

Linux Desktops at Oxford

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1 Some background

1.1 OSS Watch

- I'm from Computing Services. I started last March.
- I'm working half of my time for the Information Services Group of OUCS, ...
- ... and working the other half for OSS Watch.
- OSS Watch is a JISC-funded advisory service.
- OSS Watch provides unbiased advice and guidance to UK FE and HE institutions about free and open source software.

1.2 Surveys

- In 2003, OSS Watch conducted a survey of the use of open source software in UK FE and HE institutions.
- We plan to repeat the exercise later this year.
- As part of this work, I've recently done an informal survey of Linux desktops at the University of Oxford.
- My main aim today is to report to you what I've found.

2 The adoption of Linux

2.1 The adoption of Linux on servers

- In October 2004, the UK Government released a Final Report on the trials of OSS in public bodies.
- http://www.ogc.gov.uk/embedded_object.asp?docid=1002367
- In this report they conclude:
OSS Server and infrastructure products, generally based on Linux, are now perceived by the market as mature, gaining increasing acceptance, and delivering significant value for money opportunities.

2.2 The adoption of Linux on desktops

- *OSS Desktop products ... are developing but there still has been little significant widespread implementation, though these are currently starting to be rolled out in public sector bodies in other European countries.*
- *public sector bodies should ... consider the benefits of incremental change by diversifying OSS use beyond the server platform to products like Email, LDAP, ... and internet Browser.*

3 Linux desktops at Oxford

3.1 Performing the survey

- Produced a list of about 30 questions.
- Trialled them by *interviewing* the sysadmin of one unit.
- Then *interviewed* the sysadmins of nine other units.
- Found it difficult to keep to the script.
- So survey is *informal*.
- Obtained other information from the replies to a message to `itss-discuss`.

3.2 Units that I've visited

Astro Physics
Atmospheric Physics
Chemistry
Comlab
Experimental Psychology
Mathematics
Medical Vision Group (Robotics, Engineering)
Oxford Supercomputing Centre
Physiology
Statistics

3.3 Units that replied

Arch'y	MolMed
Christ Church	OUCS
Classics	PartPhy
EarthSci	Politics
Ecol and Hydro	Psych'try
FMRIB	St Anthony's
IMSU	St John's
Invensys	ScanOptMic
Jesus	Sociology
Linacre	SolidMechsAndMats
Materials	StructGenCons
MolBioph	SERS

3.4 Number of Linux desktops

150 Astro Physics
150 Mathematics
110 Statistics
63 Atmospheric Physics
53 Comlab
50 Chemistry
50 Physiology
47 Molecular Biophysics
40 Experimental Psychology
36 OUCS
35 Ecology and Hydrology (Centre for)
33 FMRIB (Centre for)
20 Structural Genomics Consortium
17 Materials
15 Earth Sciences
15 Scanning Optical Microscopy (Engineering)
12 Medical Vision Group (Robotics, Engineering)
12 Particle Physics
12 Psychiatry
10 IMSU (Clinical School)
7 Solid Mechanics and Materials (Engineering)
5 Archaeology
5 Molecular Medicine
4 St Anthony's College
3 Oxford Supercomputing Centre
3 St John's College
1 Christ Church College
1 Classics
1 Invensys (Control, Engineering)
1 Jesus College
1 Linacre College
1 Politics
1 Sociology
1 Systems and Electronic Resources Service

3.5 Summary of number of Linux desktops

```

==150 Astro Physics, Mathematics
>=100 Statistics
>=50 Atmos Phys, Chemistry, Comlab, Physiology
>=40 Exptl Psy, MolBioph
>=30 Ecol and Hydro, FMRIB, OUCS
>=15 EarthSci, Materials, ScanOptMic, StructGenCons
>=10 IMSU, MedVision, PartPhy, Psych'try
>=5 Arch'y, MolMed, SolidMechsAndMats
>=2 OSC, St Anthony's, St John's
==1 Christ Church, Classics, Invensys, Jesus
==1 Linacre, Politics, Sociology, SERS

```

3.6 Total number of Linux desktops

- That means I've been told about 965 Linux desktops.

3.7 What distros are used at Oxford?

- Debian (woody, sarge)
- Gentoo
- Mandrake (9.2, 10, 10.1, 10.2); now called Mandriva
- Red Hat (7, 8, 9, FC1, FC2, FC3, FC4 beta)
- Slackware (10)
- SuSE (8.1, 8.2, 9.0, 9.1, 9.2)
- Ubuntu and Kubuntu

3.8 What releases of distros are used?

- Although some units have all their desktops running the same release of the same distribution, ...
- ... most have a mix of releases.
- For example, one unit uses: RH7, RH9, FC1, FC2, FC3 and FC4 beta.

3.9 How did they choose a distribution?

- Often, evaluation of the various distros was not done.
- Often, decision made before the sysadmin arrived.
- Sometimes a distribution was chosen because another unit was using that distribution.
- Some units moved from RH when licensing changed.
- Although some did move to FC, some jumped ship, mainly to SuSE.

3.10 What is the most used distribution?

```

150 Astro Physics           Debian
150 Mathematics           Debian
>100 Statistics            Fedora Core
 63 Atmospheric Physics    Debian
 53 Comlab                 Fedora Core
 50 Chemistry              Fedora Core
 50 Physiology             SuSE
 40 Experimental Psychology SuSE
 35 Ecology and Hydrology  Bio-Linux (Debian)
 33 FMRIB                  SuSE
 26 OUCS                   various

```

3.11 Who uses the Linux desktop?

At Oxford, different units had different policies:

1. Just one person: it's his/her desktop.
2. Principally one,
but others in same group also use it.
3. Anyone can log in to the desktop:
 - either physically;
 - or remotely.

3.12 Who uses the Linux desktop?

- One unit argues that often machines just sit there doing nothing. Spare cpu time should be used.
- They have a policy: people can use other machines.
- The unit did a survey: 10 people said that they sometimes used 10 to 20 machines concurrently.
- One said he'd even used 60 machines concurrently.

3.13 Where are the home directories?

- The decision on who uses a desktop may affect where home directories are located.
- In some units,
home directories are stored on the local disc.
- In other units,
a home directory is mounted from a file server.

3.14 Who has root access?

At Oxford, widely different attitudes:

1. It is difficult to deny root access to the owner of the machine as they bought the machine.
2. A small number of people in each research group have root access to the machines in that group.
3. Only the sysadmin has root password because he/she takes the responsibility that the machines are secure and up-to-date.

3.15 How are machines patched?

At Oxford, many different policies:

1. Test out the patch on a master machine and then when happy tell each machine to update.
2. Every night, on each machine:
 - run a cron job that does the patching;
 - reboot may be required, e.g., if patch is to kernel;
 - negotiate with the user as to when convenient.
3. Leave it to each user to update their machine.

3.16 When do machines get OS releases?

- Some distributions have quick release cycles whereas others have longer release cycles.
- For example, SuSE releases every 6 months, whereas the latest Debian took nearly 3 years.
- If 3 years, need other ways to get new software.
- If 6 months, then this can be disruptive to the user.

3.17 When do machines get OS releases?

At Oxford, two common approaches:

1. upgrade when the machine is recycled to a new user
 - this means supporting different releases of the OS;
2. do a massive change occasionally
 - this means all the machines are the same.

3.18 What software is installed?

- Most sysadmins do a *full install* of the distribution.
- This provides people with choice:
 - desktop environment: Gnome, KDE
 - web browser: Firefox, Konqueror
 - mailer: Evolution, pine, Thunderbird
- Although choice provided, usually more support given to one.

3.19 What discipline-oriented software?

- Many units use: the gnu compilers, java, TeX/LaTeX.
- A lot of units install: MATLAB.
- Quite a few install: Mathematica.
- Other software includes: bioinformatics tools, FDR, FMRI, FSL, Haskell, IDL, IRAF, Maple, R, S-PLUS, SPM

3.20 Can other software be installed?

- If the user/group has root access, then they can install anything.
- Otherwise, the sysadmin installs the software.
- In some units, it is installed locally, whereas in other units it is installed on a file server.

3.21 Can the desktop run a webserver?

At Oxford:

- The University's firewall only allows access for incoming port 80 for registered machines.
- In some units, there are other port 80 restrictions.
- In most units, webserver is not installed.
- So, only a handful of desktops run a webserver.
- A user could install a webserver on port 8080.

3.22 Can the user access MS Windows?

At Oxford, there are four approaches:

1. Some units provide the user with two machines.
2. Some units provide a Windows Terminal Server.
3. Some units install VMWare on the desktop:
 - (a) Doesn't allow VMWare as he is unhappy about its security.
 - (b) It requires too much resource and falls over.

3.23 Can the user access MS Windows?

4. Some units allow dual boot:

- (a) If I allow this, I won't be able to contact the machine and do Linux updates.
- (b) Machine may be in Linux for a long time; then very out-of-date with Windows security patches.
- (c) This annoys other users because they are unable to remote login when it is in Windows.

3.24 Why is MS Windows needed?

- Often the answer was: need access to MS Office.
- But Linux provides Office clones, such as OpenOffice.
- In some units, OpenOffice is only started when the user is using a mail client and receives an attachment. However, the user switches to Windows if he/she wants to produce a document.
- Elsewhere people extensively use OpenOffice.

3.25 Can the user access MS Windows?

Tim Colles (University of Edinburgh) has two articles discussing:

- being a user of both Linux and MS Windows;
- accessing an Office document from Linux.

http://www.dice.inf.ed.ac.uk/groups/user_support/windows/windowsdice.html

The latter topic is also discussed in Section 4.2 of the Government's Final Report on the trials of OSS.

4 Linux desktops elsewhere

4.1 Linux desktops at Cambridge

- The Computing Service at the University of Cambridge provide a *public workstation facility (PWF)*.
- These are managed collections of machines (which they call *clusters*).
- 1200 of them are PCs. There are also some Macs.
- Between 500 and 600 of the PCs dual-boot between Windows and Linux; the other PCs are Windows only.

4.2 Linux desktops at Cambridge

- There are a large number of Computing Service clusters, all of which have PWF Linux.
- These are in different buildings.
- There are also PWF Linux clusters in departments such as Chemistry, Computing Laboratory, Law, the Moore Library, Mathematics, Physics, ...
- ...and in Colleges: Clare, Fitzwilliam, Kings, Queens, Selwyn, Trinity, and Trinity Hall colleges.

4.3 Linux desktops at Cambridge

- Some machines are restricted by membership of a group, and some by physical access to the machine.
- Remote logins to PWF Linux are not permitted.
- Instead, the Computing Service provide two special machines for remote logins.
- Users' home directories are accessible from Windows, Linux and the Macs.
- Moving from SuSE 9.0 to 9.3 during Summer 2005.

4.4 Linux desktops at Durham

- University of Durham has a room with 18 desktops
- ... that dual-boot between Linux (FC3) and Windows.
- They use kickstart over the network to install.
- So installing a machine is not much more than a bit of pre-configuring settings on the server, booting from a cd, typing "linux ks" and waiting.

4.5 Linux desktops at Durham

- They use cfengine (<http://www.cfengine.org/>) to make any changes to a group of Linux desktops,
- ... so all the desktops should be the same,
- ... and the desktop should revert back to this state if it is reinstalled.

4.6 Linux desktops at Durham

- The desktops are kept up-to-date with patches by cfengine checking for updates every 15 minutes.
- They have plans for desktops to boot into Windows once a week so the Windows patching can happen.
- On the other hand, there are enough Windows-based classes for it to happen naturally at the moment anyway (the Windows system has a similar patching-update system).

4.7 Linux desktops at Edinburgh

- Edinburgh's academic structure has 3 Colleges.
- One is the *College of Science and Engineering*.
- Its Computing Committee has produced 'Planning with Linux in Mind' (by Colin Higgs), Draft 4: Jan 2004.
- <http://www.see.ed.ac.uk/chiggs1/papers/ccc/linux-draft4.pdf>
- About 1800 of around 5000 desktops (38%) in the College are Linux desktops (2003-2004).

4.8 Linux desktops at Edinburgh

The report makes the following recommendations (here abbreviated):

1. Services should be accessible and usable from Linux.
2. The University should strive to use open standards and open technologies wherever possible.
3. OpenOffice.org or StarOffice versions of documents should be available for writeable forms (as well as Microsoft Office versions).

4.9 Linux desktops at Edinburgh

4. The University should be more effective in enforcing its own policies on issues dealing with consistency and compatibility.
5. The University should investigate increasing support for Linux users and computing officers.
6. The University should investigate offering some kind of Linux management service (perhaps LCFG).

4.10 Linux desktops at Edinburgh

- The University of Edinburgh has developed a 'Knowledge Management Strategic Plan'.
- Provision of a *Linux managed desktop* appeared in the Edition 1 of the KMSP published in May 2004.
- 2nd edition (April 2005) is available in draft format.
- http://www.kmstrategy.ed.ac.uk/KM_Index.htm

4.11 Linux desktops at Edinburgh

- Section 6.1.34 of this draft includes the sentence
The managed desktop concept will extend to Linux and Macintosh systems using technologies appropriate to those environments.
- In this draft, one of the *Milestones* for 2005-06 is
IT-51: Linux managed desktop available.

4.12 Linux desktops at Warwick

- The University of Warwick has four faculties.
- The Centre for Scientific Computing is a research centre in the Faculty of Science.
- The CSC has:
 - 300 registered Linux users (mixed staff/students);
 - a Linux cluster with 62 processors;
 - about 100 Linux desktops.
- The distribution of Linux used is Mandriva.

4.13 Linux desktops at Warwick

- Each user can log in to any of the systems ...
- ... they will always get the same environment.
- The desktops are treated like cluster nodes.
- So cluster mgt s/w is used to deploy/maintain them.
- So, users get the best of both worlds: consistent environment and processing speed of local CPU.
- Desktops are organised into a taskfarm allowing users to exploit unused CPU cycles.

4.14 Linux desktops at Warwick

The Centre for Scientific Computing ensures:

- daily delivery of patches to the desktop;
- nightly backup of users' home directories;
- exclusive use of secure protocols
(such as secure shell) for remote access;
- routinely scanning users' files for Windows viruses.

4.15 Linux desktops at Warwick

- The CSC and IT Services are about to roll out this Managed GNU/Linux desktop to other departments.
- Jaroslaw Zachwieja (aka grok) of the CSC estimates:
 - that by the end of 2005 there will be 300 more desktops in other science departments
 - and an additional 200 desktops in arts departments in 2006.

5 Conclusions

5.1 Conclusions

- In the informal survey of units at Oxford, I found a significant number of Linux desktops.
- Linux is used on the desktop mostly in scientific departments.
- I also found widely different practices around the various units for managing these desktops.
- I guess some are more successful than others.

5.2 Conclusions

- I would like to thank those I pestered with questions.
- I hope I haven't misrepresented you.
- Please e-mail me with any errors.
- Trick question: I forgot to ask about backup.

5.3 Conclusions

- In a brief look on the web, I've found some evidence that other universities are looking at how they can manage Linux desktops.
- I would like to thank:
 - Julian King (Cambridge)
 - Michael Young (Durham)
 - Jaroslaw Zachwieja (Warwick)