Computing Facilities Manager’s Report

15 April 2005

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Lab Changes

There have been a number of changes to our lab infrastructure since last year. Amongst these are:

Vacating the EE3 labs

At the end of 2004, we vacated the remaining four labs on the third floor of the Electrical Engineering building (we had vacated the kazoo lab a year earlier), handing the rooms back to the Faculty.
This was a direct result of falling student numbers, the delayed effect of the
dot-com bust several years ago. These labs were the ones most remote from our
other facilities and from our base in K-17; and were therefore the most difficult
to service satisfactorily.

This was also our final leave-taking of our birthplace as a School, on the third
floor of the Electrical Engineering building, and our home for many years before
that as the Department of Computer Science in the School of Electrical Engi-
neering and Computer Science. Nevertheless, by the time we finally departed,
there was little memory of Computer Science in the walls and floor. Most rooms
had been refurbished, the corridor repainted. The glass-fronted wood-panelled
computer room in room 343 — hosting the University’s first computing centre
(Ken can still probably spell JCL), a PDP-11/40 on which ran the first instance
of Unix outside the USA, and a succession of PDP-11s and VAXs before we
moved to networked workstations — had been long since remodelled into a
number of different rooms.

Diverting a little further from my report; on moving out of (what remained
of) the computer room when we moved to K-17 we pulled most of the accreted
history from the cavity under the false floor. This was rather like an archae-
ological dig, delving back through layers of history, though UTP and FDDI
cables on top, then a layer of thin ethernet, some thick ethernet, a layer of
Apollo token ring, skeins of serial cables, a couple of lengths of Unibus, some
industrial-strength earth straps and finally three-phase power before reaching
the slab.

**lyre Lab Refurbishment**

The lab on the ground floor of K-17, previously known as the asyst lab, has
taken on the name of the lyre lab and is now used for networks teaching and
research in both sessions.

During the summer we have been constructing a small server room inside the
lyre lab, with power, cooling and space for two racks which will, in due course,
take much of the rack-mounted equipment from the networks lab in room 615
and allow that room (615) to be much more useable for people (quieter, addi-
tional desks). Unfortunately, as with many projects on campus, the project has
been delayed significantly for several reasons and, although the lab is generally
available for teaching, the small server room is not yet ready and any changes
to room 615 are several months off yet.

The other user of the asyst lab, the Advanced Operating Systems people,
are currently homeless. We will need to allocate them lab space before session
2. The current plan is that this will be the bongo lab next to the Help Desk
in the Mechanical Engineering undercroft. This lab also houses a small number
of computers with advanced graphics cards which run Windows and particular
graphics software (Maya and Virtools), and so has a role already as a specialist
lab.
Richard’s Virtual Security Lab

As noted in my last report1 and in the August 2004 Computing Support Gazette2 for session 2 last year we created a virtual lab to assist with teaching COMP34113. This was implemented using new vina lab hardware and appears to have worked well and there are plans to teach it again next session.

There is a change, in that the vina lab is now using the new hardware and Peter Linich have worked out ways of running the crypto lab on the old hardware (there issues about recovering easily from scrambled system configurations).

As a general principle, virtual labs seem to work reasonably well for a number of special purposes. Please come and talk to me if you have a possible need for such a facility.

Laptop Lab Refurbishment

Another long-delayed project has been the refurbishment of the Laptop Lab in the basement of the K-17 building. Last year plans were made but funding was not available. We have some hopes that funding will become available this year, though it may well be the end of the year before we have an opportunity to do the work (this cannot happen during session and so must happen in the depths of winter or during the summer break).

This is currently a hot topic and news and plans change frequently. Please contact me or Kathy Mitris if you need current information.

24 hour Lab Access

For several reason we have been looking at options for running un-supervised (possibly 24×7) labs. The primary reasons are:

1. There are several groups of students, such as part-time students, who have limited time on campus, usually late evenings once or twice a week. It would be convenient if these students had access late at night when they had a need.

2. As the School budget has diminished, we have been looking at various ways of reducing our costs. Although the Student Help Desk has been providing excellent service4 its use of casual employees has been fairly expensive and we have been looking at ways of reducing costs while not significantly reducing services. The plan is to allow late-night lab access without having staff on site during the quiet, late periods.

The plan has been to equip several labs so that they can be run without staff supervision. This includes the installation of Security Help Points, telephones, 1http://www.cse.unsw.edu.au/~geoffo/fc-reports/2004-06-18/2004-06-18.html 2http://cgi.cse.unsw.edu.au/~csg/news/?issue=0023 3http://www.cse.unsw.edu.au/~cs3441/ 4Along with the CSE Student Office, the Help Desk has often been noted in School and Faculty surveys as providing outstanding service.
cameras; and policies, practices and education to ensure that people remain
safe.

This is yet another project that has fallen foul of delays elsewhere, the Help
Points, etc, are yet to be installed and are unlikely to be ready before the end
of session (though they are likely to be ready for session two).

Another complication is that a long-delayed upgrade of the University’s
CARDAX (swipe card access) system will mean that no changes can be made
to swipe card access during weeks 7 through 12.

Our current plan is to fall back to having staff supervising labs and to have
the Mechanical Engineering and Eatery labs open till 12 midnight from week 7
till the end of session. Our best guess, from analysing lab usage numbers
from this session and from previous sessions is that this will provide sufficient lab
computers for expected demand while minimising the costs of running them.

Security Issues

The Security Committee, a sub-committee of the Computing Committee to
discuss various security issues, is proposing two measures to be implemented
over the coming months to address two issues of some concern.

Require Wireless VPNs

The proposal is to require VPNs for accessing the CSE wireless network.

The issue, of course, is the flagrant openness of wireless traffic. Ssh tunnels,
etc, have been a partial solution, but very much up to individuals to get right
(and often get wrong or forget).

This proposal has been difficult to require previously because of the diffi-
culty in Linux support (required rebuilding kernels). There is now much better
support.

The Security Committee suggests a strong advertising campaign over a num-
ber of months, with the block on non-VPN connections coming into force after
exams at the end of session two.

Signed Email

The proposal is to require GPG/PGP signatures on locally submitted email.

This is largely about education about privacy/security issues, on helping
people recognise (and deal with) trusted (and untrusted) email; and to actively
contribute to the level of trust in email.

CSG will need to do work in creating tools and instructions for the common
mail clients.

Implementing this policy should be similar to the recent implementation
of requiring authenticated local mail submission (several months of mailing
unauthenticated submitters with instruction on how to authenticate) and later
(maybe at the end of session two) rejecting locally submitted unsigned email.

\[^{5}\text{http://www.cse.unsw.edu.au/~stat/lablogins/index.html}\]
Quota/Access Issues

After some discussion with the Help Desk staff and the System Support group, we are proposing various changes to disk quota, IP quota and print quota. These are described in detail in the proposed new policy.

Briefly, they are about:

1. Increasing disk quotas. This seems sensible because:
   (a) More and more, software and data continues to bloat. Unpleasant, but true.
   (b) Increasing density of our file servers and increasing reliability of the NFS infrastructure (thanks Neil) makes this more viable.

   It does increase the backup burden. This should be somewhat alleviated by the new LTO-3 tape library we are about to order, but we will need to monitor it as the usage increases over time.

2. Smaller increases in IP quota. The primary reason is that more and more the Web is a useful and necessary tool for work (as well as other purposes). However, the increases are not as large as the disk quota increases because:
   (a) They constitute a significant cost to the School (currently in the order of $100,000 per year). We are currently charged about $23 per gigabyte, in comparison with $3 per gigabyte for domestic use by many ISPs (go figure).
   (b) We suspect that a large proportion of students now have ADSL or cable connection at home, alleviating the need for large volumes of internet traffic from Uni.

3. No changes to print quota. The reasons for this are:
   (a) It was not clear that there has been a significant increase in the need for printing.
   (b) Printing is another significant cost to the School (currently in the order of $200,000 per year).
   (c) Although our print quotas are relatively modest (for non-staff) we allow people to buy extra pages at cost recovery price (approximately 4c per page, compared with 10c per page elsewhere on campus).
   (d) If any subject has a real requirement for additional printing (maybe large reports), the lecturer in charge should ask System Support for additional print quota for that class.

As always, these quotas are up for discussion and can be modified in the light of appropriately compelling argument or chocolates.

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https://cgi.cse.unsw.edu.au/~csg/twiki/bin/view/Policies/ProposedResourceQuotasPolicy
Server and Service Issues

Computer Room Air-conditioning

This project, years in the delay, is now largely complete. We have plenty of coolth in the computer room via two complete separate chiller systems and four separate heat exchange units. This should provide sufficient redundant cooling for the foreseeable future. There are still a couple of minor issues outstanding, but essentially the job is finally finished. Woo hoo!

Computer Room Power

This is another project that has taken much longer than originally expected.

The increasing computer density in the computer room, which triggered the need for more cooling, has reached the point where several racks must be turned on in stages to stop circuit breakers tripping on the start-up current. We need to be cautious about plugging anything else in in the room.

We now have quotes for the work and it should be feasible to schedule the installation (which will include a major shutdown of the computer room) during the winter break.

Blade Servers

As part of the summer server upgrades we installed six DELL blade-based systems. These were described in the March 2005 Computing Support Gazette (with pictures).

These blades are now in use as:

- wagner and weill, our two general-purpose login servers.
- williams, our special-purpose login server intended for long running jobs.
- albeniz, our primary web server.
- maestro, our primary name server (DNS, YP, booking system, etc).
- tone, a new mail server which will complement note.

The machines that had filled these roles have been shuffled on to other positions, and several old servers (with dual 300MHz PII processors) have been disposed of.

The blade chassis has built-in redundant power supplies and a management module which means that, amongst other things, they can be rebooted from off-site; which should mean that we can provide better after-hours service (though of course we hope not to have to).

7IT folk pay twice for electricity, once to warm the room up, again to cool it down.
8http://cgi.cse.unsw.edu.au/~csg/news/?issue=0026
Backup Issues

I propose increased disk storage elsewhere in this report. This necessarily increases the load on our backup infrastructure (described in the FAQ on Backups\footnote{http://www.cse.unsw.edu.au/faq/questions/account-backups.html}).

Related, but independent of this, a number of people have data on systems that is not automatically backed up. In general, this is:

- Anything on the local disk of a self-administered computer or a CSG-administered Windows computer is not backed up automatically by the School’s backup infrastructure. People using these computers should arrange that critical files or directories be copied to their home directory of one of the servers (typically to their Z: drive) which will automatically be backed up; or else arrange some other reliable backup mechanism.

- People with CSG-administered linux computers with large disks on their desk may have their “home directory” on that computer. However, because of backup size limitations, we limit the amount that is backed up from these home directories to 10GB (we prefer less). For people with need for more data than that, we create another partition (actually a directory-tree) on the computer and that directory-tree which is not backed up. People can use that area as scratch space (using symlinks or other tools to manage the actual location of data) or backup that partition themselves.

Whilst these are solutions, they are imperfect, particularly in that they do not just happen, and therefore often do not happen. Which is a catastrophe waiting to happen, as anyone who has lost the only copy of their thesis will aver.

Our current plan for a better solution is to make a bigger space available where people can copy important data, on a larger, slower server. The point is that this is not a fast, live home directory, but a repository for files which is guaranteed to be backed up reliably. We (CSG) will help out with tools to automatically copy selected data onto this server (probably using rsync or similar tools), which can then be easily configured by people and just left to run. This model will also work for laptops and other computers who are only intermittently connected to the network and for whom regular nightly backups would be problematic.

We have acquired a large, relatively slow server for the purpose, called feldman\footnote{Morton Feldman, a large composer of long, lugubrious pieces.}.

Unfortunately, backing up feldman is beyond our current tape infrastructure (which is now about five years old, almost out of warranty and no longer expandable) and we are in the process of acquiring a new tape library unit. This will have between 60 and 100 LTO-3 tapes. The tape have four times the capacity of our current LTO-1 tapes, and the library will hold about twice as many tapes.

feldman and the new tape library should be in service by the mid-year break.
Large Format Printing

Regular readers will recall that I have canvassed large format printing before[1]
At the time (and generally since then) the cost of procuring and running a
suitable large format printer was more than our use of it would justify.

However, since 2001, our need for advertising posters has increased and
recently the cost of one printer in particular (and its consumable costs) have
dropped to the point where it is economically feasible to buy one.

The printer is a Canon W6200[2] and borrowing from Chris Petrov’s trade
experience and contacts, is a very high quality printer (for its class) with the
cheapest running costs (in its class). It will print A1 cut sheets or 24” rolls, a
wide range of media with full-bleed (edge-to-edge) printing.

The 42” similar printer[3] was a significant jump in cost and it seems that
almost all our printing is A1 or smaller (A0 jobs we can still print externally).

All being well, this printer should be available by the mid-year break.

Although its use is relatively cheap, it is still not for commodity printing
and we are likely to restrict access to it to authorised people and purposes only.

Monitoring Tools

We are increasing our use of automated monitoring systems to detect environ-
ment or service anomalies and, if necessary, send pager (SMS) or email messages
to alert us. Though it does not need justifying, the core reasons for this are:

- Increasingly our systems are being used 24×7.
- Budget constraints are requiring us to do more with less, to use automated
tools rather than depending on manual monitoring.

We are using nagios[4] as our core software monitoring tool and are gradually
training it to monitor our systems and send alerts when required. Although
CSG does not officially provide (and is not paid to provide) 24 hour service, we
can usually respond to emergencies within an hour or so.

As a related project, we have a new environmental monitoring system ini-
tially to monitor temperature in the computer room. This will shortly be ex-
tended to include a computer powered by an independent UPS, connected to
the environmental monitor and an SMS modem, running the nagios server, able
to send email or SMS messages even if the entire building loses power (or if web
server dies, or any other sufficiently interesting event occurs).

We also plan to run monitoring software on an off-site computer (probably
several of our ADSL-connected home computers) to detect internet access prob-
lems. These will also be able to send automatic SMS pager messages via our
normal email→pager→SMS service

This system is still in its early stages of development, but has already proved
its worth several times. For people interested in computer names, the monitoring

Staff Issues

There have been a number of staff changes in the months since my last report. Overall these mean that there has been a 10% drop in permanent staff in CSG in recent months and a dramatically larger drop in the casual staff at the Student Help Desk.

The changes have been:

Departures

Trent Swift has left his position leading the System Support team to take up the role of IT Manager for the UNSW node of NICTA.

Claire D’Estre has resigned from her System Support position to concentrate on her PhD.

Mark Wotton has also resigned from the System Support team to join the big bad commercial world.

Angie Szczepanik this actually a partial non-return rather than a departure. At the start of the year, Angie return from maternity leave to her Help Desk Manager position. Unfortunately she is experiencing difficulty in finding child-care for her twins and is only able to work two days a week.

This has caused some shuffling: George Emsies, who would normally be the part-time Assistant Help Desk Manager, is now sharing Angie’s job to provide coverage; Kyaw Ko-Ko Zin (known as Dicky), one of the senior casual people at the Help Desk is working extra casual hours to help cover the role of Assistant Help desk Manager.

Help Desk staff Changes mentioned above (the 24 hour lab discussion) in the Student Help Desk mean that we have lost about half the casual students working in that area.

Returns

Slade Matthews has partially returned from his year working as the School’s OH&S Compliance Officer. For two days a week (half of his work in the School) he is very welcome back in the System Support group.

Shuffles

Simon Bowden has moved from Neil Brown’s Software Systems team to fill Trent Swift’s position leading the System Support team. He has been in that position now for about six months doing excellent work and initiating a number of internal system and processes to improve the workingness of things. Simon’s departure from Neil’s team leaves a hole in our capacity to do “interesting” things.
Work Loads

Fewer students has meant that the total work load on the Student Help Desk has dropped, though the changes to hours and the massive drop in staff has increased the load on the remaining staff. We are still developing the new-look Help Desk and Angie and George are committed not to lower the high standards of service that have developed over the years. But it will be difficult.

Fewer students has not significantly changed the load on the rest of the CSG and work loads on individual staff have increased. Excess flexi-time and leave accruals are one sign of this, as people try to take up the slack. To some extent we can shuffle responsibilities and improve processes internally to help out; but in due course, as part of the school-wide restructure discussions, we must be thinking about which services have (or not have) priority and adjust our services appropriately.