Five things you never knew about CSG

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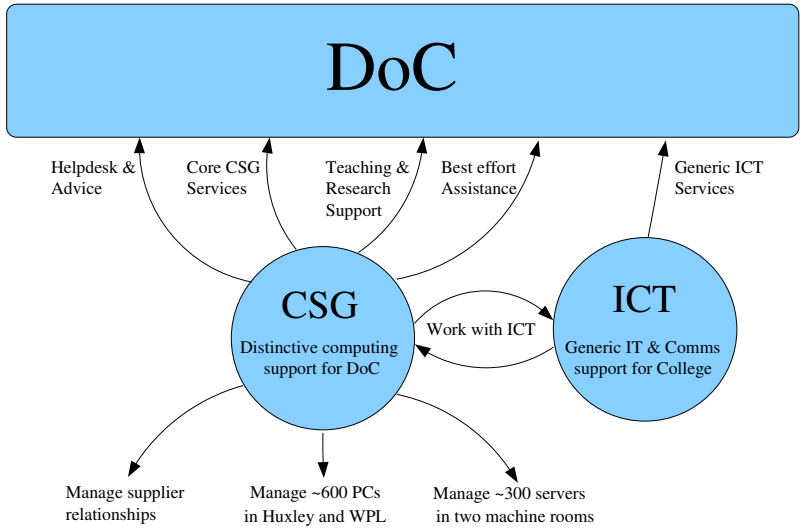
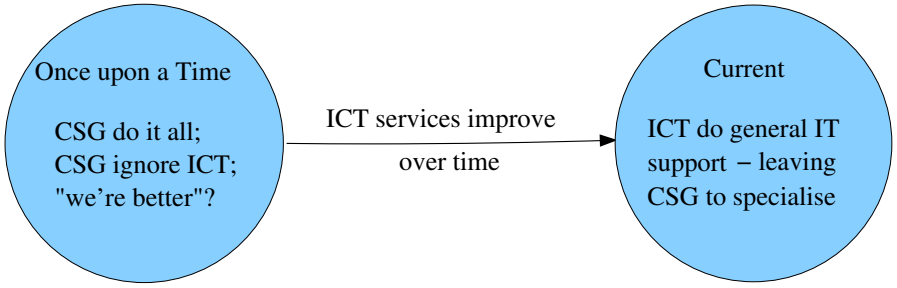
- Thanks to Philippa and Giuliano for inviting me!
- Hopefully everyone has a vague idea of what CSG do:





- Once upon a time..
- CSG tried to do everything..
- often CSG and DoC were first (eg. Internet, Email, WiFi)..
- But over time ICT caught up..
- now ICT provide general IT and Comms support..
- CSG concentrate on doing distinctive things that ICT don't do.

- Networking (including WiFi).
- Email (although we feed mailing list membership information from the teaching database direct into ICT's databases).
- user authentication for staff and students (College passwords).
- Big printers and photocopiers.
- Hardware support/repair: for PCs, this has been replaced with a combination of longer warranties, ICT's preferred partnership with Hewlett Packard, plus College PC renewals programme.
- Lecture Theatre Audio-Visual Support. We do first line support in working hours, but all the AV kit has been replaced with ICT provided and supported kit.
- High Performance Computing (we have Condor running on desktop PCs, but ICT spend £1m per annum on HPC clusters). DoC should use the HPC kit more!
- Mac support and Windows laptop support, provided by our in-house ICT Faculty Support engineer - currently Niels Boyadjian. (Although we'll help on a best effort basis if Niels is not in the room).

- Linux Support: At any time, CSG maintain 2 or 3 supported "DoC Linux builds" (currently Ubuntu 10.04, Ubuntu 11.04 and Ubuntu 12.04), and offer advice on other distros.
- Windows Support: CSG maintain two or three supported "DoC desktop Windows builds" and "DoC server Windows builds". Currently Windows 7 for desktops, Windows Server 2008 and Windows Server 2012 for servers.
- Home directory Fileservers: Soon to be stored on 4 Linux fileservers, all home directories replicated to a partner to deliver "two live or near live copies". Note: 10Gb networking coming to various fileservers over the summer.
- Shared Volume Fileservers: over 50 medium sized shared volumes (for research groups/projects, teaching, admin or infrastructure) currently stored on 4 Linux servers, each replicated to a partner.
- Refresh Desktop PCs (and Macs): Each year we receive about 15 free staff PCs, and about 40 free lab PCs, under the College PC renewal scheme. The Dept typically buys another 140 PCs for new PhDs, RAs, staff, and the labs.

- Specialist Servers: CSG maintain a wide variety of specialist Departmental servers, Windows or Linux, physical or virtual:
- For infrastructure:
  - DNS and DHCP servers.
  - Apache web servers.
  - Microsoft IIS/.net webservers.
  - Postgres database servers.
  - Microsoft SQL database servers.
  - Departmental database Postgres servers (teachdb,cate etc).
  - TFs autotesting/continuous integration servers.
- For research groups:
  - Individual fileservers, web servers etc.
  - Compute clusters (some brand new, others quite elderly).
  - Clusters with specialist hardware eg, Wayne's GPU servers.
- Plus of course the recently purchased Departmental cloud servers, currently doing service as experimental proto-clouds, or ad-hoc compute servers/clusters.

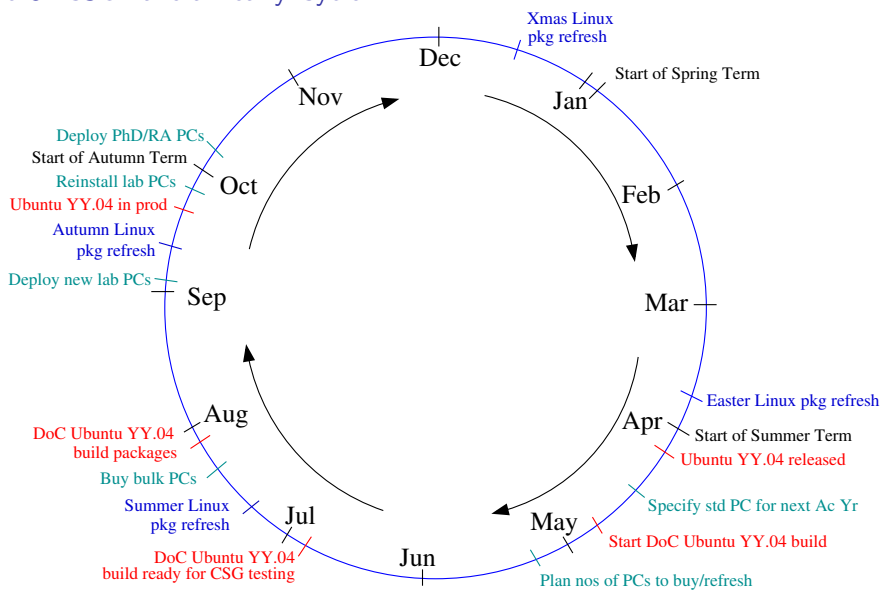
No 1: Networking Improvements

- Recently, desktop network sockets now auto-configure themselves onto the right network VLAN when you plug a known device in. More convenient all round!
- However: not all sockets are connected (patched to a switch port). Still have to ask us/ICT to patch a socket.
- Over the summer, ICT's network contractor A-Tech are replacing all DoC desktop network wiring in levels 3 to 5 Huxley.
- More network sockets for everyone (4 per person), more reliable, plus: ICT take over patching responsibility.
- We can request extra network sockets in blocks of 4 via ICT, free of charge.
- VOIP (Voice-over-IP) phones will follow new wiring.
- For servers: ICT now offer copper 10Gb ethernet via "top of rack switches" - we have bought 4 x 10Gb network switches, first two installed in Huxley machine room. Core fileservers to get dual 10Gb connections over the summer.

No 2: Quarterly Linux Package Upgrades

- Each summer, CSG build a new supported version of Linux. We used to freeze everything on Oct 1st for the whole year (except emergency patches)!
- My colleagues Gary and Michael have just started work on the Ubuntu 13.04 DoC linux build. Like to experiment with it this summer? volunteers welcome!
- New this year: we are performing quarterly (termly) package refreshes on all supported Linux distros, pulling package version updates from the upstream package repositories, releasing them in a controlled manner to desktops and servers.
- Currently, Ubuntu 10.04, 11.04 and 12.04 still have package repositories receiving updates, we refreshed all 3 distros at Christmas and Easter, and will do them in July and Sept.
- This keeps our computers more secure, more up to date, risk: slightly greater instability - we're being very cautious!

No 3: CSG have a Yearly Cycle



No 4: CSG are skilled Programmers - a resource to use?

- Most members of CSG are experienced programmers, highly skilled in a wide variety of languages, tools and techniques.
- We are happy to offer assistance with programming, algorithms and optimization to DoC staff, PhD students etc - just ask us!
- We are particularly keen to expand our research support, so next time you or your PhD students have a problem optimizing code, why not have a chat?
- You may wonder if we're smart enough to help (so do I:-)). Lloyd Kamara and Michael Breza have Imperial PhDs!
- Think of us as like Jon Bentley of Bell Labs, who wrote the ACM column Programming Pearls, based on his experiences of listening to his colleagues' tricky optimization problems.
- I once advised a student who requested 1TB of disk space and a year's CPU time.. who went away happy with 50GB more disk space (x20 shrunk) and a "summarise as you go" strategy that meant her final analysis took one day CPU time (x300 shrunk).

No 5: CSG write original software

- CSG members write, and maintain, quite a lot of original software, large and small. For instance:
- LEXIS - Linux Exam Invigilation System: Originally written in Ruby by Mike Wyer, I have completely rewritten this in threaded Perl, which runs approx 30x faster.
- TINT - Tint is Not Tar (sorry): a near-tar replacement used in our backup system that does more than Gnu tar does (checksums, sorted traversal and information gathering), in less time, and produces smaller archive files!
- Gary Corrall has recently joined us, and has implemented a flexible and attractive "repeating announcements" web interface for the new information displays beginning to appear on level 2, William Penney entrance hall soon.
- Finally, Maint: our Linux-based configuration management system, which, making extensive use of Postgres databases, automatically installs and configures a brand new Linux desktop or server for use in DoC, without human intervention!

- Our function is to serve this Dept. We only exist to serve you.
- Please tell us, what more do you think we should be doing?
- Not doing? Doing better? Doing differently?
- One thing we'd love to do better is to shrink the tail faster - i.e. manage to retire or reinstall old computers, especially those experimental PCs lurking in research labs, and ancient compute clusters. How could we do that?
- We can offer you virtual servers (currently using VMware ESX), and you can create yourself virtual machines on your desktop PC (currently using VirtualBox).
- When we have a Cloud Manager, we'll also build our production DoC private cloud, with the ability to create cloud instance VMs on the fly.
- In the meantime, is there anything more we should be doing re: virtualisation?
- Thank you very much for listening. Please send comments and suggestions to me.