Laptop Support in CS&E

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Description

The Computing Support Group has an interesting in providing better support for laptops than it currently provides. It would like to be able to provide a similar level of support to the support it currently provides for desk-top computers.

Background

Currently, for desk-top computers it provides several levels of support, being:

1. fully-supported unix: very similar to our standard laboratory computers.
   The user of the computer does not have root access; but all management and admin issues are handled by CSG. These include security updates, backups, software upgrades and hardware maintenance. “conform” is the primary tool used to maintain software integrity; these computers are

2.
known as conformed computers. NFS-mounting provides a seamless file-system including access to class accounts. The hardware will generally be a standard configuration, possibly with added features paid for by the computer’s user. It is a general purpose computer sufficient for most tasks, though special research needs might be beyond the range of this computer.

2. fully-supported Windows computers: a similar level of support to the conformed unix computers on similar hardware. The user of the computer does not have admin access. We do not have conform or anything similar, so there is more work in maintaining these computers. Fixing problems will often require simply re-installing the computer (though this is within the Microsoft model). Backup support is relatively limited: users have a samba-mounted unix home directory which is backed up. Any local files must be copied to that directory. Accessing other services and facilities in the school will generally require an Xsession connection to one of the unix servers.

3. fully-supported Macintosh computers: typically used by admin staff. As of OS-X, the user of the computer does not have root access. We do not have conform or anything similar, so there is more work in maintaining these computers. These computers are fully backed up, but the backups are not integrated with the unix backups and the backup system is not as extensive. Accessing other services and facilities in the school will generally require an Xsession connection to one of the unix servers. Some of this may change with the adoption of OS-X which has a base unix operating system and it is feasible to integrate it much more the the rest of our infrastructure.

4. self-supported computers: where people chose to administer their own computers and handle security, backups, etc, themselves. This may be because they require particular (different) hardware; or they require access to the operating system or configuration (such as when writing device drivers).

Currently, all laptop computers are self-supported computers. However, the variety and volatility of laptop computers makes them difficult to support and many people have been coming to CSG requiring assistance in setting up their computers. This is onerous. Setting up a typical new laptop typically takes between a day and three weeks depending on how new and different the system is. Windows is usually (but not always) easier to install than linux.

As more and more people in the school are using laptops and requiring support for them, we keenly need a new model for supporting them. This model will be developed over a series of meetings by interested people within CSG, with input from outside CSG wherever this might be useful or appropriate.

**Laptop Support Goal**

The goal of this project is to support laptop computers in a similar way to its support of desktop computers. The features of this support would include:
- Reliable hardware covered by an appropriate warranty or maintenance contract.
- Reliable and secure software configuration.
- Simple and reliable software installs and upgrades.
- Simple and reliable backups.
- Simple and reliable security updates.
- Simple and reliable access to printers.
- Simple and reliable access to class accounts.
- Simple, reliable and secure connectivity.

One of the key aspects of managing the support burden will be to severely limit the variety of things that would be supported. To this end the proposed laptop support will for a limited range of operating systems, software, hardware and services; but which is still sufficient to satisfy most needs.

We hope to be providing improved laptop support as a result of this project in the first half of 2003. We may be providing partial support (and indeed we already are) before all of these issues are resolved.

**Meeting Reports**

**18 November 2002 (Canvassing Issues)**

This was an introductory meeting to initially canvas the issues that would need to be resolved before laptops could be said to be satisfactorily supported. The summary list of such items is:

**Secure connectivity** (especially wrt wireless access). The solution may include use of VPNs.

**Standard hardware platform** As laptops become more commodity items, the rate-of-change is slowing down, configurations are becoming cheaper and more powerful. There is no longer the same need to get the very latest. For most people a known-to-be reliable configuration will be of more use than something too new to have tested device drivers.

**Operating Systems** What operating systems do we need to support.

**Control** Can we allow non-CSG people to have privileged access to the computer and still provide the reliability and security required? Can we even prevent non-CSG people from acquiring privileged access to the computer?

**Installations** How best to provide a simple, fast installation for any laptop. This needs to include any CSE customisation such as making the system secure.

**Software upgrades** including security updates, as seamlessly and transparently as possible. Can the user install new packages easily themselves, or easily request such installation.
Backups as seamlessly and transparently as possible, including retrieval access to the backups. Security is also an issue here.

File-sharing seamless, secure access to class accounts.

Printing seamless, secure access to printing services.

This list is not complete; other issues will probably emerge as the project progresses.

18 November 2002 (Hardware)

The focus of this meeting was to consider hardware platforms.

One of the primary problems in laptop support so far has been that almost every laptop has been significantly different from previously encountered laptops. We should be able to provide a smallish list of well-configured, known-to-work systems that will satisfy most people. Other people still have the option to configure their own hardware specifications, with the understanding that if it differs significantly from the “standlard” configuration then CSG may not be able to provide adequate support for it. “Significantly different” may simply be a graphics chipset that we cannot find a suitable driver for.

The experience of the hardware team is that most laptops can be generally classified as either:

medium systems 2–3 kg, a useful range of devices on board, but not a fully configured desktop replacement system.

light systems around 1.5 kg, small and compact, a minimum number of devices on board (eg, only one removable drive), other devices can be externally attached as required.

“Kitchen-sink” systems and ultra-light systems were occasionally asked for, but fairly rarely. These could be considered special orders, with all the caveats of being “special”.

We have had reasonable success with IBM thinkpads. They are generally more easy to configure and have been a little more robust. Some of the issues concerning them include:

• They have a three-button mouse\(^1\) which is useful for unix installations.

• The pointing device is a nipple (not to everyone’s taste).

• There are issues with ports on the docking option (again a matter of taste).

We have also had reasonable success with some of the DELL range, particularly the Lattitude. Some of the issues concerning them include:

• They have a two-button mouse\(^2\) which is less useful for unix installations.

• The pointing device is a track-pad (not to everyone’s taste).

\(^1\)I appreciate that it is clearly not a mouse, but I cannot think of a better term.

\(^2\)This is not a mouse either.
• There are issues with ports on the docking option (again a matter of taste).

Our recommended models for Unix (Linux) and Windows installations are:

<table>
<thead>
<tr>
<th>Light-weight</th>
<th>Medium-weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>X Series</td>
</tr>
<tr>
<td>DELL</td>
<td>C4xx</td>
</tr>
<tr>
<td></td>
<td>R Series</td>
</tr>
<tr>
<td></td>
<td>C6xx</td>
</tr>
</tbody>
</table>

Standard devices, which we would expect all configurations to support (possibly as externally attached devices), are:

• CD-RW (possibly including DVD)
• Wireless
• UTP
• Modem
• Floppy
• Docking option
• USB

This list is not complete and will change over time, possibly before we ever buy an officially standard laptop.

Compatibility issues do not exist (to anywhere near the same extent) for Macintosh laptops; one of the few advantages of a relatively closed system.

2 December 2002 (Installs/Upgrades — primarily Linux)

The primary focus of this meeting was installing and maintaining Linux on a “standard” laptop. The initial discussion assumed that if we were to support a laptop system as well as we support as our desk-top computers, that we would need to use conform.

This is problematic without a very significant change in the conform model. The conform model assumes that we (CSG, via conform) have total control of the computer and have total knowledge of software installed on the computer (in the “system” directories).

The first requirement (total control) is impossible to guarantee on a laptop. The second (total knowledge) makes it difficult for users to install new software (our experience is that on laptops, much more than desk-top computers, people want to be able to install their own choice of packages).

It seems that conform is not a viable option, but that the lack of conform implies a number of other management issues then would need resolution.

Conform is still required on the lab computers (which still comprise more than half of the school’s computing infrastructure) for reasons such as ensuring a consistent, stable, reliable, secure computing platform for 3,5000 students.
The best option canvassed for handling linux installations and upgrades was to use Debian packages and package management as the basic machinery. CSG would need to provide a source of current packages and would configure the system initially so that the user could simply (possibly automatically) load any upgraded packages or select new packages. They probably want to check for security updates at least every week. Possibly we could configure the laptop to check for updates every time it rejoined the network (maybe just once a day).

There are a couple of tools around for checking a new system and installing an initial operating system; Knoppix seems to be useful. We would also need to be able to provide simple means of partitioning the system for multi-boot.

Summary

- We plan to use Debian packages and package management as the basic machinery.
- Tracking the “testing” distribution should provide a reasonable compromise between reliability and currency.
- We hope to be able to acquire or build a CD that will be able to install a complete basic system with little or no manual intervention.
- We may be able to give this CD to people to take home for emergencies.
- The initial build needs to include the option of multi-boot.
- Backups would need to include Debian control files (to facilitate system rebuilds).
- dselect, possibly run automatically, will be able to install upgraded or new software. Security updates should be checked at least weekly.
- Users can install or upgrade software of their choice.

Subjects for future meetings still include:

- Windows installation and upgrades
- File-sharing, such as access to class accounts
- Backups
- Configuration issues, including security

5 February 2003 (Catchup after Christmas)

A number of issues were brought up and after some discussion:

- Simon will drive investigating and planning for and implementing installing and upgrading Linux on laptops. To this end he is getting a laptop + docking station as his “school” computer and will make it work.
• Ghost is a reasonable start for initial installs for Windows, though this requires a separate image for each system and does not, of itself, solve the update issue.

• Chris will drive the wireless security issue. Currently interesting tools include Poptop and Aegis; both need looking into.

• Simon and Van will be looking into DHCP for wireless (and for the untrusted wired network).

Other issues still requiring discussion include backups and file and printer sharing.

17 February 2003

Following up mostly on issues from last week:

• Simon’s laptop still on the way, we expect a lot will come of the experience of setting it up (in an easily replicable way).

• Much of the backup question rides on Zain’s and Neil’s work on revamping our primary backup system. We encourage them to work quickly and fruitfully.

• With wireless access:
  – Initial licensing costs for Aegis suggest the server costs US$1,500; linux clients are free; a comprehensive site is US$5,000 (a little expensive, but worth the money if it fulfills its promise).
  – We have an evaluation copy of Aegis to try
  – Poptop still needs setting up for trial

• DHCP is running on wireless and is starting to run on untrusted (with static addresses).

Multi-user laptops have not seriously been considered yet. Arguably such laptops need to have someone who is considered the owner and is responsible for things such as ensuring that security updates are loaded. For short-term loan laptops need more discussion.

We also need to start picking up on Windows issues.

20 February 2003 (Security Mailing Lists)

This meeting was actually about self-administered computers and about helping self-administrators to know that (particularly) security updates were available and to facilitate the simple (automated?) installation of these. Laptops are a special case of self-administered computers (small and light); in most cases they can be considered to have the same sets of problems requiring the same sorts of solutions.

A primary premise is that people self-administrators are encouraged/obliged to be responsible for their self-administered computers; and that CSG provides an environment that assists with that responsibility.
The initial suggestion was to have someone from CSG monitor bugtraq and similar lists and pass on particularly critical messages to a mailing list which contained all self-administrators.

The problem noted with this is that there are a lot of security announcements, many of which have only a small target audience. For example, news of an exploit for mysql will be of critical importance to some in the school but disruptive noise to many others. A further complication is that no-one in CSG will know what is installed on all self-administered computers.

There are already security-related mailing lists for the major distributions that we are interested in (Debian, Redhat, Windows and Macs).

After some discussion, we plan to create several new mail lists. For each of the four preferred distributions, there will be a list called self-admin-<distrib> which is subscribed to the appropriate distribution list. All self-administrators would be subscribed to the appropriate lists for their computers (more than one for multiple computers or multi-boot computers) and not be able to unsubscribe themselves. Any other interested people could, if interested, also add themselves to these lists. These distribution-sourced lists are not currently noisy; it is reasonable to expect people to read them.

An additional local list, self-admin, will have as members those four lists. This can be used for sending critical messages (maybe a new SSH exploit) to all self-administrators.

Additionally, as each self-administered box is set up, it will include installing and enabling automatic detection (and possibly installing) of security updates for any software currently installed on that computer.

5 March 2003 (Simon, VPNs, Hotdesk Laptops)

Simon’s Laptop Project

Simon’s laptop has arrived and is online and useable (with care). Simon is cautiously doing things by hand, taking notes, preparing to be able to automate all this.

- Currently using samba to access the fileservers. This is likely to be the best choice (despite the permission problems) until Neil’s authenticated NFS is viable.
- A good solution to backups are waiting for Zain and Neil to get a bit further with their reworking of the backup infrastructure. In the meantime, copying to a home directory on a server is a usable workaround.
- There are issues with the docking station regarding multiple screens and multiple resolutions.
- Issues that have not yet received much attention (but gee, he has not had it very long) include email, printing and easy/automatic updates.

VPNs

We had been looking at two options:

**Aegis:** The server came up easily, clients are available for all likely platforms, but it is not useful for wired clients and so is not of great interest.
**PoPToP:** A public version of PPTP. A server is available as a standard Debian package and clients are available for all platforms. It can also be used on wired networks, adding a useful degree of trust for our untrusted network.

Chris and Simon will make it a priority to get PoPToP set up and working.

There are other issues, such as the interaction with IPQ. Peter needs to be party to this.

**Hotdesk laptops**

This spills over from a suggestion to alleviate the School's space problem by using any desk as a potential hot desk if the resident is away for the day. The visitor can be issued with some standard laptop, can sit at the specified hot desk and do some sort of work.

The best option for looking after the software installation is to effectively run it as a thinish client.

- People log in to a generic guest account.
- When the laptop is returned, someone logs into a *cleanup* account which returns everything to a known state, wiping out traces of the previous login session.
- Available options when logged in will be limited to:
  - Run a browser (IP access similar to the laptop lab).
  - Connect to a linux server.
  - Connect to a windows server.

As far as possible, the hardware would be identical and so allow rebuilding to be trivial.

**5 March 2003 (Simon, Printing, Secure Communications)**

Simon has been working at getting printing working happily via Samba.

Hot-docking is still an issue, though not a priority.

Chris has got the PoPToP server running and has accessed it via a Mac laptop. Simon has not yet been able to access it from his linux laptop; that is now a priority issue.

After some discussion, we decided to look at ssh tunnelling. This has the advantage of being simple and easy to set up and requires no new infrastructure. The main disadvantage is that each necessary port has to be individually re-directed. It is likely to be a useful solution in some instances and it may be feasible to *wrap* per it so that it provides sufficient functionality for most purposes.

Chris, Simon, and others as required will continue to work on both PoPToP and on ssh tunnelling.