

**GridPP**  
UK Computing for Particle Physics

**GridPP Project Management Board**

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# GridPP Resource Status

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## Overview

The audited SLA for FY09 was previously presented in the documents for the December 2010 Oversight Committee meeting. The provisional outturn figures for the FY10 SLA are used here to show the present understanding of the situation at the end of the GridPP3 project. These figures will be updated once all final adjustments have been made and the STFC accounts are closed and audited, though we believe the figures here to be reasonably good estimates.

## GridPP3 Financial Status

Table-1 below shows the GridPP3 financial situation at the end of April 2011 in terms of hardware, staff costs in each of the areas of the project and miscellaneous expenditure, which includes items such as travel. Spend in bold has been finalised, while non-bold text is estimated expenditure.

	WG	FY08	FY09	FY10	TOTAL
Tier-1 HW	A	<b>£1,658,531</b>	<b>£1,938,833</b>	£1,224,900	£4,822,264
Tier-2 HW	B	<b>£2,186,000</b>	<b>£269,370</b>	<b>£1,746,000</b>	£4,201,370
Tier-1 Staff	A	<b>£993,757</b>	<b>£1,339,959</b>	£1,509,000	£3,842,715
Tier-2 Staff	B	<b>£926,630</b>	<b>£967,401</b>	£1,004,866	£2,898,897
Support Staff	C	<b>£678,610</b>	<b>£552,694</b>	£486,953	£1,718,257
Operation etc	D	<b>£726,778</b>	<b>£829,597</b>	£1,054,954	£2,611,328
Management	E	<b>£316,288</b>	<b>£336,318</b>	£356,838	£1,009,443
Misc. staff	F	<b>£46,176</b>	<b>£47,426</b>	£49,042	£142,644
Grants Staff		<b>£1,988,146</b>	<b>£1,981,062</b>	£2,122,653	£6,091,861
SLA Staff		<b>£1,700,092</b>	<b>£2,092,332</b>	£2,350,400	£6,142,824
Misc. spend (travel etc.)	G	<b>£179,227</b>	<b>£173,408</b>	£182,400	£535,035
<b>Total</b>		<b>£7,711,996</b>	<b>£6,455,005</b>	<b>£7,614,953</b>	<b>£21,781,954</b>

Table-1: Provisional GridPP3 Final Expenditure

The overall project budget is shown in Table-2 below. Originally allocated funds for GridPP3 were £22,874,628, plus a working allowance of £247,000. Early in 2010 the STFC Tier-1 hardware allocation was reduced by £855,333 to £1.38m, and then subsequently revised up to £1.447m in February this year. This leads to a total of £22,086,295 for the available GridPP3 funds in Table-2.

<b>Total Project Spend</b>	<b>£21,781,954</b>
<b>2010 Tier-1 reduction</b>	<b>£788,333</b>
<b>Total funds available for GridPP3</b>	<b>£22,086,295</b>
<b>Project Balance (under-spend)</b>	<b>£304,341</b>

*Table-2: Provisional GridPP3 Project Balance.*

Notes:

- a) The SLA FY10 outturn is provisional and has not yet been audited. The figures have been obtained from the SSC on the 4<sup>th</sup> May 2011. Final accruals adjustments and corrections are not yet all included. These may result in some additional charges to GridPP during FY10.
- b) The SLA pay costs per FTE have increased from an estimate of £80,300 at the last meeting to £82,182 for FY10. The details of this are now coming from the SSC system. Projects are now charged average pay per band, rather than actual pay for each individual. This has resulted in increases across PPD including the GridPP project.
- c) The Tier-1 hardware budget that had been reduced by £855,333 in FY10 was re-discussed with STFC and adjusted again during February 2011. STFC confirmed the Capital spend of £1.1m as previously agreed but allowed an increase in the Resource spend on hardware from £100k up to £347K for a total Tier-1 hardware budget of £1.447M.
- d) The anticipated financial pressure on GridPP4 hardware, together with the uncertainty associated with Capital expenditure at the end of GridPP3 and the start of GridPP4, led to a plan to purchase ten T10KC tape drives plus the associated servers and media at the end of GridPP3. This plan was “aggressive” in that the technology would only become available in the first quarter of 2011 but it offered GridPP the best opportunity to reduce GridPP4 costs (by moving to the new generation of drives earlier than planned) and possibly the flexibility of moving a Capital purchase between financial years at short notice. Unfortunately, despite a delivery date of early March, the drives finally arrived in the UK on April 1<sup>st</sup> and their cost (£207k) must now be charged to GridPP4. The tape media did arrive on time and was funded by GridPP3 (£67K).
- e) The Tier 2 hardware grants had already been issued at the time of the last OC meeting. In February, STFC advised us that they would like as much the money to be spent in FY10 as possible despite some of the end dates on these grants being later. The sites managed to ensure that most of the hardware was delivered before the end of the financial year. In the tables above *all* of the Tier-2 hardware spend is shown as spent since it will all be charged to GridPP3.
- f) Travel costs for FY10 were £168k, which is less than previous years and is discussed in the last section of this paper.

## **GridPP3 Staff effort**

GridPP quarterly reports have now been submitted for Q1 2011, so staff effort can be tracked to the end of the project. The figures from the Tier-1 are provisional but provide a good indication of actual levels. In the last few months of the project there has been a loss of four Staff from the SLA.

- Two of the fixed term contract posts resigned before they could be extended. GRIDPP fixed term appointments at RAL were initially extended to March 2012 and then subsequently extended indefinitely (owing to employment law constraints). A further four Tier-1 staff have been lost (three resignations and one death in service).
- Lost posts were distributed across the Operations and Support team, being from Storage, Tape, Experiment Support and Core Operations
- Only two of the staff losses occurred during GridPP3, and as the Tier-1 had been over booking as agreed, the final reporting level was very close to planned.
- There will be a significant shortage at the start of GridPP4. There are now five vacancies at the Tier-1, and recruitment has started. Planning is underway to re-prioritise and re-distribute work, but the Grid team in particular (3 losses) is particularly vulnerable. It is probable that availability will suffer, particularly when remaining staff are away.

At the Tier 2s there have been two departures due to the reduction in support posts at the UCL and Bristol sites in GridPP4. QMUL and Brunel are currently recruiting one post each. Glasgow will be refilling the Data Processing post. In addition the LHCb Ganga support post based at Imperial has left, and recruitment is under way to find a replacement.

The effort delivered in FY10 is shown below in Table-3.

Work Area	GridPP funded effort (FTE)	Fraction of GridPP funded effort delivered	Additional effort delivered (FTE)	Total effort delivered
Management	3.5	100.0%	0.0	100%
Miscellaneous	1.1	100.0%	0.0	100%
Operations + experiment	6.5	100.0%	5.0	178%
Support	5.9	100.0%	0.6	111%
Tier-1	18.0	100.0%	4.9	127%
Tier-2	18.4	100.0%	10.9	159%
<b>Total</b>	<b>53.4</b>	<b>100.0%</b>	<b>21.6</b>	<b>140%</b>

*Table-3: Effort delivered to GridPP3 during FY10*

The cumulative effort over GridPP3 is presented in the GridPP3 review document GRIDPP-PMB-155-Review.pdf

## GridPP3 Travel

The travel spend in FY10 is shown in bright green in Figure-1 below, and follows the trend of previous years. The figures are gathered from the SSC system and are provisional at this stage as not all expense claims will have been processed.

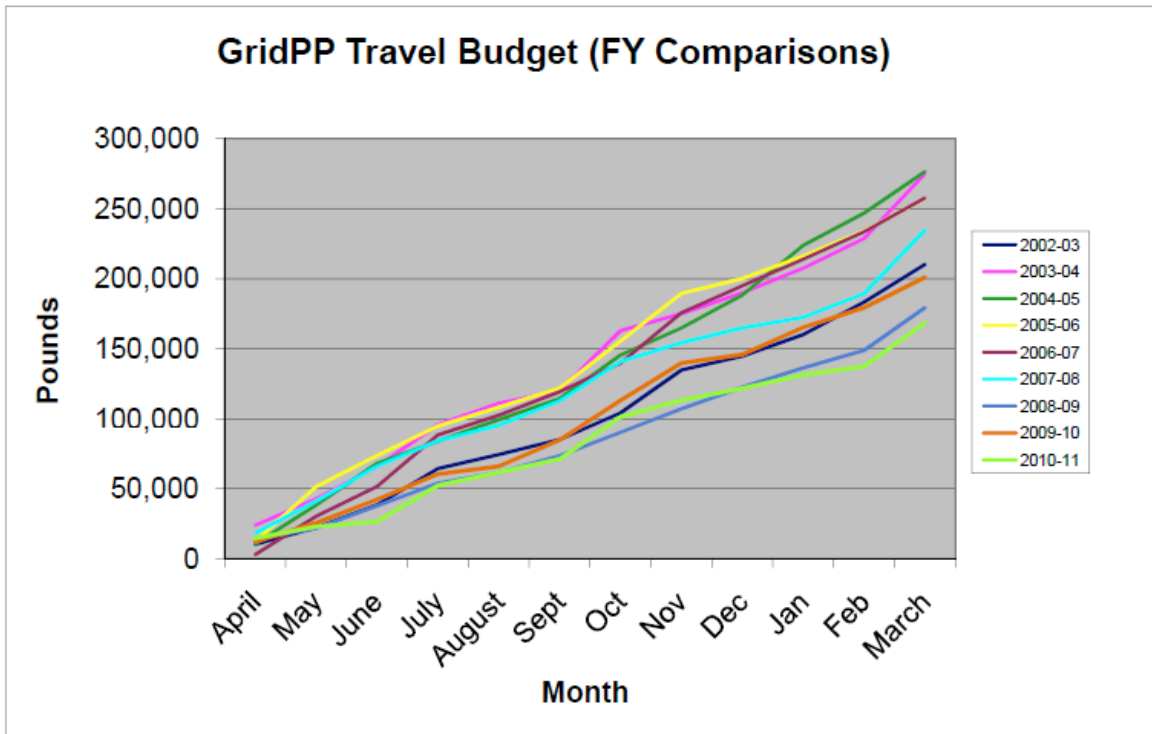


Figure-1: GridPP travel budget

The travel-spend for FY2010/11 is lower than in previous years. This reflects the consolidation of EGEE activities into EGI as well as the more stable operation of the Grid in production mode during LHC operations. Fluctuations early in the year are largely as a consequence of the change of financial systems at STFC. The 'knee' in the autumn can be attributed to increased travel associated with the GridPP collaboration meeting and the EGI Technical Forum. The rise in March 2011 similarly results from large GridPP and EGI meetings as well as end-of-year effects.

## GridPP4 Financial Planning

Since the last Oversight Committee, STFC has confirmed the full GridPP4 budget with one remaining caveat concerning the Tier-2 Hardware funding. Previously, only the first two out of the four years had been confirmed. The award as currently approved is reproduced in Figure-2:

WP	Description		FY11	FY12	FY13	FY14	Total
A	Tier-1	Staff	1,607	1,623	1,639	1,656	6,526
		Hardware	1,452	1,417	1,664	1,277	5,810
B	Tier-2	Staff	1,515	1,530	1,545	1,560	6,150
		Hardware	1,394	0	1,303	0	2,697
C	Deployment, operations and support		597	603	609	615	2,423
D	Experiment support		465	470	383	387	1,705
E	Management		296	279	244	246	1,065
F	KE/EI and admin		49	50	51	51	201
G	Travel and other costs		316	311	315	321	1,263
<b>Total</b>			<b>7,690</b>	<b>6,282</b>	<b>7,754</b>	<b>6,114</b>	<b>27,840</b>

In summary, the full award, including the interim award already announced, commences on April 2011 and now runs for a period of 4 years, i.e. from 1/04/11 to 31/03/15, and comprises the PPAN recommended levels of support for Tier 1 Hardware, university-based and RAL-based staff posts, consumables, travel and other specified costs. This should allow the collaboration to now go ahead with planned staff appointments for the full period of the award. However, **please note** that the funding approval for Tier 2 Hardware costs included above, which is affected by STFC's capital funding position, has still to be given, but I hope to be able to confirm this shortly.

Figure-2: GridPP4 award from STFC.

The numbers above are based on the GridPP4 proposal written 17 months ago. Since then, the LHC schedule has changed to include running throughout 2012; hardware prices have risen due to the economic downturn (reduced demand/volumes and exchange rates) rather than fall, as expected from Moore's Law; and the experiments have had to change their computing models to handle far higher pile-up rates (due to the success of the LHC) than planned. In addition, the late arrival of GridPP3 hardware at RAL has transferred £207k of GridPP3 hardware costs onto the GridPP4 hardware budget. The financial impact of these events is compounded by the fact that the first-tranche of GridPP4 grants issued by STFC came in about 2.5% higher than planned due to changes in the calculations of indirect costs and inflation factors at the institutes. Although a small percentage, it is 2.5% of almost £20m, which translates to about £500k over the life of the project.

In response to these developments, GridPP has evolved the financial plan and the current version is presented in Table-4 below. However, this is just a snapshot because the experiment resource requests for 2012/3 are not yet finalised; in addition, the experiments have not yet provided any estimates for 2014 and 2015, which must also be funded from GridPP4. The two key points are:

1. Table-4 shows that there is a shortfall of funding for Tier-2 hardware of £345k, which could be reduced to £196k if the surplus on the Tier-1 hardware line can be used to fund Tier-2 hardware at PPD. The situation will continue to evolve as the experiments refine their 2014 and 2015 requirements and we have some hope that hardware costs will be better than the current assumptions. This estimate is based on the CRSG recommendations updated on May 13<sup>th</sup> 2011 and includes the increase in assumed Tier-2 efficiency, which effectively reduced the Tier-2 CPU

requirement by 10%. However, it must be noted that we are proposing to spend less capital in FY11 than originally proposed. Ultimately, any shortfall in funding would result in a reduced Tier-2 pledge in 2014 and 2015.

2. Integrated over all the work packages, there is a £510k shortfall in the recurrent budget to fund staff. Again, there is a degree of uncertainty due to the effects of pay-freezes and/or average-band costs at RAL. We plan to manage the shortfall by reducing funding for every post by one man-month per FTE at the institutes and slightly more than this at the Tier-1, as necessary to balance the books. For this reason, we have not rushed to issue the second-tranche GridPP4 grants before the picture becomes clearer, but the P.I.'s have been forewarned to save a month of funding per FTE when and where possible. To facilitate this, the two GridPP4 grants will need to overlap for some period and STFC has agreed that six months will be possible

WP		FY11	FY12	FY13	FY14	Total	Difference
A	Tier-1 Staff	£1,607,154	£1,623,226	£1,639,458	£1,655,852	£6,525,690	£310
	Tier-1 Hardware	£1,662,794	£1,247,725	£1,462,242	£1,288,125	£5,660,885	£149,115
B	Tier-2 Staff	£1,551,532	£1,588,822	£1,630,749	£1,673,811	£6,444,915	-£294,915
	Tier-2 Hardware	£1,000,000	£0	£2,041,882	£0	£3,041,882	-£344,882
C	Dep/Ops/Support	£596,261	£606,565	£617,823	£629,337	£2,449,986	-£26,986
D	Experiment Support	£471,027	£477,656	£437,369	£444,100	£1,830,152	-£125,152
E	Management	£321,834	£309,582	£278,495	£285,650	£1,195,561	-£130,561
F	KE/EI and admin	£34,416	£35,277	£36,247	£37,244	£143,183	£57,817
G	Travel and Other Costs	£318,316	£310,074	£311,849	£313,642	£1,253,881	£9,119
<b>TOTAL</b>		<b>£7,563,334</b>	<b>£6,198,926</b>	<b>£8,456,115</b>	<b>£6,327,761</b>	<b>£28,546,136</b>	<b>-£706,136</b>

Table-4: Current GridPP4 Financial Plan. A negative number in last column shows a shortfall compared to the award in Figure-2

## Summary

The provisional outturn presented for the GridPP3 project shows an under-spend of £304,341 compared to the funds actually made available. This primarily arose due to the late delivery of Tape Drives (£207,000) and represents a 1.4% under-spend on the total budget of £22,086,295. The project received all of the effort funded in the last two quarters but there are now five vacancies at the Tier-1 as staff identified alternative opportunities before the extension of fixed term contracts could be confirmed.

A preliminary GridPP4 financial plan is presented. There is pressure on the Tier-2 hardware budget and the experiment resources requirements at the Tier-1 and Tier-2 for 2014/15 are not yet well established. Staffing costs on the first tranche of grants has come in 2.5% higher than estimated but plans have been formulated to address this over the duration of the project.