Poster paper

Specialist Labs with Removable Hard Drives

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Courses in Operating Systems and Data Communications are well established (Sloan 2002, ACM 2001). The topics of Operating Systems and Networking are generally taught with two varying approaches, emphasising either a theoretical or an applied focus of the fields. Sometimes this choice is the result of careful pedagogical deliberation. At other times the choice is driven by resource availability (especially available funds). It is often difficult to expose students to an environment in which they can apply the theory that was covered in a lecture. The activities that may be undertaken are often incompatible with a teaching environment that is shared with other topics.

Dedicated labs are an option, and not uncommon (Sloan 2002). However they are expensive. The room and all equipment within are usually idle and unusable when not scheduled for the specific class. Various solutions have been suggested and implemented. These range from remotely accessing a lab (Sloan 2002, Yoo & Hovis 2004, Sivakumar & Robertson 2004) through to rapid deployment of disk images.

Our operating systems lecturers wished the students to experience practical activities that reflected current practice with OS administration, from patch management through to various file-systems while our Networking lecturers wanted each student to have their own system which they administer and maintain. All of the activities that were proposed had merit in that they supporting student's understanding of the theoretical concepts covered in lecture and extended the student's skill base within the field. However, numerous labs, each dedicated to a single paper was not feasible.

Our solution trialled in 2002 was to have one single room dedicated to Operating Systems and Networking papers. This room is supplied with standard desktop computers installed with removable hard-drive bays. Each paper that uses the room is given a different set of removable hard-drives.

The drives are used in various ways depending on the field of study at the time. For instance:

- IT202 Data Communications and Networking (introduction to networks) uses a standard installation of MS Win2kPro. Students alter the network configuration (ip address etc) and utilise various standard tools.
- IT210 Operating Systems: students install many various systems and alternate configurations to demonstrate the concepts covered in lecture.
- IT310 Networking: students install their own Linux system. Multiple streams share a single drive with the use of a boot loader to select their own system. The students then install and configure various tools such as DHCP, DNS, Web servers, Firewalls etc.

This approach is not cost-neutral. The extra drives and removable bays are not free (approx $300 for drive+bay). However the return on investment is considerable. We currently have the equivalent of three dedicated computer suites for the cost of an extra set of hard-drives per class. It has also resulted a very high room utilisation, which has it's own problems for students wishing to work outside of class time. We may have to expand this in future. Overall, this has proved very successful and has allowed activities that could not otherwise have been attempted.

References

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