our plan is to use the DAQ bandwidth available to us to collect a large statistics in 2009-2010.

Finally, as stated in the conclusions of the Chamonix meeting, a one month PbPb run is for us equivalent to a standard year of HI data taking as reported in the Computing TDR.

All other parameters used to calculate the resources required for the 2009-2010 operation are those reported in the Computing TDR.

Requirements

The requirements are presented in Table 2 for CPU, Table 3 for Disk and Table 4 for the integrated Custodial Storage, distributed in quarters. Comparison is made with previous requirements for 2009 revised following the recommendations by the Computing Resources Scrutiny Group (RRB-2008-106).

Table 1: LHC running scenario in 2009/2010

Year	Month	LHC efficiency × availability
2009	August	cosmic data taking
	September	cosmic data taking
	October	cosmic data taking
	November	10 %
	December	10 %
2010	January	0 %
	February	0 %
	March	24 %
	April	24 %
	May	24 %
	June	24 %
	July	32 %
	August	32 %
	September	32 %
	October	32 %
	November	Heavy-ion run
	December	shutdown

Table 2.: CPU requirements for 2009-2010 and comparison with previous requirements

	TO new	CAF	T1	T2	T0	CAF	T1	T2	T0	CAF	T1	T2
	new requirements (MSI2K)				old requirements (KSI2K)				variation (%)			
2009Q1	7,9	2,6	8,0	8,1								
2009Q2	7,9	2,6	8,0	8,1	9,1	2,6	19,9	14,3	-11 %	1 %	-55 %	-37 %
2009Q3	7,9	2,6	8,0	8,1								
2009Q4	8,1	2,6	10,7	9,0								
2010Q1	8,4	2,6	10,7	9,0								
2010Q2	8,4	2,6	10,7	9,0	9,1	2,6	23,6	25,1	0 %	0 %	9 %	-19 %
2010Q3	8,5	2,6	10,7	9,0								
2010Q4	9,1	2,6	25,6	20,2								

Table 3.: Disk requirements for 2009-2010 and comparison with previous requirements

	CERN	T1	T2	CERN	T1	T2	CERN	T1	T2
	new requirements (PB)			old requirements (PB)			variation (%)		
2009Q1	1,7	2,4	1,7						
2009Q2	1,9	3,0	2,6	2,5	9,9	9,6	-4 %	-56 %	-54 %
2009Q3	2,2	3,6	3,5						
2009Q4	2,4	4,3	4,4						
2010Q1	2,6	4,9	5,3						
2010Q2	2,9	5,5	6,2	4,2	9,9	10,3	8 %	-0 %	21 %
2010Q3	3,1	6,1	7,0						
2010Q4	4,5	9,9	12,4						

Table 4.: Custodial Storage (integrated) requirements for 2009-2010 and comparison with previous requirements

	CERN	T1	CERN	T1	Tape	T1
	new requirements (PB)		old requirements (PB)		variation (%)	
2009Q1	3,3	2,4				
2009Q2	3,4	3,6	7,7	10,6	-52 %	-44 %
2009Q3	3,6	4,7				
2009Q4	3,7	5,9				
2010Q1	4,1	7,0				
2010Q2	4,6	8,2	8,1	19,7	-18 %	-41 %
2010Q3	5,0	9,3				
2010Q4	6,7	11,6				