

DRAFT LCG Tier 0 and 1 Resources DRAFT

Chris Eck - 9 June 2005 - Requirements from TDR

CERN Tier0	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)			2500	5940	12270	14600	24210		3000	4100	4600	570	12270
Disk (Tbytes)			400	548	1066	1126	1468		100	354	400	272	1126
Tape (Tbytes)			2420	4660	11390	21670	33360		2300	6170	3800	500	12770
Tape (Mbytes/sec)			1723	1723	1723	2348	2348		1250	420	498	180	2348
Nominal WAN (Mbits/sec)	30000	60000	80000	100000	120000	140000	160000						

CERN Analysis Facility	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)				3560	7840	17030	27390		4500	2820	4700	320	12340
Disk (Tbytes)				2220	4147	6748	9493		1187	1418	1700	554	4859
Tape (Tbytes)				1130	2190	5300	9770		1000	530	800	860	3190
Tape (Mbytes/sec)				600	600	600	600						

Canada Tier1	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)		180	600	316	1060	1904		Offered		1060			1060
								% of Total		4%			4%
Disk (Tbytes)		34	113	222	618	924		Offered		618			618
								% of Total		4%			4%
Tape (Tbytes)		120	120	121	404	742		Offered		404			404
								% of Total		4%			4%
Tape (Mbytes/sec)								Offered					
								Required					580
								Balance					
Nominal WAN (Mbits/sec)					10000	10000	10000						

GridKa	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)	330	530	1300	3020	8820	11580	14340	Offered	4020	3020	1450	1290	9780
								% of Total	25%	13%	10%	29%	16%
Disk (Tbytes)	59	83	192	490	980	1430	1880	Offered	465	306	246	109	1126
								% of Total	5%	2%	4%	5%	3%
Tape (Tbytes)	100	150	450	1400	3000	5800	8600	Offered	1900	1000	900	400	4200
								% of Total	21%	11%	5%	19%	11%
Tape (Mbytes/sec)								Offered					
								Required					2320
								Balance					
Nominal WAN (Mbits/sec)	2000	10000	10000	10000	20000	20000	20000						

IN2P3 Lyon	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)	247	402	1171	2666	6769	10464	17325	Offered	1443	3021	1490	1200	7154
								% of Total	9%	13%	10%	27%	12%
Disk (Tbytes)	42	86	516	1591	3790	5376	8435	Offered	803	1763	780	658	4004
								% of Total	8%	12%	11%	27%	12%
Tape (Tbytes)	136	177	535	1453	3464	6384	9902	Offered	786	1153	1180	555	3674
								% of Total	9%	13%	7%	26%	10%
Tape (Mbytes/sec)		280	350	400	500	600	700	Offered					500
								Required					2320
								Balance					-78%
Nominal WAN (Mbits/sec)	2500	5000	10000	10000	10000	10000	10000						

INFN CNAF	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)		1300	1800	2400	6300	10500	18000	Offered	2310	2016	2205	693	7350
								% of Total	14%	8%	15%	16%	12%
Disk (Tbytes)		200	850	1500	3500	5600	9000	Offered	1232	1120	1225	385	4025
								% of Total	13%	8%	18%	16%	12%
Tape (Tbytes)		460	850	1500	4000	6000	9500	Offered	1320	1280	1400	440	4500
								% of Total	15%	14%	8%	21%	12%
Tape (Mbytes/sec)		240	500	1000	2000	2400	2700	Offered					2000
								Required					2320
								Balance					-14%
Nominal WAN (Mbits/sec)		2000	5000	10000	20000	30000	40000						

NL Tier1	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)	180	300	306	1677	4382	7544	12305	Offered	794	3048		1017	4859
								% of Total	5%	13%		23%	11%
Disk (Tbytes)	9	150	168	1059	2510	3753	6149	Offered	431	1778		559	2768
								% of Total	4%	12%		23%	10%
Tape (Tbytes)	10	70	143	719	1813	3548	5736	Offered	431	1163		477	2071
								% of Total	5%	13%		23%	10%
Tape (Mbytes/sec)								Offered					
								Required					580
								Balance					
Nominal WAN (Mbits/sec)	10000	10000	10000	100000	100000	100000	100000						

Nordic Tier1	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)		225	450	1050	2100	2700	3450	Offered	900	1400			2300
								% of Total	6%	6%		6%	
Disk (Tbytes)		45	105	300	1050	1950	3000	Offered	650	700			1350
								% of Total	7%	5%		6%	
Tape (Tbytes)		45	105	300	1050	1950	3000	Offered	650	700			1350
								% of Total	7%	8%		8%	
Tape (Mbytes/sec)								Offered					
								Required					580
								Balance					
Nominal WAN (Mbits/sec)		1000	2000	5000	10000	20000	20000						

Taipei Tier1	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)	166	500	950	1770	3400	3600		Offered		1870	1530		3400
								% of Total		8%	10%		9%
Disk (Tbytes)	24	120	400	900	1500	2373		Offered		825	675		1500
								% of Total		6%	10%		7%
Tape (Tbytes)	20	140	500	800	1300	2000		Offered		715	585		1300
								% of Total		8%	4%		5%
Tape (Mbytes/sec)	20	80	80	160	200	300		Offered					200
								Required					580
								Balance					-66%
Nominal WAN (Mbits/sec)	2400	2400	4800	10000	10000	10000							

UK Tier1	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)		651	980	1492	2712	4206	5857	Offered	84	1571	449	644	2748
								% of Total	1%	7%	3%	15%	6%
Disk (Tbytes)		174	450	841	1484	2087	3020	Offered	46	887	227	343	1503
								% of Total	0%	6%	3%	14%	6%
Tape (Tbytes)		250	664	1080	2074	3934	5710	Offered	46	1033	670	346	2095
								% of Total	1%	11%	4%	16%	8%
Tape (Mbytes/sec)		150	310	360	360	700	700	Offered					360
								Required					1440
								Balance					-75%
Nominal WAN (Mbits/sec)	2500	10000	10000	10000	10000	10000	10000						

US-ATLAS Tier1	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)	200	500	1125	2558	5300	9520	16266	Offered		5300			5300
								% of Total		22%			22%
Disk (Tbytes)	84	225	525	1108	3093	4619	8374	Offered		3093			3093
								% of Total		21%			21%
Tape (Tbytes)	57	168	300	603	2023	3707	6175	Offered		2023			2023
								% of Total		22%			22%
Tape (Mbytes/sec)	60	90	180	360	600	1080	1920	Offered					600
								Required					1390
								Balance					-57%
Nominal WAN (Mbits/sec)	622	2488	2488	9952	19904	29856	39808						

US-CMS Tier1	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)	82	167	728	1792	4256			Offered			4256		4256
								% of Total			28%		28%
Disk (Tbytes)	46	65	100	700	1986			Offered			1986		1986
								% of Total			28%		28%
Tape (Tbytes)			250	300	3224			Offered			3224		
								% of Total			19%		
Tape (Mbytes/sec)			240	240	900			Offered					900
								Required					580
								Balance					155%
Nominal WAN (Mbits/sec)													

PIC, Barcelona	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)					2000			Offered		850	850	300	2000
								% of Total		4%	6%	7%	5%
Disk (Tbytes)					1160			Offered		500	500	160	1160
								% of Total		3%	7%	7%	5%
Tape (Tbytes)					2320			Offered		1000	1000	320	2320
								% of Total		11%	6%	15%	8%
Tape (Mbytes/sec)								Offered					
								Required					
								Balance					
Nominal WAN (Mbits/sec)													

Summary Tier1s	2004	2005	2006	2007	2008	2009	2010	Split 2008/9	ALICE	ATLAS	CMS	LHCb	SUM 2008/9
CPU (kSI2K)	1205	4755	9410	18741	47099	62018	87543	Offered	9551	23156	12230	5144	50207
								Required	16000	24000	15200	4400	59600
								Balance	-40%	-4%	-20%	17%	-16%
Disk (Tbytes)	264	1182	3419	8711	21671	28112	39858	Offered	3627	11590	5639	2214	23133
								Required	9600	14400	7000	2400	33400
								Balance	-62%	-20%	-19%	-8%	-31%
Tape (Tbytes)	323	1580	3917	8276	24672	34065	48623	Offered	5133	10471	8959	2538	23937
								Required	9000	9000	16700	2100	36800
								Balance	-43%	16%	-46%	21%	-35%

The left part of the tables for each T1 shows the planned ramp-up of capacities, covered by approved budgets until 2008.

The row Tape (Mbytes/sec) shows the tape access bandwidth offered and required for the sum of the experiments.

The percentages in the right part of the T1 tables give for each T1 the total requirements of each experiment provided by this T1 and the percentage of the overall requirements provided by the T1.

Requirements for ATLAS, CMS and LHCb are for 2008 and compared with 2008 pledges. For ALICE the reference year is 2009, their first year with full requirements.

The left part of the summary table is just the sum of all the pledged capacities where summing up is meaningful.

Years 2009 and 2010 are obviously too small, as several centres have not provided the corresponding input.

The right side provides the split onto the experiments for the reference year.

Requirements 2008/9	ALICE	ATLAS	CMS	LHCb	SUM
CPU (kSI2K)	16000	24000	15200	4400	59600
Disk (Tbytes)	9 600	14 400	7 000	2 400	33400
Tape (Tbytes)	9 000	9 000	16 700	2 100	36800
Number of T1s	6	10	7	6	n/a