Central Support for Unix/Linux Computing at Princeton

Sub-committee on Research Computing

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INTRODUCTION

Princeton is a research university, and computers are essential tools for most or all of the research programs on campus. The University's research productivity depends on these computers, and considerable effort and expense is involved in their purchase and operation. This subcommittee was convened by Provost Ostriker to examine "central support for research computing at Princeton", and to report to the Faculty Committee on Computing and the Library.

The campus network, and connections to outside networks, are crucial elements of the physical infrastructure for computing. Princeton's campus network is generally perceived as well-run, although the subcommittee did hear of some recent interruptions in network access which severely affected some researchers. While we offer no specific recommendations regarding network operations, we stress that a reliable high-bandwidth network is vital for both education and research at Princeton.

Computers require support, and providing highly skilled software support is costly. In some cases the cost is figured in salaries for professional systems administrators; in other cases the cost may be in time diverted from research. Our subcommittee focussed on issues related to computer software where we believe that steps can be taken which can both save money and enhance the effectiveness of research computing.

A number of different operating systems are used for research computing at Princeton, including Unix/Linux, Windows/NT, Macintosh, and DEC/VMS. Unix/Linux is the most widely-used operating system for research computing, and our subcommittee therefore focussed its attention on support for computing on Unix/Linux platforms.

Summary of Recommendations

The committee members are unanimous in their view that modest steps could be taken by CIT which could be highly beneficial to Unix users in both small and large departments, and which can result in overall cost savings to the University. In brief:

- We recommend that CIT maintain a library – "/usr/princeton" – of public domain and site-licensed software for common Unix platforms.
- We recommend that the supported platforms for /usr/princeton include Solaris, Irix, and Linux.
- We recommend steps to be taken by CIT to better coordinate licensing of software.
- We recommend that consideration be given to expansion of the DeSC program to include Linux as an option.
- We recommend that the hardware support available for DeSC hardware be made available for identical hardware running Linux.

These recommendations are expanded upon below.

RECOMMENDATIONS

1. Unix Software Maintenance and /usr/princeton.

For at least a decade, CIT has maintained "/usr/princeton" libraries of software for several Unix platforms. These libraries could be either remotely mounted or copied to local disk. At the present time four platforms are supported: SunOS 4.x, SunOS 5.x (=Solaris 2.x), Irix 4.x, and Irix 6.x. Unfortunately, the quality of this support has been uneven, with the result that local Unix systems administrators have felt it necessary to independently install and maintain many of the software packages which are, or should be, in /usr/princeton.

We recommend that CIT take responsibility for maintaining libraries of widely-used public domain software in /usr/princeton for several different Unix platforms. This would result in significant saving of effort across the various University departments and research groups which already use this software. In addition, it would make available University-wide a body of valuable software tools.

The software packages to be included in /usr/princeton would be determined by discussion at meetings of systems administrators. The SCAD (Support for Computing in Academic Departments) program provides a possible forum for such discussions because we expect that all substantial Unix user groups on campus will have at least one reprentative belonging to SCAD, but it would be helpful if the meetings where /usr/princeton and other issues are discussed could be open to *all* Unix systems administrators, including those not officially in the SCAD program. If the SCAD group becomes the forum, this group should actively solicit suggestions and comments from interested parties who may not be SCAD members.

This SCAD group, ideally expanded, can also provide the forum for feedback to CIT on issues arising in connection with /usr/princeton, such as policies regarding installation of new software releases on /usr/princeton.

In addition to the software actually installed on /usr/princeton, it would be valuable if the person or persons responsible for maintaining /usr/princeton maintained a web page with links to other web sites where one could find (1) software for "platforms" other than those selected for /usr/princeton support, and (2) additional freeware or shareware likely to be of interest to users at Princeton.

2. Platforms for /usr/princeton.

At this time, three Unix "platforms" are in wide use at Princeton:

- SunOS 5.x (=Solaris 2.x) on sparc cpus
- Irix 6.x on Silicon Graphics mips cpus
- Linux on Intel cpus

Other platforms include IBM/AIX and HP/AUX, but the three platforms listed above are by far the most prevalent. We recommend that CIT support /usr/princeton for all three of these platforms starting immediately. In coming years, the pattern of computer use will undoubtedly evolve, and it may become appropriate to terminate support of /usr/princeton for some platform, and/or begin supporting /usr/princeton for another platform. Such decisions could be taken based on discussions at meetings of systems administrators.

3. Software Licensing.

It would be very helpful to science and engineering departments and research groups if there were a way to easily find out

- what software licenses now exist at the university, and
- what level of interest exists for getting additional licenses.

This would make it easier to coordinate volume discounts on licenses, and, in some cases, to arrange university-wide site licenses.

We recommend that this information on licenses be made available on a web page managed by CIT. When individuals or departments express interest in the possibility of new or additional licenses, CIT should take the lead in alerting other potentially interested parties so that volume discounts or site licenses can be considered.

4. Linux and the DeSC program.

Linux is emerging as a widely-used version of Unix. At this time there are over 600 Linux systems registered at Princeton, and the number is growing rapidly. One of the advantages of Linux is that it makes it possible to take advantage of the economies of Intel-based computing and a full-featured operating system with a complete set of high quality software tools available gratis. We recommend that consideration be given to expanding the university DeSC program to include the Linux operating system as an option. This would benefit the university in several ways:

- It would encourage standardization among the many Unix/Linux users at Princeton.
- It would permit the same economies of centralized support of both hardware and software which are anticipated for the Windows/NT DeSC systems.
- It would permit use of idle distributed computing resources under CIT coordination and scheduling.

5. Hardware Support for DeSC Hardware.

We recommend that hardware support available through the DeSC program be extended to identical hardware running Linux, whether or not this hardware is part of the DeSC program. We assume that such hardware support would be very attractively priced compared to other hardware support options. If this hardware support is perceived as cost-effective, it should encourage voluntary "standardization" of Intel-based hardware. Increased purchases of common hardware should also result in better pricing.