LHC Computing Grid Project

C-RRB Preparations

Christoph Eck
IT Division, CERN
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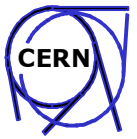


Summary

- A large part of the C-RRB preparation is the writing of the report on the LCG Project resources.
  - I will give a preview of its main contents.
- Updating data about the Regional Centre resources was difficult.
  - I will show you the results collected so far by Bernd and myself.
  - Mirco will present this point to the C-RRB.
- In October the C-RRB will discuss for the first time LCG Phase 2 resources.
  - Bernd and his task force has created a new cost estimate.
  - I will show the result in the context of the current understanding of funding for Phase 2.

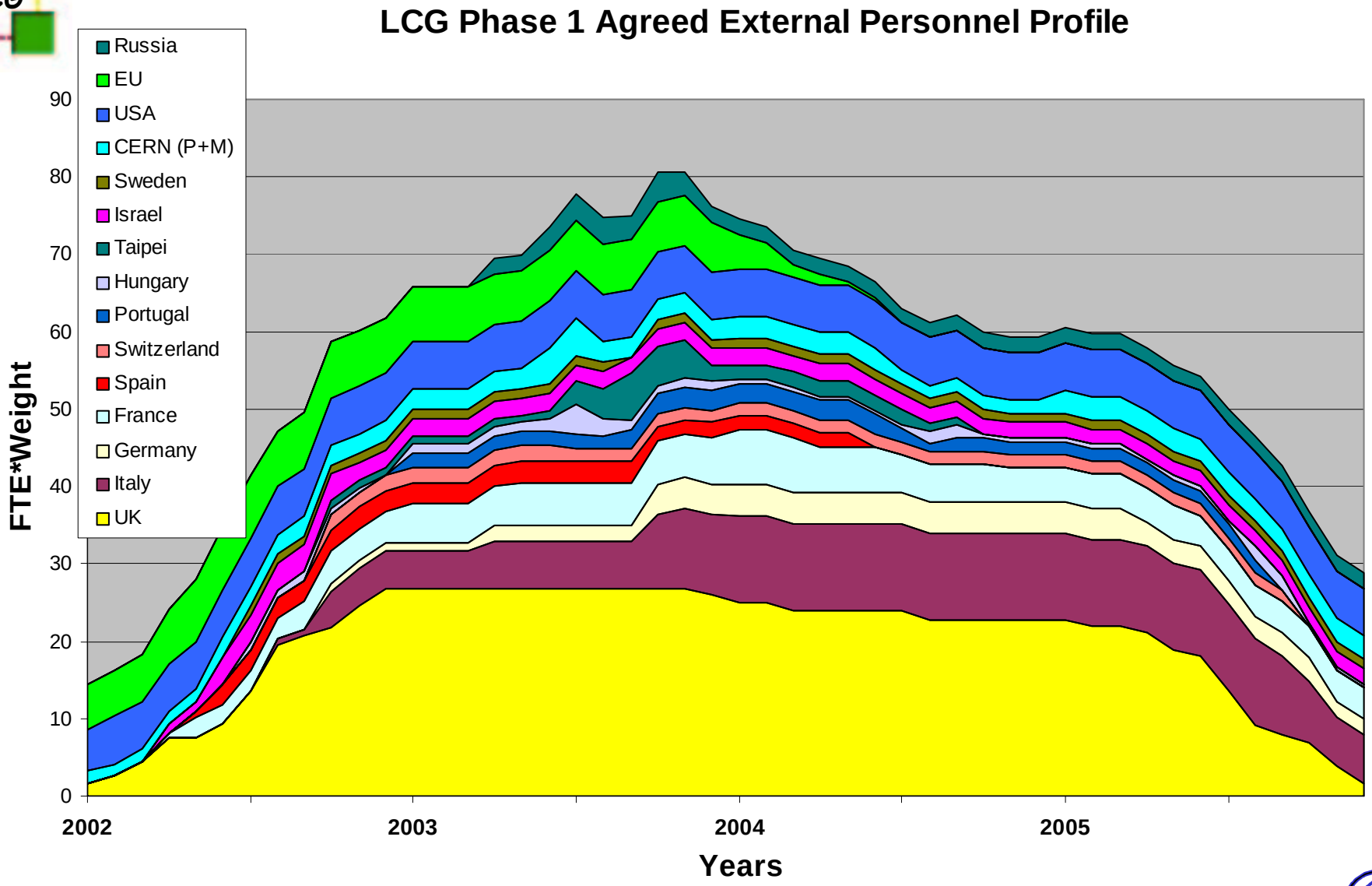
Update on Personnel Resources

- The table on the next slide presents the externally funded personnel capacity pledged to work for LCG at CERN. The given FTE values are weighted according to the experience of provided personnel.
  - The cost column lists actual costs for people paid via accounts at CERN. For others 50 kCHF per year is counted for students and trainees, 120 kCHF per year for established engineers/physicists.
  - The rightmost column shows a comparison with the April C-RRB.
  - Another plus of 5% !
- The following two charts display the FTEs of externally funded people and, for the first time the FTEs of CERN funded people working for LCG.

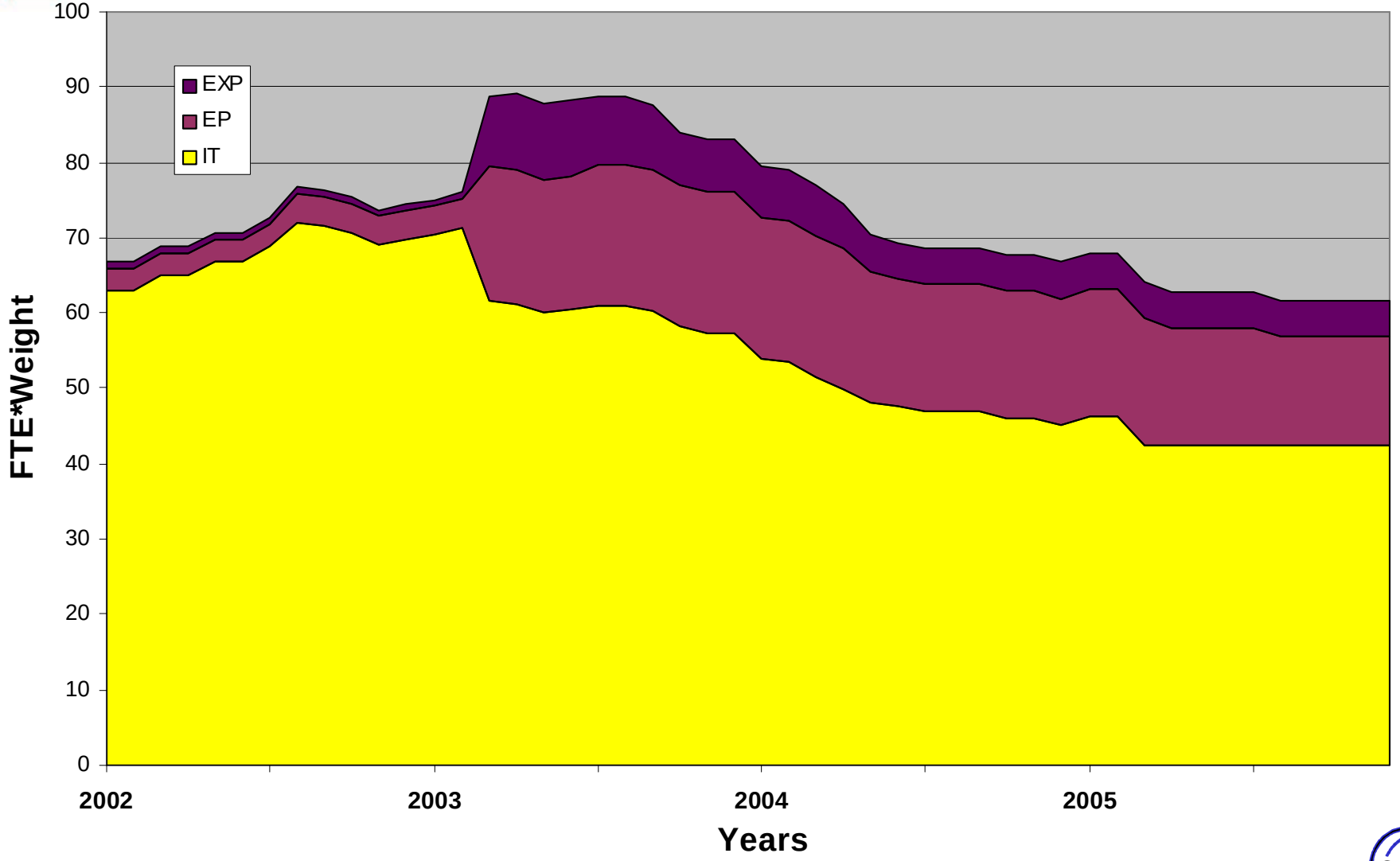
Externally funded LCG Personnel at CERN

Source of Funding	Personnel in FTE 2002	2003	2004	2005	SUM FTE	Cost kCHF	C-RRB3 SUM FTE
EU DataGrid	7.2	6.7	1.0		14.8	1775	14.1
LCG Assoc.[1]	2.2	3.0	2.3	3.0	10.5	1320	10.6
France	2.8	6.1	6.3	4.8	20.0	2230	15.1
Germany[2]	0.3	2.3	4.0	3.1	9.6	1150	16.0
Hungary	0.4	1.6	0.7	0.7	3.3	295	3.6
Israel	2.0	2.2	2.1	2.0	8.3	595	8.3
Italy-INFN[2]	1.4	6.8	11.2	10.0	29.3	3495	30.9
Portugal		2.1	2.1	1.1	5.3	530	3.6
Russia		2.2	2.0	2.0	6.2	750	6.3
Spain	1.6	2.5	0.8		4.9	490	8.4
Sweden	0.6	1.1	1.2	1.2	4.1	225	4.2
Switzerland	0.5	1.8	1.6	1.2	5.1	610	6.0
Taipei	0.3	2.6	1.3		4.2	500	2.0
UK-EPSRC	0.8	1.0	0.2		2.0	226	2.0
UK-PPARC	10.8	24.1	21.8	12.3	69.0	9650	72.1
UK-Expts	1.7	1.7	1.7	1.7	6.8	820	
USA	6.0	6.1	6.1	6.1	24.4	2930	14.5
SUM	**38.5**	**73.6**	**66.3**	**49.2**	**227.6**	**27591**	**217.6**

India[3]	0.6	8.0	10.0	10.0	28.6
Russia[4]		3.0	6.0	6.0	15.0


LCG Phase 1 Agreed External Personnel Profile
Russia
EU
USA
CERN (P+M)
Sweden
Israel
Taipei
Hungary
Portugal
Switzerland
Spain
France
Germany
Italy
UK
FTE*Weight
0
10
20
30
40
50
60
70
80
90
2002
2003
2004
2005
Years

LCG Phase 1 EP and IT Personnel Profile



Update on Materials Funding

- The table on the next slide records the current state of external materials funding to LCG at CERN.
  - The new format this time displays funds duly committed for years 2004 and 2005.
  - And funds under discussion and becoming possibly available.
    - With varying degrees of probability.
  - Again a comparison column has been added.

External Materials Funding

Source of Funding	Materials in kCHF						SUM of Materials	Type of Funding[1]	C-RRB3 SUM Materials
	2002	2003	2004 comm.	2004 poss.	2005 comm.	2005 poss.			
Belgium		200	100		100		400	cash	400
Finland		50	50				100	cash	100
France				*1000*			1000	cash	
Germany	3742						3742	computing	3742
Greece		200	100				300	cash	300
Italy-INFN		700	510	*60*	320	*60*	1650	cash	1701
Japan		190	100		100		390	in kind comp.	190
Spain		450	0		150		600	cash	591
Sweden		54					54	cash	54
Taipei		30					30	in kind comp.	30
UK-PPARC		1620	1280				2900	computing	2900
US-LHC			400	*130*		*530*	1060	in kind comp.	
Enterasys[2]		85					85	in kind comp.	200
Intel + HP[3]						*180*	180	in kind comp.	180
SUM comm.	**3742**	**3579**	**2540**		**670**		**10531**		**10388**
SUM poss.				***1190***		***770***	***1960***		
SUM total							**12491**		

LCG Materials Expenditure at CERN

- The next table list the items for which LCG spent money at CERN in 2002 and spending plans for 2003 to 2005.
- Total costs for the prototype construction were once more reduced by 300 kCHF.
  - Less system admin costs, more LAN costs
- The cost for the CC stayed the same but the distribution between 2004 and 2005 was adapted to the latest schedule of the work.

	2001	2002	2003	2004	2005	TOTAL
PROTOTYPE						
Processors -		422	220	300	500	
PC R&D + admin tests		100		50		
Disk storage -		919	120	930	780	
Mass storage -		1323	100	200	200	
Systems admin contract -		380	200		400	
Physics WAN/LAN -			225	500	500	
LCG Associates		290	310	360	360	
TOTAL PROTOTYPE	**2454**	**3434**	**1175**	**2340**	**2740**	**12143**
PREPARING CC FOR PHASE 2						
Vault		1665				
Substation			1590	805	550	
Main computer room			850	1880	500	
Air conditioning				300	450	
TOTAL CC for PHASE 2	**150**	**1665**	**2440**	**2985**	**1500**	**8740**
TOTAL PROTOTYPE OPERATION	**2604**	**5099**	**3615**	**5325**	**4240**	**20883**

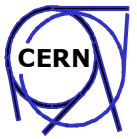
Materials Budget Evolution for LCG Phase 1 at CERN

- Figures for the total materials cost of LCG Phase 1 at CERN have evolved dramatically over the last 24 months.
  - An overview is given below.

2379/Rev	31.6	Original estimate in the Council paper
C-RRB 1	29.4	Project extended to 2005; requirements reduced by task force
C-RRB 2	23.4	Cost reductions: WAN, CC, Associates, 1.2 MCHF for UPS moved to Phase 2
Book Closing 2002	23.2	System administration costs reduced by 200 kCHF
POB 1	21.2	No further tape drives, increase in CC (covered by contingency) remaining contingency cut
C-RRB 4	20.9	Reduction in system admin. costs, increase in LAN costs

Costs and Funding for Physics Computing Materials at CERN in MCHF

Estimated Costs	**2001**	**2002**	**2003**	**2004**	**2005**	**Totals**	**Totals C-RRB3**
Sum Physics Comp.	**9.3**	**9.9**	**10.6**	**10.7**	**9.7**	**50.2**	**49.7**
Base Physics	6.7	4.8	7.0	5.4	5.5	**29.3**	**28.5**
LCG Phase 1 at CERN	2.6	5.1	3.6	5.3	4.2	**20.9**	**21.2**
Funding							
Income per Year	**9.3**	**9.9**	**10.6**	**9.5**	**8.6**	**47.9**	**45.6**
Base Physics	6.7	4.8	7.0	5.4	5.5	**29.3**	**31.1**
Addn. CERN Funding	2.6	1.4	0.0	1.6	2.5	**8.1**	**4.1**
External Income	0.0	3.7	3.6	2.5	0.7	**10.5**	**10.4**
Annual Balance	0.0	0.0	0.0	-1.2	-1.1		
Cumulative Balance	**0.0**	**0.0**	**0.0**	**-1.2**	**-2.2**		**-4.1**



Budget Plan for LHC Computing

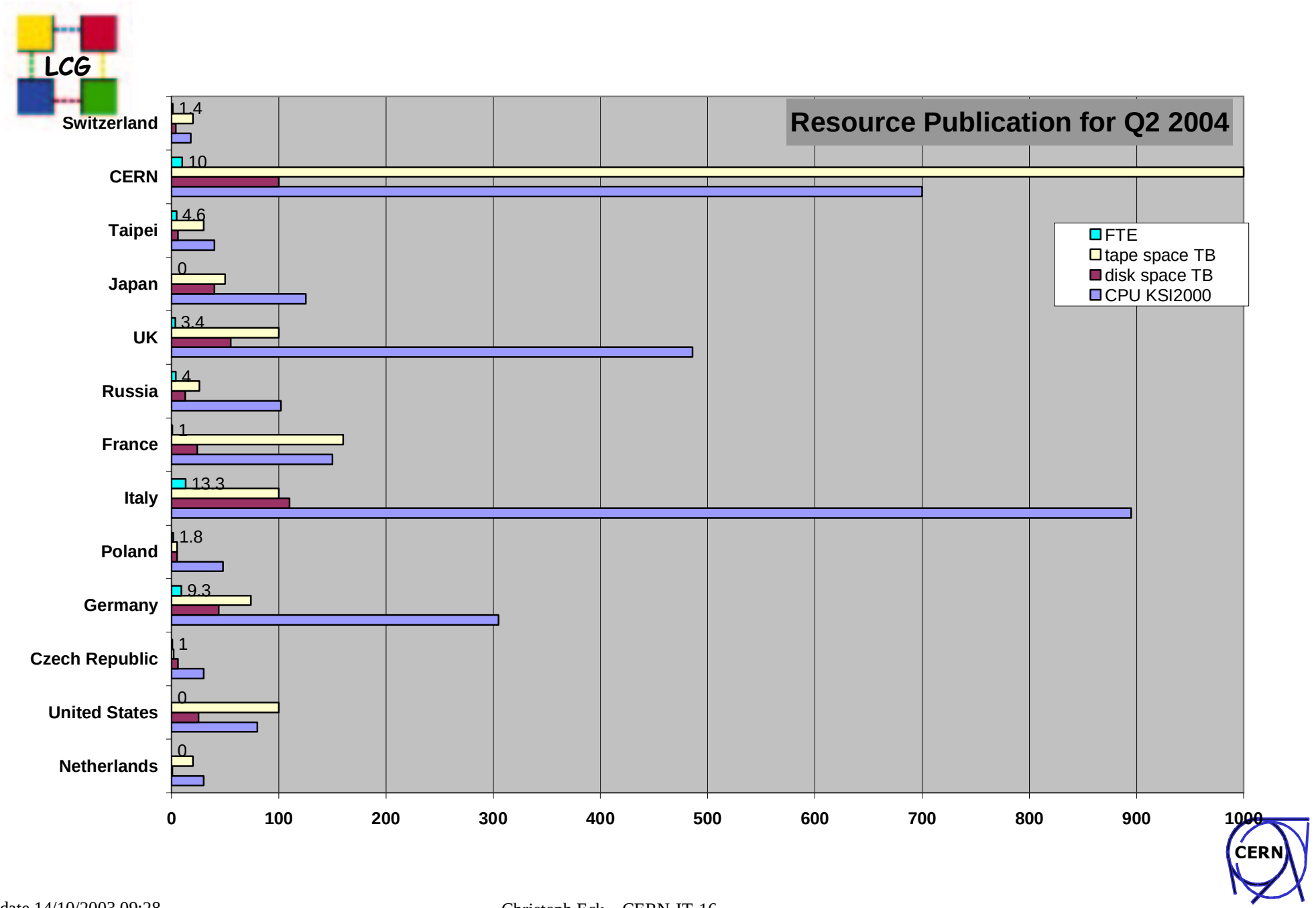
- The previous slide gives the budget for physics computing at CERN.
  - Since the creation of EP-SFT group there is materials money for this also in EP.
  - The row "Addn. CERN Funding" displays now explicitly all funds invested by CERN into LCG.
  - We lack now "only" 2.2 MCHF !
    - Improvement mainly due to 1.4 MCHF consolidation money from CERN and 300 kCHF cost reduction.
- But there is the possibility for a balanced budget in 2004, if France, US-LHC and Italy confirm their possible contributions for 2004.

Regional Centre Capacity

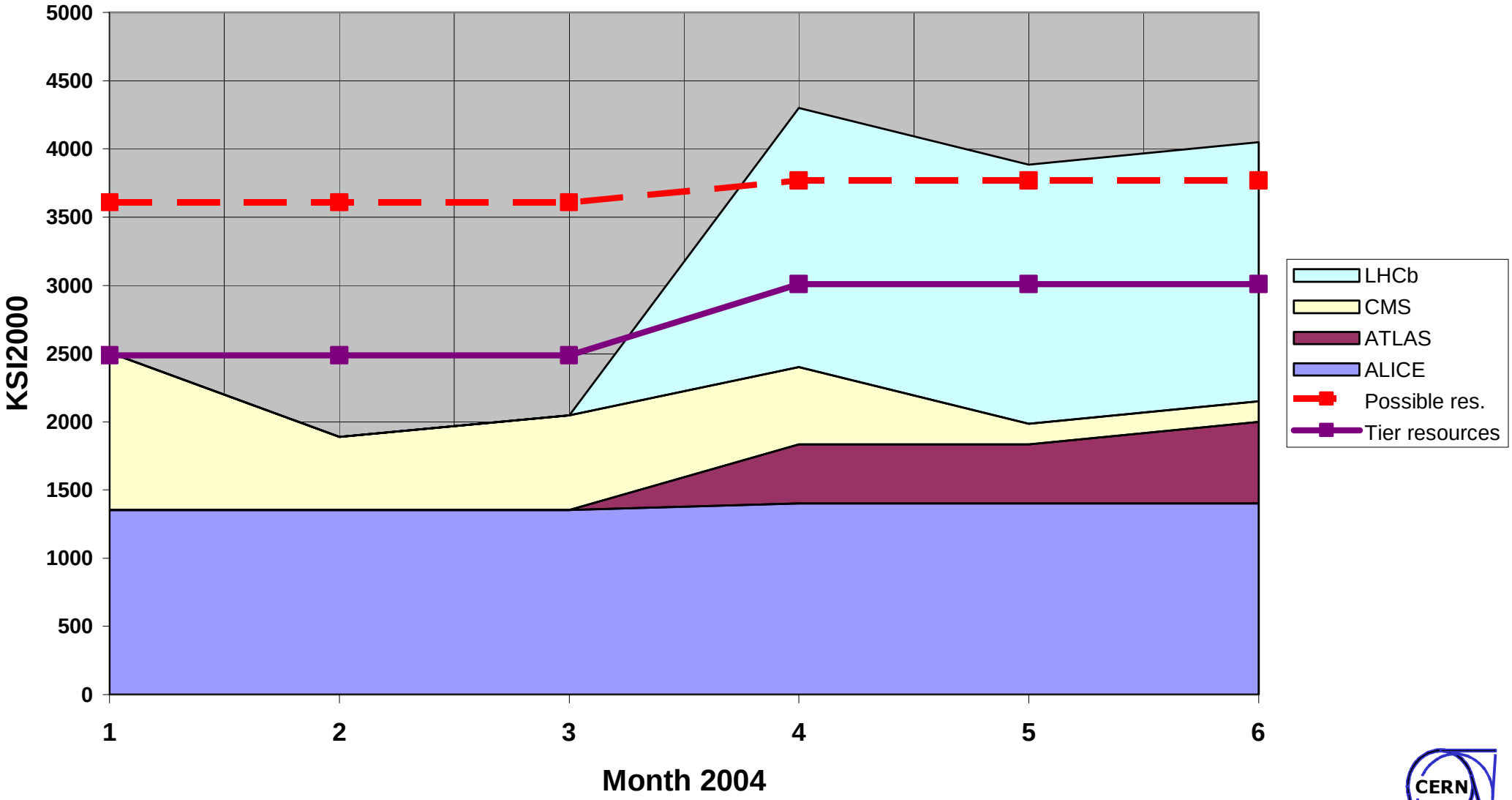
- The table on the next slide gives an overview of the results of the update request launched in August.
  - Three countries didn't answer at all, only BNL from the US.
  - Except for Germany, Italy and CERN updated capacity numbers went down, sometimes massively.
  - The available manpower reported by France is inconsistent with the hardware capacity.
- The following charts show the result graphically and give the comparison with the capacity required by the experiments.

Regional Centre Capacity 2Q2004

Country	CPU Capacity kSI2k	Disk Capacity TB	LCG Support FTE	Online Tapes TB	Ann. CPU for 2004 May 2003	Ann. CPU for 2003 May 2003
CERN	700	100	10.0	1000	700	400
Czech Rep.	30	6	1.0	2	60	25
France	150	24	1.0	160	420	140
Germany	305	44	9.3	74	207	81
Holland	30	1	3.0	20	124	70
Hungary					70	30
Italy	895	110	13.3	100	507	276
Japan	125	40		50	220	20
Poland	48	5	1.8	5	86	63
Russia	102	12.9	4.0	26	120	56
Taipei	40	5.8	4.6	30	220	75
UK	486	55.3	3.4	100	1656	1494
USA[1]	80	25		100	801	770
Switzerland	18	4	1.4	20	26	26
Spain					150	150
Sweden					179	179
Sum	**3009**	**433**	**53**	**1687**	**5547**	**3855**


Resource Publication for Q2 2004
Switzerland
CERN
Taipei
Japan
UK
Russia
France
Italy
Poland
Germany
Czech Republic
United States
Netherlands
1.4
10
4.6
0
3.4
4
1
3.3
1.8
9.3
1
0
0
FTE
tape space TB
disk space TB
CPU KSI2000
0
100
200
300
400
500
600
700
800
900
1000

Resources and Requests



Resources and Requests

- The previous slide shows clearly that the officially announced resources are insufficient.
- Assuming that the countries, who did not reply, have nevertheless resources available, an estimate of the inclusion of these resources has been put into the last chart.
  - Still a very tight fit of resources and requests !
- Without realistic capacity figures announced by ALL regional centres correct capacity planning for Data Challenges will not be possible.

LCG Phase 2 Resources at CERN

- The next table shows the development of costing and funding figures for Tier 0+1 installation and operation at CERN since February 2002.
- The "Corrected Task Force 1" column doesn't refer to an error of that Task Force, but to an error of the February 2002 estimation of the cost of tape media.
- The overall result is a shortfall of 20.2 MCHF, 4.4 MCHF for materials, the rest for 105 FTE years.

Summary of Phase 2 Costs and Funding

	Task Force 1 (feb02)	Corrected Task Force 1	Move of UPS Costs	july03 Estimate
Phase 2 Costs	*MCHF*	*MCHF*	*MCHF*	*MCHF*
Tier 0+1 Installation & Operation	63.7	71.2	72.4	70.0
Base Physics	13.2	13.2	13.2	13.1
Additional Personnel	21.9	21.9	21.9	16.7
Total Estimated Cost of Phase 2	**98.8**	**106.3**	**107.5**	**99.8**
Phase 2 Funding -	***CC/2430***			***FC/4690***
Physics Base Budget	19.7	19.7	19.7	19.3
Special Phase 2 Funding	59.4	59.4	59.4	59.4
Total Funding	**79.1**	**79.1**	**79.1**	**78.7**
Shortfall assumed to be found from external sources	**19.7**	**27.2**	**28.4**	**21.1**
Personnel funded from base CERN budget				41.4
Total Estimated Cost of Phase 2 with CERN pers.				**141.2**
Personnel Already Committed from External Sources				0.9
Still to be found from external sources				**20.2**