Computing Strategy

School of Informatics

26th November 2008

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1 Long-term vision and strategic objectives

The aim of the Informatics Computing Service is to ensure that members of the School of Informatics (staff, students and visitors) receive computing services necessary for their research, teaching and knowledge transfer activities. These services should be efficient, state-of-the-art, fit to users' requirements, and good value for money. Appendix A outlines the evaluation processes that we have established to ensure that we are fulfilling this aim.

Strategic objectives

We have four principal strategic objectives underpinning the Informatics Computing Strategy:

S1 Maintenance, review and update of state-of-the-art computing environment for all members of the school.

S2 Increased interoperability of Informatics Computing with College and IS services.

S3 Development and deployment of new computing services.

S4 Engagement with international best practice.

In addition, we have specific objectives relating to the computing infrastructure and to the activities of the school: research, teaching and knowledge transfer.

Infrastructure   We are committed to providing an infrastructure that ensures that members of the school get those services that they they need. These services may be provided by the school or centrally. Using centrally provided services, particularly commodity services, releases effort to better meet specific research/teaching needs and to develop new services.

I1 Transfer of commodity services to IS (or college), and working with IS to ensure that centrally provided services meet the needs of Informatics.

I2 Provision of Informatics know-how and technologies to college and university level, and beyond.

I3 Development of new services.

I4 Review and evaluate computing infrastructure change taking account of changing user needs and general computing trends.

Research   In addition to providing a flexible, responsive environment for research in the school, we must meet the specific research requirements across our research institutes, and structure research computing support to be well-matched to the ways researchers propose and carry out research projects.

R1 Continued development of lightweight, responsive support for research computing that is fully compatible with full economic costing of research

R2 Ensuring that Informatics users get efficient, responsive access to high performance research computing and storage facilities

R3 Provision of support for interdisciplinary and collaborative research projects.

Teaching   In addition to provide a stable environment for the schools teaching activities, we shall develop appropriate instrumentation in the teaching environment to support research/teaching synergy.

T1 Enable student creativity and flexibility through increased personalization of the computing environment.

T2 Support research-led teaching by providing support for the transfer of research tools to our standard teaching platform.

T3 Ensuring that our infrastructure complies with open e-learning standards where possible.

Commercialization and knowledge transfer   Informatics Computing can support the schools knowledge transfer activities by providing a bridge between research and use.

C1 Using the school's commercialization infrastructure as a driver to develop prototype services from applied research in Informatics.

Strategic assumptions

The computing strategy outline in this document makes a number of assumptions.

- Informatics computing does not take place in a vacuum and our strategy reflects a number of general computing trends, such as mobility, personalization and multimedia computing.
- Development of the school strategy will be coupled with the university and college computing strategies.
- Several of these objectives require additional resourcing (eg via JISC, the Research Councils, SFC) and thus there needs to be some complementarity with the aims and objectives of the political and funding environment.
- Informatics Computing serves over 300 staff, over 250 research students, over 120 taught postgraduate students, over 750 undergraduates, and over 100 visitors and associates.

2 Report on 2007/2008

Goals

Our goals for 2007/8 were dominated by the move to the Informatics Forum which resulted in the schools activities being moved from four sites across the university to the Forum and Appleton Tower.

1. **Goal** Move to to the Informatics Forum (expected spring 2008). This includes design, procurement and deployment of infrastructure, planning the move of desktops and services, and restructuring support desks.

   Progress The move was completed in July 2008. There are still a number of ongoing related issues. The air-conditioning in the Forum server room has not proven to be reliable so our compute clusters, having moved to the Forum before problems were apparent, have sat idle for four months. The problems have also delayed the move of servers located in the old server rooms at FH, BP and KB. The AV facilities still require further work to be fully serviceable.

2. **Goal** Continued investigation of migrating commodity services to centrally provided services.

   Progress We continued with our migration to the central Staffmail service, began promoting the central Wiki service for certain new Wiki requirements and investigated the central Call Management System.

3. **Goal** Improved collaboration with IS and other schools.

   Progress There has been collaboration on development of LCFG SL5 (with IS and other schools), GPFS (with IS), the Forum network connectivity (with IS), distributed computing (ECDF).

4. **Goal** Reduction of energy footprint of the School's desktops. These are currently powered 24/7 for maintenance reasons, we will look at hibernating desktops overnight (weighing the benefits against use in Condor pools). Cost benefit estimate is £15-20k per annum.

   Progress Project to investigate possible approaches was completed. Follow-on implementation project for 2008/2009.

5. **Goal** Development of an LCFG Scientific Linux (SL5) platform; benefits include compatibility with the ECDF compute clusters (and other schools), and longer server platform lifetime.

   Progress This project was completed in collaboration with EPCC. All School Linux desktops and servers (over 1000 in total) were upgraded to SL5.

6. **Goal** Development of a new account management framework (including multi-tier authentication and lightweight accounts) to improve flexibility and manageability in securing School services.

   Progress Project was started and is expected to deliver implementation in early 2009.

7. **Goal** Continued transition of users to AFS file servers - all new students and new staff now hosted on AFS.

   Progress Approximately two thirds of our users have moved to the AFS file service.

8. **Goal** Ringfencing 10% of individual computing staff's time for staff development.

   Progress There has been some progress on this, but a figure of 5% has been more typical.

9. **Goal** Increase emphasis on research computing support

   Progress There has been some progress on this but this has been limited due to staffing issues.

De-prioritised areas

Goal Informatics Mail: We are aiming to transition all our staff from the School's mail service to the central staffmail service during 2007/2008. Computing staff, and new staff since September 2007, are already using staffmail.

Progress Many staff have transitioned to the central staffmail service. An enforced move of the remaining staff was postponed because of the disruption already caused by the move to the Forum. We have set a hard deadline of 1st November 2008 at which point any remaining users of the School's service will be moved to the central service. (**Update:** this deadline was met and all staff are now using the central staffmail service.)

Relationship with IS (and other schools)

Our collaboration with IS, and with other schools in the College, is focused on a migration to central services where appropriate, significantly increased technical collaboration, and interactions at a technical and strategic level (also outlined in appendix C).

- We encouraged the School's research groups to utilise, and invest in, the ECDF compute clusters. We reviewed the School's existing compute cluster provision and, as a result, decommissioned our original desktop based clusters.
- We collaborated with IS on deploying IBM's GPFS (global file system) to integrate the central ECDF storage and the School's storage such that both central IS and school compute facilities, including desktops, will have seamless access to all storage provision. This work will continue into 2008/2009.
- We continued to consider the migration of commodity services to central IS provision :-
  - put in place a timetable for migrating to Staffmail;
  - investigated a move to the IS Call management system, to allow transfer of user queries between School and IS support staff (but see 2008/2009 Obstacles)
  - promoted the use of the IS Central wiki for those new wiki requirements which don't involve external collaborators (but see 2008/2009 Obstacles)
- We made efforts to improve technical collaboration with IS and other schools.
  - Collaborated with EPCC in developing an LCFG Scientific Linux (SL5) platform, and with IS in developing their central LCFG service.
  - Held regular meetings with IS infrastructure to improve awareness of each others' developments. We would be keen to meet on a similar basis with other IS sections.
  - Continued with a regular LCFG deployers' group, with members from IS and various other schools.
- We are providing the network infrastructure for the new residents of our old Buccleuch Place and Forrest Hill sites.

3 Revised plan for 2008/9

Goals

Moving to the Informatics forum will provide a good environment to review and evaluate the current computing provision in Informatics. Specific goals for 2008/9 are:

1. Consolidation of all school servers at 3 sites (currently 5)
2. Reviewing our existing commitments given a non front-line staff loss of 25% and plan how to cope with reduced effort
3. Develop strategy for addressing the increasing move to portable and/or personal machines, and how this impacts our commodity computing provision.
4. Reduction in energy consumption by server consolidation using virtualisation technology
5. Development of the teaching environment as a "living lab" that supports innovation in teaching and informatics research in education.
6. Review school web provision in light of central web development project
7. Continued consideration of migration to central services:
    - Use of central teaching labs.
    - source repository service (eg SVN)
    - mailing list service
    - room booking system
    - Forum wireless provision
    - Wiki
8. Rewrite of the LCFG core to improve maintainability and extensibility
9. Deploy virtualisation for desktops (specialist teaching and research requirements).
10. Complete and deploy new account management framework (including multitier authentication and lightweight accounts) to improve flexibility and manageability in securing School services.
11. Complete transition of users to AFS file service
12. Reduction of energy footprint of the School's desktops. These are currently powered 24/7 for maintenance reasons, we will look at hibernating desktops overnight (weighing the benefits against use in Condor pools). Cost benefit estimate is £15-20k per annum.
13. Ringfencing 10% of individual computing staff's time for staff development
14. Implement research computing support mechanism
15. Improve communication between users and computing staff
16. Consider a community based support mechanism
17. Identify ways in which the School can align itself with the University's e-learning strategy
18. School/EUCLID database enhancements. Develop business critical local enhancements to EUCLID; eg Post Application Visiting Day.
19. Replace existing business critical feeds to School Database with feeds direct from IDMS and EUCLID.
20. Complete move of research publications from School Database to central ERA system.

Deprioritised areas

- "Vanilla" cluster computing—due to transition to ECDF, subject to ECDF continuing to meet research needs.
- Solaris platform — with move to AFS and Teradactyl backup technology
- Forrest Hill and Buccluech Place server rooms

Relationship with IS and others

Our relationship with IS during this period will continue with the themes that we have already established:

- We will continue to collaborate with IS on deploying IBM's GPFS (global file system) to integrate the central ECDF storage and the School's storage such that both central IS and school compute facilities, including desktops, will have seamless access to all storage provision;
- Continued technical collaboration on projects such as LCFG;
- Further integration of school resources with ECDF;
- Continued consideration of migration to central services, focusing on source repository service, mailing list service, room booking system;
- Use of central teaching labs, which would be facilitated by common use of SL5;
- Co-host, with IS, a workshop focusing on schools' experiences of deploying LCFG.
- Investigate whether any of the enhancements we require of EUCLID which are unlikely to be implemented in EUCLID in the medium term, can be developed at College level.

Obstacles

- The current implementation of the IS Wiki does not support eVisitor accounts; until it does, the School will have to continue using its own Wiki service for those Wikis which involve external collaborators.
- The school was hoping to move to the central CMS (Call Management System) in 2008/2009 but this has proven not to be possible largely due to IS staffing issues. Given the likely replacement of the central CMS service in 2009 it appears more sensible to defer a move from the School's CMS service until this new service is in operation (in 2009/2010).
- The air conditioning in the Forum Server room has not proved to be reliable.
- We have suffered a 25% loss of non front-line computing staff, without dropping any operational commitment.
- We had planned to deprioritise the School database in 2008/2009, but this will not be possible as :-
    - we have identified new functionality required; PAVD, supplemental data for PGT admissions and BoS course proposal procedures.
    - transition to EUCLID slower and involves more work as have to adapt as various functionality moves to EUCLID (eg. account/authentication/authorisation management, online submission, RT DoS triage system)
- consultation improving, but certain areas of IS are better than others.

4 Plan for 2009/2010

Goals

1. Implement strategy developed in 2008/2009 for addressing the increasing move to portable and/or personal machines.
2. Development of prototype services from R&D projects (eg lecture recording and indexing).
3. Continue development of the teaching environment as a living lab that supports innovation in teaching and informatics research in education.
4. Review and update structure and content of end user documentation.
5. Investigate server virtualisation technologies as a means of improving system availability.
6. Continued consideration of migration to central IS services (eg WIKI)
7. Improved disaster recovery procedures
8. Migrate to new central Call Management System
9. School Database review - reimplement remaining non EUCLID hosted database requirements on new lighter weight database service.
10. Migration of student records and assessment to EUCLID

Deprioritised areas

- School's call management system (RT)

Relationship with IS

- Likely port of LCFG to Scientific Linux 6 (with IS and/or another school)
- Continued technical collaboration on projects such as ECDF and LCFG;
- Continued consideration of migration to central IS services (eg WIKI, central web service)
- Consideration of common storage facilities.

Appendices

A Evaluation

We have established a number of evaluation processes, to ensure that we are delivering a service in line with our strategic objectives.

- **Fit to requirements** User requirements are captured using various mechanisms. Teaching requirements are met through a stable and well established system for the collection, negotiation and delivery of computing requirements. We have implemented a newer mechanism to capture research computing needs, based on a basic level of recharge per researcher, in return for which certain services (eg disk space, network connectivity, cluster computing usage) are provided. Research input to school computing strategy comes via the school committee structure in which the convener of research advisory committee sits on computing strategy group. Specific requirements are also captured in depth via focussed innovation meetings, to which all members of the school may attend.
- **Value for money** This is a criterion for the annual review document, and is related to transparent support for research computing, centralised procurement that remains close to academic needs, and official audits of various research project expenditure.
- **Objective evaluation** Each unit provides a quarterly report, which includes proportions of staff time spent on various activities, projects undertaken, etc. This data is used to inform strategy, and management: for example, consistently lower proportions of time spent on development activities (due to operational demands) than planned can be identified, and emphases changed.

B Staffing and Resources

The school employs 22 computing staff (21 FTE).

There are 740 managed DICE (Linux) desktops; 480 personal machines for staff and research students, and 260 in student labs (7 undergraduate teaching labs and 2 tutorial rooms). There are a further 75 managed Windows desktops for administrative staff.

In addition there are several hundred self-managed Linux, Mac OS and Windows desktops and laptops.

There 155 managed DICE (Linux) servers, and a further 58 beowulf nodes spread over 2 clusters. In addition there are 10 managed Solaris servers. Once we have fully migrated to the Forum, our servers will be housed in 3 air-conditioned machine rooms, with a total area of around 160 m^2.

C College, University, External Relationships

The school has a high degree of interaction and engagement at the college and university level, arising in particular from the expertise within the school. We are engaged with university committees concerned with authentication, security, and information architecture, for example, and play a leading role in envisioning the development of computing at a university level. One our computing staff is the Convenor of the University's IT Professionals Forum. Externally, our computing staff interact intensively with organizations such as Usenix and UKUUG through workshops, conferences and tutorials.