

MAGEEC Q1 Review Meeting





mageec.org



Project Scope

- The objective and context remains unchanged.
- Progress is to plan, so we expect to deliver on time.
 - Deliverables largely completed to schedule so far.
 - Plans in place to resolve delayed and rescheduled deliverables.









Risks Update

- The risk of lack of staff at Bristol has been reduced via alternative staff approach, hiring undergrad students during breaks in academic calendar.
- Identified risk of not identifying our own application feature set, mitigated through MILEPOSTs features as a backup set.
- Risk of lack of benchmark and test programs, mitigated by community engagement and more staff resource at Bristol.
- Risk of data gather phase taking too long (e.g. due to reliability of boards), mitigated through use of redundant boards and exploration of smaller data sets whilst more data is being gathered.
- Second power measuring board also doesn't work, low impact as we have working existing boards.









Exploitation

- Planned high level industrial and academic exploitation outputs remain the same.
 - Industrial: Optimise/build system database for customer-specific architectures
 - Academic: Paper publications, awareness/involvement with students
 - Both: Conference presentations, community involvement
- We have achieved
 - mageec.org website, IRC and Mailing Lists
 - GNU Tools Conference, TSB EEC Annual Meeting
 - BEEBS 1.0 (http://www.cs.bris.ac.uk/Research/Micro/beebs.jsp)
 - Paper Submissions (http://arxiv.org/abs/1308.5174, http://arxiv.org/abs/1303.6485)
- Plan going forward
 - Conference/Workshops
 - 2013: Wuthering Bytes, US LLVM
 - 2014: HiPEAC, FOSDEM(?), DATE, Euro LLVM, GNU Tools Conference, ILP, ECML
 - Increase number of BEEBS benchmarks
 - Paper submissions
 - Student involvement/projects, Embecosm employment





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Work Package Summary

- The following packages are in progress or complete:
 - Work Package 1: Iterative Design of Compiler Framework
 - Work Package 2: Iterative Implementation of Compiler Framework
 - Work Package 3: Design and Build of Hardware Measurement Platform
 - Work Package 4: Training Set, Test Program, Test Hardware and Case Study Development
 - Work Package 5: Theory of Analysis of Machine Learning Techniques









WP1 Design of Compiler Framework

- Decision of GCC/LLVM for first implementation
 - GCC first implementation
- Design documentation for compiler integration/machine learning interface/feature selection
 - Low level documentation for interfaces at http://mageec.org/doxygen
 - High level design on project wiki, http://mageec.org/wiki/Design_overview
 - Refinements for future iterations to occur during implementation (WP2)









WP2 Implementation of Compiler Framework

- First iteration of compiler framework
 - Stub functions implemented
 - In line commenting generates interface documentation for WP1.
 - First elements of high level documentation on wiki.
- Second iteration (not yet started)
 - LLVM based once GCC plugin complete, acting as verification of framework portability.









WP3 Design and Build of Hardware Measurement

- Design board
 - New energy measurement board designs
 - First failed to deliver required functionality
 - Currently working on second
 - Existing designs are currently supplying necessary data
 - Tested with our data gather flow and shown to give accurate energy results.
 - Designs open sourced
 - https://github.com/mageec/powersense-shield









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WP4 Training Set and Test Programs

- Test Programs
 - Core set based on BEEBS (http://www.cs.bris.ac.uk/Research/Micro/beebs.jsp) has been completed
 - Scope for increasing this benchmark suite as part of the project
- Need for larger programs
 - This is still ongoing with ongoing discussion/inspiration from community members.
 - Possible sources include compiler regression suites, popular open source packages
- Embedded System Setup
 - Working hardware from WP3 running software from WP4
 - Details on test execution at http://mageec.org/wiki/Collecting_Energy_Results_with_the_Automated_Test _Framework





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WP5 Machine Learning

- Literature Review
 - Built up knowledge base, review of which is to be prepared for a technical note.
 - Also building on experience via discussions with MILEPOST team.
 - Identification that feature space reduction is a bad idea.
- Selection of Core Algorithm
 - Identified via experimentation (WEKA) and discussions above
 - Three possibilities: J48, KNN, SVM
 - Final selection by end of September based on reviewing each for practicability, performance, reliability.









UoB Budget Deviances

Some significant deviances from forecast can be explained in two manners:

- Use of Summer students not post-doc
- Conference travel was uniformly budgeted across the project in both DI:Travel and DI:Other. It should have been forecast more lumpy (corrected in updated forecast).

Line	Deviance	To come	Comment
DI: Staff	(£1978)	£0	Summer students instead of post-doc. Some staff time moved to Christmas and Easter
DI: Travel	(£616.10)	£147.52	Meeting travel spent but no conferences attended. Conferences Planned for Qs3,4,5,6
DI: Other	(£257.42)	£43.06	Hardware board money spent but no conferences attended. Planned for Qs3,4,5,6







IMBECOSM

Embecosm Budget Deviances

- Significant changes to actuals:
 - Infrastructure engineer slightly cheaper than expected
 - Pension payment for project manager is lump in Q3
 - Capital expenditure was wrongly accounted in initial forecast (no depreciation)
 - GNU conference was in California, but no registration fee
 - More travel to Bristol than planned

- Changes to forecast
 - Lumpy project manager pension and pay
 - Slightly cheaper infrastructure engineer
 - Allow for buying some small machines in Q4 when we know more
 - Properly show depreciation
 - Visit to US LLVM conference in Q2
 - Planned conferences have no/small conference fees – move to travel

	Q1	Q2	Q3	Q4	Q5	Q6		
	Jun-Aug 13	Sep-Nov 13	Dec 13 – Feb 14	Mar-May 14	Jun-Aug 14	Sep-Nov 14	Total	Variance
Labour	6,140.41	6,491.46	11,529.68	7,925.42	15,721.51	15,956.51	63,765.00	-889.00
Overheads	895.03	946.20	1,680.57	1,155.21	2,291.58	2,325.83	9,294.42	-129.58
Materials	429.07	200.00	-	300.00	-	-	929.07	-70.93
CapEx	1,650.90	-	-	-	-	-	1,650.90	950.90
Depreciation	-137.58	-137.58	-137.58	-137.58	-137.58	-137.58	-825.48	-825.48
Subcontract	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	2,400.00	14,400.00	-
T&S	5,028.03	1,500.00	207.60	2,303.80	3,091.30	1,000.10	13,130.83	3,490.83
Conf Fees	-	80.00	-	-	-	-	80.00	-2,320.00
Open Access Fees	-	-	-	1,700.00	-	1,700.00	3,400.00	-
Total	16,405.86	11,480.08	15,680.27	15,646.86	23,366.81	23,244.86	105,824.73	206.73
Variance	570.28	-396.70	3,554.39	-1,272.60	-1,658.93	-589.70	206.73	

